

Actuarial Terms and Concepts

March 2022



Agenda

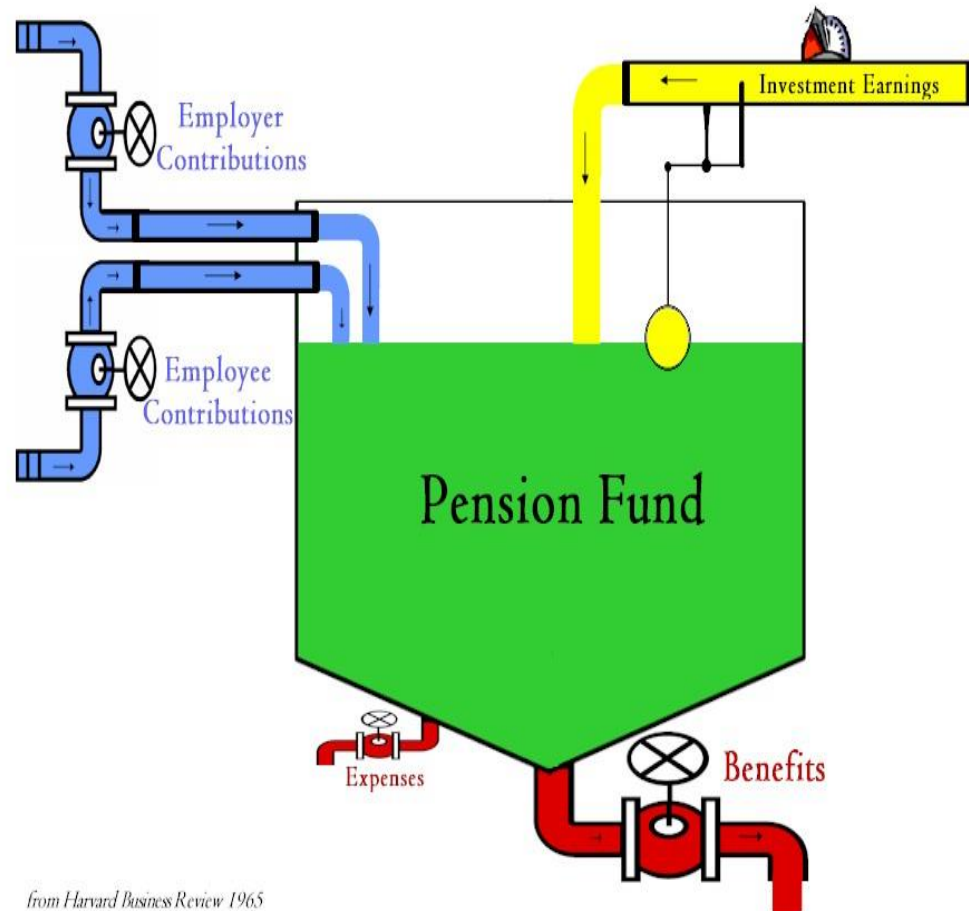


- Actuarial Valuation Process
- Pension Plan Basics
- Assumptions
- Actuarial Valuation
- Funding
- Results from December 31, 2020 Valuation
- OPEB Overview

The Actuarial Valuation Process



1. Collect information
 - Member data
 - Plan provisions
 - Asset information
2. Apply assumptions
 - Demographic
 - Economic
3. Project all future benefit payments
4. Determine a present value of the benefits
5. Compare to assets
6. Calculate employer and employee contributions



from Harvard Business Review 1965



- Defined benefit plan
 - The benefit a participant receives is based upon the plan provisions and his or her work history
 - The Plan Sponsor must provide the benefit throughout retirement
- Pension benefit valuation requires
 - Demographic information on plan participants
 - Plan provisions
 - Assumptions regarding the future

Assumptions



- Ideally unbiased, objective, and long term
- Must balance past experience of the Plan with ongoing national trends
- Must balance recent experience with future expectations
 - Demographic (participant behavior): weighted to recent experience
 - Economic: weighted to expectations
- Consistency among assumptions
- Assumptions normally are determined when experience studies are done and remain in place until the next experience study



- Demographic assumptions:
 - Mortality
 - Termination
 - Retirement
 - Disability
 - DROP participation and crediting rate
 - Salary increases
 - Percentage of employees married and spouse age difference
- Economic assumptions:
 - Investment return (discount rate): 7.50%, net of investment expenses
 - Inflation: 2.75%
 - Administrative expenses: 0.8% of covered payroll

Actuarial Valuation - Liabilities



- The true cost of the Plan is all future benefit payments (and expenses) paid from the Plan
- Actuaries calculate future expected benefit payments using Plan provisions, demographic information, and assumptions

Total future benefits

- Using economic assumptions, actuaries discount future payments

Present Value of Future Benefits

Discount to present

- The actuarial cost method splits Present Value of Future Benefits (PVFB) into past (accrued) and future service
- The value of benefits accrued for the current year is called normal cost (NC)

Actuarial Liability

NC

Future NC



- Purposes of annual actuarial valuation
 - Primary:
 - Contribution requirements (CRS at fixed 16.25% of pay)
 - Funded status
 - Focus on future results and risks
 - Secondary:
 - Disclosure requirements
 - Basis for pricing proposed plan changes
 - Analysis of demographic experience
 - Analysis of financial experience
- Try to answer three questions: Where have you been? Where are you now? Where are you going?



- Money is set aside during the working life of an employee to cover all future benefit payments – Plan assets
 - Market Value of Assets (MVA) – current value
 - May be volatile depending on returns
 - Actuarial Value of Assets (AVA) – smoothed value
 - More predictable, often used for funding
 - CRS uses a five-year smoothing period
- If AVA is less than Actuarial Liability (AL), the Plan has an Unfunded Actuarial Liability (UAL)



- Normal cost + interest on UAL
- Minimum contribution needed to avoid an increase in the UAL



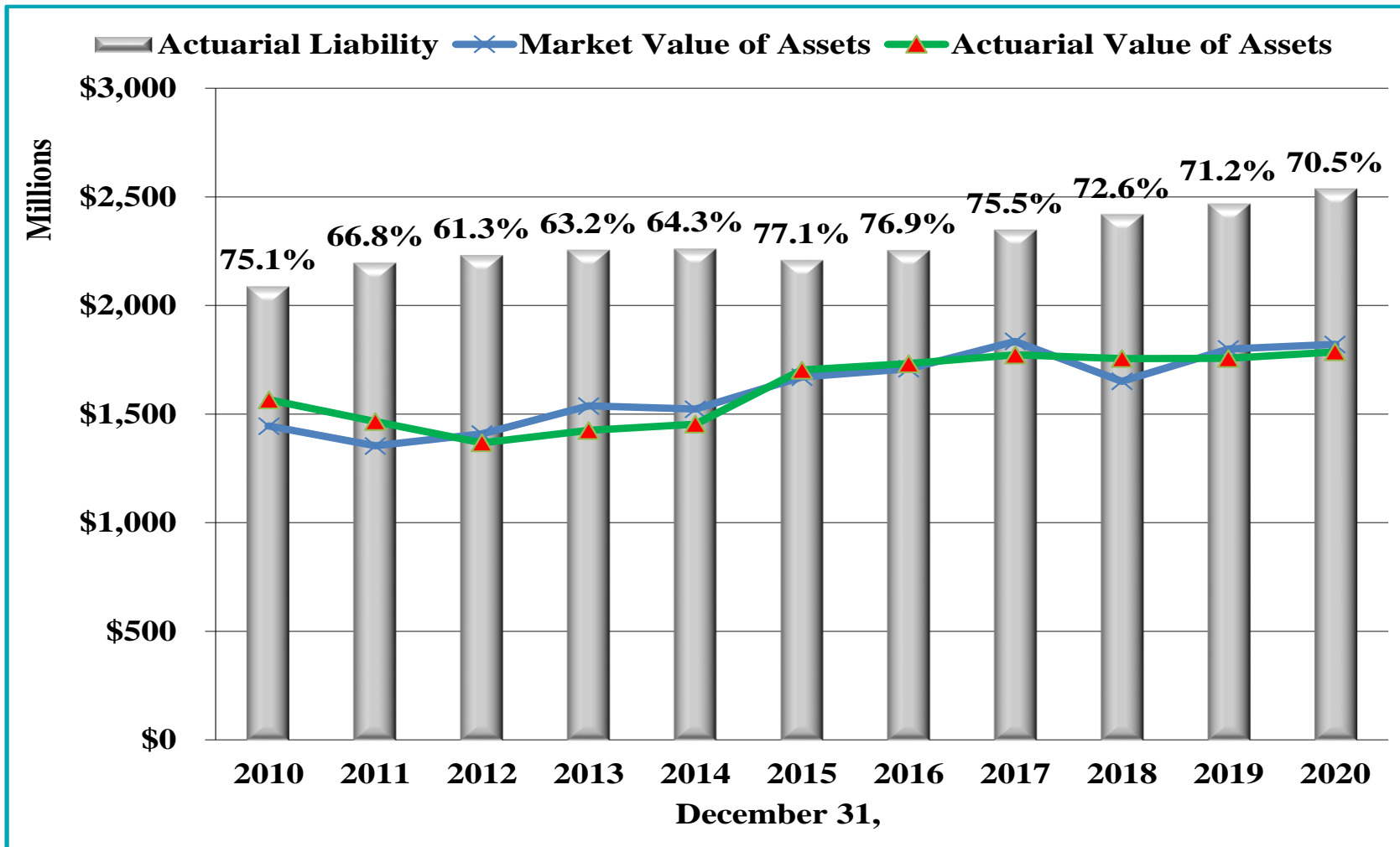
- Used as Board's funding benchmark
 - This is not what the City actually contributes
- Normal cost + expenses + UAL payment
- UAL payment
 - 30 year
 - Rolling/open
 - Level dollar

Actual City Contributions



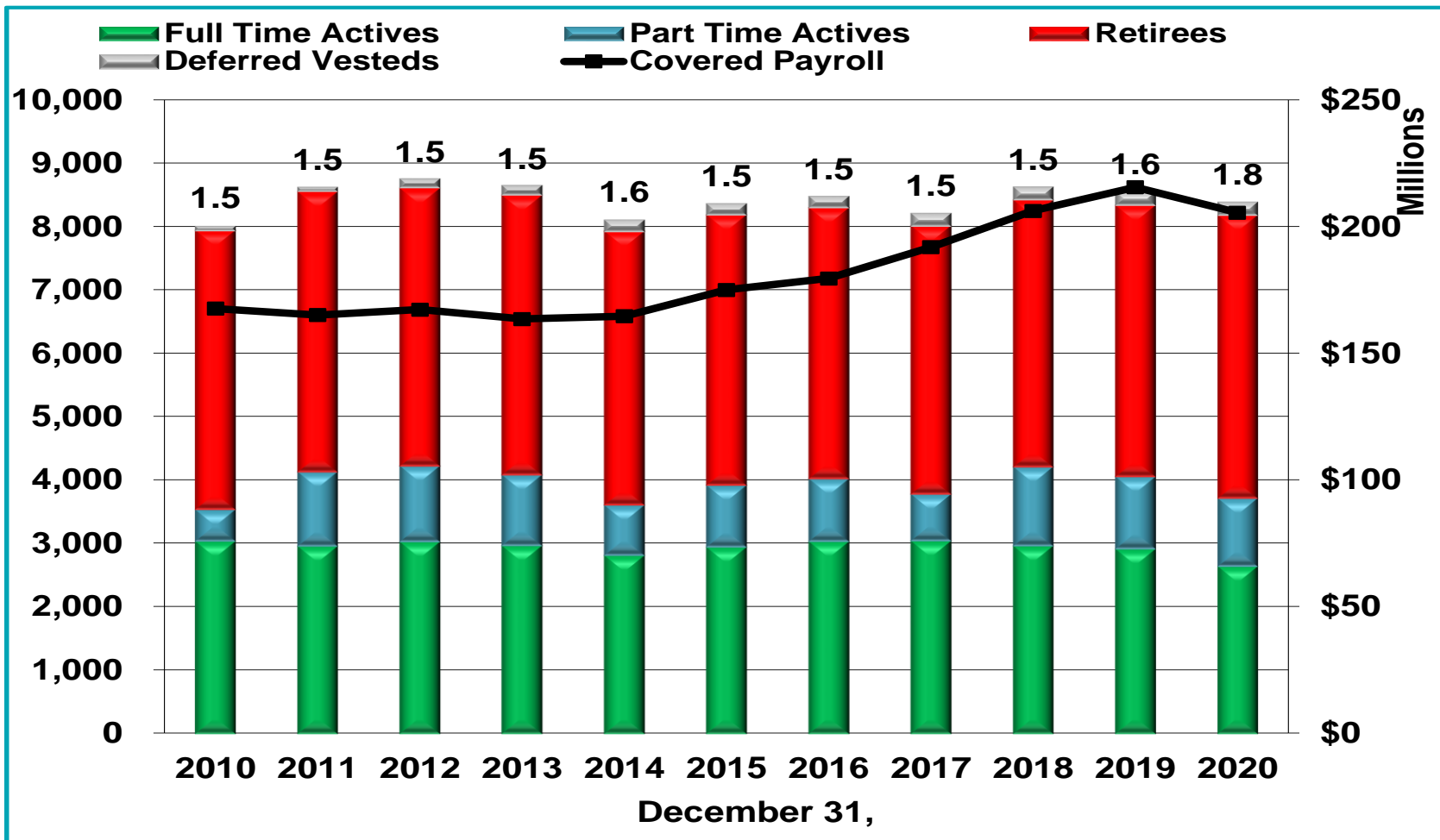
- City does not contribute based on the actuarially determined contribution rate
- City's contribution determined by the Collaborative Settlement Agreement
- Actual City contribution
 - 16.25% of payroll for full-time active members
 - 16.25% of payroll for DROP members
 - 3.00% of payroll for part-time members

Assets and Liabilities



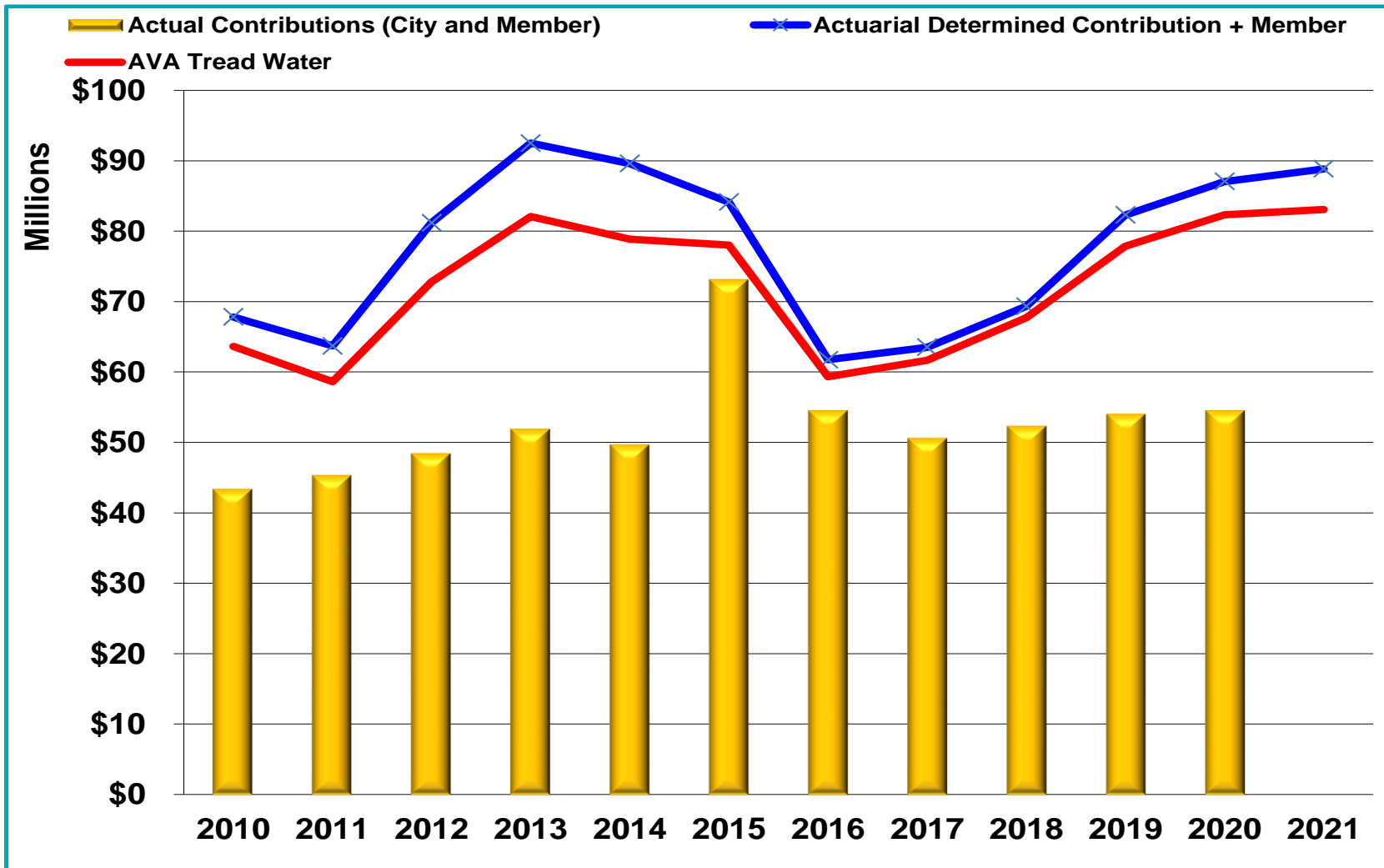
Percentages above the bars represent the funded ratios (ratio of Actuarial Value of Assets divided by the Actuarial Liability)

Membership Trends



Support ratio above bars is the ratio of the number of inactive (Retirees and Deferred Vested) per active (Full-Time only). Payroll includes Full-Time and Part-Time actives for years shown. For 2018, 2019 and 2020, also includes payroll of DROP participants.

Contributions vs ADC vs Tread Water



Key Results from the December 31, 2020 Valuation



Key Results

Valuation as of:	December 31, 2019	December 31, 2020	% Change
<u>Participant Counts</u>			
a) Full Time Actives	2,903	2,631 ¹	(9.4%)
b) Part Time Actives ²	1,143	1,078	(5.7%)
c) Deferred Vesteds	225	222	(1.3%)
d) Members in Pay Status ³	<u>4,276</u>	<u>4,459</u>	<u>4.3%</u>
e) Total	8,547	8,390	(1.8%)
f) Annual Salaries of Full Time Active Members	\$ 198,603,201	\$ 187,328,061	(5.7%)
g) Annual Retirement Allowances	\$ 169,251,391	\$ 183,826,082	8.6%
<u>Assets and Liabilities</u>			
h) Present Value of Future Benefits	\$ 2,677,799,961	\$ 2,744,006,755	2.5%
i) Actuarial Liability	\$ 2,466,348,546	\$ 2,533,246,815	2.7%
j) Actuarial Value of Assets (AVA)	\$ 1,756,533,401	\$ 1,786,649,816	
k) Unfunded Actuarial Liability [(i) - (j)]	\$ 709,815,145	\$ 746,596,999	5.2%
l) Funded Ratio on AVA basis [(j) ÷ (i)]	71.2%	70.5%	(0.7%)
m) Market Value of Assets (MVA)	\$ 1,799,975,000	\$ 1,820,915,000	
n) Funded Ratio on MVA basis [(m) ÷ (i)]	73.0%	71.9%	(1.1%)
<u>City's Actuarial Determined Contribution (ADC)</u>			
	<u>FYE June 30, 2021</u>	<u>FYE June 30, 2022</u>	
o) Gross Normal Cost Rate	12.46%	12.15%	(0.31%)
p) Plan Changes ⁴	0.00%	1.34%	1.34%
q) Unfunded Actuarial Liability Amortization Rate	26.41%	28.17%	1.76%
r) Administrative Expenses	0.80%	0.80%	0.00%
s) Expected Employee Contributions	<u>(9.00%)</u>	<u>(9.00%)</u>	0.00%
t) City's ADC Rate [(o) + (p) + (q) + (r) + (s)]	30.67%	33.46%	2.79%

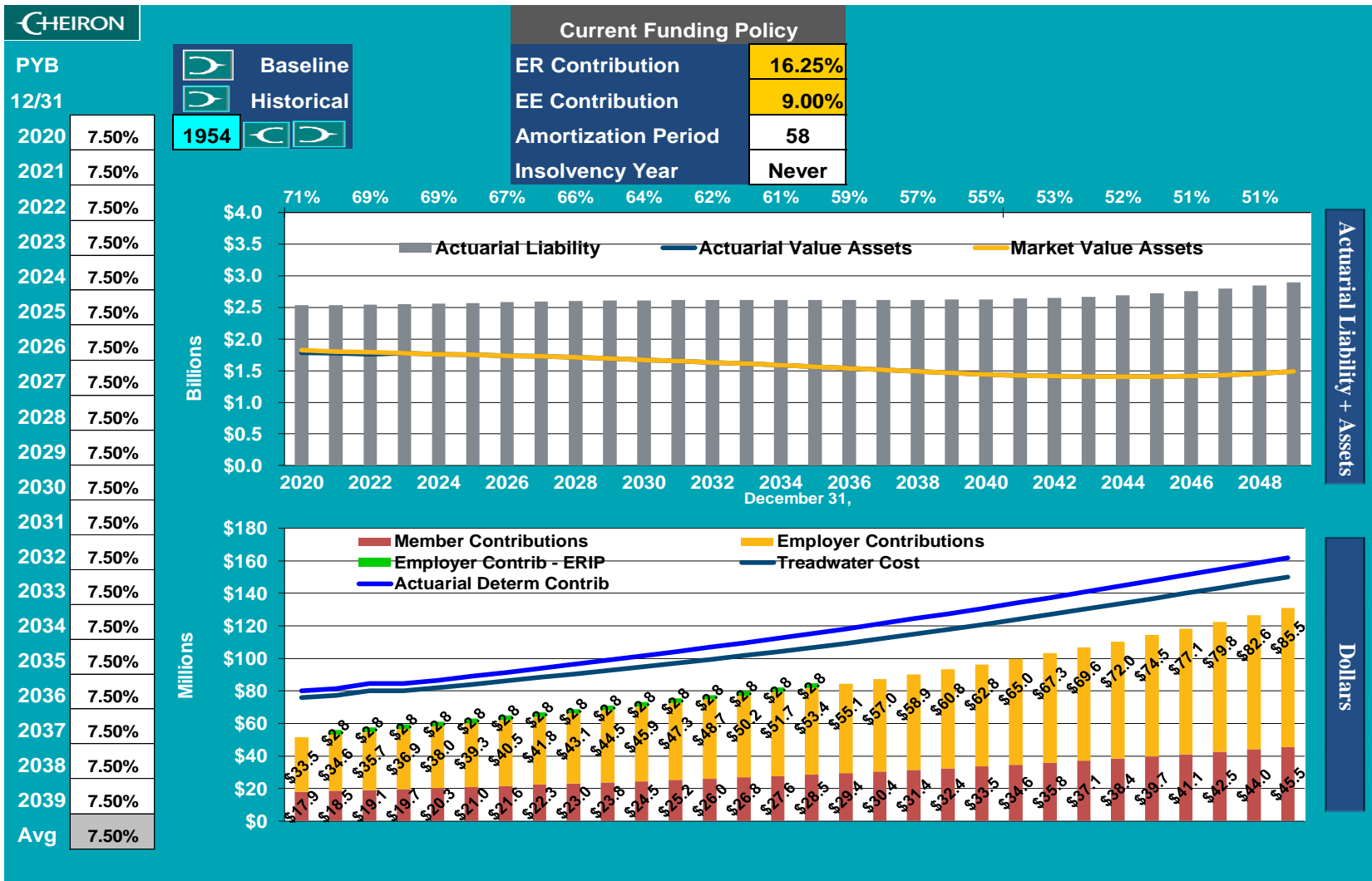
¹ Excludes 123 participants who elected to participate in the ERIP but have Effective Dates of Retirement in 2021. For valuation purposes, these participants were included as Members In Pay Status.

² As of December 31, 2020, 625 of the 1,078 Part Time actives had reported last pay periods before December 2020.

³ Includes 234 and 222 members as of December 31, 2020 and 2019 respectively currently participating in DROP.

⁴ Starting January 1, 2022, City intends on paying ERIP with 15 level annual payments of \$2.8 million each January 1.

Projections Based on December 31, 2020 Valuation



Actuarial Liability + Assets

Dollars



- Benefits paid by employer but received after employment ends, if not part of the pension plan
 - Healthcare (medical, dental, Rx, vision)
 - Life insurance
 - Disability
 - Group legal
 - Long-term care
- Not part of OPEB
 - Leave (vacation, sick leave, etc.)
 - COBRA (Statement 47)
 - Early Retirement Incentives (Statement 47)
 - Life insurance, disability, etc. that is part of pension plan



- Plan Description
 - Name of the Plan, entity that administers the Plan, and identification of Plan type (single-employer, agent multiple-employer, or cost-sharing multiple-employer)
 - Brief description of the types of benefits and the authority under which benefit provisions are established or may be amended
 - Whether the OPEB plan issues a stand-alone financial report or is included in the report of a PERS or another entity, and if so, how to obtain the report
- Funding Policy
 - Authority under which contribution requirements are established or may be changed
 - Required member contribution rates
 - Required employer contribution rates (and, if significantly different from GASB ADC, how it is determined)



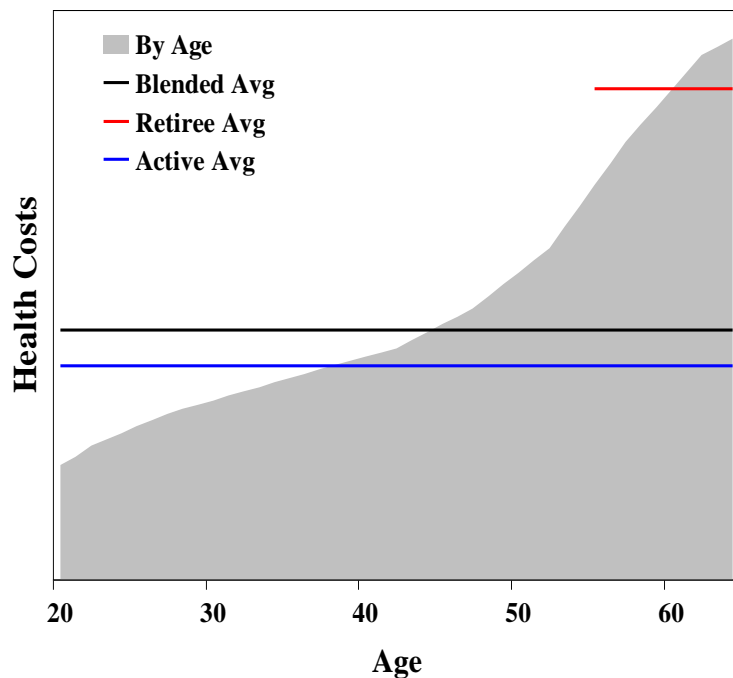
- Data
 - Age, service, salary, division, Plan election, etc.
 - Includes all retirees and dependents with coverage
 - Includes all active employees who could one day retire and elect coverage (regardless of if they have coverage now)
- Benefits Promised
 - According to practice (not necessarily what's written)
 - Ages of eligibility
 - Retiree contributions
 - City explicit subsidy
- Assumptions
 - Demographic
 - Withdrawal, retirement, mortality, disability, family composition
 - Economic
 - Investment return, salary increases, health care inflation

OPEB How to Estimate Liabilities (cont.)

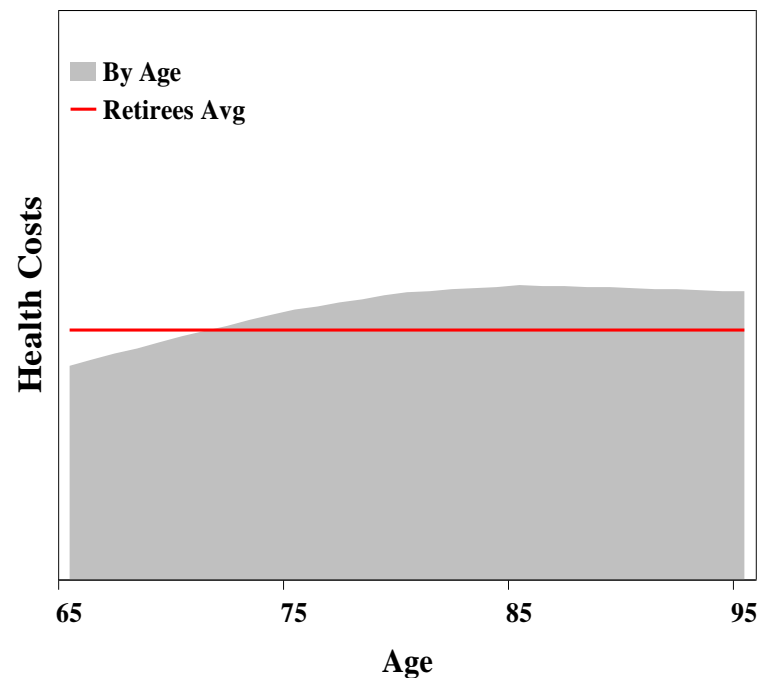


- We determine the cost per person by age
- And then subtract retiree contributions

Pre-Medicare Costs



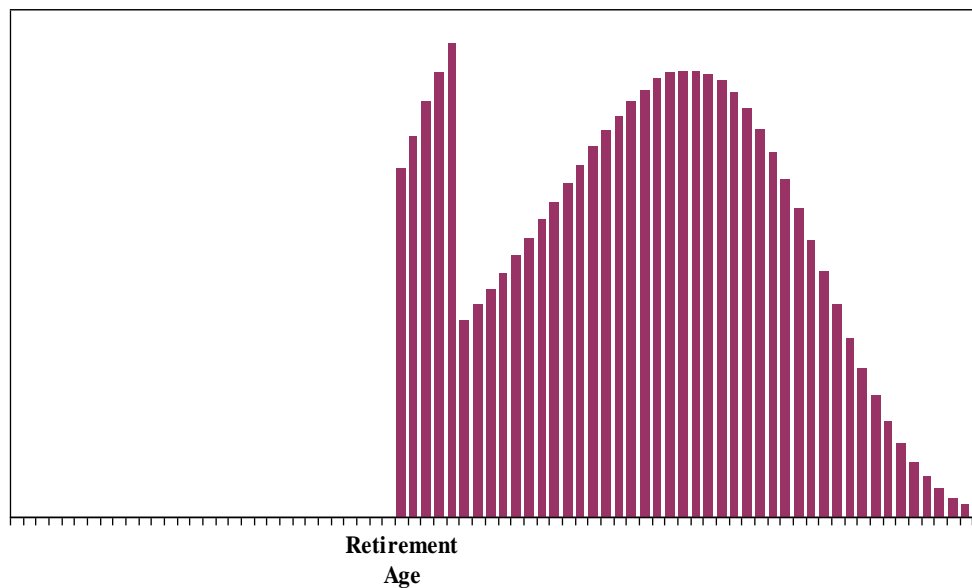
Post-Medicare Costs



OPEB How to Estimate Liabilities (cont.)

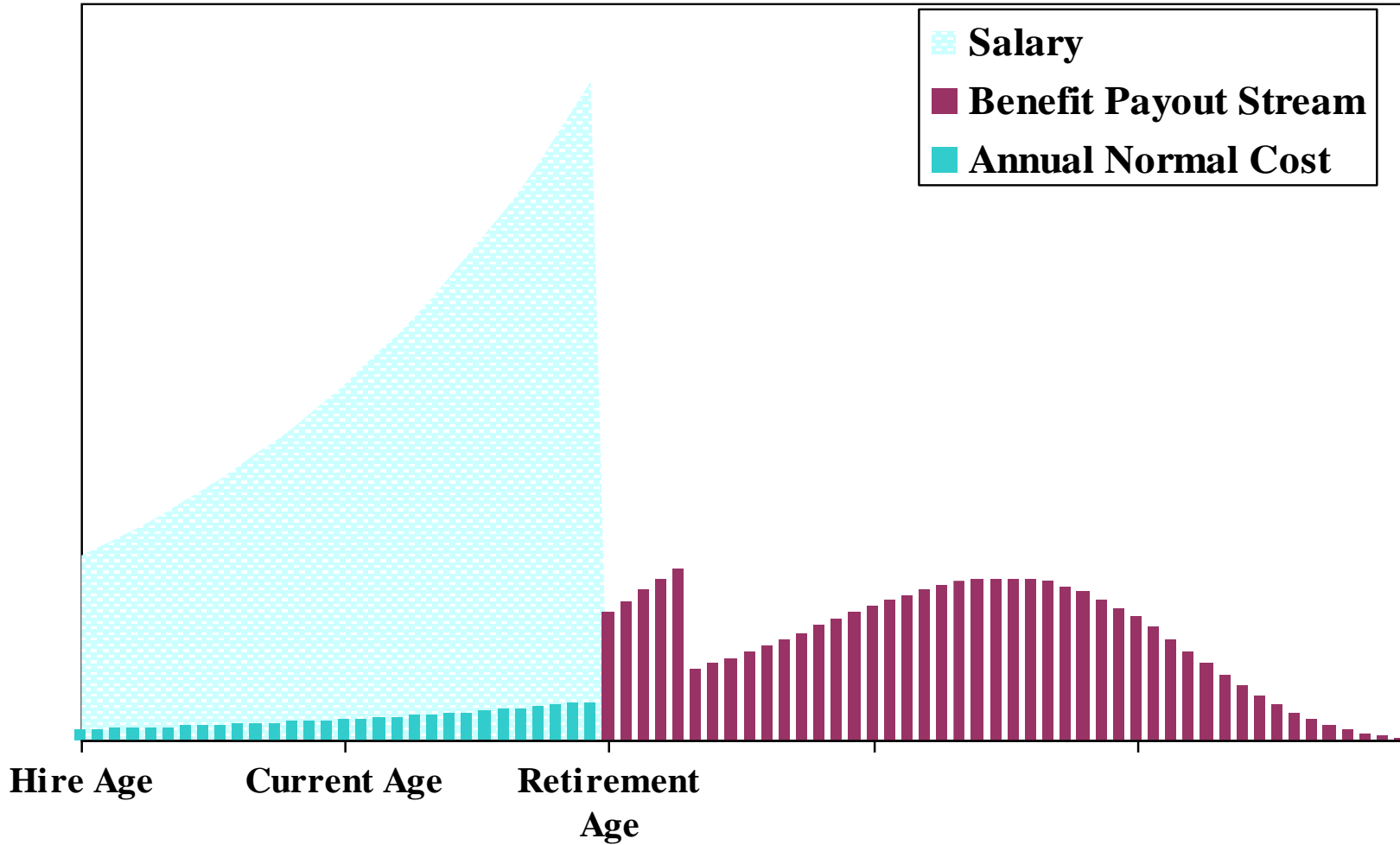


- We then project the claims to be paid by the Plan (net of retiree contributions) for each age in the future
- This payout stream reflects health care trends, age, Medicare status, and the probabilities of reaching retirement and then living to each age



- *The discounted value of all payout streams is the Present Value of Future Benefits (PVFB)*

OPEB Terminology Illustrated



OPEB December 31, 2020 Results



Summary of Valuation Results

Valuation Date	December 31, 2019	December 31, 2020
Discount Rate	7.50%	7.50%
Actuarial Liability (AL)	\$ 376,560,845	\$ 397,835,569
Actuarial Value of Assets	<u>488,000,142</u>	<u>502,357,775</u>
Unfunded actuarial liability (UAL)	\$ (111,439,297)	\$ (104,522,206)
Funded Ratio (AVA/AL)	129.59%	126.27%
Market Value of Assets	\$ 500,123,000	\$ 511,981,000
Funded Ratio (MVA/AL)	132.81%	128.69%
Fiscal Year Ending	June 30, 2021	June 30, 2022
Actuarially Determined Contribution	\$ -	\$ -
Expected Net Benefit Payments	26,731,000	30,699,244

Required Disclosures



The purpose of this presentation is to review actuarial terms and concepts. This presentation is for the use of the Cincinnati Retirement System (CRS or System) Board and staff.

In preparing our presentation, we relied on information, some oral and some written, supplied by the System. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The actuarial assumptions and methods are outlined in the Actuarial Valuation Report as of December 31, 2020. The census data provided to us by CRS was as of December 31, 2020.

The assumptions reflect our understanding of the likely future experience of the System, and the assumptions as a whole represent our best estimate for the future experience of the System. The results of this presentation are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the System could vary from our results.

This presentation and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as other applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this presentation. This presentation does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This presentation was prepared exclusively for the Cincinnati Retirement System for the purpose described herein. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.