

The background of the slide features a cosmic theme with a dark blue and black space filled with stars and nebulae. In the upper left, a person is cosplaying as Han Solo, wearing a brown jacket and holding a blaster. In the lower right, a person is cosplaying as Chewbacca, wearing a brown bandolier. The title 'GUARDIANS OF THE FINANCE GALAXY' is prominently displayed in the upper center in a bold, yellow, sans-serif font. Below the title, the text 'THE 2019 CSMFO ANNUAL CONFERENCE' is written in a smaller, white, sans-serif font. The overall aesthetic is reminiscent of a comic book or movie poster.

GUARDIANS OF THE FINANCE GALAXY

THE 2019 CSMFO ANNUAL CONFERENCE

Actuarial Information/Valuations 101

*Julian Robinson, FSA, EA, MAAA
CalPERS Senior Pension Actuary*

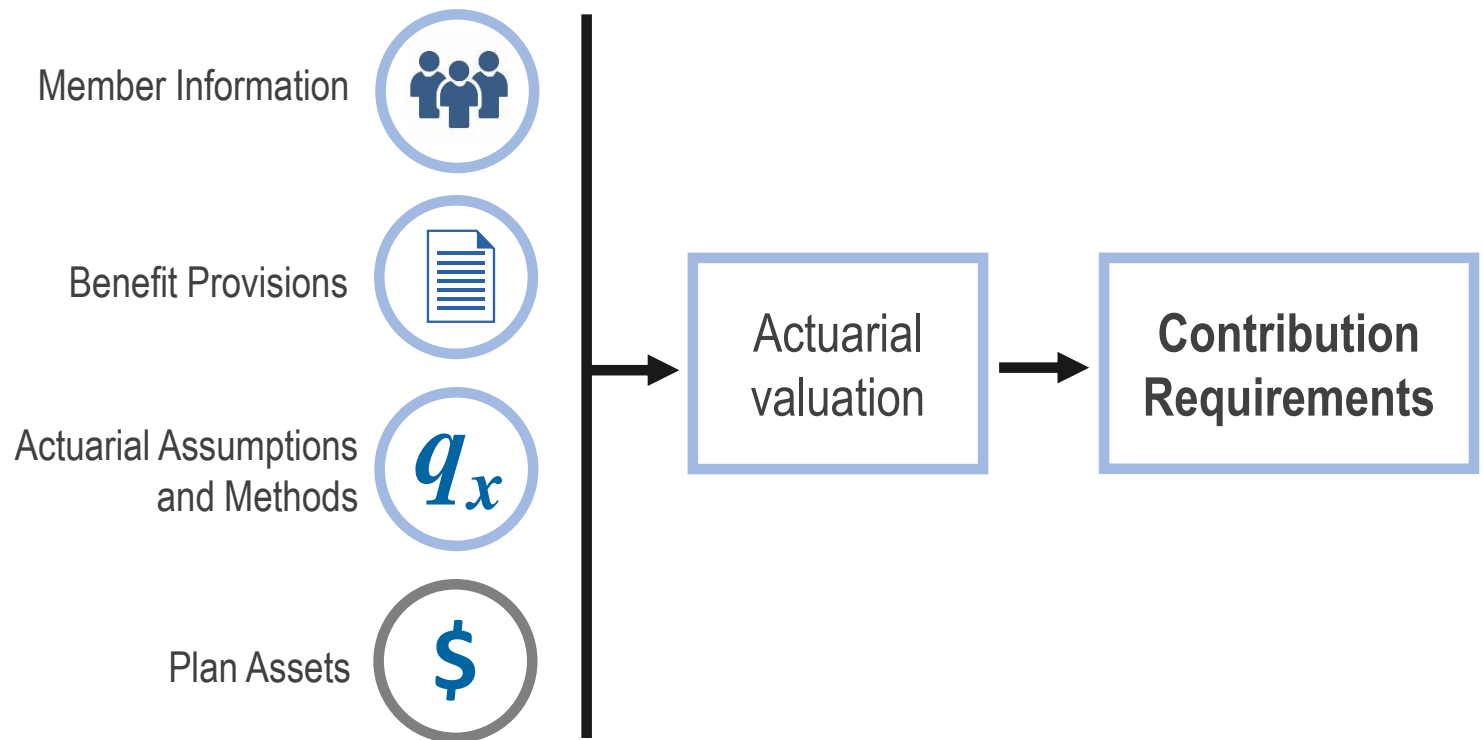


Topics

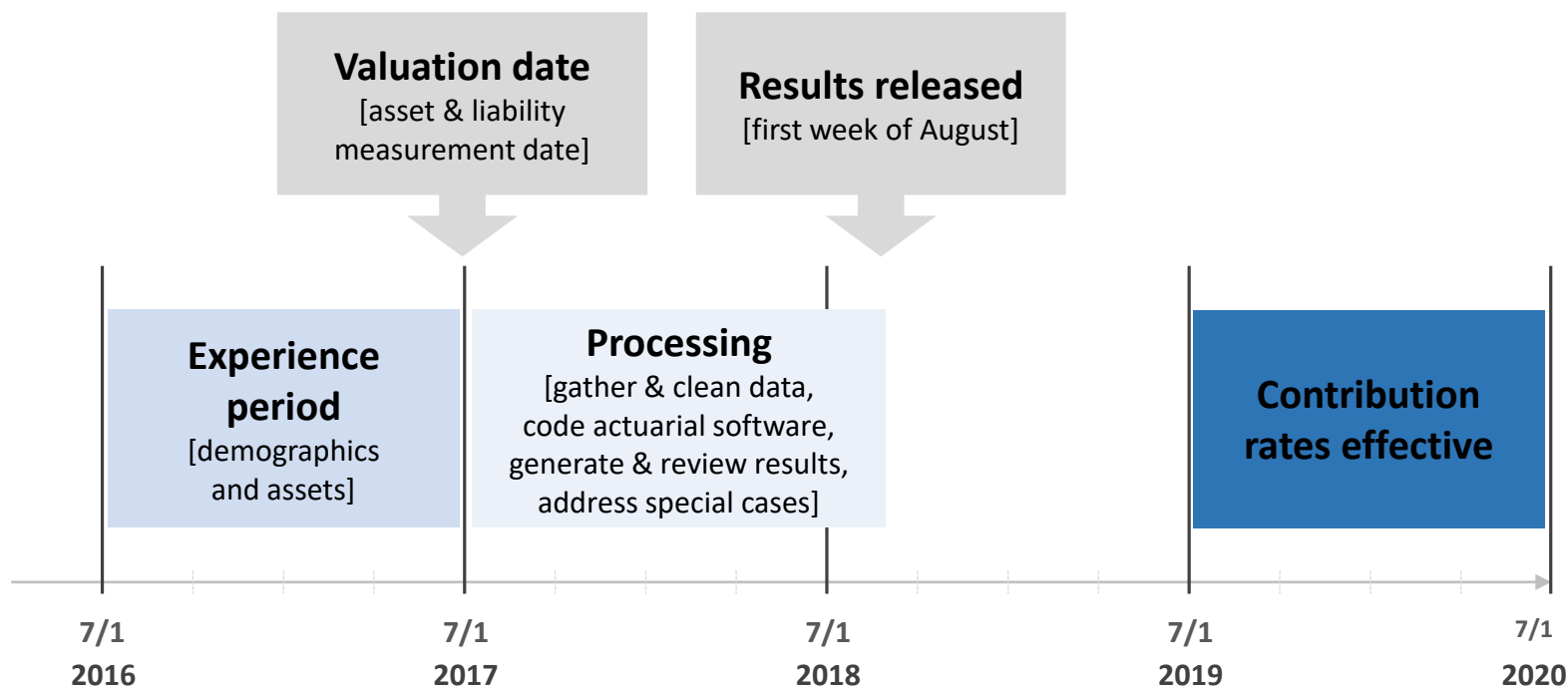
- Pension Funding Principles
- Non-pooled plans vs Pooled plans
- Actuarial Report Highlights
 - Contribution Requirements for FY 2019-20
 - Funded Status of the Plans
 - 5-Year Contribution Projections
 - Alternatives for proactively managing Unfunded Accrued Liabilities

Pension Funding Principles

Development of Contribution Requirements



Actuarial Valuation Timeline

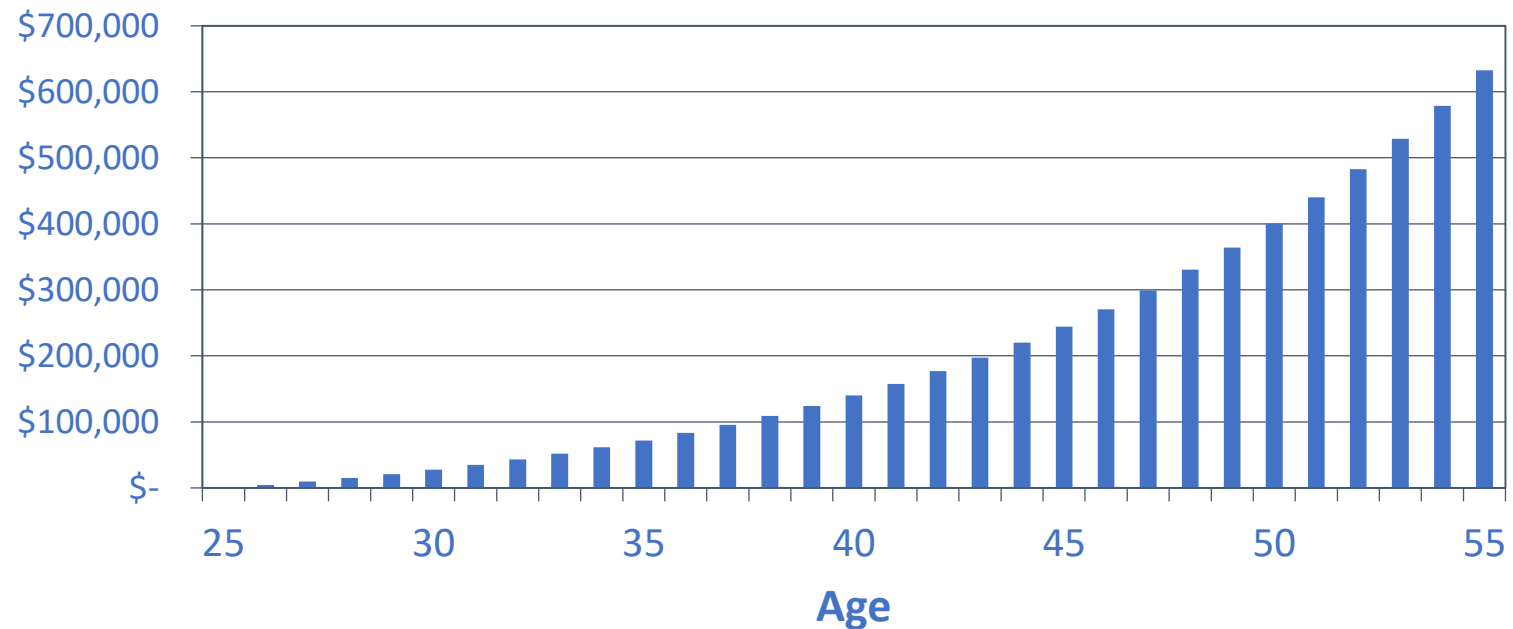


Normal Cost and Accrued Liability

- Service accrues each year for active members
 - Example 2% of salary each year in the 2% @ 62 benefit formula
- Normal Cost is the actuarially determined value of the annual accrual
 - Shared between Employer and Employee
- Accrued Liability is the total of all prior years' Normal Costs

Normal Cost and Accrued Liability

Accrued liability over a 30-year career



Unfunded Accrued Liability (UAL) and Funded Status

$$\text{UAL (\$)} = \text{Accrued Liability} - \text{Market Value of Assets}$$

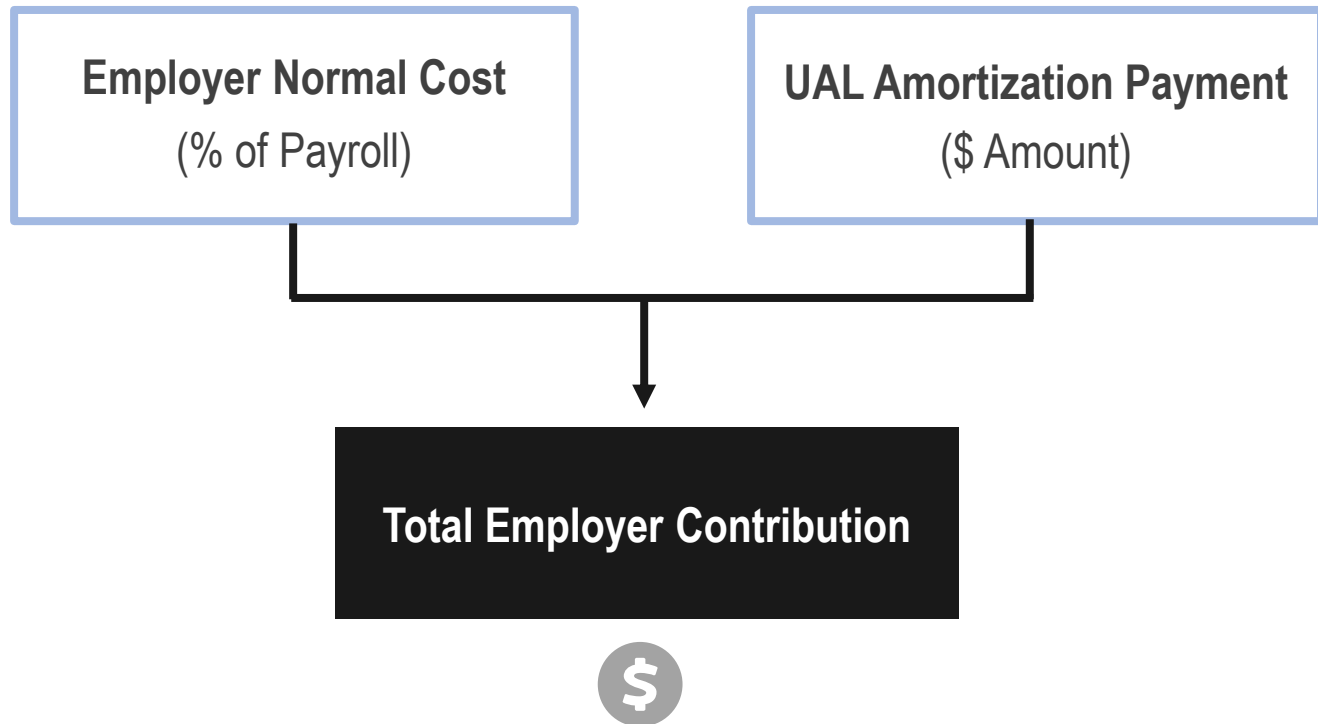
$$\text{Funded Status (\%)} = \frac{\text{Market Value of Assets}}{\text{Accrued Liability}}$$

Unfunded Accrued Liability (UAL) and Funded Status

$$\begin{array}{rcccl} \boxed{\text{UAL (\$)}} & = & \boxed{\text{Accrued Liability}} & - & \boxed{\text{Market Value of Assets}} \\ \boxed{\$50 \text{ million}} & = & \boxed{\$200 \text{ million}} & - & \boxed{\$150 \text{ million}} \end{array}$$

$$\boxed{\text{Funded Status (\%)}} = \frac{\boxed{\text{Market Value of Assets}}}{\boxed{\text{Accrued Liability}}} = \frac{\boxed{\$150 \text{ million}}}{\boxed{\$200 \text{ million}}} = \boxed{75\%}$$

Required Employer Contributions



Non-Pooled Plans / Pooled Plans

Pooled Plans vs Non-Pooled Plans

- Plans with less than 100 active members are combined into Risk Pools
 - Miscellaneous Risk Pool
 - Safety Risk Pool
- Aggregate data and experience of all pooled plans
 - Setting normal cost
 - Vary by plan formula and provisions
 - Pool's gains/losses allocated among pooled plans
 - proportionate share based on accrued liability

Risk Pool's Required Employer Contribution

| | | Fiscal Year 2018-19 | Fiscal Year 2019-20 |
|---|----|--------------------------------|--------------------------------|
| Contribution in Projected Dollars | | | |
| a) Risk Pool's Normal Cost | \$ | 363,403,777 | \$ 430,072,060 |
| b) Employee Contribution | | <u>154,192,108</u> | <u>179,394,337</u> |
| c) Risk Pool's Gross Employer Normal Cost [(a) - (b)] | \$ | 209,211,669 | \$ 250,677,723 |
| d) Payment on Risk Pool's Amortization Bases | | 239,409,456 | 282,330,885 |
| e) Total Required Employer Contribution* [(c) + (d)] | \$ | 239,409,456 | \$ 533,008,608 |
| * Total may not add up due to rounding | | | |

Risk Pool's Normal Cost by Benefit Formula

| Normal Cost Contribution as Percentage of Projected Payroll for Fiscal Year 2019-20 | Benefit Formula | | | | | |
|--|------------------------|---------------------|---------------------|-----------------------|-----------------------|---------------------|
| | 2% at 62 | 2% at 60 | 2% at 55 | 2.5% at 55 | 2.7% at 55 | 3% at 60 |
| 1) Total Normal Cost Contribution | 13.735% | 14.996% | 16.586% | 18.774% | 20.468% | 21.476% |
| 2) Expected Employee Contribution | <u>6.750%</u> | <u>6.915%</u> | <u>6.906%</u> | <u>7.951%</u> | <u>7.954%</u> | <u>7.784%</u> |
| 3) Total Employer Normal Cost Base Benefit [(1)-(2)] | 6.985% | 8.081% | 9.680% | 10.823% | 12.514% | 13.692% |

Class 1 benefits as provided in Appendix C-1 are in addition to these costs.

Funded Status of the Risk Pool

| | | June 30, 2016 | June 30, 2017 |
|--|----|----------------------|----------------------|
| 1. Present Value of Projected Benefits | \$ | 17,510,837,713 | \$ 18,999,994,902 |
| 2. Entry Age Normal Accrued Liability | \$ | 14,775,287,594 | \$ 15,944,026,687 |
| 3. Market Value of Assets (MVA) | \$ | 10,897,707,800 | \$ 12,162,131,074 |
| 4. Unfunded Liability [(2) - (3)] | | 3,877,579,794 | 3,781,895,613 |
| 5. Funded Ratio [(3) / (2)] | | 73.8% | 76.3% |

Risk Pool's Required Employer Contribution

| | | Fiscal Year 2018-19 | Fiscal Year 2019-20 |
|---|----|------------------------|------------------------|
| Contribution in Projected Dollars | | | |
| a) Risk Pool's Normal Cost | \$ | 404,112,798 | \$ 460,050,248 |
| b) Employee Contribution | | <u>130,684,983</u> | <u>146,793,126</u> |
| c) Risk Pool's Gross Employer Normal Cost [(a) - (b)] | \$ | 273,427,815 | \$ 313,257,122 |
| d) Payment on Risk Pool's Amortization Bases | | 359,815,296 | 420,506,951 |
| e) Total Required Employer Contribution* [(c) + (d)] | \$ | 633,243,111 | \$ 733,764,073 |
| * Total may not add up due to rounding | | | |

Risk Pool's Normal Cost by Benefit Formula

| Normal Cost Contribution as Percentage of Projected Payroll for Fiscal Year 2019-20 | Benefit Formula | | | | | | |
|--|-----------------|---------------|---------------|-------------|-------------|-------------|-------------|
| | 2% at 57 | 2.5% at 57 | 2.7% at 57 | 2% at 55 | 2% at 50 | 3% at 55 | 3% at 50 |
| 1) Total Normal Cost Contribution | 20.216% | 23.919% | 25.034% | 20.463% | 25.575% | 27.914% | 29.696% |
| 2) Expected Employee Contribution | 10.000% | 12.000% | 12.000% | 6.923% | 8.939% | 8.986% | 8.989% |
| 3) Total Employer Normal Cost Base Benefit [1 -2] | 10.216% | 11.919% | 13.034% | 13.540% | 16.636% | 18.928% | 20.707% |

Class 1 benefits as provided in Appendix C-1 are in addition to these costs.

Funded Status of the Risk Pool

| | | June 30, 2016 | June 30, 2017 |
|--|----|----------------|-------------------|
| 1. Present Value of Projected Benefits | \$ | 23,317,051,957 | \$ 24,824,813,602 |
| 2. Entry Age Normal Accrued Liability | \$ | 19,698,755,513 | \$ 20,966,498,823 |
| 3. Market Value of Assets (MVA) | \$ | 13,911,091,881 | \$ 15,135,860,105 |
| 4. Unfunded Liability [(2) - (3)] | | 5,787,663,632 | 5,830,638,718 |
| 5. Funded Ratio [(3) / (2)] | | 70.6% | 72.2% |

Actuarial Report Highlights

Common Questions

- What are my required contributions?
- Is my plan in good shape?
- Why did my required contributions change?
- Where are my required contributions headed?
- Are there any alternative UAL amortization schedules?
- Where are my PEPRA members?
- What additional information is available in the reports?

Non-Pooled & Pooled Plans

- What are my required contributions? - Cover page

| Fiscal Year | Employer Normal Cost Rate | Employer Amortization of Unfunded Accrued Liability | Employee PEPRA Rate |
|--------------------------|---------------------------|---|---------------------|
| 2019-20 | 10.321% | \$5,679,604 | 7.25% |
| <i>Projected Results</i> | | | |
| <i>2020-21</i> | <i>11.0%</i> | <i>\$6,360,000</i> | <i>TBD</i> |

- Rates do not reflect any cost sharing information
- FY 2020-21 projection:
 - Phase in of discount rate 7.00%
 - Doesn't reflect the FY 2017-18 asset gain

Non-Pooled and Pooled Plans

•What are my required contributions? – Page 4

Required Contributions

| Required Employer Contribution | Fiscal Year 2019-20 |
|---|------------------------|
| Employer Normal Cost Rate | 10.321% |
| <i>Plus, Either</i> | |
| 1) Monthly Employer Dollar UAL Payment | \$ 473,300 |
| <i>Or</i> | |
| 2) Annual UAL Prepayment Option | \$ 5,484,277 |
| Required PEPRA Member Contribution Rate | 7.25% |
| <i>The total minimum required employer contribution is the sum of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll) plus the Employer Unfunded Accrued Liability (UAL) Contribution Amount (billed monthly in dollars).</i> | |
| <i>Only the UAL portion of the employer contribution can be prepaid (which must be received in full no later than July 31). Plan Normal Cost contributions will be made as part of the payroll reporting process. If there is contractual cost sharing or other change, this amount will change.</i> | |
| <i>In accordance with Sections 20537 and 20572 of the Public Employees' Retirement Law, if a contracting agency fails to remit the required contributions when due, interest and penalties may apply.</i> | |
| <i>For additional detail regarding the determination of the required contribution for PEPRA members, see Appendix D. Required member contributions for Classic members can be found in Appendix B.</i> | |

Non-Pooled & Pooled Plans

- Employer Contribution comprised of 2 components
 1. Normal Cost Rate (% of Payroll)
 2. UAL Dollar Payment
- Annual UAL Prepayment Option
 - Only for UAL Dollar Payment component
 - Discount of a half year of interest
 - Avoid overpaying
 - Normal Cost Rate must be paid regularly throughout the year

UAL Invoice July 1, 2018

Invoice Number 100000015346497
 Invoice Date: July 01, 2018
 Payment Due Date: July 31, 2018

| Description | Amount | | | | |
|---|---------------------|----------|--------------|---------------|--|
| <p>Annual Unfunded Accrued Liability as of the June 30, 2016 Actuarial Valuation for Rate Plan Identifier [REDACTED]</p> <p>The total minimum required employer contribution is the sum of the Plan's Employer Normal Cost Rate (expressed as a percentage of payroll) plus the Employer Unfunded Accrued Liability Contribution Amount.</p> <p>Your agency's monthly amount due toward the Unfunded Accrued Liability is:</p> <table> <tr> <td>Amount</td><td>Due Date</td></tr> <tr> <td>\$389,874.00</td><td>July 31, 2018</td></tr> </table> <p>If you would like to prepay the entire Annual Payment toward your Plan's Unfunded Accrued Liability, you can submit the Annual Lump Sum Prepayment amount of \$4,514,959.00 to the invoice number above by July 31, 2018 instead of the monthly amount listed.</p> <p>Please refer to the June 30, 2016 Actuarial Valuation report for the details of this calculation. Reports are available at CalPERS On-Line or by visiting MyCalPERS.CA.GOV.</p> <p>Unfunded Accrued Liability contributions are to be paid in full by the payment due date each month. Payments that are not received in full on or before this date will be assessed interest on the total outstanding balance due (Public Employees' Retirement Law § 20572 (b)). Please note that this monthly statement is a demand for payment in accordance with Public Employees' Retirement Law § 20572 (a).</p> <p>For questions concerning your invoice, please call our CalPERS Customer Contact Center at 888 CalPERS (or 888-225-7377) and ask to be referred to the Financial Office.</p> | Amount | Due Date | \$389,874.00 | July 31, 2018 | |
| Amount | Due Date | | | | |
| \$389,874.00 | July 31, 2018 | | | | |
| Total Due | \$389,874.00 | | | | |

Non-Pooled & Non Pooled Plans

• Is my plan in good shape? – Page 5

Plan's Funded Status

| | June 30, 2016 | June 30, 2017 |
|---|----------------|----------------|
| 1. Present Value of Projected Benefits | \$ 298,987,967 | \$ 313,514,027 |
| 2. Entry Age Normal Accrued Liability | 268,433,783 | 280,833,232 |
| 3. Market Value of Assets (MVA) | \$ 189,131,190 | \$ 203,560,016 |
| 4. Unfunded Accrued Liability (UAL) [(2) – (3)] | \$ 79,302,593 | \$ 77,273,216 |
| 5. Funded Ratio [(3) / (2)] | 70.5% | 72.5% |

- Unfunded Liability = UAL = Unfunded Accrued Liability
- Funded Ratio is one indicator of the plan's health
- Information as of June 30, 2017

Non-Pooled Plans

- Why did my required contributions change? Page 14

(Gain)/Loss Analysis 6/30/16 – 6/30/17

1. Total (Gain)/Loss for the Year

| | | |
|---|----|-------------|
| a) Unfunded Accrued Liability (UAL) as of 6/30/16 | \$ | 79,302,593 |
| b) Expected Payment on the UAL during 2016-17 | | 2,982,117 |
| c) Interest through 6/30/17 $[(1.07375 \times (1a) - ((1.07375)^{1/2} - 1) \times (1b))]$ | | 5,740,557 |
| d) Expected UAL before all other changes $[(1a) - (1b) + (1c)]$ | | 82,061,033 |
| e) Change due to plan changes | | 0 |
| f) Change due to assumption change | | 3,614,522 |
| g) Expected UAL after all other changes $[(1d) + (1e) + (1f)]$ | | 85,675,555 |
| h) Actual UAL as of 6/30/17 | | 77,273,216 |
| i) Total (Gain)/Loss for 2016-17 $[(1h) - (1g)]$ | \$ | (8,402,339) |

2. Contribution (Gain)/Loss for the Year

| | | |
|---|----|-----------|
| g) Contribution (Gain)/Loss $[(2e) - (2f)]$ | \$ | (138,764) |
|---|----|-----------|

3. Asset (Gain)/Loss for the Year

| | | |
|--------------------------------------|----|-------------|
| j) Asset (Gain)/Loss $[(3h) - (3i)]$ | \$ | (7,258,551) |
|--------------------------------------|----|-------------|

4. Liability (Gain)/Loss for the Year

| | | |
|---|----|-------------|
| d) Liability (Gain)/Loss $[(4a) - (4b) - (4c)]$ | \$ | (1,005,024) |
|---|----|-------------|

- Expected liability and asset values compared with actual values
- Explains changes to the UAL amount

Pooled Plans

Gain/Loss Analysis

- Gain/Loss Analysis performed for entire pool
- Share of Gain/Loss allocated to each plan in the pool
- Appears in Section 2 Reports
 - Available on CalPERS website www.calpers.ca.gov Forms & Publications



Section 2

**Actuarial Valuation
as of June 30, 2017
for CalPERS**

Miscellaneous Risk Pool

**Required Contributions
for Fiscal Year
July 1, 2019 – June 30, 2020**

Non-Pooled and Pooled Plans

Why did my contributions change?

Amortization Schedule and Alternatives

- Schedule of Required UAL Amortization Payments
- Two sample Fresh Start Alternatives
 - Pay off UAL more rapidly
 - Other alternatives available

Non-Pooled & Pooled Plans

Non-Pooled p16 / Pooled p9

Schedule of Amortization Bases

| Reason for Base | Date Established | Ramp Up/Down 2019-20 | Amortization Period | Balance 6/30/17 | Expected Payment 2017-18 | Balance 6/30/18 | Expected Payment 2018-19 | Balance 6/30/19 | Scheduled Payment for 2019-20 |
|---------------------|------------------|----------------------|---------------------|---------------------|--------------------------|---------------------|--------------------------|---------------------|-------------------------------|
| ASSUMPTION CHANGE | 06/30/03 | No Ramp | 6 | \$5,507,032 | \$826,023 | \$5,050,849 | \$845,206 | \$4,541,727 | \$867,739 |
| METHOD CHANGE | 06/30/04 | No Ramp | 7 | \$(504,682) | \$(68,653) | \$(470,173) | \$(70,214) | \$(431,546) | \$(72,092) |
| BENEFIT CHANGE | 06/30/06 | No Ramp | 9 | \$743,224 | \$86,071 | \$707,971 | \$87,944 | \$668,223 | \$90,307 |
| GOLDEN HANDSHAKE | 06/30/09 | No Ramp | 12 | \$140,632 | \$13,567 | \$136,777 | \$13,842 | \$132,359 | \$14,216 |
| ASSUMPTION CHANGE | 06/30/09 | No Ramp | 12 | \$3,968,375 | \$382,823 | \$3,859,625 | \$390,601 | \$3,734,935 | \$401,146 |
| SPECIAL (GAIN)/LOSS | 06/30/09 | No Ramp | 22 | \$4,108,056 | \$278,201 | \$4,117,780 | \$282,636 | \$4,123,617 | \$290,347 |
| SPECIAL (GAIN)/LOSS | 06/30/10 | No Ramp | 23 | \$(2,825,565) | \$(186,979) | \$(2,836,780) | \$(189,885) | \$(2,845,798) | \$(195,069) |
| ASSUMPTION CHANGE | 06/30/11 | No Ramp | 14 | \$4,895,589 | \$429,335 | \$4,805,893 | \$437,657 | \$4,701,075 | \$449,503 |
| SPECIAL (GAIN)/LOSS | 06/30/11 | No Ramp | 24 | \$(2,539,820) | \$(164,470) | \$(2,553,629) | \$(166,962) | \$(2,565,858) | \$(171,524) |
| PAYMENT (GAIN)/LOSS | 06/30/12 | No Ramp | 25 | \$1,837,403 | \$116,591 | \$1,849,871 | \$118,313 | \$1,861,460 | \$121,549 |
| (GAIN)/LOSS | 06/30/12 | No Ramp | 25 | \$9,673,666 | \$613,836 | \$9,739,308 | \$622,902 | \$9,800,321 | \$639,936 |
| (GAIN)/LOSS | 06/30/13 | 100% → | 26 | \$31,793,816 | \$1,283,821 | \$32,769,323 | \$1,737,544 | \$33,345,671 | \$2,231,372 |
| ASSUMPTION CHANGE | 06/30/14 | 80% ↗ | 17 | \$12,649,717 | \$470,917 | \$13,079,132 | \$719,540 | \$13,282,203 | \$985,487 |
| (GAIN)/LOSS | 06/30/14 | 80% ↗ | 27 | \$(21,297,610) | \$(582,601) | \$(22,238,336) | \$(886,498) | \$(22,932,544) | \$(1,214,414) |
| (GAIN)/LOSS | 06/30/15 | 60% ↗ | 28 | \$15,117,178 | \$212,871 | \$15,992,721 | \$431,543 | \$16,705,281 | \$665,107 |
| ASSUMPTION CHANGE | 06/30/16 | 40% ↗ | 19 | \$4,166,537 | \$(117,522) | \$4,590,319 | \$86,621 | \$4,833,411 | \$177,985 |
| (GAIN)/LOSS | 06/30/16 | 40% ↗ | 29 | \$14,627,485 | \$0 | \$15,687,978 | \$217,697 | \$16,599,906 | \$447,391 |
| ASSUMPTION CHANGE | 06/30/17 | 20% ↗ | 20 | \$3,614,522 | \$(151,828) | \$4,033,810 | \$(156,193) | \$4,488,017 | \$84,580 |
| (GAIN)/LOSS | 06/30/17 | 20% ↗ | 30 | \$(8,402,338) | \$0 | \$(9,011,508) | \$0 | \$(9,664,842) | \$(133,962) |
| TOTAL | | | | \$77,273,216 | \$3,442,003 | \$79,310,931 | \$4,522,294 | \$80,377,618 | \$5,679,604 |

Non-Pooled & Pooled Plans

Schedule of Amortization Bases

NEW!!

| Reason for Base | Date Established | Ramp Up/Down 2019-20 | Amortization Period | Balance 6/30/17 | Exp P |
|---------------------|------------------|----------------------|---------------------|---------------------|---------------|
| ASSUMPTION CHANGE | 06/30/03 | No Ramp | 6 | \$5,507,032 | |
| METHOD CHANGE | 06/30/04 | No Ramp | 7 | \$(504,682) | \$(6 |
| BENEFIT CHANGE | 06/30/06 | No Ramp | 9 | \$743,224 | \$8 |
| GOLDEN HANDSHAKE | 06/30/09 | No Ramp | 12 | \$140,632 | \$1 |
| ASSUMPTION CHANGE | 06/30/09 | No Ramp | 12 | \$3,968,375 | \$38 |
| SPECIAL (GAIN)/LOSS | 06/30/09 | No Ramp | 22 | \$4,108,056 | \$27 |
| SPECIAL (GAIN)/LOSS | 06/30/10 | No Ramp | 23 | \$(2,825,565) | \$(18 |
| ASSUMPTION CHANGE | 06/30/11 | No Ramp | 14 | \$4,895,589 | \$42 |
| SPECIAL (GAIN)/LOSS | 06/30/11 | No Ramp | 24 | \$(2,539,820) | \$(16 |
| PAYMENT (GAIN)/LOSS | 06/30/12 | No Ramp | 25 | \$1,837,403 | \$11 |
| (GAIN)/LOSS | 06/30/12 | No Ramp | 25 | \$9,673,666 | \$61 |
| (GAIN)/LOSS | 06/30/13 | 100% → | 26 | \$31,793,816 | \$1,28 |
| ASSUMPTION CHANGE | 06/30/14 | 80% ↗ | 17 | \$12,649,717 | \$47 |
| (GAIN)/LOSS | 06/30/14 | 80% ↗ | 27 | \$(21,297,610) | \$(58 |
| (GAIN)/LOSS | 06/30/15 | 60% ↗ | 28 | \$15,117,178 | \$21 |
| ASSUMPTION CHANGE | 06/30/16 | 40% ↗ | 19 | \$4,166,537 | \$(11 |
| (GAIN)/LOSS | 06/30/16 | 40% ↗ | 29 | \$14,627,485 | |
| ASSUMPTION CHANGE | 06/30/17 | 20% ↗ | 20 | \$3,614,522 | \$(15 |
| (GAIN)/LOSS | 06/30/17 | 20% ↗ | 30 | \$(8,402,338) | |
| TOTAL | | | | \$77,273,216 | \$3,44 |

Amortization Schedule and Alternatives

| Date | <u>Current Amortization Schedule*</u> | | <u>Alternate Schedules</u> | | | |
|--------------------------|---------------------------------------|--------------------|----------------------------|--------------------|----------------------|--------------------|
| | Balance | Payment | 20 Year Amortization | | 15 Year Amortization | |
| | | | Balance | Payment | Balance | Payment |
| 6/30/2019 | 80,377,618 | 5,679,604 | 80,377,618 | 6,007,347 | 80,377,618 | 7,308,810 |
| 6/30/2020 | 80,323,109 | 6,282,966 | 79,983,692 | 6,180,058 | 78,635,876 | 7,518,938 |
| 6/30/2021 | 79,639,796 | 6,976,899 | 79,382,345 | 6,357,735 | 76,550,246 | 7,735,108 |
| 6/30/2022 | 78,188,295 | 7,464,159 | 78,553,394 | 6,540,520 | 74,089,540 | 7,957,492 |
| 6/30/2023 | 76,126,946 | 7,623,444 | 77,475,050 | 6,728,559 | 71,220,127 | 8,186,270 |
| 6/30/2024 | 73,751,188 | 7,842,615 | 76,123,789 | 6,922,006 | 67,905,756 | 8,421,625 |
| 6/30/2025 | 70,976,212 | 7,039,488 | 74,474,226 | 7,121,013 | 64,107,355 | 8,663,747 |
| 6/30/2026 | 68,831,784 | 7,329,787 | 72,498,974 | 7,325,742 | 59,782,825 | 8,912,830 |
| 6/30/2027 | 66,231,245 | 7,540,520 | 70,168,495 | 7,536,357 | 54,886,813 | 9,169,074 |
| 6/30/2028 | 63,223,929 | 7,640,760 | 67,450,941 | 7,753,028 | 49,370,470 | 9,432,685 |
| 6/30/2029 | 59,894,776 | 7,860,432 | 64,311,976 | 7,975,927 | 43,181,192 | 9,703,874 |
| 6/30/2030 | 56,096,763 | 8,086,418 | 60,714,598 | 8,205,235 | 36,262,344 | 9,982,861 |
| 6/30/2031 | 51,789,355 | 7,735,264 | 56,618,936 | 8,441,136 | 28,552,956 | 10,269,868 |
| 6/30/2032 | 47,533,323 | 7,601,513 | 51,982,036 | 8,683,818 | 19,987,408 | 10,565,127 |
| 6/30/2033 | 43,107,241 | 6,785,226 | 46,757,634 | 8,933,478 | 10,495,084 | 10,868,874 |
| 6/30/2034 | 39,205,630 | 6,467,244 | 40,895,912 | 9,190,316 | | |
| 6/30/2035 | 35,350,457 | 5,992,258 | 34,343,230 | 9,454,537 | | |
| 6/30/2036 | 31,707,688 | 5,484,612 | 27,041,846 | 9,726,355 | | |
| 6/30/2037 | 28,326,544 | 5,353,190 | 18,929,613 | 10,005,988 | | |
| 6/30/2038 | 24,836,370 | 5,209,676 | 9,939,652 | 10,293,660 | | |
| 6/30/2039 | 21,241,785 | 5,210,359 | | | | |
| 6/30/2040 | 17,385,886 | 5,360,159 | | | | |
| 6/30/2041 | 13,095,299 | 4,140,027 | | | | |
| 6/30/2042 | 9,757,230 | 4,359,619 | | | | |
| 6/30/2043 | 5,949,740 | 4,104,194 | | | | |
| 6/30/2044 | 2,130,727 | 1,481,018 | | | | |
| 6/30/2045 | 751,440 | 574,710 | | | | |
| 6/30/2046 | 210,740 | 218,246 | | | | |
| 6/30/2047 | | | | | | |
| 6/30/2048 | | | | | | |
| Totals | | 163,444,407 | | 159,382,815 | | 134,697,183 |
| Interest Paid | | 83,066,789 | | 79,005,197 | | 54,319,565 |
| Estimated Savings | | | | 4,061,592 | | 28,747,224 |

| <u>Current Amortization Schedule*</u> | | | <u>Alternate Schedules</u> | | | |
|---------------------------------------|------------|-------------|----------------------------|-------------|----------------------|-------------|
| | | | 20 Year Amortization | | 15 Year Amortization | |
| Date | Balance | Payment | Balance | Payment | Balance | Payment |
| 6/30/2019 | 80,377,618 | 5,679,604 | 80,377,618 | 6,007,347 | 80,377,618 | 7,308,810 |
| 6/30/2020 | 80,323,109 | 6,282,966 | 79,983,692 | 6,180,058 | 78,635,876 | 7,518,938 |
| 6/30/2021 | 79,639,796 | 6,976,899 | 79,382,345 | 6,357,735 | 76,550,246 | 7,735,108 |
| 6/30/2022 | 78,188,295 | 7,464,159 | 78,553,394 | 6,540,520 | 74,089,540 | 7,957,492 |
| 6/30/2023 | 76,126,946 | 7,623,444 | 77,475,050 | 6,728,559 | 71,220,127 | 8,186,270 |
| 6/30/2024 | 73,751,188 | 7,842,615 | 76,123,789 | 6,922,006 | 67,905,756 | 8,421,625 |
| 6/30/2025 | 70,976,212 | 7,039,488 | 74,474,226 | 7,121,013 | 64,107,355 | 8,663,747 |
| 6/30/2026 | 68,831,784 | 7,329,787 | 72,498,974 | 7,325,742 | 59,782,825 | 8,912,830 |
| 6/30/2027 | 66,231,245 | 7,540,520 | 70,168,495 | 7,536,357 | 54,886,813 | 9,169,074 |
| 6/30/2028 | 63,223,929 | 7,640,760 | 67,450,941 | 7,753,028 | 49,370,470 | 9,432,685 |
| 6/30/2029 | 59,894,776 | 7,860,432 | 64,311,976 | 7,975,927 | 43,181,192 | 9,703,874 |
| 6/30/2030 | 56,096,763 | 8,086,418 | 60,714,598 | 8,205,235 | 36,262,344 | 9,982,861 |
| 6/30/2031 | 51,789,355 | 7,735,264 | 56,618,936 | 8,441,136 | 28,552,956 | 10,269,868 |
| 6/30/2032 | 47,533,323 | 7,601,513 | 51,982,036 | 8,683,818 | 19,987,408 | 10,565,127 |
| 6/30/2033 | 43,107,241 | 6,785,226 | 46,757,634 | 8,933,478 | 10,495,084 | 10,868,874 |
| 6/30/2034 | 39,205,630 | 6,467,244 | 40,895,912 | 9,190,316 | | |
| 6/30/2035 | 35,350,457 | 5,992,258 | 34,343,230 | 9,454,537 | | |
| 6/30/2036 | 31,707,688 | 5,484,612 | 27,041,846 | 9,726,355 | | |
| 6/30/2037 | 28,326,544 | 5,353,190 | 18,929,613 | 10,005,988 | | |
| | | | | | | |
| 6/30/2047 | | | | | | |
| 6/30/2048 | | | | | | |
| | | | | | | |
| Totals | | 163,444,407 | | 159,382,815 | | 134,697,183 |
| Interest Paid | | 83,066,789 | | 79,005,197 | | 54,319,565 |
| Estimated Savings | | | | 4,061,592 | | 28,747,224 |

Non-Pooled & Pooled Plans

- Where are my required contributions headed? – Page 5

Projected Employer Contributions

| | Required Contribution | Projected Future Employer Contributions (Assumes 7.25% Return for Fiscal Year 2017-18) | | | | |
|---------------------------------|-----------------------|---|-------------------|-------------------|-------------------|-------------------|
| Fiscal Year | 2019-20 | 2020-21 | 2021-22 | 2022-23 | 2023-24 | 2024-25 |
| Normal Cost % | 10.321% | 11.0% | 11.0% | 11.0% | 11.0% | 11.0% |
| UAL Payment | 5,679,604 | 6,360,000 | 7,208,000 | 7,861,000 | 8,202,000 | 8,611,000 |
| <i>Total as a % of Payroll*</i> | <i>30.0%</i> | <i>32.5%</i> | <i>34.7%</i> | <i>36.2%</i> | <i>36.5%</i> | <i>37.1%</i> |
| <i>Projected Payroll</i> | <i>28,899,871</i> | <i>29,622,499</i> | <i>30,437,117</i> | <i>31,274,138</i> | <i>32,134,176</i> | <i>33,017,866</i> |

*Illustrative only and based on the projected payroll shown.

- Assumes expected return for FY2017-18 and thereafter
- No demographic gains or losses after 6/30/17 included
- Total as % of Payroll for illustration purposes only

Discount Rate Change

- On December 21, 2016 the CalPERS Board adopted a 7% discount rate with a 3-year phase-in
 - 7.375% to be used 6/30/2016
 - **7.25% to be used 6/30/2017**
 - 7.00% to be used 6/30/2018
- Affects all non-pooled and pooled actuarial valuations
- Lower discount rates result in higher accrued liabilities and normal costs
- Full impact of 7.00% discount rate will take 7 years due to phase-in procedures

Other Assumption Changes

- Effective for June 30, 2017 valuation
 - Inflation assumption 2.625%
 - 2.50% for 6/30/18 valuation
 - Payroll growth 2.875%
 - 2.75% for 6/30/18 valuation
 - Updated demographic assumptions
 - Mortality rates
 - Early Retirement rates
 - Adopted by Board in December 2017

Non-Pooled Plans

- Where are my PEPRA members?
 - Non pooled plans include PEPRA members
 - Non pooled plans require the same **employer** rate for all members in the plan
 - Non pooled plans require differing **employee** rates
 - Classic member rate is set by statute
 - PEPRA member rate can be found in Appendix D

DEVELOPMENT OF PEPRA MEMBER CONTRIBUTION RATE

| | | Basis for Current Rate | | Rates Effective July 1, 2019 | | | |
|----------------------|---------------------|------------------------|-------------|------------------------------|--------|---------------|-------------|
| Rate Plan Identifier | Benefit Group Name | Total Normal Cost | Member Rate | Total Normal Cost | Change | Change Needed | Member Rate |
| 99999 | Miscellaneous PEPRA | 13.300% | 6.750% | 14.501% | 1.201% | Yes | 7.250% |

Non-Pooled Plans

Normal Cost for Each Group/Tier

- Appendix D
 - New in June 30, 2017 valuation reports



| Rate Plan Identifier | Benefit Group Name | Total Normal Cost FY 2019-20 | Number of Actives | Payroll on 6/30/2017 |
|----------------------|--------------------------|---------------------------------|----------------------|-------------------------|
| 999 | Miscellaneous First Tier | 17.729% | 213 | 20,427,686 |
| 999999 | Miscellaneous PEPRA | 15.736% | 87 | 6,116,313 |

Pooled Plans

- Where are my PEPRA members?
 - Separate report for PEPRA members
 - Separate contributions for pooled PEPRA members

Non-Pooled & Pooled Plans

- Additional information – NP p23 / P p15

Analysis of Discount Rate Sensitivity

| Sensitivity Analysis | | | | |
|-------------------------------|--------------------|-------------------|----------------------------|---------------|
| As of June 30, 2017 | Plan's Normal Cost | Accrued Liability | Unfunded Accrued Liability | Funded Status |
| 7.25% (current discount rate) | 17.261% | \$280,833,232 | \$77,273,216 | 72.5% |
| 6.0% | 22.326% | \$324,217,372 | \$120,657,356 | 62.8% |
| 7.0% | 17.956% | \$288,137,178 | \$84,577,162 | 70.6% |
| 8.0% | 14.616% | \$258,110,029 | \$54,550,013 | 78.9% |

Non-Pooled & Pooled Plans

- Additional Information – NP p25 / P p17

Hypothetical Termination Liability

| Market Value of Assets (MVA) | Hypothetical Termination Liability ^{1,2} @ 1.75% | Funded Status | Unfunded Termination Liability @ 1.75% | Hypothetical Termination Liability ^{1,2} @ 3.00% | Funded Status | Unfunded Termination Liability @ 3.00% |
|------------------------------|---|---------------|--|---|---------------|--|
| \$203,560,016 | \$522,900,530 | 38.9% | \$319,340,514 | \$471,459,246 | 43.2% | \$267,899,230 |

- 2 discount rate scenarios
 - Prevailing Treasury Bond rates
- Unfunded Term Liability = Hypothetical Term Liability less Market Value of Assets
- Highly sensitive to the discount rate

Other Information



Actuarial Assumptions

- **Appendix A**



Benefit Provisions

- non-pooled: **Appendix B**
- pooled: **page 18**



Participant Data

- non-pooled: **Appendix C**
- pooled: **page 18**



PEPRA Member Rate

- non-pooled: **Appendix D-2**

Unanswered Questions?

- Contact the actuary assigned to the plan
 - Call the Customer Contact Center at 888 CalPERS (or 888-225-7377)
- Actuary is named on page 1 of the report
- Page 1 includes important certification

report page 1

Actuarial Certification

To the best of our knowledge, this report is complete and accurate, and we disclose, fully and fairly, the funded condition of the Miscellaneous Retirement Plan. This valuation is based on the member and financial data as of July 1, 2010, and the benefits under this plan with CalPERS as of that date. We have the opinion that the valuation has been performed in accordance with standards of practice prescribed by the actuarial profession, and the assumptions and methods are internally consistent and reasonable. This report is prepared in accordance with provisions of the California Retirement Law.

The undersigned is an actuary for CalPERS, a member of the Society of Actuaries and meets the Qualification Standards of the actuarial opinions contained herein.

John Doe

JOHN DOE, FSA, EA, MAAA
Senior Pension Actuary, CalPERS

Discussion / Q&A