



PERS Board Meeting

OREGON PUBLIC EMPLOYEES RETIREMENT SYSTEM

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July 31, 2020

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Introduction

- Today we will review summary valuation results for:
 - Tier 1/Tier 2 & OPSRP retirement programs
 - Retiree Health Insurance Account (RHIA), and
 - Retiree Health Insurance Premium Account (RHIPA)
- Also, we will ask the Board to adopt methodology to reflect the offset for member redirect contributions in the 2021-2023 rate calculations
- Formal, detailed results will be presented in our forthcoming December 31, 2019 System-Wide Actuarial Valuation Report
 - All work is based on asset levels and member demographics at year-end 2019
- This valuation will be the basis for 2021-2023 employer contribution rates presented for adoption at the October 2, 2020 board meeting
 - Employers' rates will be in the October meeting's materials
- Shortly after that meeting, we will provide PERS staff with detailed reports for each employer, and PERS will deliver those reports to employers

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Valuation Process and Timeline

- Actuarial valuations are conducted annually
 - Alternate between “rate-setting” and “advisory” valuations
 - This valuation as of 12/31/2019 is rate-setting
- Board adopts contribution rates developed in rate-setting valuations, and those rates go into effect 18 months after the valuation date

Valuation Date	Employer Contribution Rates
12/31/2017	July 2019 – June 2021
12/31/2019	July 2021 – June 2023
12/31/2021	July 2023 – June 2025

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Two-Year Rate-Setting Cycle

LEGEND

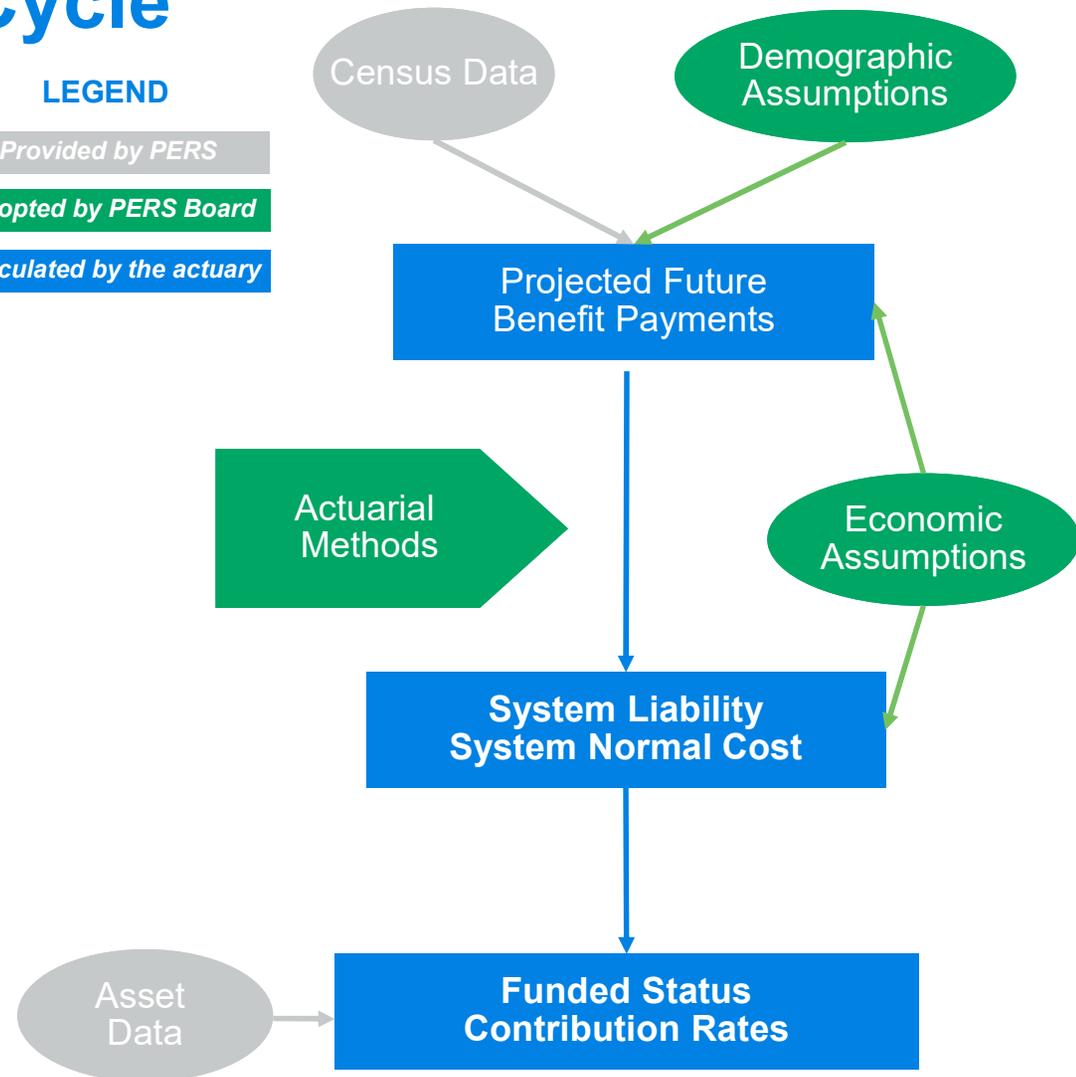
Provided by PERS

Adopted by PERS Board

Calculated by the actuary

- July 2019: Assumptions & methods adopted by Board in consultation with the actuary
- October 2019: System-wide 12/31/18 actuarial valuation results
- December 2019: Advisory 2021-2023 employer-specific contribution rates
- July 2020: System-wide 12/31/19 actuarial valuation results**
- October 2020: Disclosure & adoption of employer-specific **2021-2023 contribution rates**

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Board Objectives - Methods & Assumptions

- Transparent
- Predictable and stable rates
- Protect funded status
- Equitable across generations
- Actuarially sound
- GASB compliant

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Some of the objectives can conflict, particularly in periods with significant volatility in investment return or projected benefit levels. Overall system funding policies should seek an appropriate balance between conflicting objectives.

Changes Since the Last Rate-Setting Valuation

- The 12/31/2017 rate-setting actuarial valuation developed 2019-2021 contribution rates
- Since the 12/31/2017 rate-setting valuation:
 - The PERS Board adopted new assumptions and methods from the 2018 Experience Study
 - Cumulative 2018 and 2019 asset returns were less than assumed, generating approximately a \$0.4 billion actuarial investment loss over the biennium
 - System payroll increased 14% from 12/31/2017 to 12/31/2019
 - Senate Bill 1049 was signed into law in June 2019
 - Made a number of changes, many centered on funding/financing of the System's benefits

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Changes Since the Last Advisory Valuation

- The 12/31/2019 rate-setting valuation will develop final 2021-2023 rates and reflects the following changes since the 12/31/2018 advisory valuation:
 - 2019 OPERF regular account return of +13.56%, which produced a single-year actuarial investment gain of \$3.5 billion
 - System payroll increase of 6% from 12/31/2018 to 12/31/2019
- The 12/31/2018 advisory actuarial valuation already reflected:
 - Updated assumptions and methods from the 2018 Experience Study
 - Single-year actuarial investment loss of \$3.9 billion for experience during 2018

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Senate Bill 1049

- SB 1049 provisions relevant to valuation and funding:
 - Redirects portion of member contribution to fund DB benefits starting in July 2020
 - Employer contributions paid for rehired retirees effective January 2020
 - One-time re-amortization of Tier 1/Tier 2 UAL over 22 years
 - Salary for benefits limited to \$195,000 (indexed) starting in 2020
 - Only change affecting projected DB benefits; effect is small at system level
- Of these, Tier 1/Tier 2 UAL re-amortization has biggest impact on 2021-23 contribution rates
- Member redirect contributions are expected to serve as an offset to employer rates effective with 2021-2023 rates
- In this presentation, “**total rates**” are rates prior to this offset; “**employer rates**” are after reflecting the offset

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Member redirect offset - Introduction

- Treatment of member redirect contributions in rate-setting process was discussed with PERS Board and staff last year
 - Discussions occurred after experience study published, so was not formally included in Board adoption of actuarial methods and assumptions
 - However, treatment was reflected in December 31, 2018 advisory valuation
- Today, we request adoption of methodology for treating member redirect contributions in developing 2021-2023 contribution rates
- Background:
 - SB 1049 redirected portion of member contributions to Employee Pension Stability Accounts (EPSA)
 - Redirected amount: 2.50% of salary for Tier 1/Tier 2 and 0.75% for OPSRP
 - Both only apply to members with salary greater than \$2,500 in a month (indexed in future years)

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Member redirect offset – Methodology part 1

- Statutory redirected contribution levels vary by member
 - 2.50% of payroll for Tier 1/Tier 2 members above the monthly pay threshold
 - 0.75% of payroll for OPRSP members above the monthly pay threshold
 - No redirection for members below the monthly pay threshold
- At a system average level, the pay threshold will reduce the amount of redirected contributions by about **0.05%** of payroll
- Part 1 of the requested methodology for adoption:
 - Adopted employer contribution rates reflect system-average member redirect offset rates of:
 - **2.45%** of Tier 1/Tier 2 payroll
 - **0.70%** of OPSRP payroll
- This approach fits with existing framework for collecting employer contributions

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Member redirect offset – Methodology part 2

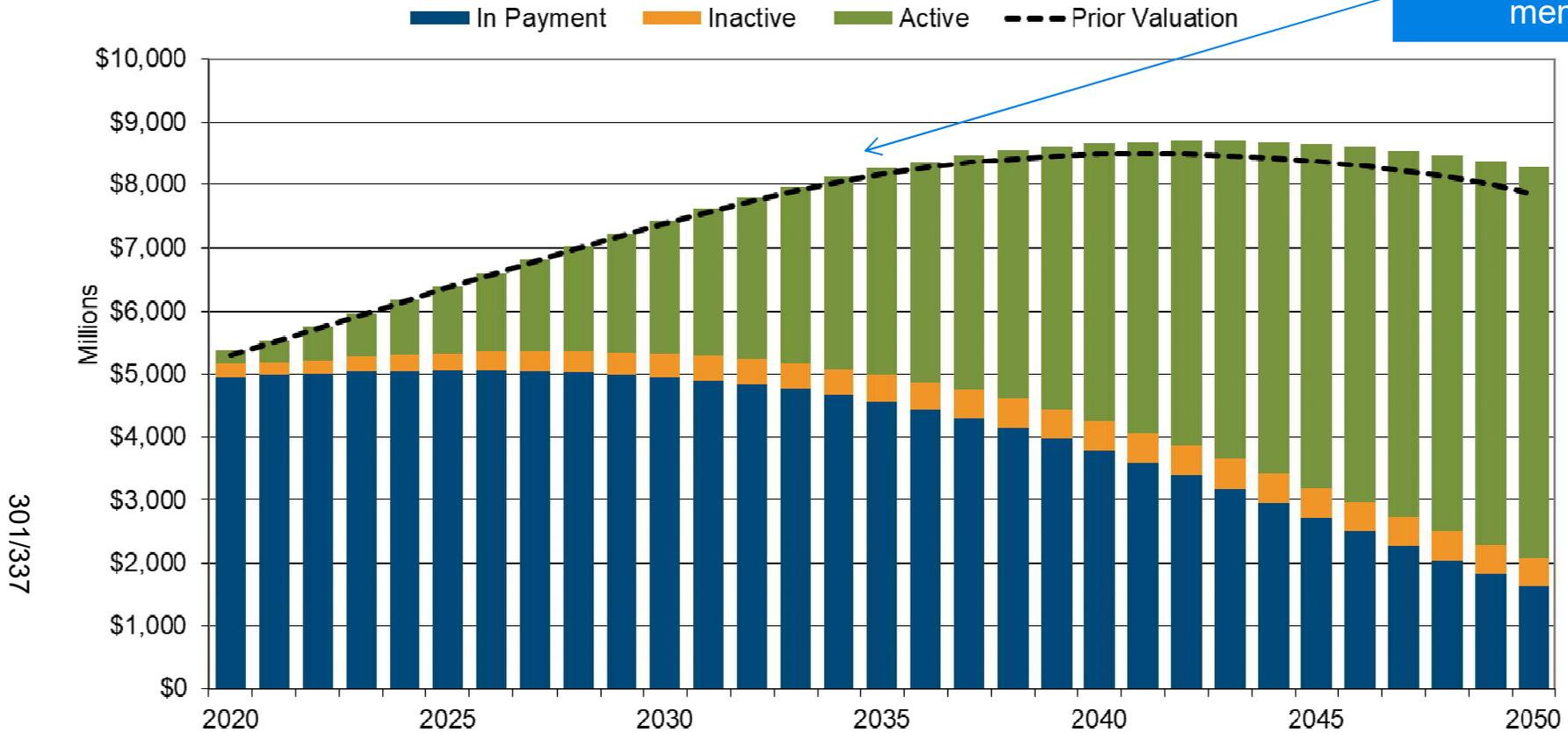
- During the biennium the member redirect contribution could be eliminated via either judicial or legislative action
- This possibility can be addressed by Board use of a “total contribution rate” structure
 - The Board adopts the total contribution rate; the employer contribution rate is found by subtracting the member redirect offset rate (2.45% or 0.70%, per the prior slide)
- If member redirect was eliminated, under this structure
 - The member redirect offset rate would decrease to zero
 - The employer rate would increase to the total contribution rate
- Part 2 of the methodology requested for adoption:
 - Adopted rates reflect a total contribution rate and a member redirect offset rate, which are used to determine the employer rate

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Projected Benefit Payments

Tier 1/Tier 2 & OPSRP Expected Benefit Payments
by status as of 12/31/2019

By 2034, projected to be \$8 billion in benefit payments to current members



As illustrated by the dotted line, projected benefit payments did not change significantly between the prior and current actuarial valuation



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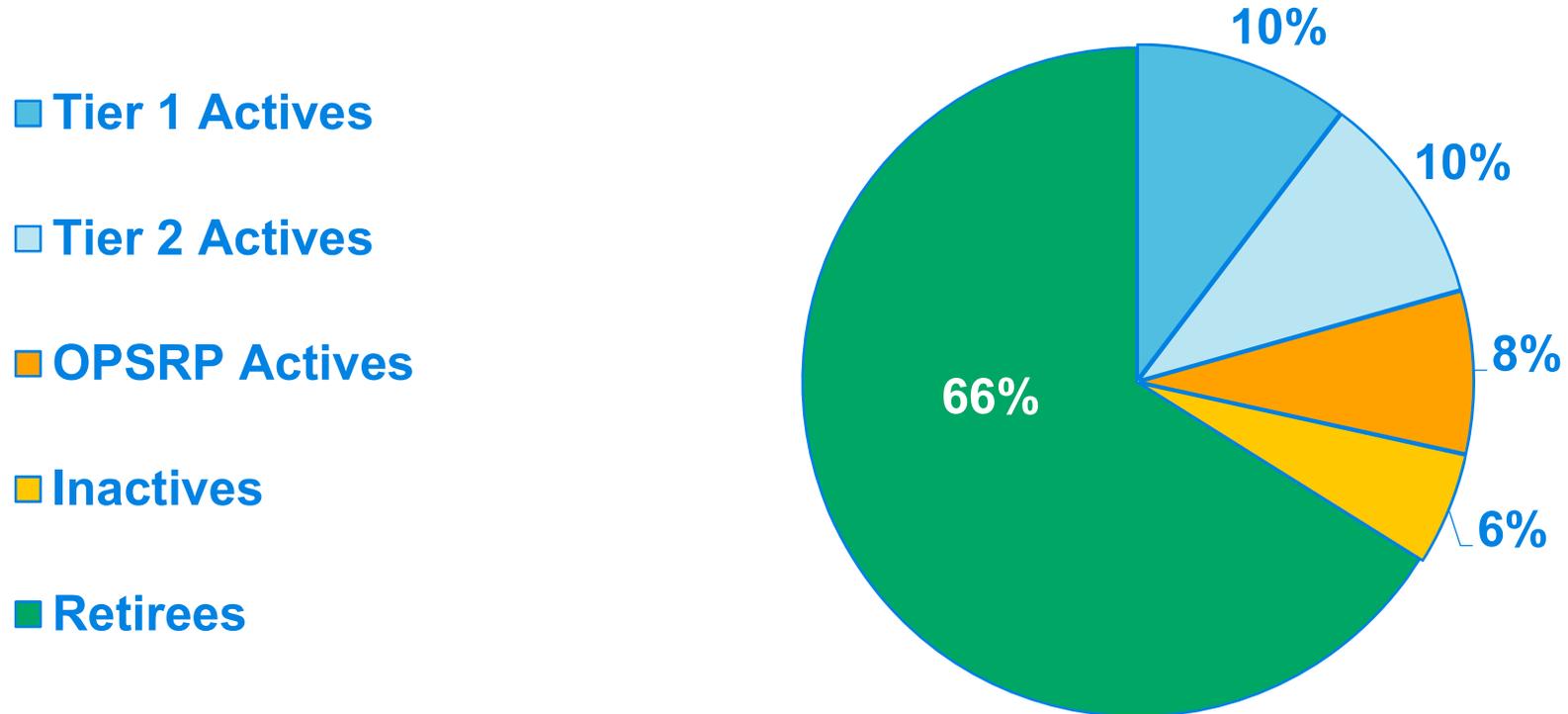
Funded Status & Unfunded Actuarial Liability (UAL)

System-total Pension Funded Status (\$ billions)			
<i>Valuation date:</i>	12/31/2017	12/31/2018	12/31/2019
<i>Assumed return:</i>	7.20%	7.20%	7.20%
Actuarial liability	\$ 84.1	\$ 86.6	\$ 89.4
Assets (excluding side accounts)	<u>61.8</u>	<u>59.6</u>	<u>64.8</u>
UAL (excluding side accounts)	\$ 22.3	\$ 27.0	\$ 24.6
Funded status (excluding side accounts)	73%	69%	72%
Side account assets	<u>\$ 5.6</u>	<u>\$ 5.2</u>	<u>\$ 5.5</u>
UAL (including side accounts)	\$ 16.7	\$ 21.8	\$ 19.1
Funded status (including side accounts)	80%	75%	79%

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Division of Actuarial Accrued Liability by Category

12/31/2019 Tier 1/Tier 2 and OPSRP Actuarial Liability



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Accrued Actuarial Liability represents the present value of projected future benefits allocated to service performed through December 31, 2019

Sources of 2019 UAL (Excl. Side Account) Change

(\$ billions)	UAL Increase
Expected UAL increase/(decrease) during 2019	\$ 0.6
2019 actual investment performance	(3.5)
Actual demographic experience different than assumed	<u>0.5</u>
Actual UAL increase/(decrease) during 2019	(\$ 2.4)

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 The **expected UAL increase/(decrease)** is the change, based on 12/31/2018 valuation results, projected to occur during 2019 if actual 2019 experience followed that valuation's assumptions; this is primarily due to the effects of the rate collar, the level of employer rates, and the timing and magnitude of employer rate increases
- The 2019 investment gain is about 6.4% of assets, reflecting actual 2019 OPERF returns of approximately +13.6% compared to the assumed 7.20% return
- The increase from actual demographic experience different than assumed was largely the result of individual member salary increase experience versus assumption

Tier 1/Tier 2 Rate Pool Funded Status and UAL

Amounts Shown as of December 31, 2019

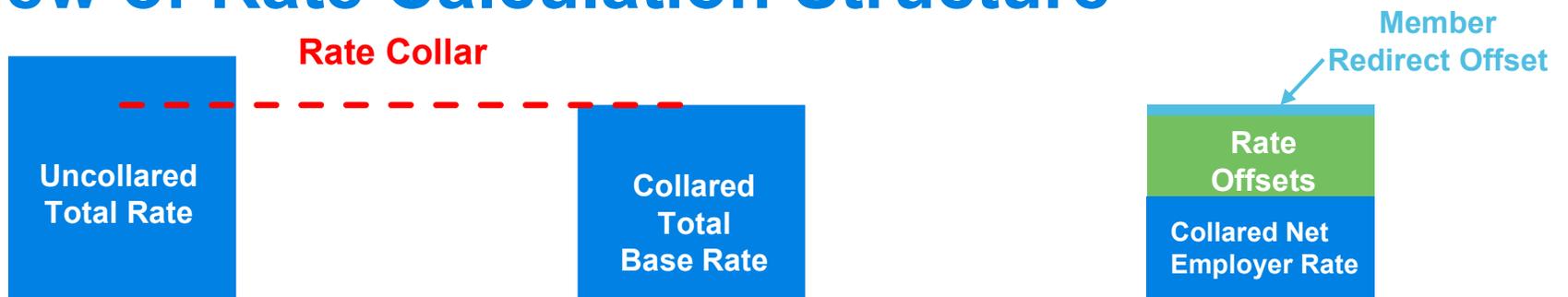
(\$ billions) <i>totals may not add due to rounding</i>	SLGRP	School Districts
Actuarial liability	\$ 44.1	\$ 30.3
Assets (excluding side accounts)	<u>31.4</u>	<u>22.4</u>
UAL (excluding side accounts)	\$ 12.7	\$ 7.9
Funded status (excluding side accounts)	71%	74%
Projected 2020 payroll	\$ 6.8	\$ 3.7
Assets to payroll ratio (excl. side accounts)	4.6x	6.0x
UAL to payroll ratio (excl. side accounts)	1.9x	2.1x
Side account assets	\$ 2.7	\$ 2.7
UAL (including side accounts)	\$ 10.1	\$ 5.2
Funded status (including side accounts)	77%	83%

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Overview of Rate Calculation Structure

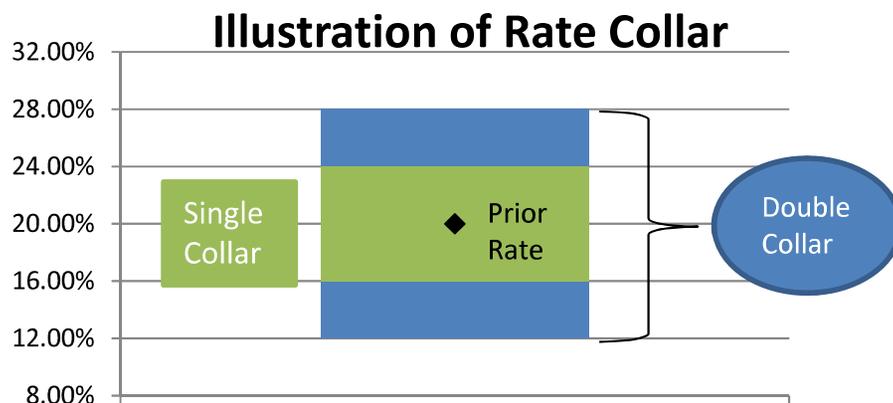


- The ***uncollared total rate*** is the theoretical contribution rate to reach 100% funded status over a specified amortization period if:
 - Contributions at that rate started on the actuarial valuation date, and
 - Actual future experience mirrors the actuarial valuation's assumptions, and
 - The normal cost rate does not change in subsequent years
- The rate collar sets a biennium's ***collared total base rate***, limiting the base rate change for a single biennium when there is a large change in the uncollared rate
- ***Member redirect offset*** reflects estimated portion of collared total base rate paid by redirected member contributions
- Employers pay the ***collared net employer rate***, which reflects the member redirect offset and any rate offset adjustments from:
 - Side account rate offsets for employers with side accounts
 - SLGRP charges/offsets (e.g., Transition Liability/Surplus)

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Current Rate Collar Design

- The maximum change typically permitted by the rate collar is:
 - 20% of the rate currently in effect (3% of payroll minimum collar width)
- If funded status is 60% or lower, the width of the rate collar doubles
 - 40% of rate currently in effect (6% of payroll minimum collar width)
- If the funded status is between 60% and 70%, the rate collar's width is pro-rated between the single-collar and double-collar widths



- Collars limit the biennium to biennium increase in the UAL Rate for each individual employer (or experience-sharing pool, if applicable)

Comments on 2021 – 2023 Rates

- No single employer pays the system-wide average rate
 - Individual employer rates reflect either rate pool or independent employer-specific results, not the system-wide average
 - Relative proportion of Tier 1/Tier 2 vs. OPSRP payroll also varies by employer
- Employers in a rate pool do not pay the pool average rate
 - Actual rates reflect employer-specific side account rate offsets and/or any remaining SLGRP charges/offsets
 - SLGRP normal cost rates are specific to an employer's workforce mix of member tier and job classification
- Rates shown do not include the effects of:
 - Individual Account Plan (IAP) contributions
 - Rates for the RHIA & RHIPA retiree healthcare programs
 - Debt service payments on pension obligation bonds

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School District Weighted Total* Pension-Only Rates

2009-2011
rates set prior to economic downturn

2011-2013
rates first to reflect -27% return in 2008

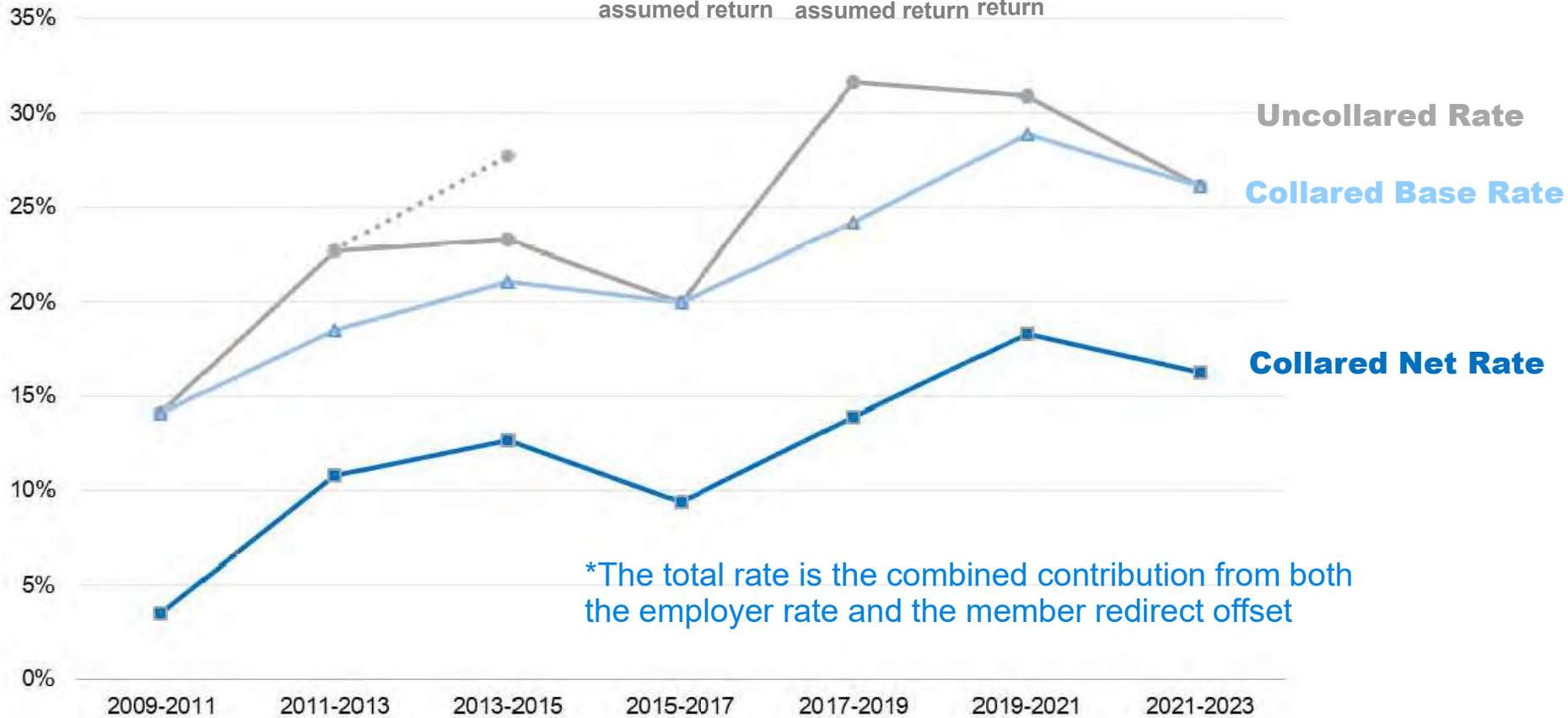
2013-2015
shown before (dotted line) and after (solid line) legislated changes

2015-2017 set pre-Moro reflecting 2012 (+14.3%) & 2013 (+15.6%) returns, first decrease in assumed return

2017-2019 set post-Moro, reflecting 2015 return (+2.1%) and second decrease in assumed return

2019-2021 reflects 2017 return (+15.4%) and third decrease in assumed return

2021-2023 reflects legislatively-mandated Tier 1/Tier 2 UAL reamortization; rates shown are total rates before reduction for effect of SB 1049 member redirect offset contributions.



*The total rate is the combined contribution from both the employer rate and the member redirect offset

Assumed Return:

8.00%

8.00%

8.00%

7.75%

7.50%

7.20%

7.20%



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Uncollared Total Pension Rates – School Districts

Excludes Retiree Health Care, IAP Contributions, Rate Collar, Side Accounts

	12/31/2017 Valuation 2019 – 2021 Final Rates			12/31/2019 Valuation 2021 – 2023 Final Rates		
	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ¹	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ¹
Total Normal Cost	13.79%	8.40%	10.75%	13.45%	8.64%	10.35%
Tier 1/Tier 2 UAL	18.66%	18.66%	18.66%	14.09%	14.09%	14.09%
OPSRP UAL	<u>1.45%</u>	<u>1.45%</u>	<u>1.45%</u>	<u>1.69%</u>	<u>1.69%</u>	<u>1.69%</u>
Uncollared Total Rate	33.90%	28.51%	30.86%	29.23%	24.42%	26.13%
Increase/(Decrease)				(4.67%)	(4.09%)	(4.73%)

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The pool-average collared base and net rates for 2021-2023 are shown on subsequent slides

Rates shown on this slide are “total” rates, and do not incorporate treatment of redirected member contributions as an offset

¹ Weighting based on pool payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date



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Collared Total Pension Base Rates – School Districts

Excludes Retiree Health Care & IAP Contributions, Side Account Offsets

	12/31/2017 Valuation 2019 – 2021 Final Rates			12/31/2019 Valuation 2021 – 2023 Final Rates		
	Payroll			Payroll		
	Tier 1 / Tier 2	OPSRP	Weighted Average ¹	Tier 1 / Tier 2	OPSRP	Weighted Average ¹
Uncollared Total Rate	33.90%	28.51%	30.86%	29.23%	24.42%	26.13%
Collar Limitation	<u>(1.93%)</u>	<u>(1.93%)</u>	<u>(1.93%)</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
Collared Total Base Rate	31.97%	26.58%	28.93%	29.23%	24.42%	26.13%
Increase/(Decrease)				(2.74%)	(2.16%)	(2.80%)

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The 2021 – 2023 total base rates decreased – rather than increased as shown in the 12/31/2018 advisory valuation – due to the actuarial investment gain from returns during 2019

Rates shown on this slide are “total” rates, and do not incorporate treatment of redirected member contributions as an offset

¹ Weighting based on pool payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date



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Collared Employer Pension Rates – School Districts

Excludes Retiree Health Care & IAP Contributions

	12/31/2017 ¹ Valuation 2019 – 2021 Final Rates			12/31/2019 ¹ Valuation 2021 – 2023 Final Rates		
	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ²	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ²
Collared Total Base Rate	31.97%	26.58%	28.93%	29.23%	24.42%	26.13%
Member redirect offset	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>(2.45%)</u>	<u>(0.70%)</u>	<u>(1.25%)</u>
Collared Base Employer Rate	31.97%	26.58%	28.93%	26.78%	23.72%	24.88%
Side Account (Offset)	<u>(10.66%)</u>	<u>(10.66%)</u>	<u>(10.66%)</u>	<u>(9.93%)</u>	<u>(9.93%)</u>	<u>(9.93%)</u>
Collared Net Employer Rate	21.31%	15.92%	18.27%	16.85%	13.79%	14.95%
Increase/(Decrease)				(4.46%)	(2.13%)	(3.32%)

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Rates vary by employer, as only some employers have side accounts

Weighted-average net employer rates decreased more than total base rates, due to the introduction of the member redirect offset

¹ For this exhibit, adjustments are assumed not to be limited due to an individual employer reaching a 0.00% contribution rate

² Weighting based on pool payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date



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School Districts Rate Summary

Weighted Average Total Rates (Tier 1/Tier 2 and OPSRP)

	Final 2019 - 2021	Final 2021 - 2023	Increase/ (Decrease)
Uncollared Total Base Rate	30.86%	26.13%	(4.73%)
Collared Total Base Rate	28.93%	26.13%	(2.80%)
Collared Base Employer Rate	28.93%	24.88%	(4.05%)
Collared Net Employer Rate	18.27%	14.95%	(3.32%)

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- The collared total base rate for School Districts is equal to the uncollared total base rate
- The uncollared total base rate decrease was primarily due to the re-amortization of Tier 1/Tier 2 UAL per SB 1049
- The collared base employer rate decrease was larger than the decrease in the collared total base rate due to the offset to employer rates for member redirect contributions

SLGRP Rate Summary

Weighted Average Total Rates (Tier 1/Tier 2 and OPSRP)

	Final 2019 - 2021	Final 2021 - 2023	Change
Uncollared Total Base Rate	28.30%	25.54%	(2.77%)
Collared Total Base Rate	23.62%	25.54%	1.91%
Collared Base Employer Rate	23.62%	24.29%	0.66%
Collared Net Employer Rate	17.94%	18.61%	0.66%

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- The collared total base rate for the SLGRP is equal to the uncollared total base rate
- The uncollared base rate decrease was primarily due to the re-amortization of Tier 1/Tier 2 UAL per SB 1049
- The collared total base rate increase was driven by the existence of a “collared off” rate increase in the prior biennium, an outcome of the scheduled systematic rate modifications to amortize the UAL over time if future experience follows assumptions

System-Wide Rate Summary

Weighted Average Total Rates (Tier 1/Tier 2 and OPSRP)

	Final 2019 - 2021	Final 2021- 2023	Change
Uncollared Total Base Rate	29.22%	25.91%	(3.31%)
Collared Total Base Rate	25.23%	25.82%	0.59%
Collared Base Employer Rate	25.23%	24.57%	(0.66%)
Collared Net Employer Rate	18.32%	17.93%	(0.39%)

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- System-wide rates are the payroll-weighted average of rates for School Districts, the SLGRP, and independent employers that do not pool their Tier 1/Tier 2 liability experience
- At a system-wide level the uncollared total base rate is 0.09% higher than the collared total base rate, reflecting that some independent employers have their 2021-2023 rate increases limited by the rate collar
- The collared total base rate increase was driven by the existence of a “collared off” rate increase in the prior biennium, an outcome of the scheduled systematic rate modifications to amortize the UAL over time if future experience follows assumptions



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Projected 2021-2023 Total Contributions

(\$ millions)	Projected 2019-21 Payroll*	(A) Projected 2019-21 Contribution	Projected 2021-23 Payroll*	(B) Projected 2021-23 Total Contribution	(B - A) Projected Total Contribution Increase / (Decrease)
State Agencies	\$ 6,910	\$ 1,185	\$ 7,400	\$ 1,480	\$ 295
School Districts	7,485	1,335	8,015	1,275	(60)
All Others	<u>8,680</u>	<u>1,585</u>	<u>9,300</u>	<u>1,910</u>	<u>325</u>
Total	\$23,075	\$ 4,105	\$24,715	\$ 4,665	\$ 560

- Collared net rates are used to project 2021-2023 contributions
- The advisory valuation projected a total contribution increase of \$1,160 million between the 2019-21 and 2021-23 biennia, compared to a projected \$560 million increase in this valuation
- Projected 2019-21 contributions increased by \$100 million compared to prior estimate (based on 12/31/2018 valuation) as a result of a larger-than-expected increase in system payroll

* Assumes total payroll grows at 3.50% annually based on 12/31/2019 active member census. The collared net rate applied to this payroll reflects the projected change over time in payroll composition as new OPSRP members are hired to replace retiring Tier 1/Tier 2 members

Factors Driving the Projected Contribution Increase

- The projected \$0.6 billion 2021 - 2023 total contribution increase consists of:
 - \$0.3 billion - system-wide average increase in contributions of 0.86% of payroll, consisting of a 0.39% of payroll decrease in the collared net employer rate and the addition of a 1.25% of payroll contribution from member redirect
 - Includes impact on average contribution rate of projected change over time in payroll distribution between Tier 1/Tier 2 and OPSRP
 - \$0.3 billion - projected system payroll growth between 2019-2021 and 2021-2023
 - Assumed system payroll growth of 3.5% per year / 7.1% per biennium means the collared net rate increase is applied to a larger payroll base
 - Assumes no change in payroll distribution between Tier 1/Tier 2 and OPSRP
- 3177837
- Redirected member contributions will serve to offset employer contribution rates in the 2021-2023 biennium

- This can either partially or fully mitigate an employer's effective increase
- An estimate of this effect is shown on the next slide

Projected Split of 2021-2023 Total Contributions

(\$ millions)	(A) Projected 2019-21 Contribution	(B) Projected 2021-23 Total Contribution	(C) Estimated Member Redirected Contributions*	(B - C) Projected 2021-23 Employer Contribution	(B - C - A) Projected Employer Contribution Increase / (Decrease)
State Agencies	\$ 1,185	\$ 1,480	\$ 85	\$ 1,395	\$ 210
School Districts	1,335	1,275	100	1,175	(160)
All Others	<u>1,585</u>	<u>1,910</u>	<u>110</u>	<u>1,800</u>	<u>215</u>
Total	\$ 4,105	\$ 4,665	\$ 295	\$ 4,370	\$ 265

* Reflects member redirect offset of 2.45% of payroll for Tier 1 and Tier 2, and 0.70% for OPSRP; the statutory 2.50% and 0.75% redirection levels were adjusted downward by 0.05% to estimate the anticipated effect of members below the statutory pay threshold who will not have contributions redirected

12/31/2019 Retiree Health Care Valuations

- Retiree health liabilities combined are less than 1% of the pension liability
- Two separate health care benefit subsidies are valued:
 - RHIA provides a \$60 per month subsidy toward healthcare premiums for Medicare-eligible Tier 1/Tier 2 retirees
 - RHIPA provides Tier 1/Tier 2 state employees who retire prior to age 65 with an alternative to PEBB coverage until they reach Medicare eligibility
- OPSRP retirees are not eligible for either subsidy
- The combination of a 10-year UAL amortization period and recent experience has improved RHIA funded status to over 100%
 - The RHIA UAL rate is limited to zero (rather than negative), consistent with Board decision with 12/31/2017 rate-setting valuation
- RHIPA funded status has improved significantly in recent years due to both increased contributions and lower participation levels

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12/31/2019 Retiree Health Care Valuations

UAL and 2021-23 Contribution Rates

	RHIA		RHIPA *	
	12/31/2018	12/31/2019	12/31/2018	12/31/2019
Actuarial Liability	\$ 412	\$ 404	\$ 63	\$ 59
Assets	<u>571</u>	<u>644</u>	<u>39</u>	<u>52</u>
UAL	\$ (159)	\$ (240)	\$ 24	\$ 7
Funded Status	139%	159%	61%	87%
Normal Cost Rate	0.05%	0.05%	0.11%	0.11%
UAL Rate	<u>0.00%</u>	<u>0.00%</u>	<u>0.22%</u>	<u>0.17%</u>
Total Rate	0.05%	0.05%	0.33%	0.28%

* State Agencies, OUS, and State Judiciary are the only employers who pay RHIPA rates

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Wrap Up / Valuation Next Steps

- Board adoption of methodology for treatment of member redirect in 2021-2023 contribution rate calculations
 - Part 1 – to reflect the anticipated 0.05% of payroll effect of the statutory pay threshold, adopted employer contribution rates reflect system-average member redirect offset rates of **2.45%** of Tier 1/Tier 2 payroll and **0.70%** of OPSRP payroll
 - Part 2 – Adopted rates reflect a total contribution rate and a member redirect offset rate, which are used to determine the employer rate
- Valuation next steps
 - Provide employer-specific rates for adoption at October 2, 2020 meeting
 - Issue system-wide December 31, 2019 actuarial valuation report
 - Prepare employer-specific rate-setting valuation reports
 - PERS to distribute to employers

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Appendix

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Certification

This presentation summarizes key preliminary results of an actuarial valuation of the Oregon Public Employees Retirement System (“PERS” or “the System”) as of December 31, 2019, for the Plan Year ending December 31, 2019. The results are preliminary in nature and may not be relied upon to, for example, prepare the System’s Consolidated Annual Financial Report (CAFR). The reliance document will be the forthcoming formal December 31, 2019 System-Wide Actuarial Valuation Report.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the System’s staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan’s funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. Our annual financial modeling presentation to the PERS Board should be referenced for additional analysis of the potential variation in future measurements. Our forthcoming December 31, 2019 Actuarial Valuation Report will provide additional discussion of the System’s risks. The PERS Board has the final decision regarding the appropriateness of the assumptions.

Actuarial computations presented in this report are for purposes of presenting advisory contribution rates consistent with the adopted funding policy the System. The computations prepared for other purposes may differ as disclosed in our report. The calculations in the enclosed report have been made on a basis consistent with our understanding of the System’s funding requirements and goals. The calculations in this report have been made on a basis consistent with our understanding of the plan provisions described in the appendix of this report. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.



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- (a) The System may provide a copy of Milliman's work, in its entirety, to the System's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the System.
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The consultants who worked on this assignment are actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel. The actuaries are independent of the plan sponsors. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the principles prescribed by the Actuarial Standards Board and the Code of Professional Conduct and Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States of the American Academy of Actuaries. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein. Assumptions related to the claims costs and healthcare trend (cost inflation) rates for the retiree healthcare program discussed in this report were determined by Milliman actuaries qualified in such matters.



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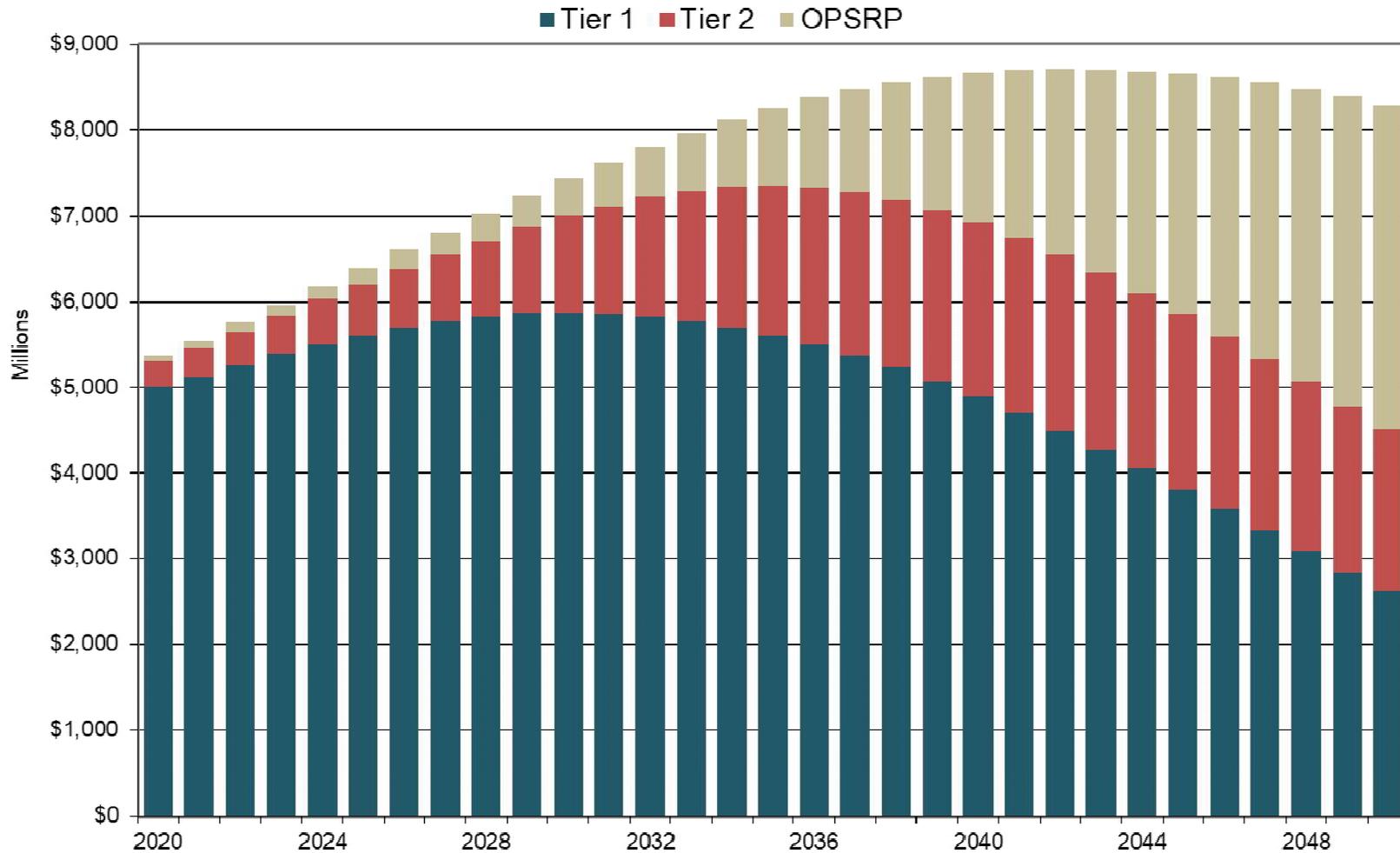
Data Exhibits

	December 31, 2019				December 31, 2018
	Tier 1	Tier 2	OPSRP	Total	Total
Active Members					
Count	17,317	32,191	131,249	180,757	176,763
Average age	56.9	52.2	43.0	46.0	46.1
Average total service	26.5	18.8	6.7	10.7	10.9
Average prior year covered salary	\$84,259	\$76,946	\$55,279	\$61,914	\$59,632
Inactive Members¹					
Count	11,237	14,189	21,366	46,792	45,945
Average age	60.8	54.7	47.8	53.0	53.1
Average monthly deferred benefit	\$2,192	\$833	\$439	\$980	\$983
Retired Members and Beneficiaries¹					
Count	129,711	16,718	6,549	152,978	148,893
Average age	73.0	68.2	67.6	72.2	72.0
Average monthly benefit	\$2,995	\$1,138	\$550	\$2,687	\$2,634
Total Members	158,265	63,098	159,164	380,527	371,601

¹ Inactive and Retiree counts are shown by lives within the system. In other words, a member is counted once for purposes of this exhibit, regardless of their service history for different rate pools. This contrasts with the method used to count inactive participants in some of the later exhibits of this report.

Projected Benefit Payments by Tier

Tier 1/Tier 2 & OPSRP Expected Benefit Payments
by Tier as of 12/31/2019



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System-average Weighted Total* Pension-Only rates

2009-2011
rates set prior
to economic
downturn

2011-2013
rates first to
reflect -27%
return in 2008

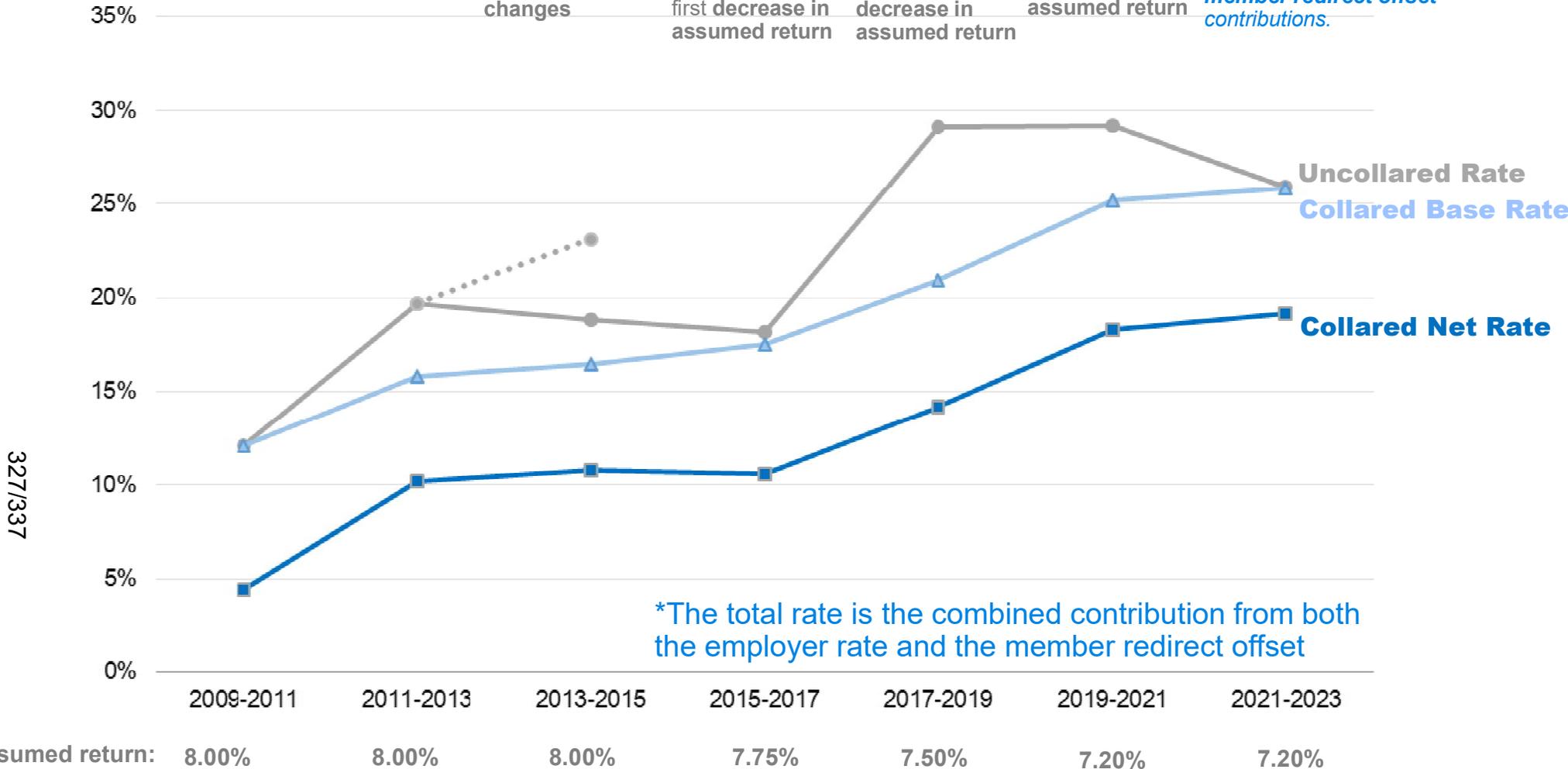
2013-2015
shown before
(dotted line)
and after (solid
line) legislated
changes

2015-2017 set
pre-Moro
reflecting 2012
(+14.3%) & 2013
(+15.6%) returns,
first decrease in
assumed return

2017-2019 set
post-Moro,
reflecting 2015
return (+2.1%)
and second
decrease in
assumed return

2019-2021
reflects +15.4%
return in 2017
and third
decrease in
assumed return

2021-2023 reflects +0.48%
return in 2018 and +13.6% return
in 2019; rates shown are *before
reduction for effect of SB 1049
member redirect offset
contributions.*



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Funded Status and UAL by Program

Pension Funded Status (\$ billions) at 12/31/2019

totals may not add due to rounding

	Tier 1/Tier 2	OPSRP	Combined
Actuarial liability	\$81.4	\$8.1	\$89.4
Assets (excluding side accounts)	<u>\$58.7</u>	<u>\$6.2</u>	<u>\$64.8</u>
UAL (excluding side accounts)	\$22.7	\$1.9	\$24.6
Funded status (excluding side accounts)	72%	77%	72%
Side account assets			<u>\$5.5</u>
UAL (including side accounts)			\$19.1
Funded status (including side accounts)			79%

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Uncollared Total Pension Rates – SLGRP Average

Excludes Retiree Health Care, IAP Contributions, Rate Collar, Side Accounts

	12/31/2017 Valuation 2019 – 2021 Final Rates			12/31/2019 Valuation 2021 – 2023 Final Rates		
	Payroll		Weighted Average ¹	Payroll		Weighted Average ¹
	Tier 1 / Tier 2	OPSRP		Tier 1 / Tier 2	OPSRP	
Normal Cost	15.83%	8.92%	11.74%	15.41%	9.16%	11.18%
Tier 1/Tier 2 UAL	15.11%	15.11%	15.11%	12.67%	12.67%	12.67%
OPSRP UAL	<u>1.45%</u>	<u>1.45%</u>	<u>1.45%</u>	<u>1.69%</u>	<u>1.69%</u>	<u>1.69%</u>
Uncollared Total Rate	32.39%	25.48%	28.30%	29.77%	23.52%	25.54%
Increase				(2.62%)	(1.96%)	(2.77%)

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The pool-average advisory collared net rates which employers would be charged are shown on subsequent slides

Rates shown on this slide are “total” rates, and do not incorporate any treatment of redirected member contributions as an offset

Rates vary, sometimes widely, for employers in the SLGRP

¹ Weighting based on pool payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date.



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Collared Total Pension Base Rates – SLGRP Average

Excludes Retiree Health Care & IAP Contributions, Side Account Offsets

	12/31/2017 ¹ Valuation 2019 – 2021 Final Rates			12/31/2019 ¹ Valuation 2021 – 2023 Final Rates		
	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ²	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ²
Uncollared Total Rate	32.39%	25.48%	28.30%	29.77%	23.52%	25.54%
Collar Limitation	<u>(4.68%)</u>	<u>(4.68%)</u>	<u>(4.68%)</u>	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>
Collared Total Base Rate	27.71%	20.80%	23.62%	29.77%	23.52%	25.54%
Increase				2.06%	2.72%	1.91%

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The actual increase in total base rates is smaller than shown in the 12/31/2018 advisory valuation due to investment gains during 2019

Rates shown on this slide are “total” rates, and do not incorporate treatment of redirected member contributions as an offset

¹ For this exhibit, adjustments are assumed not to be limited due to an individual employer reaching a 0.00% contribution rate.

² Weighting based on pool payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date



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Collared Employer Pension Rates – SLGRP Average

Excludes Retiree Health Care & IAP Contributions

	12/31/2017 ¹ Valuation 2019 – 2021 Final Rates			12/31/2019 ¹ Valuation 2021 – 2023 Final Rates		
	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ²	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ²
Collared Total Base Rate	27.71%	20.80%	23.62%	29.77%	23.52%	25.54%
Member redirect offset	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>(2.45%)</u>	<u>(0.70%)</u>	<u>(1.25%)</u>
Collared Base Employer Rate	27.71%	20.80%	23.62%	27.32%	22.82%	24.29%
Side Account (Offset)	(4.99%)	(4.99%)	(4.99%)	(4.99%)	(4.99%)	(4.99%)
SLGRP Charge/(Offset)	<u>(0.69%)</u>	<u>(0.69%)</u>	<u>(0.69%)</u>	<u>(0.69%)</u>	<u>(0.69%)</u>	<u>(0.69%)</u>
Collared Net Rate	22.03%	15.12%	17.94%	21.64%	17.14%	18.61%
Increase				(0.39%)	2.02%	0.66%

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Rates vary by employer, sometimes significantly, as only some employers have side accounts and the SLGRP charge/(offset) varies by employer

¹ For this exhibit, adjustments are assumed not to be limited due to an individual employer reaching a 0.00% contribution rate.

² Weighting based on pool payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date

Uncollared Total Pension Rates – System-Wide

Excludes Retiree Health Care, IAP Contributions, Rate Collar, Side Accounts

	12/31/2017 Valuation 2019 – 2021 Final Rates			12/31/2019 Valuation 2021 – 2023 Final Rates		
	Payroll			Payroll		
	Tier 1 / Tier 2	OPSRP	Weighted Average ¹	Tier 1 / Tier 2	OPSRP	Weighted Average ¹
Normal Cost	15.27%	8.92%	11.59%	14.92%	9.16%	11.09%
Tier 1/Tier 2 UAL	16.18%	16.18%	16.18%	13.13%	13.13%	13.13%
OPSRP UAL	1.45%	1.45%	1.45%	1.69%	1.69%	1.69%
Uncollared Total Rate	32.90%	26.55%	29.22%	29.74%	23.98%	25.91%
Increase				(3.16%)	(2.57%)	(3.31%)

Rates shown on this slide are “total” rates, and do not incorporate any treatment of redirected member contributions as an offset

¹ Weighting based on system-wide payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date.

Collared Total Pension Base Rates – System-Wide

Excludes Retiree Health Care & IAP Contributions, Side Account Offsets

	12/31/2017 Valuation 2019 – 2021 Final Rates			12/31/2019 Valuation 2021 – 2023 Final Rates		
	Payroll			Payroll		
	Tier 1 / Tier 2	OPSRP	Weighted Average ¹	Tier 1 / Tier 2	OPSRP	Weighted Average ¹
Uncollared Total Rate	32.90%	26.55%	29.22%	29.74%	23.98%	25.91%
Collar Limitation	(3.99%)	(3.99%)	(3.99%)	(0.09%)	(0.09%)	(0.09%)
Collared Total Base Rate	28.91%	22.56%	25.23%	29.65%	23.89%	25.82%
Increase				0.74%	1.33%	0.59%

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Increases that will be effective July 2021 are limited by the collar for some employers

¹ Weighting based on system-wide payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date.

Collared Employer Pension Rates – System-Wide

Excludes Retiree Health Care & IAP Contributions

	12/31/2017 ¹ Valuation 2019 – 2021 Final Rates			12/31/2019 ¹ Valuation 2021 – 2023 Final Rates		
	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ²	Tier 1 / Tier 2	Payroll OPSRP	Weighted Average ²
Collared Base Rate	28.91%	22.56%	25.23%	29.65%	23.89%	25.82%
Member redirect offset	<u>0.00%</u>	<u>0.00%</u>	<u>0.00%</u>	<u>(2.45%)</u>	<u>(0.70%)</u>	<u>(1.25%)</u>
Collared Base Employer Rate	28.91%	22.56%	25.23%	27.20%	23.19%	24.57%
Side Account (Offset)	(6.51%)	(6.51%)	(6.51%)	(6.24%)	(6.24%)	(6.24%)
SLGRP Charge/(Offset)	(0.40%)	(0.40%)	(0.40%)	(0.40%)	(0.40%)	(0.40%)
Collared Net Rate	22.00%	15.65%	18.32%	20.56%	16.55%	17.93%
Increase				(1.44%)	0.90%	(0.39%)

Rates vary by employer, as only some employers have side accounts

Changes in side account offsets are not collared

- 1 For this exhibit, adjustments are assumed not to be limited due to an individual employer reaching a 0.00% contribution rate.
- 2 Weighting based on system-wide payroll levels (Tier 1/Tier 2, OPSRP) as of the valuation date



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Retirement System Risks

- Oregon PERS, like all defined benefit plans, is subject to various risks that will affect future plan liabilities and contribution requirements, including:
 - **Investment risk:** the potential that investment returns will be different than expected
 - **Demographic risks:** the potential that mortality experience, retirement behavior, or other demographic experience for the plan population will be different than expected
 - **Contribution risk:** the potential that actual future contributions will be materially different than expected, for example if there are material changes in the System's covered payroll
- The results of an actuarial valuation are based on one set of reasonable assumptions, but it is almost certain that future experience will not exactly match the assumptions.
- Further discussion of plan risks and historical information regarding plan experience are shown in our annual actuarial valuations. In addition, our annual financial modeling presentation to the PERS Board illustrates future outcomes under a wide range of future scenarios reflecting variation in key risk factors.

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Actuarial Basis

Data

We have based our calculation of the liabilities on the data supplied by the Oregon Public Employees Retirement System and summarized in the data exhibits on the preceding slides.

Assets as of December 31, 2019, were based on values provided by Oregon PERS reflecting the Board's earnings crediting decisions for 2019.

Methods / Policies

Actuarial Cost Method: Entry Age Normal, adopted effective December 31, 2012.

UAL Amortization: The UAL for OPSRP, and Retiree Health Care as of December 31, 2007 are amortized as a level percentage of combined valuation payroll over a closed 16 year period for OPSRP and a closed 10 year period for Retiree Health Care. For the Tier 1/Tier 2 UAL, the amortization period was reset at 20 years as of December 31, 2013. Senate Bill 1049 was signed into law in June 2019 and requires a one-time re-amortization of Tier 1/Tier 2 UAL over a closed 22 year period at the December 31, 2019 rate-setting valuation which will set actuarially determined contribution rates for the 2021-2023 biennium. Gains and losses between subsequent odd-year valuations are amortized as a level percentage of combined valuation payroll over the amortization period (20 years for Tier 1/Tier 2, 16 years for OPSRP, 10 years for Retiree Health Care) from the odd-year valuation in which they are first recognized.

Actuarial Basis

Methods / Policies (cont'd)

Contribution rate stabilization method: Contribution rates for a rate pool (e.g. Tier 1/Tier 2 SLGRP, Tier 1/Tier 2 School Districts, OPSRP) are confined to a collar based on the prior contribution rate (prior to application of side accounts, pre-SLGRP liabilities, and 6 percent Independent Employer minimum). The new contribution rate will generally not increase or decrease from the prior contribution rate by more than the greater of 3 percentage points or 20 percent of the prior contribution rate. If the funded percentage excluding side accounts drops below 60% or increases above 140%, the size of the collar doubles. If the funded percentage excluding side accounts is between 60% and 70% or between 130% and 140%, the size of the rate collar is increased on a graded scale.

Expenses: Tier 1/Tier 2 administration expenses are assumed to be equal to \$32.5M, while OPSRP administration expenses are assumed to be equal to \$8.0M. The assumed expenses are added to the respective normal costs.

Actuarial Value of Assets: Equal to Market Value of Assets excluding Contingency and Tier 1 Rate Guarantee Reserves. The Tier 1 Rate Guarantee Reserve is not excluded from assets if it is negative (i.e. in deficit status).

Assumptions

337/337 Assumptions for valuation calculations are as described in the 2018 Experience Study for Oregon PERS and presented to the PERS Board in July 2019.

Provisions

Provisions valued are as detailed in the forthcoming 2019 Valuation Report.