II. ACTUARIAL EXHIBITS

2019
Actuarial
Valuation
Report

Office of the State Actuary

"Supporting financial security for generations."

Actuarial Certification Letter
Actuarial Valuation Report
As of June 30, 2019

August 2020

This report documents the results of an actuarial valuation of the retirement plans defined under Chapters 41.26, 41.32, 41.35, 41.37, 41.40, and 43.43 of the Revised Code of Washington. The primary purpose of this valuation is to determine contribution requirements for the retirement plans for the 2021-23 Biennium based on a June 30, 2019, measurement date, consistent with the prescribed funding policies. This valuation also provides information on the funding progress and developments in the plans over the past year. This valuation report should not be used for other purposes. Please replace this report with a more recent report when available.

Future actuarial measurements may differ significantly from the current measurements presented in this report if plan experience differs from that anticipated by the assumptions, or if changes occur in the methods, assumptions, plan provisions, or applicable law. The Risk Assessment page of our website provides further information on the range and likelihood of potential outcomes that vary from expected results. The Commentary on Risk page of our website provides additional risk education.

The valuation results summarized in this report involve calculations that require assumptions about future economic and demographic events. We believe that the assumptions and methods used in the underlying valuation are reasonable and appropriate for the primary purpose stated above. However, the use of another set of assumptions and methods could also be reasonable and could produce materially different results. Actual results may vary from our expectations.

For all plans with the exception of LEOFF 2, the assumptions used in this valuation for investment return, inflation, salary growth, and membership growth were prescribed by the PFC and are subject to revision by the Legislature. For LEOFF 2, these assumptions are prescribed by the LEOFF 2 Retirement Board. Please see our *2019 Economic Experience Study* report for further information on economic assumptions. We developed the demographic assumptions used in this valuation during the *2013-2018 Demographic Experience Study*. The Legislature prescribed the actuarial cost and asset valuation methods. In our opinion, all methods, assumptions, and calculations are reasonable and are in conformity with generally accepted actuarial principles and standards of practice as of the date of this publication.

The Department of Retirement Systems (DRS) provided us with audited member and beneficiary data. We checked the data for reasonableness as appropriate based on the purpose of the valuation. WSIB and DRS provided audited financial and asset information. We relied on all the information provided as complete and accurate, however we did adjust

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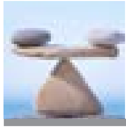


the LEOFF 2 assets to reflect an expected future transfer to the LEOFF 2 Benefit Improvement Account consistent with RCW 41.26.805. In our opinion, this information is adequate and substantially complete for purposes of this valuation.

The asset smoothing method adopted during the 2003 Legislative Session (Chapter 11, Laws of 2003, E1) was intended to address the volatility of contribution rates under the aggregate funding method when used in combination with the existing asset allocation policy of WSIB. The combination of the current asset smoothing method with any other funding method or asset allocation policy may not be appropriate. The Legislature may need to revisit the application of the current asset smoothing method with the Plan 1 funding method as the duration of liabilities in those plans becomes shorter.

The funding method prescribed by the Legislature for PERS 1 and TRS 1 is a non-standard amortization method since it includes payroll outside the plan. Additionally, the funding method includes minimum contribution rates effective at the beginning of the 2015-17 Biennium. All contributions required under this method are necessary to fully amortize the UAAL in these plans. Failure to make all future required contributions may result in premature plan insolvency.

The Plan 1 funding method for PERS 1 and TRS 1 is also non-standard in its use of the employer normal cost rate from the Plans 2/3 instead of the underlying Plan 1 employer normal cost rate. However, we find this method reasonable and appropriate given the limited remaining future salary in Plan 1 and the relatively short period for amortizing the UAAL. Furthermore, Plan 1 member normal cost rates are fixed in statute at 6 percent and the use of the Plan 2/3 employer normal cost for Plan 1 allows the Legislature to charge all employers the same contribution rate regardless of the plan in which employees hold membership (except for LEOFF).

In order to limit the short-term expected volatility in WSPRS Plans 1/2 employer contribution rate, the Legislature elected to smooth the employer rates over three biennia. The smoothing is expected to result in no expected funding shortfall to WSPRS Plans 1/2 at the end of the three biennia on June 30, 2025.

The undersigned, with actuarial credentials, meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. While this report is intended to be complete, we are available to offer extra advice and explanations as needed.

Sincerely,

Luke Masselink, ASA, EA, MAAA
Senior Actuary

Matthew M. Smith, FCA, EA, MAAA
State Actuary

Office of the State Actuary August 2020

CONTRIBUTION RATES

Member and Employer Rate Summary				
	Plan 1		Plans 2/3	
	2019	2018	2019	2018
PERS				
Member*	6.00%	6.00%	6.36%	7.46%
Employer (Normal Cost)	6.36%	7.48%	6.36%	7.48%
Employer (Plan 1 UAAL)	3.71%	4.08%	3.71%	4.08%
Total Employer	10.07%	11.56%	10.07%	11.56%
TRS				
Member*	6.00%	6.00%	8.05%	8.02%
Employer (Normal Cost)	8.05%	8.40%	8.05%	8.40%
Employer (Plan 1 UAAL)	6.19%	6.11%	6.19%	6.11%
Total Employer	14.24%	14.51%	14.24%	14.51%
SERS				
Member*	N/A	N/A	7.76%	8.02%
Employer (Normal Cost)	N/A	N/A	7.76%	8.02%
Employer (PERS Plan 1 UAAL)	N/A	N/A	3.71%	4.08%
Total Employer	N/A	N/A	11.47%	12.10%
PSERS				
Member	N/A	N/A	6.50%	7.09%
Employer (Normal Cost)	N/A	N/A	6.50%	7.09%
Employer (PERS Plan 1 UAAL)	N/A	N/A	3.71%	4.08%
Total Employer	N/A	N/A	10.21%	11.17%
LEOFF				
Member	0.00%	0.00%	7.68%	8.67%
Employer	0.00%	0.00%	4.61%	5.20%
State (Normal Cost)	0.00%	0.00%	3.07%	3.47%
State (Plan 1 UAAL)	0.00%	0.00%	0.00%	0.00%
Total State	0.00%	0.00%	3.07%	3.47%
WSPRS				
Member	8.61%	8.45%	8.61%	8.45%
Employer (State)	18.57%	20.41%	18.57%	20.41%

Note: Employer rates exclude administrative expense rate.

**Plan 3 members do not contribute to the defined benefit plan.*

Development of 2019 Employer/State Rates					
	PERS		TRS		SERS
	Plan 1	Plans 2/3	Plan 1	Plans 2/3	Plans 2/3
a. Total Normal Cost	12.36%	12.72%	14.05%	16.10%	15.52%
b. Member Normal Cost*	6.00%	6.36%	6.00%	8.05%	7.76%
c. Employer Contribution (a - b)	6.36%	6.36%	8.05%	8.05%	7.76%
d. Cost to Amortize UAAL	3.71%	3.71%	6.19%	6.19%	3.71%
e. Total Employer Rate (c + d)	**10.07%**	**10.07%**	**14.24%**	**14.24%**	**11.47%**

Note: Employer rates exclude administrative expense rate.

**Plan 3 members do not contribute to the defined benefit plan. TRS 2 member rate may be subject to a member maximum rate.*

Development of 2019 Employer/State Rates				
	PSERS	LEOFF		WSPRS
	Plan 2	Plan 1	Plan 2	Plans 1/2
a. Total Normal Cost	13.00%	0.00%	15.36%	27.18%
b. Member Normal Cost*	6.50%	0.00%	7.68%	8.61%
c. Employer Contribution (a - b)	6.50%	0.00%	7.68%	18.57%
d. Cost to Amortize UAAL	3.71%	0.00%	0.00%	N/A
e. Total Employer Rate (c + d)**	**10.21%**	**0.00%**	**4.61%**	**18.57%**

Note: Employer rates exclude administrative expense rate.

**Plan 3 members do not contribute to the defined benefit plan. WSPRS member rate may be subject to a member maximum rate.*

***The state pays 20% of the total normal cost for LEOFF 2. The total employer rate reflected above represents the local government, i.e. non-state, portion.*

TRS Plan 2 Maximum Member Contribution Rates					
Valuation Year	Prior Max	Supplemental	New Max	Description	Source
2010 - 2019	8.63%	0.01%	8.64%	AFC protection against reduced salaries.	C 5 L 11
2007 - 2009	8.55%	0.08%	8.63%	Out-of-state service credit purchases.	C 101 L 08
2006	7.76%	0.79%	8.55%	Improved Subsidized ERFs for certain Plan 2/3 members.	C 491 L 07
2005	7.75%	0.01%	7.76%	Lowered vesting requirements for certain Plan 3 members.	C 33 L 06
1999 - 2004	6.59%	1.16%	7.75%	Subsidized ERFs for Plan 2/3 members.	C 247 L 00
1997 - 1998	N/A	N/A	6.59%		

Note: Maximum member contribution rates change each year by 50% of benefit improvements, except as stated in RCW 41.45.070.

WSPRS Plan 1/2 Maximum Member Contribution Rates					
Valuation Year	**Prior Max**	**Supplemental**	**New Max**	**Description**	**Source**
2019	8.45%	0.16%	8.61%	Modified the definition of "Veteran" and leave cash-out as pensionable salary.	C 97 L 20
2017 - 2018	8.44%	0.01%	8.45%	Modified the definition of "Veteran".	C 61 L 18
2016*	7.68%	0.76%	8.44%	Expanded the definition of pensionable overtime.	C 181 L 17
	7.34%	0.34%	7.68%		
2014 - 2015	7.19%	0.15%	7.34%	L&I duty-related death benefits paid from pension trust fund on remarriage.	C 78 L 15
2009 - 2013	7.18%	0.01%	7.19%	Increased duty-related death benefits.	C 261 L 10
2008	6.95%	0.23%	7.18%	Survivor benefits for registered domestic partners.	C 522 L 09
2006 - 2007**	N/A	N/A	6.95%		

Note: Maximum member contribution rates change each year by 50% of benefit improvements, except as stated in RCW 41.45.070.

**This law stipulated a phased increase to the member maximum rate by applying 0.34% in Fiscal Year 2018 and 0.76% in Fiscal Year 2019.*

***The original maximum contribution rate of 7% was decreased by 0.05% for C 87 L 07 (Raised maximum retirement age, 0.14% decrease) and C 488 L 07 (Provided medical premium reimbursements for certain survivors, 0.09% increase).*

The following table compares the member and total employer contribution rates that were adopted by the PFC against the rates that were calculated by OSA. Note the 2019-21 adopted rates we display include the supplemental rates charged following the 2019 Legislative Session.

Contribution Rates			
	2019-21 Adopted[1]	2021-23 Calculated	2021-23 Adopted
PERS 1			
Member	6.00%	6.00%	6.00%
Total Employer	12.68%	10.07%	10.07%
PERS 2/3			
Member[2]	7.90%	6.36%	6.36%
Total Employer	12.68%	10.07%	10.07%
TRS 1			
Member	6.00%	6.00%	6.00%
Total Employer	15.33%	14.24%	14.24%
TRS 2/3			
Member[2]	7.77%	8.05%	8.05%
Total Employer	15.33%	14.24%	14.24%
SERS 2/3			
Member[2]	8.25%	7.76%	7.76%
Total Employer	13.01%	11.47%	11.47%
PSERS 2			
Member	7.20%	6.50%	6.50%
Total Employer	11.96%	10.21%	10.21%
LEOFF 1			
Member	0.00%	0.00%	0.00%
Employer	0.00%	0.00%	0.00%
State	0.00%	0.00%	0.00%
LEOFF 2[3]			
Member	8.59%	7.68%	8.53%
Employer	5.15%	4.61%	5.12%
State	3.44%	3.07%	3.41%
WSPRS 1/2[4]			
Member	8.45%	8.61%	8.61%
Employer (State)	17.50%	18.57%	17.66%

Employer rates exclude administrative expense rate.

[1] 2019-21 adopted rates include 2019 Session supplemental rate.

[2] Plan 3 members do not contribute to the defined benefit plan.

[3] The LEOFF 2 Board adopts contribution rates for LEOFF 2. The Board adopted rates equal to 100 percent of the Entry Age Normal Cost. Please see the 2019 LEOFF 2 Actuarial Valuation Report for more information.

[4] Adopted employer contribution rate reflects temporary and supplemental smoothing policy per 2019 Legislative Session Law (C 416 L19 Sec 711(6).

The tables on the following pages show the development of the normal cost rates and the Plan 1 UAAL rates. Consistent with current funding policy, the normal cost rates include minimum contribution rates to provide stable and adequate contribution rates over time. These minimum rates are a percent of the normal cost calculated under the EAN funding method. The percent is 70 percent for WSPRS Plans 1 and 2, 100 percent for LEOFF 2 (which reduces to 90 percent when the plan's funded ratio is at least 105 percent), and 80 percent for all other plans.

The PERS 1 and TRS 1 UAAL, under current funding policy, must be amortized over a rolling ten-year period, as a level percentage of projected system payroll. All employers of PERS, SERS, and PSERS members contribute toward the PERS 1 UAAL, while all employers of TRS members contribute toward the TRS 1 UAAL. UAAL rates also include minimum contribution rates to ensure complete amortization of the UAAL. The minimum UAAL rate is 3.50 percent in PERS 1 and 5.75 percent in TRS 1. Please see the Glossary for a more detailed explanation of EAN and UAAL.

The funded ratio for LEOFF 2 is currently above 105 percent and therefore the minimum contribution rate is 90 percent of the EANC rate based on Board policy.

We provide additional contribution rate calculations on the Interactive Reports page of our website. This interactive report calculates member and employer contribution rates that vary based on the asset valuation method and discount rate that the user selects. The state's funding policy, defined under Chapter 41.45 RCW, does not vary based on these selections.

Development of Normal Cost Rates			
(Dollars in Millions)	**PERS 2/3**	**TRS 2/3**	**SERS 2/3**
1. Calculated Member Normal Cost Rate			
a. Future Value of Fully Projected Benefits	$316,203	$208,149	$48,545
b. Present Value of Fully Projected Benefits	51,592	23,168	8,096
c. Valuation Assets	40,766	15,311	5,872
d. Unfunded Fully Projected Benefits (b - c)	10,826	7,857	2,224
e. Past Liability Balance	3	37	0
f. Adjusted Unfunded (d - e)	**$10,823**	**$7,820**	**$2,224**
Present Value of Projected Salaries to Current Members (PVS)			
g. Plan 1 PVS	N/A	N/A	N/A
h. Plan 2 PVS	73,788	21,933	8,867
i. Plan 3 PVS	22,565	53,253	10,926
j. Weighted PVS (2g + 2h + i)	**$170,140**	**$97,120**	**$28,660**
k. Member Normal Cost (f / j)	6.36%	8.05%	7.76%
l. Member Minimum Contribution Rate	4.37%	5.33%	4.72%
m. Prior Year Member Maximum Contribution Rate	N/A	8.64%	N/A
n. Member Contribution Rate with Max/Min	6.36%	8.05%	7.76%
o. Change In Plan Provisions (Laws of 2020)	0.00%	0.00%	0.00%
p. Calculated Member Contribution Rate (n + o)*	**6.36%**	**8.05%**	**7.76%**
2. Calculated Employer Normal Cost Rate			
a. Present Value of Fully Projected Benefits	$51,592	$23,168	$8,096
b. Valuation Assets	40,766	15,311	5,872
c. Unfunded Benefits (a - b)	10,826	7,857	2,224
d. Present Value of Member Contributions	4,694	1,766	688
e. Past Liability Balance**	3	37	0
f. Employer Responsibility (c - d - e)	**$6,129**	**$6,054**	**$1,536**
Present Value of Projected Salaries to Current Members (PVS)			
g. Plan 1 PVS	N/A	N/A	N/A
h. Plan 2 PVS	73,788	21,933	8,867
i. Plan 3 PVS	22,565	53,253	10,926
j. Total PVS (g + h + i)	**$96,352**	**$75,187**	**$19,793**
k. Employer Normal Cost (f / j)	6.36%	8.05%	7.76%
l. Employer Minimum Contribution Rate	4.37%	5.33%	4.72%
m. Employer Contribution Rate with Minimum	6.36%	8.05%	7.76%
n. Excess Employer Rate	N/A	0.00%	N/A
o. Rate to Amortize Past Liability Balance**	0.00%	0.00%	0.00%
p. Change In Plan Provisions (Laws of 2020)	0.00%	0.00%	0.00%
q. Calculated Employer Contribution Rate (m + n + o + p)	**6.36%**	**8.05%**	**7.76%**
3. Adopted Normal Cost Rates for 2021-2023			
a. Member Contribution Rate	6.36%	8.05%	7.76%
b. Employer Contribution Rate	6.36%	8.05%	7.76%
c. State Contribution Rate	N/A	N/A	N/A
d. Total Contribution Rate (a + b + c)	**12.72%**	**16.10%**	**15.52%**

Note: Totals may not agree due to rounding.

**Plan 3 members do not contribute to the defined benefit plan.*

***Past liabilities are expected to be paid off when contribution rates are effective in 2021-23 Biennium.*

Development of Normal Cost Rates *(Continued)*			
(Dollars in Millions)	**PSERS 2**	**LEOFF 2**	**WSPRS 1/2**
1. Calculated Member Normal Cost Rate			
a. Future Value of Fully Projected Benefits	$16,600	$118,647	$9,160
b. Present Value of Fully Projected Benefits	1,391	16,095	1,586
c. Valuation Assets[1]	690	13,294	1,301
d. Unfunded Fully Projected Benefits (b - c)	701	2,802	285
e. Past Liability Balance	0	0	6
f. Adjusted Unfunded (d - e)	**$701**	**$2,802**	**$279**
Present Value of Projected Salaries to Current Members (PVS)			
g. Plan 1 PVS	N/A	N/A	$ 238
h. Plan 2 PVS	5,390	24,130	854
i. Plan 3 PVS	N/A	N/A	N/A
j. Weighted PVS (2g + 2h + i)	**$10,779**	**$48,260**	**$2,184**
k. Member Normal Cost (f / j)	6.50%	5.81%	12.77%
l. Member Minimum Contribution Rate	5.51%	7.68%	7.31%
m. Prior Year Member Maximum Contribution Rate	N/A	N/A	8.45%
n. Member Contribution Rate with Max/Min	6.50%	7.68%	8.45%
o. Change In Plan Provisions (Laws of 2020)	0.00%	0.00%	0.16%
p. Calculated Member Contribution Rate (n + o)	**6.50%**	**7.68%**	**8.61%**
2. Calculated Employer Normal Cost Rate			
a. Present Value of Fully Projected Benefits	$1,391	$16,095	$1,586
b. Valuation Assets[1]	690	13,294	1,301
c. Unfunded Benefits (a - b)	701	2,802	285
d. Present Value of Member Contributions	351	1,401	139
e. Past Liability Balance	0	0	6
f. Employer Responsibility (c - d - e)	**$351**	**$1,401**	**$139**
Present Value of Projected Salaries to Current Members (PVS)			
g. Plan 1 PVS	N/A	N/A	$ 238
h. Plan 2 PVS	5,390	24,130	854
i. Plan 3 PVS	N/A	N/A	N/A
j. Total PVS (g + h + i)	**$5,390**	**$24,130**	**$1,092**
k. Employer Normal Cost (f / j)	6.50%	5.81%	12.77%
l. Employer Minimum Contribution Rate	5.51%	7.68%	7.31%
m. Employer Contribution Rate with Minimum	6.50%	7.68%	12.77%
n. Excess Employer Rate	N/A	N/A	4.32%
o. Rate to Amortize Past Liability Balance[2]	N/A	N/A	1.32%
p. Change In Plan Provisions (Laws of 2020)	0.00%	0.00%	0.16%
q. Calculated Employer Contribution Rate (m + n + o + p)	**6.50%**	**7.68%**	**18.56%**
3. Adopted Normal Cost Rates for 2021-23[3]			
a. Member Contribution Rate	6.50%	8.53%	8.61%
b. Employer Contribution Rate	6.50%	5.12%	17.66%
c. State Contribution Rate	N/A	3.41%	N/A
d. Total Contribution Rate (a + b + c)	**13.00%**	**17.06%**	**26.27%**

Note: Totals may not agree due to rounding.

[1] LEOFF 2's assets for 2019 exclude the $22 million held in the LEOFF 2 BIA and have been further reduced by $300 million payable to the BIA effective 7/1/2019 (C 366 L 19).

[2] WSPRS liability is attributable to past costs for improved survivor benefits.

[3] LEOFF 2 rates adopted by LEOFF 2 Board; all others adopted by the PFC. LEOFF 2 rate: 50% Member, 30% Employer, 20% State.

Amortization of the Plan 1 Unfunded Actuarial Accrued Liability (UAAL)			
(Dollars in Millions)	**PERS 1**	**TRS 1**	**LEOFF 1**
a. Future Value of Fully Projected Benefits	$24,134	$17,306	$8,997
b. Present Value of Fully Projected Benefits (PVFB)	11,445	8,283	4,077
c Valuation Assets	7,461	5,558	5,734
d. Actuarial Present Value of Future Normal Costs	40	11	0
e. Balance of Plan 1 Benefit Improvements[1]	185	134	N/A
f. UAAL (b - c - d - e)	**$3,759**	**$2,580**	**($1,657)**
g. Amortization Date	N/A	N/A	6/30/2024
h. Present Value of Projected Salaries[2]	$127,043	$62,008	$6,017
i. Contribution Rate Before Adjustments (f / h)	2.96%	4.16%	(27.53%)
j. Minimum Contribution Rate	3.50%	5.75%	N/A
k. Preliminary Contribution Rate	3.50%	5.75%	(27.53%)
l. Plan 1 Benefit Improvements	0.10%	0.21%	N/A
m. Change In Plan Provisions (Laws of 2020)	0.11%	0.23%	0.00%
n. Calculated Plan 1 UAAL Contribution Rates (k + l + m)[3]	**3.71%**	**6.19%**	**(27.53%)**
Adopted UAAL Contribution Rates for 2021-2023	**3.71%**	**6.19%**	**0.00%**

Note: Totals may not agree due to rounding.

[1] As stated in RCW 41.45.060, the cost of funding Plan 1 benefit improvents shall be amortized over a fixed 10-year period.

[2] Measured under the plan's mortization method.

[3] No LEOFF 1 UAAL contributions are required when the plan is fully funded under current methods and assumptions.

ACTUARIAL LIABILITIES

Present Value of Fully Projected Benefits							
(Dollars in Millions)	PERS			TRS			SERS
	Plan 1	Plans 2/3	Total	Plan 1	Plans 2/3	Total	Plans 2/3
Active Members							
Retirement	$518	$28,383	$28,901	$188	$13,566	$13,754	$4,239
Termination	0	3,295	3,295	0	2,979	2,979	704
Death	3	169	172	1	95	96	30
Disability	0	118	118	0	36	36	19
ROC[1] on Termination	0	500	500	0	66	66	62
ROC[1] on Death	5	183	189	1	29	31	17
Total Active	**$527**	**$32,648**	**$33,175**	**$190**	**$16,772**	**$16,961**	**$5,071**
Inactive Members							
Terminated Vested	$65	$3,264	$3,329	$19	$1,224	$1,243	$755
Terminated Non-Vested[2]	7	316	323	3	61	63	39
Service Retired[3]	10,031	14,552	24,583	7,620	4,573	12,193	2,044
Disability Retired	96	152	248	70	13	83	18
Survivors	719	497	1,216	382	95	476	56
TAP Annuities	0	164	164	0	431	431	112
Total Inactive	**$10,919**	**$18,944**	**$29,863**	**$8,093**	**$6,396**	**$14,489**	**$3,025**
Laws of 2020	130	1	131	132	0	132	0
2019 Total	**$11,575**	**$51,593**	**$63,168**	**$8,415**	**$23,168**	**$31,583**	**$8,096**
2018 Total	**$11,999**	**$48,354**	**$60,353**	**$8,598**	**$19,837**	**$28,436**	**$7,109**

Note: Totals may not agree due to rounding.

[1] Return of Contributions.

[2] Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

[3] Includes liability from individuals who are entitled to a portion of the primary member's benefit (legal order payees).

Present Value of Fully Projected Benefits *(Continued)*						
(Dollars in Millions)	PSERS	LEOFF			WSPRS	Total
	Plan 2	Plan 1	Plan 2	Total	Plans 1/2	
Active Members						
Retirement	$1,069	$25	$10,001	$10,027	$636	$58,626
Termination	154	0	169	169	5	7,306
Death	4	0	110	110	4	416
Disability	9	0	543	543	1	726
ROC[1] on Termination	41	0	111	111	3	783
ROC[1] on Death	8	0	83	83	2	329
Total Active	**$1,285**	**$25**	**$11,018**	**$11,044**	**$649**	**$68,185**
Inactive Members						
Terminated Vested	$44	$1	$250	$252	$20	$5,643
Terminated Non-Vested[2]	17	0	16	16	1	459
Service Retired[3]	43	1,823	4,398	6,221	837	45,922
Disability Retired	2	1,538	281	1,819	4	2,172
Survivors	1	690	132	822	74	2,646
TAP Annuities	0	0	0	0	0	707
Total Inactive	**$106**	**$4,052**	**$5,077**	**$9,129**	**$936**	**$57,549**
Laws of 2020	0	0	1	1	3	267
2019 Total	**$1,391**	**$4,077**	**$16,096**	**$20,173**	**$1,589**	**$126,001**
2018 Total	**$1,349**	**$4,096**	**$14,846**	**$18,942**	**$1,517**	**$117,706**

Note: Totals may not agree due to rounding.

[1] Return of Contributions.

[2] Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

[3] Includes liability from individuals who are entitled to a portion of the primary member's benefit (legal order payees).

Entry Age Normal Accrued Liability[1]					
(Dollars in Millions)	PERS		TRS		SERS
	Plan 1	Plans 2/3	Plan 1	Plans 2/3	Plans 2/3
Active Members					
Retirement	$485	$21,726	$179	$8,765	$3,081
Termination	(6)	1,853	(1)	1,662	348
Death	2	122	0	62	21
Disability	0	54	0	12	7
ROC[2] on Termination	(0)	(214)	(0)	(25)	(16)
ROC[2] on Death	5	114	1	11	9
Total Active	**$486**	**$23,656**	**$180**	**$10,486**	**$3,449**
Inactive Members					
Terminated Vested	$65	$3,264	$19	$1,224	$755
Terminated Non-Vested[3]	7	316	3	61	39
Service Retired[4]	10,031	14,552	7,620	4,573	2,044
Disability Retired	96	152	70	13	18
Survivors	719	497	382	95	56
TAP Annuities	0	164	0	431	112
Total Inactive	**$10,919**	**$18,944**	**$8,093**	**$6,396**	**$3,025**
Laws of 2020	130	(0)	132	0	0
2019 Total	**$11,535**	**$42,600**	**$8,405**	**$16,883**	**$6,474**
2018 Total	**$11,942**	**$40,024**	**$8,583**	**$14,705**	**$5,748**

Note: Totals may not agree due to rounding.

[1] *Calculated using the EAN cost method. This method is used in the funded ratio calculation and is not used to determine contribution requirements.*

[2] *Return of Contributions.*

[3] *Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.*

[4] *Includes liability from individuals who are entitled to a portion of the primary member's benefit (legal order payees).*

Some line items in the Entry Age Normal (EAN) accrued liability tables are negative. This is a result of how these benefits are accrued, over a member's working career, under the EAN actuarial cost method. The accrued liability for a given benefit provision is the difference between (1) today's value of all future benefits for that benefit definition and (2) how much of those future benefits are assumed to be accrued over the rest of the member's career. Item (1) is essentially split into annual "pieces" that are spread evenly across a career from first hire date to last assumed exit. Item (2) is how many more "pieces" they have left to accrue. For benefits like "Return On Contributions (ROC) on Termination", while we assume members that are eligible for retirement will no longer elect an ROC benefit when they exit the system, they are still accruing the level piece of item (2) each year until they retire. So in this instance, item (1) is zero but item (2) is positive. This means we get a negative number when subtracting item (2) from item (1).

Please note GASB mandates this methodology for the accrued liability calculation in financial reporting. We use the same methods in this report – a funding valuation – for easier comparison with financial reporting results. An alternative method is to calculate the accrued liability through the date last eligible for the benefit instead of the end of career. This would eliminate the negative accrued liability components seen above.

Entry Age Normal Accrued Liability[1] (Continued)					
(Dollars in Millions)	PSERS	LEOFF		WSPRS	Total
	Plan 2	Plan 1	Plan 2	Plans 1/2	
Active Members					
Retirement	$519	$25	$6,569	$429	$41,776
Termination	58	0	28	1	3,943
Death	2	0	14	1	224
Disability	3	0	291	0	368
ROC[2] on Termination	(7)	0	(33)	(0)	(296)
ROC[2] on Death	3	0	47	1	192
Total Active	**$578**	**$25**	**$6,914**	**$431**	**$46,206**
Inactive Members					
Terminated Vested	$44	$1	$250	$20	$5,643
Terminated Non-Vested[3]	17	0	16	1	459
Service Retired[4]	43	1,823	4,398	837	45,922
Disability Retired	2	1,538	281	4	2,172
Survivors	1	690	132	74	2,646
Tap Annuities	0	0	0	0	707
Total Inactive	**$106**	**$4,052**	**$5,077**	**$936**	**$57,549**
Laws of 2020	0	0	0	2	265
2019 Total	**$685**	**$4,077**	**$11,992**	**$1,370**	**$104,020**
2018 Total	**$596**	**$4,095**	**$11,066**	**$1,302**	**$98,061**

Note: Totals may not agree due to rounding.

[1] Calculated using the EAN cost method. This method is used in the funded ratio calculation and is not used to determine contribution requirements.

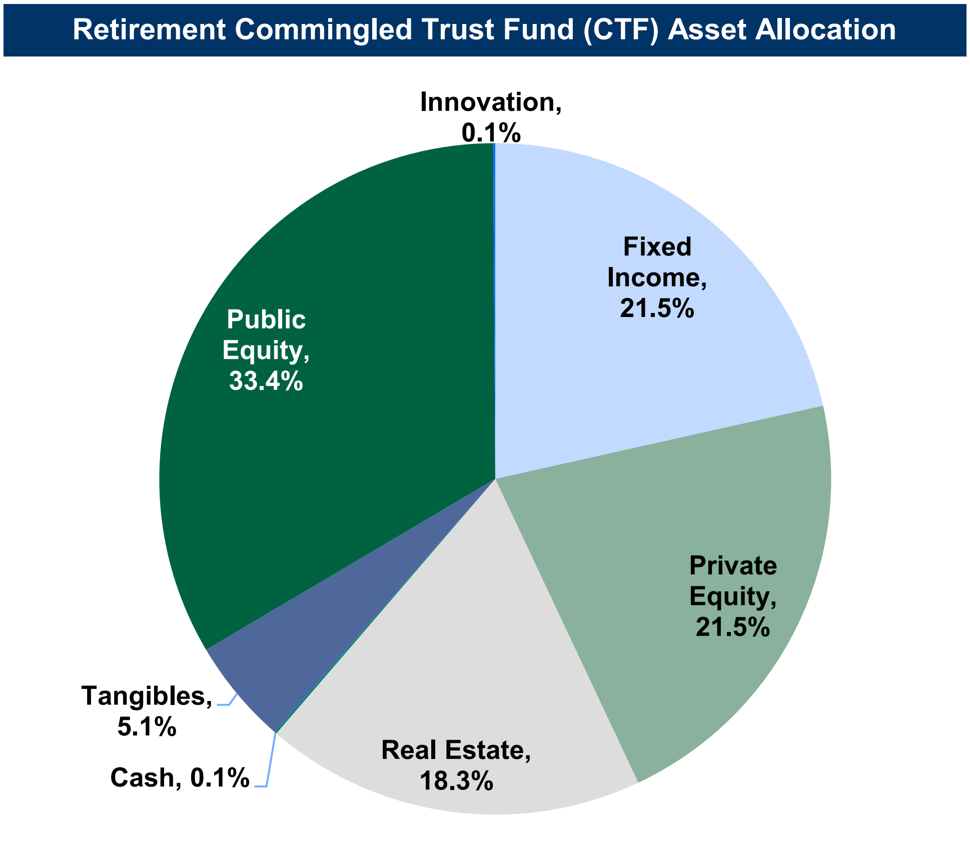
[2] Return of Contributions.

[3] Members who terminated without a vested lifetime benefit but are eligible for a refund of their employee contributions with interest that currently reside in the trust.

[4] Includes liability from individuals who are entitled to a portion of the primary member's benefit (legal order payees).

We report the present and future value of benefit payments by year and by plan on our website. We also show how the present value of these benefit payments varies by interest rate assumptions. For more information or to view projected benefit payments, please visit the Interactive Reports page on our website.

PLAN ASSETS



Source: Washington State Investment Board.

Cash: Highly liquid, very safe investments that can be easily converted into cash, such as Treasury Bills and money-market funds.

Fixed Income: Securities representing debt obligations and usually having fixed payments and maturities. Different types of fixed income securities include government and corporate bonds, mortgage-backed securities, asset-backed securities, convertible issues, and may also include money-market instruments.

Innovation: Fund that provides the ability to invest in a broad range of assets that fall outside the traditional asset classes or management style of existing asset classes.

Public Equity: Shares of U.S. and non-U.S. corporations that trade on public exchanges or "over-the-counter." The ownership of a corporation is represented by shares that are claimed on the corporation's earnings and assets.

Private Equity: The infusion of equity capital into a private company (one that is not available on the public markets). Private equity investments include securities that are not listed on a public exchange and are not easily accessible to most individuals. These investments range from initial capital in start-up enterprises to leveraged buyouts of mature corporations.

Real Estate: An externally-managed selection of partnership investments with the majority of the partnerships invested in high-quality real estate leased to third parties.

Tangibles: The tangible asset portfolio invests in sectors such as infrastructure, timber, agriculture, natural resources, commodities, or other sectors consistent with the goals of the asset class.

Each asset class is unique in terms of expected return, standard deviation, and correlation to other asset classes. Please see page 45 of the *2019 Economic Experience Study* for more information.

In the asset tables that follow, LEOFF 2's MVA and AVA exclude $22.0 million held in the LEOFF 2 BIA, and have been further reduced by $300 million payable to the BIA effective July 1, 2019 (C 366 L19). Under RCW 41.26.805, assets held in the BIA are not included when calculating contribution rates.

Change in Market Value of Assets					
(Dollars in Millions)	PERS		TRS		SERS
	Plan 1 Fund 631	Plans 2/3* Fund 641	Plan 1 Fund 632	Plans 2/3* Fund 642	Plans 2/3* Fund 633
2018 Market Value	**$7,677**	**$38,685**	**$5,802**	**$13,973**	**$5,421**
Revenue					
Member Contributions	$7	$642	$2	$120	$80
Employer/State Contributions	726	820	501	524	201
Total Contributions	**734**	**1,462**	**503**	**644**	**280**
Investment Return	641	3,440	480	1,256	486
Restorations**	3	27	1	5	1
Transfers In	0	1	0	1	0
Miscellaneous	0	0	0	0	0
Total Revenue	**$1,377**	**$4,929**	**$984**	**$1,905**	**$767**
Disbursements					
Monthly Benefits	$1,199	$1,196	$905	$355	$176
Refunds	4	48	1	4	5
Total Benefits	**1,203**	**1,244**	**906**	**359**	**181**
Transfers Out	0	4	0	3	2
Expenses	0	1	0	0	0
Payables	0	0	0	0	0
Total Disbursements	**$1,203**	**$1,249**	**$906**	**$362**	**$183**
2019 Market Value	**$7,851**	**$42,365**	**$5,880**	**$15,516**	**$6,005**
Adjustments to Market Value***	**$0**	**$166**	**$0**	**$427**	**$113**
2019 Adjusted Market Value (MV)	**$7,851**	**$42,532**	**$5,880**	**$15,943**	**$6,118**
2019 Actuarial Value (AV)	**$7,461**	**$40,766**	**$5,558**	**$15,311**	**$5,872**
Ratio (AV / MV)	**95%**	**96%**	**95%**	**96%**	**96%**

Note: Totals may not agree due to rounding.

**Excludes defined contribution portion of Plan 3 assets.*

***Includes additional annuity purchases and service credit purchases.*

****Adjustment reflects TAP assets for Plan 3 retirees and LEOFF 2 BIA asset transfer.*

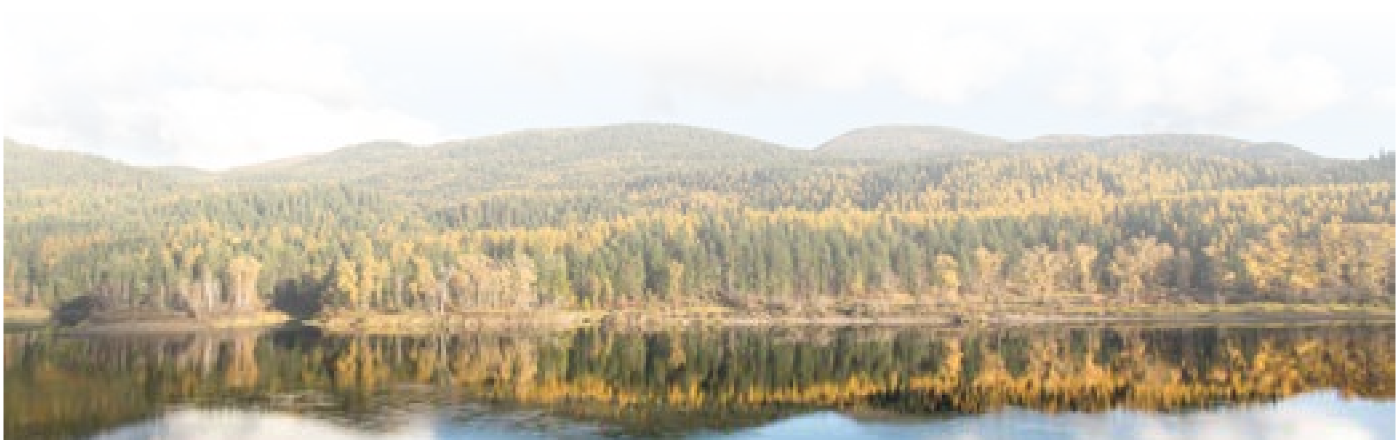
Change in Market Value of Assets *(Continued)*					
(Dollars in Millions)	PSERS	LEOFF		WSPRS	Total
	Plan 2 Fund 635	Plan 1 Fund 819	Plan 2 Fund 829	Plans 1/2 Fund 615	
2018 Market Value*	**$601**	**$5,903**	**$12,985**	**$1,289**	**$92,336**
Revenue					
Contributions					
Member	33	0	188	9	$1,081
Employer/State	32	0	189	15	3,008
Total Contributions	65	0	377	23	4,088
Investment Return	57	495	1,154	111	8,119
Restorations**	0	0	16	2	55
Transfers In	0	0	0	1	3
Miscellaneous	0	0	0	0	0
Total Revenue	**$123**	**$495**	**$1,547**	**$137**	**$12,265**
Disbursements					
Monthly Benefits	$3	$369	$305	$64	$4,572
Refunds	4	0	9	0	75
Total Benefits	7	369	314	64	4,647
Transfers Out	0	0	0	0	9
Expenses	0	0	2	0	4
Payables	0	0	0	0	0
Total Disbursements	**$7**	**$369**	**$316**	**$65**	**$4,659**
2019 Market Value	**$717**	**$6,029**	**$14,216**	**$1,362**	**$99,942**
Adjustments to Market Value***	**$0**	**$0**	**($300)**	**$0**	**$406**
2019 Adjusted Market Value (MV)	**$717**	**$6,029**	**$13,916**	**$1,362**	**$100,349**
2019 Actuarial Value (AV)	**$690**	**$5,734**	**$13,294**	**$1,301**	**$95,987**
Ratio (AV / MV)	**96%**	**95%**	**96%**	**95%**	**96%**

Note: Totals may not agree due to rounding.

**Due to adjustments from the expected BIA asset transfer, the 2018 MVA for LEOFF 2 in the table above does not match the 2018 MVA for LEOFF 2 in the* 2018 Actuarial Valuation Report.

***Includes additional annuity purchases and service credit purchases.*

****Adjustment reflects TAP assets for Plan 3 retirees and LEOFF 2 BIA asset transfer.*



Calculation of Actuarial Value of Assets								
(Dollars in Millions)				PERS 1	PERS 2/3	TRS 1	TRS 2/3	SERS 2/3
a. Adjusted Market Value at 6/30/2019				$7,851	$42,532	$5,880	$15,943	$6,118
Deferred Gains and (Losses)								
	Plan Year Ending	Smoothing Period	Years Remaining					
	6/30/2019	2	1	44	270	32	101	39
	6/30/2018	3	1	$49	$241	$37	$87	$34
	6/30/2017	7	4	239	1,119	203	398	155
	6/30/2016	6	2	(134)	(517)	(107)	(181)	(71)
	6/30/2014	8	2	191	653	157	226	89
b. **Total Deferral**				**$390**	**$1,765**	**$322**	**$632**	**$246**
c. Market Value less Deferral (a - b)				$7,461	$40,766	$5,558	$15,311	$5,872
d. 70% of Market Value of Assets				$5,496	$29,772	$4,116	$11,160	$4,283
e. 130% of Market Value of Assets				$10,207	$55,291	$7,644	$20,725	$7,954
f. **Actuarial Value of Assets***				**$7,461**	**$40,766**	**$5,558**	**$15,311**	**$5,872**

Note: Totals may not agree due to rounding. The gain/(loss) for 6/30/2015 has been fully realized for all plans.
**Actuarial Value of Assets can never be less than 70% or greater than 130% of the Market Value of Assets.*

Calculation of Actuarial Value of Assets *(Continued)*								
(Dollars in Millions)				PSERS 2	LEOFF 1	LEOFF 2	WSPRS 1/2	Total
a. Adjusted Market Value at 6/30/2019				$717	$6,029	$13,916	$1,362	$100,349
Deferred Gains and (Losses)								
	Plan Year Ending	Smoothing Period	Years Remaining					
	6/30/2019	2	1	5	34	97	8	629
	6/30/2018	3	1	4	38	85	8	583
	6/30/2017	7	4	15	186	387	39	2,742
	6/30/2016*	6,5	2,1	(4)	(99)	(166)	(20)	(1,299)
	6/30/2014	8	2	7	137	219	26	1,706
b. **Total Deferral**				**$27**	**$295**	**$623**	**$62**	**$4,361**
c. Market Value less Deferral (a - b)				$690	$5,734	$13,294	$1,301	$95,987
d. 70% of Market Value of Assets				$502	$4,220	$9,742	$954	$70,244
e. 130% of Market Value of Assets				$932	$7,837	$18,091	$1,771	$130,453
f. **Actuarial Value of Assets****				**$690**	**$5,734**	**$13,294**	**$1,301**	**$95,987**

Note: Totals may not agree due to rounding. The gain/(loss) for 6/30/2015 has been fully realized for all plans.
**PSERS 2 = 5 year smoothing period, 1 year remaining; all other plans = 6 year smoothing period, 2 years remaining.*
***Actuarial Value of Assets can never be less than 70% or greater than 130% of the Market Value of Assets.*

Investment Gains and (Losses) for Prior Year					
(Dollars in Millions)	**PERS 1**	**PERS 2/3***	**TRS 1**	**TRS 2/3***	**SERS 2/3***
a. **2018 Market Value****	$7,633	$38,640	$5,775	$13,958	$5,408
b. **Total Cash Flow**	(475)	238	(415)	289	99
c. **2019 Market Value****	7,800	42,325	5,841	15,506	5,994
d. Actual Return (c - b - a)	**$642**	**$3,447**	**$481**	**$1,260**	**$487**
e. **Weighted Asset Amount**	$7,393	$38,764	$5,561	$14,099	$5,456
f. **Expected Return (7.5% x e)**	554	2,907	417	1,057	409
g. **Investment Gain/(Loss) for Prior Year (d - f)**	88	540	64	202	78
h. **Dollar-Weighted Rate of Return****	8.68%	8.89%	8.65%	8.93%	8.93%

Note: Totals may not agree due to rounding.
**Excludes defined contribution portion of Plan 3 assets.*
***Source: Washington State Investment Board.*

Investment Gains and (Losses) for Prior Year *(Continued)*					
(Dollars in Millions)	**PSERS 2**	**LEOFF 1**	**LEOFF 2**	**WSPRS**	**Total**
a. **2018 Market Value***	$600	$5,902	$12,942	$1,288	$92,145
b. **Total Cash Flow**	59	(370)	64	(39)	(550)
c. **2019 Market Value***	715	6,028	14,159	1,361	99,729
d. Actual Return (c - b - a)	**$57**	**$496**	**$1,154**	**$111**	**$8,135**
e. **Weighted Asset Amount**	$627	$5,720	$12,974	$1,269	$91,864
f. **Expected Return (7.5% x e)****	47	429	960	95	6,877
g. **Investment Gain/(Loss) for Prior Year (d - f)**	10	67	193	16	1,258
h. **Dollar-Weighted Rate of Return***	9.12%	8.67%	8.89%	8.77%	8.86%

Note: Totals may not agree due to rounding.
**Source: Washington State Investment Board.*
***The expected return for LEOFF 2 is (7.4% x e).*

FUNDED STATUS

In our actuarial valuation report, we calculate a plan's funded status by comparing the plan's current assets, determined under an asset valuation method, to the actuarial accrued liability of its members, calculated under an actuarial cost method. Funded status can vary significantly from plan to plan, depending on the purpose of the measurement and the assumptions and methods used to determine the funded status.

Based on the purpose of the measurement, actuaries can select from several acceptable actuarial cost methods when measuring a plan's funded status. The cost methods vary in the manner they allocate benefits to past and future time periods. Generally speaking, benefits allocated to past service are considered accrued (or earned). Please see the **Glossary** on our website for an explanation of the actuarial cost methods we use in this actuarial valuation.

Consistent with financial reporting under GASB requirements, we report funded status using the EAN actuarial cost method. However, the funded status measures we share in this report may still vary from those presented in the ***DRS Comprehensive Annual Financial Report***. These differences occur because the assumptions and methods applied to determine contribution requirements (under a funding valuation) may not apply for financial reporting under GASB accounting standards (an accounting valuation). Put another way, these measurements are used for distinct purposes, and the results may vary between the two reports.

To determine the present value (today's value) of accrued benefits we discount future benefits to the valuation date using the valuation interest rate. This rate is intended to be consistent with the long-term expected return under the plan's funding policy. For all plans, with the exception of LEOFF 2, the valuation interest rate is prescribed by the PFC and is subject to revision by the Legislature. For LEOFF 2, the valuation interest rate is prescribed by the LEOFF 2 Retirement Board. (Note: This discount rate may vary from the rate used for financial reporting under GASB accounting standards.)

Funded Status on an Actuarial Value Basis*					
(Dollars in Millions)	PERS		TRS		SERS
	Plan 1	Plans 2/3	Plan 1	Plans 2/3	Plan 2/3
Accrued Liability	$11,535	$42,600	$8,405	$16,883	$6,474
Valuation Assets	$7,461	$40,766	$5,558	$15,311	$5,872
Unfunded Liability	**$4,074**	**$1,833**	**$2,847**	**$1,572**	**$602**
Funded Ratio					
2019	**65%**	**96%**	**66%**	**91%**	**91%**
2018	60%	91%	63%	90%	89%
2017	57%	89%	60%	91%	88%
2016	56%	87%	61%	89%	87%
2015	58%	88%	64%	92%	89%
2014	61%	90%	69%	94%	91%

Note: Totals may not agree due to rounding.

**Liabilities valued using the EAN cost method at an interest rate of 7.5%. All assets have been valued under the actuarial asset method.*

In addition to the valuation interest rate, we use the same long-term assumptions to develop the funded status measure in this report that we use to determine the contribution requirements of the plan. We don't expect the assumptions to match actual experience over short-term periods. However, we do expect these assumptions to reasonably approximate average annual experience over long-term periods. This measure of funded status is consistent with the state's current funding policy and financing plan for future retirement benefits.

For reporting funded status and calculating contribution requirements, we also use an asset valuation method to determine the AVA. This asset valuation method smooths the inherent volatility in the MVA by deferring a portion of annual investment gains or losses for a certain number of years. Investment gains and losses occur when the annual return on investments varies from the long-term assumed rate. To determine the 2019 investment gains or losses, we used an investment return assumption of 7.5 percent (7.4 percent for LEOFF 2). The AVA provides a more stable measure of the plan's assets on an ongoing basis.

With this background in mind, we display the funded status on an "actuarial value" basis for each plan in the following table. For the actuarial value basis, we use the assumed long-term rate of return and AVA consistent with the plan's funding policy.

It's also reasonable and acceptable to report funded status using other assumptions and methods. The resulting funded status will change with the use of assumptions and methods that vary from what we present in this report. Please visit the Interactive Reports page on our website for funded status measures that vary by interest rate assumptions and asset valuation methods.

Funded Status on an Actuarial Value Basis* *(Continued)*					
(Dollars in Millions)	PSERS	LEOFF		WSPRS	Total
	Plan 2	Plan 1	Plan 2	Plans 1/2	
Accrued Liability	$685	$4,077	$11,992	$1,370	$104,020
Valuation Assets	$690	$5,734	$13,294	$1,301	$95,987
Unfunded Liability	**($6)**	**($1,657)**	**($1,302)**	**$70**	**$8,033**
Funded Ratio					
2019	**101%**	**141%**	**111%**	**95%**	**92%**
2018	96%	135%	108%	93%	89%
2017	95%	131%	109%	92%	86%
2016	94%	126%	105%	91%	84%
2015	95%	125%	105%	98%	86%
2014	96%	127%	107%	100%	87%

Note: Totals may not agree due to rounding.

**Liabilities valued using the EAN cost method at an interest rate of 7.5% (7.4% for LEOFF 2). All assets have been valued under the actuarial asset method.*

Generally speaking, under current funding policy, when a plan is less/more than 100 percent funded, we expect higher/lower contribution requirements in the near term to return the plan to a 100 percent funded status over time. A plan with a funded status above 100 percent will require future contributions if the plan has not yet accumulated sufficient assets to pay both the expected cost of benefits that have been earned today and the expected cost of benefits that will be earned by current members in the future. As of this valuation date, and under the data, assumptions and methods used for this actuarial valuation, only LEOFF 1 has sufficient assets to cease ongoing contributions.

The funded status presented in this report are not sufficient to determine whether a plan has enough assets to terminate or settle the plan obligations.

The funded status depends on numerous assumptions. Two of the most significant assumptions are the mortality rates, which estimate how long we expect members to live, and the interest rate or expected return on plan assets. A key component of the mortality assumption is the rate at which mortality is expected to improve in the future. To show this, we doubled the current mortality improvement assumption, i.e., longer lifespans than our best estimate, and assumed no future improvements, shorter lifespans than our best estimate. The tables below demonstrate how the funded status changes across all retirement systems if we alter these assumptions. Please see our Commentary on Risk webpage for individual system results.

Sensitivity of Funded Ratios to Mortality Rates			
(Dollars in Millions)	**No Mortality Improvement**	**Best Estimate Mortality**	**Double Mortality Improvement**
Accrued Liability	$98,162	$104,020	$109,934
Valuation Assets	$95,987	$95,987	$95,987
Unfunded Liability	$2,175	$8,033	$13,947
Funded Ratio	98%	92%	87%

Sensitivity of Funded Ratios to Interest Rates*			
(Dollars in Millions)	**1% Lower 6.5%**	**Best Estimate 7.5%**	**1% Higher 8.5%**
Accrued Liability	$117,947	$104,020	$92,492
Valuation Assets	$95,987	$95,987	$95,987
Unfunded Liability	$21,960	$8,033	($3,495)
Funded Ratio	81%	92%	104%

**Best estimate assumption for LEOFF 2 is 7.4% with sensitivities equal to 6.4%/8.4%.*

ACTUARIAL GAIN/LOSS

The following tables display actuarial gains and losses, expressed as contribution rate changes. Actuaries use gain/loss analysis to compare actual changes to assumed changes from various sources with respect to assets, liabilities, and salaries. We also use this analysis to determine:

- ❖ The accuracy of our valuation model and annual processing.
- ❖ Why contribution rates changed.
- ❖ The reasonableness of the actuarial assumptions.

Actuarial gains will reduce contribution rates; actuarial losses will increase contribution rates. Under a reasonable set of actuarial assumptions, actuarial gains and losses will offset over long-term experience periods. The tables that follow provide more details on the individual contribution rate gains and losses for both the Normal Cost rate and the UAAL rate that employers pay.

Change in Employer and State Plan 2/3 Normal Cost Rate by Source			
Change in Normal Costs	**PERS**	**TRS**	**SERS**
2018 Normal Cost Before Laws of 2019	**7.45%**	**8.40%**	**8.02%**
Remove Rate Floor	0.00%	0.00%	0.00%
Remove Prior Employer Liability	(0.02%)	(0.38%)	0.00%
2018 Adjusted Normal Cost Rate	**7.43%**	**8.02%**	**8.02%**
Liabilities			
Salaries	0.11%	0.60%	0.91%
Termination	(0.15%)	(0.24%)	(0.16%)
Retirement	0.01%	0.02%	0.03%
Disability	0.01%	0.00%	0.01%
Mortality	0.01%	0.01%	0.01%
Growth / Return to Work	0.65%	1.10%	1.09%
Other Liabilities	0.12%	0.02%	0.13%
Total Liability Gains/Losses	**0.76%**	**1.51%**	**2.02%**
Assets*			
Contributions	(0.12%)	(0.03%)	(0.12%)
Disbursements	(0.03%)	(0.02%)	(0.01%)
Investment Returns	(0.65%)	(0.43%)	(0.59%)
Total Asset Gains/Losses	**(0.80%)**	**(0.48%)**	**(0.73%)**
Incremental Changes			
Plan Change	0.00%	0.00%	0.00%
Method Change	0.03%	0.01%	0.03%
Assumption Change	0.02%	0.02%	0.03%
Correction Change	0.00%	0.00%	0.00%
Experience Study Change	(0.47%)	(0.01%)	(0.04%)
Total Incremental Changes Gains/Losses	**(0.42%)**	**0.02%**	**0.02%**
Present Value of Future Salaries Gains/Losses	**(0.62%)**	**(1.09%)**	**(1.59%)**
Plan 3 TAP Annuities	**0.00%**	**0.00%**	**0.00%**
Other Gains/Losses	**0.01%**	**0.07%**	**0.02%**
Total Change	**(1.07%)**	**0.03%**	**(0.26%)**
2019 Preliminary Normal Cost	**6.36%**	**8.05%**	**7.76%**
Increase from Applied Rate Floor	0.00%	0.00%	0.00%
Rate to Amortize Prior Employer Liability	0.00%	0.00%	0.00%
Excess Member Rate	N/A	0.00%	N/A
Laws of 2020	0.00%	0.00%	0.00%
2019 Adjusted Normal Cost	**6.36%**	**8.05%**	**7.76%**

Note: Totals may not agree due to rounding.

**Asset Gain/Loss performed on AVA not MVA.*

Change in Employer and State Plan 2/3 Normal Cost Rate by Source *(Continued)*			
Change in Normal Costs	**PSERS**	**LEOFF[1]**	**WSPRS[2]**
2018 Normal Cost Before Laws of 2019	**6.76%**	**3.43%**	**20.41%**
Remove Rate Floor	0.00%	(0.84%)	0.00%
Remove Prior Employer Liability[3]	0.00%	0.00%	(6.64%)
2018 Adjusted Normal Cost Rate	**6.76%**	**2.59%**	**13.77%**
Liabilities			
Salaries	0.27%	0.13%	(0.14%)
Termination	(0.22%)	(0.01%)	0.01%
Retirement	0.01%	0.01%	(0.09%)
Disability	0.01%	0.00%	0.03%
Mortality	0.01%	0.00%	0.20%
Growth / Return to Work	2.69%	0.33%	0.82%
Other Liabilities	0.01%	0.04%	0.36%
Total Liability Gains/Losses	**2.78%**	**0.50%**	**1.19%**
Assets[4]			
Contributions	(0.19%)	(0.13%)	0.16%
Disbursements	0.00%	0.01%	0.04%
Investment Returns	(0.19%)	(0.33%)	(1.68%)
Total Asset Gains/Losses	**(0.37%)**	**(0.45%)**	**(1.47%)**
Incremental Changes			
Plan Change	0.00%	0.00%	0.00%
Method Change	0.00%	0.01%	0.01%
Assumption Change	0.00%	0.00%	0.17%
Correction Change	(0.01%)	0.00%	0.00%
Experience Study Change	(0.41%)	(0.10%)	(0.06%)
Total Incremental Changes Gains/Losses	**(0.42%)**	**(0.09%)**	**0.12%**
Present Value of Future Salaries Gains/Losses	**(2.30%)**	**(0.23%)**	**(0.89%)**
Other Gains/Losses	**0.05%**	**(0.00%)**	**0.05%**
Total Change	**(0.26%)**	**(0.27%)**	**(1.00%)**
2019 Preliminary Normal Cost	**6.50%**	**2.32%**	**12.77%**
Increase from Applied Rate Floor	0.00%	0.75%	0.00%
Rate to Amortize Prior Employer Liability	0.00%	0.00%	1.32%
Excess Member Rate	N/A	N/A	4.32%
Laws of 2020	0.00%	0.00%	0.16%
2019 Adjusted Normal Cost	**6.50%**	**3.07%**	**18.57%**

Note: Totals may not agree due to rounding.

[1] The LEOFF contribution rate is the state's portion only (20% of the Plan 2 Normal Cost).

[2] The WSPRS normal cost contribution rate applies to Plans 1 and 2.

[3] For WSPRS, this rate is attributable to the excess member rate (5.32%), and the remaining (1.32%) is attributable to prior employer liability.

[4] Asset Gain/Loss performed on AVA not MVA.

Change in Employer and State Plan 1 UAAL Rate by Source[1]			
Change in UAAL Rate	**PERS, SERS, & PSERS[2]**	**TRS**	**LEOFF[3]**
2018 UAAL Rate Before Laws of 2019	**4.08%**	**6.11%**	**(26.29%)**
Remove Rate Floor	0.00%	(0.32%)	0.00%
Remove Plan 1 Benefit Improvements	(0.24%)	(0.36%)	N/A
Fixed Amortization Date Adjustment[4]	N/A	N/A	0.66%
2018 Adjusted UAAL Rate	**3.84%**	**5.43%**	**(25.63%)**
Liabilities	**0.00%**	**0.00%**	**0.00%**
Salaries	0.00%	0.01%	(0.02%)
Termination	0.00%	0.00%	0.00%
Retirement	0.00%	0.00%	(0.03%)
Disability	0.00%	0.00%	0.00%
Mortality	0.00%	0.00%	(0.17%)
Return to Work	0.00%	0.00%	0.00%
Inflation (CPI)	0.00%	0.00%	0.41%
Other Liabilities	0.01%	0.00%	0.38%
Total Liability Gains/Losses	**0.01%**	**0.01%**	**0.57%**
Assets[5]	**0.00%**	**0.00%**	**0.00%**
Contributions	(0.22%)	(0.32%)	(0.00%)
Disbursements	0.01%	0.04%	0.07%
Investment Returns	(0.20%)	(0.33%)	(2.77%)
Total Asset Gains/Losses	**(0.40%)**	**(0.61%)**	**(2.70%)**
Incremental Changes	**0.00%**	**0.00%**	**0.00%**
Plan Change	0.09%	0.19%	0.00%
Method Change	0.00%	0.00%	0.00%
Assumption Change	0.00%	0.00%	0.00%
Correction Change	0.00%	0.00%	0.00%
Experience Study Change	(0.27%)	(0.25%)	0.33%
Total Incremental Changes Gains/Losses	**(0.18%)**	**(0.06%)**	**0.33%**
Present Value of Future Salaries Gains/Losses	**(0.37%)**	**(0.67%)**	**0.55%**
Other Gains/Losses	**0.06%**	**0.06%**	**(0.65%)**
Total Change	**(0.88%)**	**(1.27%)**	**(1.90%)**
2019 Preliminary UAAL Rate	**2.96%**	**4.16%**	**(27.53%)**
Increase from Applied Rate Floor	0.54%	1.59%	0.00%
Increase from Plan 1 Benefit Improvements	0.10%	0.21%	N/A
Laws of 2020	0.11%	0.23%	0.00%
2019 Adjusted UAAL Rate	**3.71%**	**6.19%**	**(27.53%)**

Note: Totals may not agree due to rounding.

[1] WSPRS does not have a UAAL rate.

[2] Rate determined to fund the PERS Plan 1 UAAL. SERS and PSERS employers also pay the PERS 1 UAAL rate.

[3] The LEOFF contribution rate is the UAAL rate for Plan 1. The plan has a surplus of assets over liabilities, so no rate is currently payable.

[4] LEOFF 1 fixed amortization date is 6/30/2024.

[5] Asset Gain/Loss performed on AVA not MVA.