



The elements of success

Burlington Employees' Retirement System Public Sector Actuarial Science 101

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Consulting Actuary

October 15, 2018



- Purpose of the Valuation
- Funding
- Actuarial Assumptions
- Traditional Valuation vs. Open-Group Forecast
- Financial Reporting

Purpose of the Valuation

The ultimate cost of a pension plan is based primarily on the level of benefits promised by the plan. The pension fund's investment earnings serve to reduce the cost of plan benefits and expenses. Thus,

$$\text{City's Ultimate cost} = \text{Benefits Paid} + \text{Expenses Incurred} - \text{Investment Return} - \text{Employee Contributions}$$

- The Actuarial Valuation utilizes an actuarial cost method to assign a portion of this “ultimate cost” to the budget year. The valuation does not determine the ultimate cost of the plan but is a tool used to determine the appropriate level of City contributions.
- Actuarially Determined Employer Contribution (ADEC) developed from the valuation is comprised of two components: amortization of unfunded liability (*23 years, on average, for 2016 valuation*) & normal cost (assignment of benefits “earned” for the budget year).

- Public sector plans are not subject to Internal Revenue Code minimum required/maximum deductible contribution rules
- Historically, linked to the “parameters” under GASB 25/27 financial reporting standards
- GASB 67/68 replaced GASB 25/27 in 2014, but most plans continue to apply the GASB 25/27 parameters
- **ADEC:** Actuarially Determined Employer Contribution
- ADEC usually is Normal Cost + Past Service Payment

- Most common actuarial cost method used is **Entry Age Normal (EAN)** *
- EAN: 72%; Projected Unit Credit: 13%; Aggregate: 8%; Other: 7%
- BERS valuation uses EAN, which also is the prescribed method under GASB 67/68 for financial reporting

* Source: *Actuarial Inputs and the Valuation of Public Pension Liabilities and Contribution Requirements: A Simulation Approach* (Gang Chen and David S.T. Matkin, May 2017)

- Most public sector funds smooth investment gains/losses to reduce ADEC volatility
- Typically, 5-year smoothing (20%/year recognition)
- The two most common methods are to: (1) smooth actual vs. expected return on MVA, or (2) smooth expected AVA vs. actual MVA
- BERS valuation uses 10-year smoothing, and method (1) above
- In 2017 BERS valuation, AVA is \$183.8 million, vs. MVA of \$175.5 million (\$8.3 million in unrecognized losses)

Development of Actuarial Value of Assets

Relationship of Actuarial Value to Market Value	
1. Market value 6/30/2017	\$175,471,299
2. Gain / (loss) not recognized in actuarial value 6/30/2017	(8,345,174)
3. Preliminary actuarial value 6/30/2017: (1) - (2)	183,816,473
4. Preliminary actuarial value as a percentage of market value: (3) ÷ (1)	104.8%
5. Gain / (loss) recognized for corridor minimum / maximum	N/A
6. Actuarial value 6/30/2017 after corridor minimum / maximum: (3) + (5)	183,816,473
7. Actuarial value as a percentage of market value: (6) ÷ (1)	104.8%

Development of Market Value Gain / Loss for 2016-2017 Plan Year	
1. Market value 6/30/2016	\$156,789,373
2. City contributions	9,219,098
3. Employee contributions	2,712,823
4. Benefit payments	14,770,644
5. Administrative expenses	361,811
6. Expected return at 8.00%	12,419,344
7. Expected value 6/30/2017: (1) + (2) + (3) - (4) - (5) + (6)	166,008,183
8. Market value 6/30/2017	175,471,299
9. Market value gain / (loss) for 2016-2017 plan year: (8) - (7)	9,463,116

Recognition of Gain / Loss in Actuarial Value					
Year	(a) Gain / (loss)	(b) Total recognized as of 6/30/2016	(c) Recognized in current year: 10% of (a)	(d) Total recognized as of 6/30/2017: (b) + (c)	(e) Not recognized as of 6/30/2017: (a) - (d)
2012-2013	(\$498,233)	(\$199,293)	(\$49,823)	(\$249,116)	(\$249,117)
2013-2014	8,081,381	2,424,414	808,138	3,232,552	4,848,829
2014-2015	(13,616,950)	(2,723,390)	(1,361,695)	(4,085,085)	(9,531,865)
2015-2016	(14,912,281)	(1,491,228)	(1,491,228)	(2,982,456)	(11,929,825)
2016-2017	9,463,116	0	946,312	946,312	8,516,804
Total			(1,148,296)		(8,345,174)

- Definition: *the length of time and the structure selected for increasing or decreasing contributions to systematically eliminate any unfunded actuarial liability or surplus **
- Similar to paying off a home mortgage

** Source: Spotlight on The Annual Required Contribution Experience of State Retirement Plans, FY 01 to FY 13 (Keith Brainard and Alex Brown, National Association of State Retirement Administrators, March 2015)*

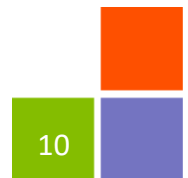
- Amortization period – generally not greater than 30 years
- Median amortization period is about 20 years for public sector pension plans
- Closed or Open amortization
- Method : Level Dollar or Level Percentage of Payroll
- Single amortization base or Layering/Separate bases
- Negative amortization – can occur if amortization period is long, and using level percentage of payroll amortization

Funding – Amortization Policy (BERS)



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- Amortization period – 30 years
- Closed amortization
- Method: Level Dollar
- Layering/Separate bases
- For 2017 valuation – average amortization period is 20 years



BERS 2017 Valuation - Executive Summary



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	June 30, 2017			June 30, 2016		
	Class A	Class B	Total	Class A	Class B	Total
Number of members						
Active employees	179	666	845	174	680	854
Terminated vested members	15	356	371	15	361	376
Vested in employee contributions only	9	115	124	6	74	80
Retired, disabled and beneficiaries	178	496	674	177	483	660
Total	381	1,633	2,014	372	1,598	1,970
Covered employee payroll	10,903,872	34,746,500	45,650,372	11,016,208	37,091,509	48,107,717
Average plan salary	60,915	52,172	54,024	63,312	54,546	56,332
Actuarial present value of future benefits	134,863,320	161,548,365	296,411,685	N/A	N/A	N/A
Actuarial accrued liability	115,558,431	136,852,540	252,410,971	110,320,376	135,622,903	245,943,279
Plan assets						
Market value of assets	75,014,835	100,456,464	175,471,299	67,913,439	88,875,934	156,789,373
Actuarial value of assets	78,582,438	105,234,035	183,816,473	76,124,499	99,621,460	175,745,959
Unfunded accrued liability	36,975,993	31,618,505	68,594,498	34,195,877	36,001,443	70,197,320
Funded ratio	68.0%	76.9%	72.8%	69.0%	73.5%	71.5%
Actuarially determined employer contribution (ADEC)						
Fiscal year ending	2019	2019	2019	2018	2018	2018
ADEC	4,805,619	5,378,047	10,183,666	4,355,137	5,621,518	9,976,655

BERS – ADEC Calculation for Fiscal 2019



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	Class A	Class B BED	Class B School	Class B Other	Class B	Total
Gross normal cost	\$2,435,453	\$798,644	\$936,366	\$2,029,696	\$3,764,706	\$6,200,159
Estimated employee contributions	<u>(1,233,404)</u>	<u>(407,016)</u>	<u>(321,304)</u>	<u>(851,591)</u>	<u>(1,579,911)</u>	<u>(2,813,315)</u>
City's normal cost	1,202,049	391,628	615,062	1,178,105	2,184,795	3,386,844
Actuarial accrued liability	115,558,431	46,911,562	24,744,888	65,196,090	136,852,540	252,410,971
Actuarial value of assets	<u>78,582,438</u>	<u>36,073,082</u>	<u>19,027,812</u>	<u>50,133,141</u>	<u>105,234,035</u>	<u>183,816,473</u>
Unfunded accrued liability	36,975,993	10,838,480	5,717,076	15,062,949	31,618,505	68,594,498
Amortization of unfunded accrued liability	3,561,498	1,068,400	563,559	1,484,825	3,116,784	6,678,282
Contribution before adjustment as of the valuation date	4,763,547	1,460,028	1,178,621	2,662,930	5,301,579	10,065,126
Estimated valuation year payroll for actives not yet at 100% assumed retirement age	11,212,762	8,274,687	7,651,713	20,280,238	36,206,638	47,419,400
City's normal cost as a percentage of payroll	10.7%	4.7%	8.0%	5.8%	6.0%	7.1%
Contribution as a percentage of payroll	42.5%	17.6%	15.4%	13.1%	14.6%	21.2%
Fiscal year ending June 30, 2019						
Adjustment for interest and inflation	<u>42,072</u>	<u>13,708</u>	<u>21,527</u>	<u>41,233</u>	<u>76,468</u>	<u>118,540</u>
Actuarially determined employer contribution	4,805,619	1,473,736	1,200,148	2,704,163	5,378,047	10,183,666

Actuarial Assumptions - Overview

- Most larger public retirement systems review actuarial assumptions on a regular basis through formal Experience Studies
- Many economic and demographic factors are taken into consideration
- The plan's actuary plays a significant role in the selection of actuarial assumptions
- Actuarial Standards of Practice ("ASOPs") provide professional guidance to actuaries during the assumption setting process



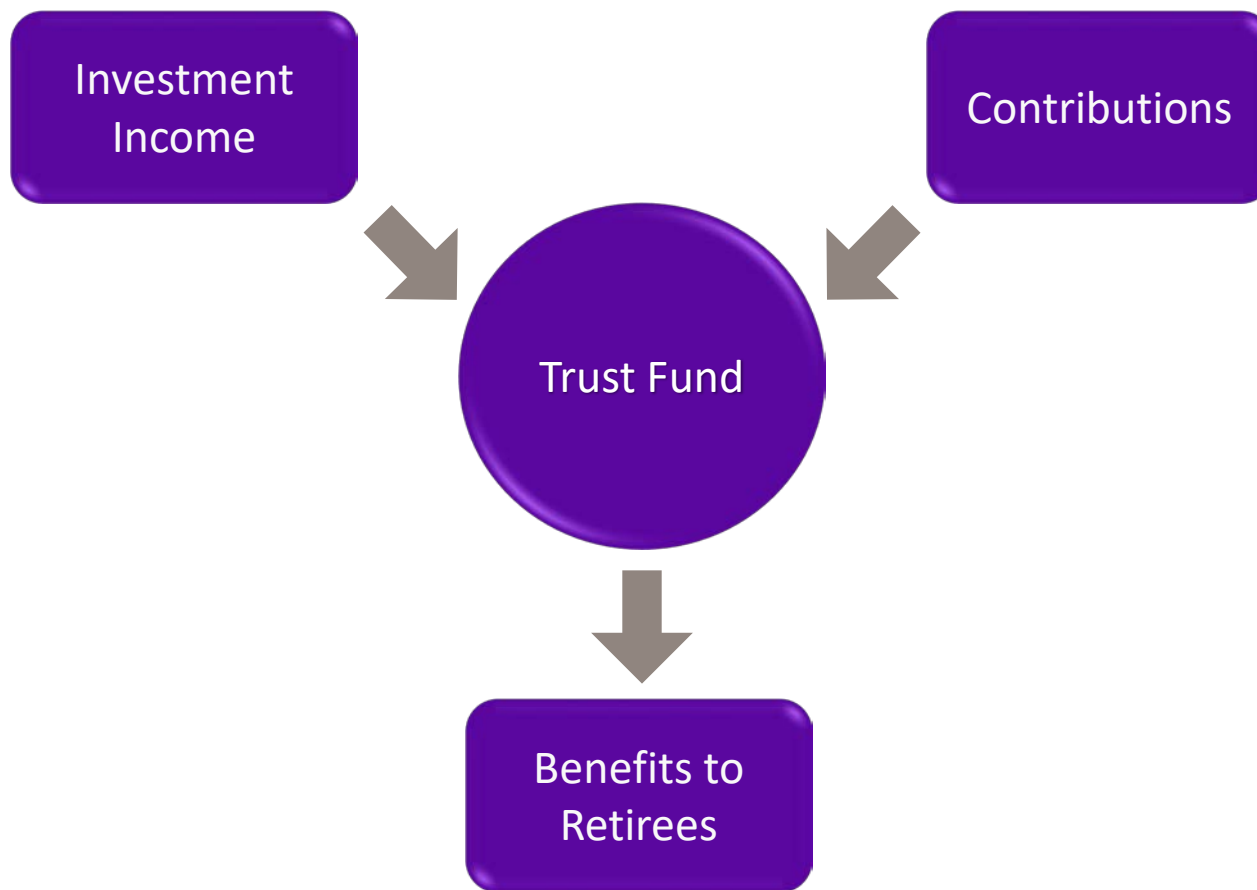
BERS most recent Experience Study was as of June 30, 2012

GFOA "BEST PRACTICE"

Perform an Experience Study at least once every 5 years

Why is the investment return assumption important?

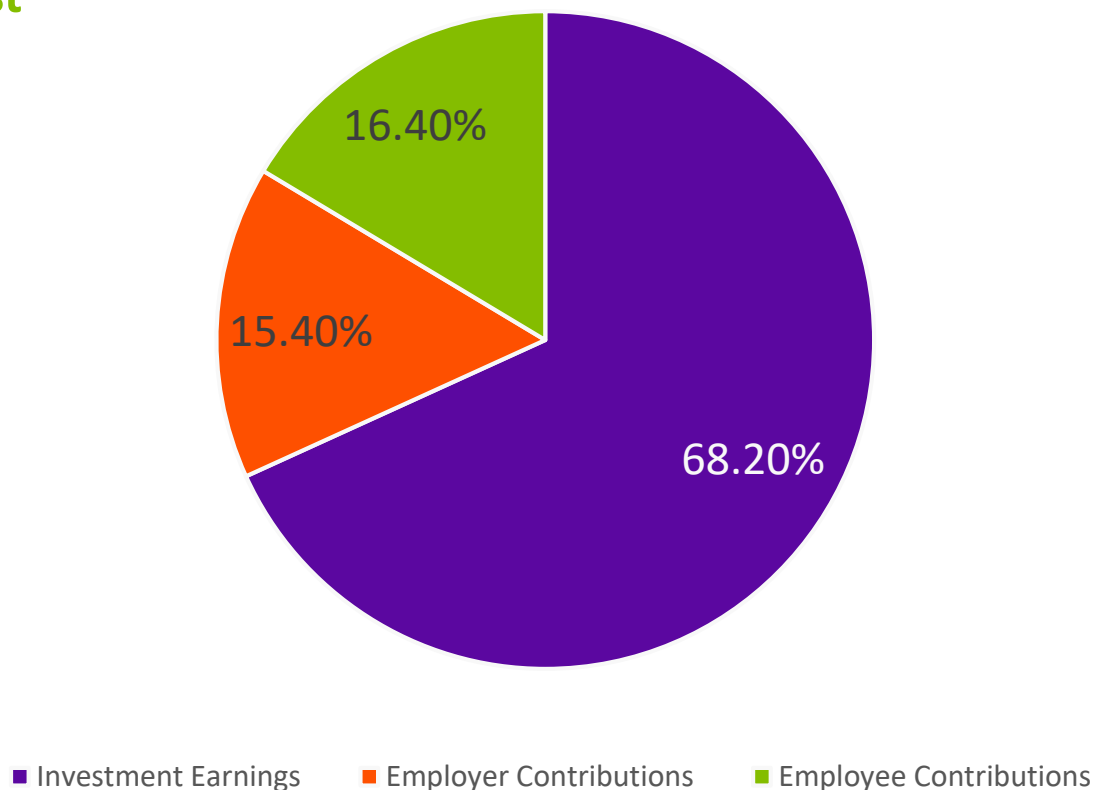
- ▶ Investment income and contribution provide the foundation for funding future benefits for plan members



Why is the investment return assumption important?

- ▶ **Investment earnings account for the majority of revenues for most public pension plans**

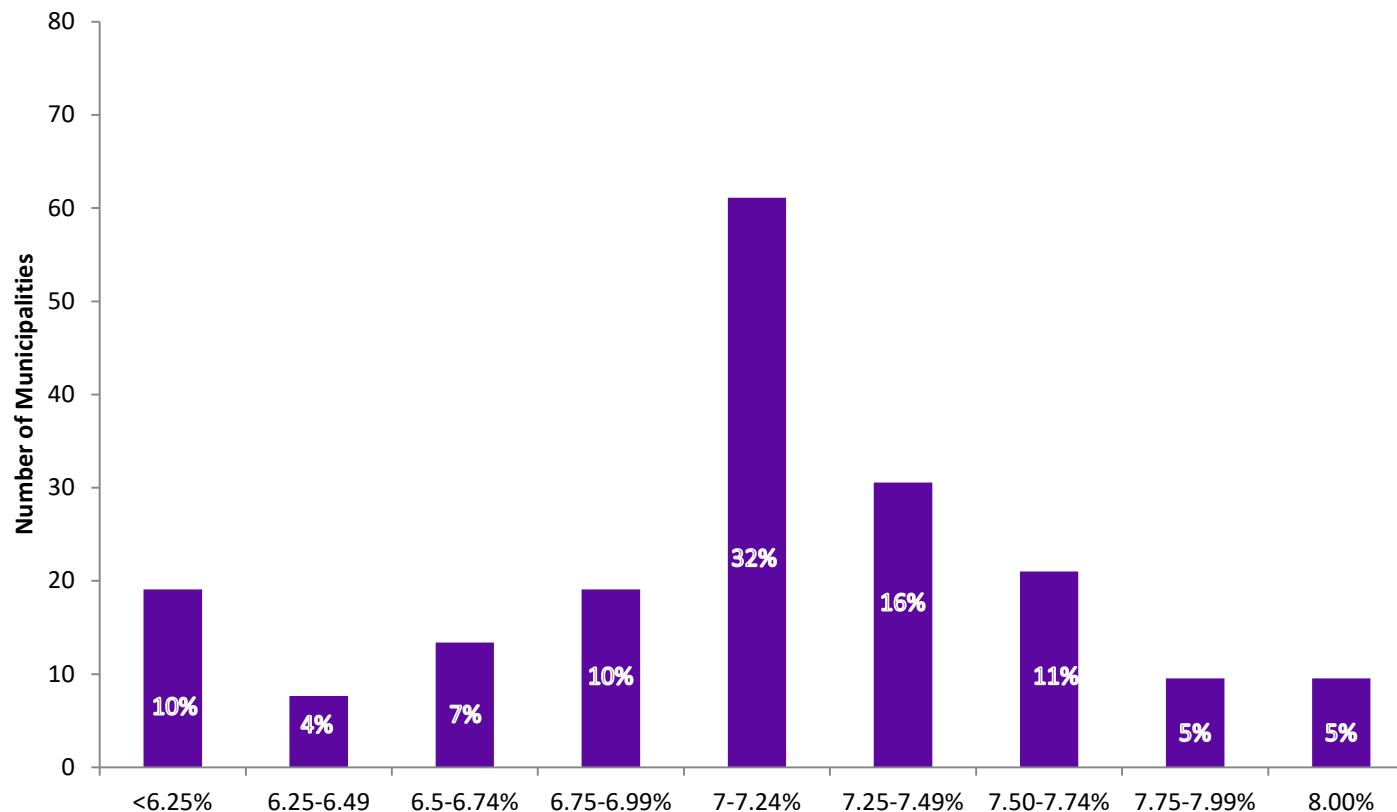
Public Pension Fund Revenue 1993-2016



- Actuaries should consider a number of factors in setting the **investment return** assumption:
 - forecasts of inflation and of total returns for each asset class
 - current yields to maturity of fixed income securities such as government securities and corporate bonds
 - historical investment data
 - historical plan performance
- Actuaries may also consider historical statistical data showing standard deviations, correlations, and other statistical measures related to historical returns for each asset class and for inflation

Long-Term rates from 2017 CAFRs

2017 LTROR Assumption



- Average rate is **6.92%** for the 191 CT plans that we gathered data on (median = 7.00%)
- Down about 0.6% from 6 years ago from 7.49% (average)
- No one assumption dominates (unlike the 8.00% assumption that was pervasive 10+ years ago – partly due to phasing-in of lower rates)

- **Alpha:** excess returns generated by active management
- Historically, alpha was expected to add 25-50 bps to returns
- Under ASOP 27, actuary may only include a margin for alpha if you can prove it exists
- Research supporting the ability of any particular active manager to consistently generate alpha is thin
- Actuaries in many cases have been lowering or eliminating the margin for alpha

- Downward trend in prospects for future investment returns
 - 100-150+ bps reduction in past decade
- No more alpha?
 - 25-50 bps reduction in expected returns
- End result: plan sponsors increasingly reviewing and lowering the investment return assumption

**BERS
assumption:
8.00%**

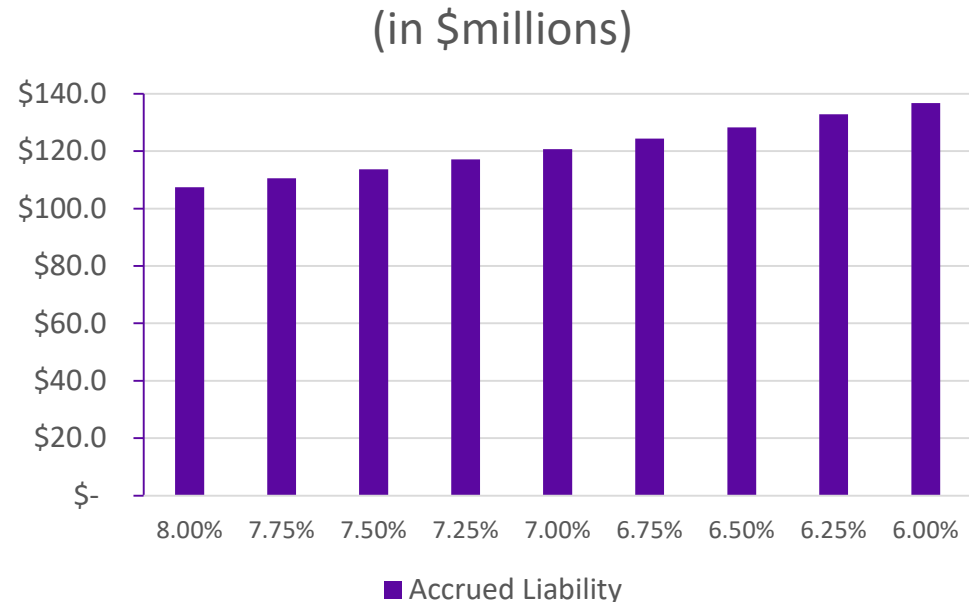
Impact of Lowering the Investment Return Assumption



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■ Short term

- Higher liabilities
- Lower funding ratios
- Larger contributions



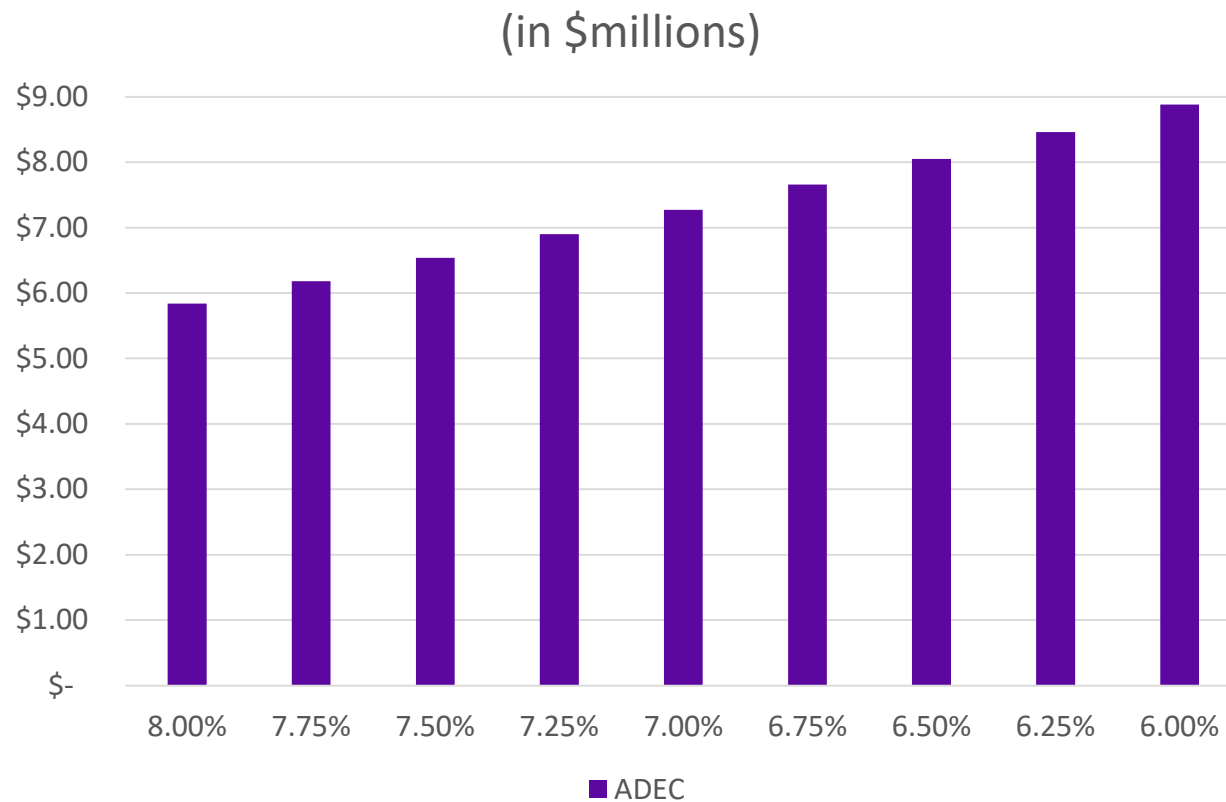
■ Long term

- More likely that investment returns will meet or exceed assumption
- Less likely that actuarial losses will accumulate
- Greater stability of contribution levels
- Decreased pressure on future taxpayers
- Credit positive

Impact of Lowering the Investment Return Assumption



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Impact on Hypothetical Plan

(\$ millions)

Interest Rate	Accrued Liability	ADEC
8.00%	\$107.4	\$5.84
7.75%	110.5	6.18
7.50%	113.7	6.54
7.25%	117.1	6.90
7.00%	120.7	7.27
6.75%	124.4	7.66
6.50%	128.3	8.05
6.25%	132.5	8.46
6.00%	136.8	8.88

Why is the mortality assumption important ?

- Pension benefits are generally payable for the lifetime of the member
- Mortality is the primary factor in determining how long the plan expects to pay benefits to a member
- Understating expected longevity will understate the current cost of pension liabilities and place additional burden on future taxpayers to fund pension obligations

How is the mortality assumption developed ?

- Mortality assumption takes into consideration various demographic factors:
 - Gender
 - Status (e.g., active, retired, disabled)
 - Type of occupation (e.g. white vs. blue-collar; uniformed vs. non)
 - Plan experience
- The plan's actuary follows guidance under ASOP 35

BERS assumption:

105% of RP-2000
Combined Mortality
Table, projected with
Scale BB

- Society of Actuaries (SOA) published a major study in 2014
- **RP-2014 Mortality Table, with MP-2014 projection scale**
- Projection scale is now being updated annually – the most recent scale is **MP-2017**
- Neither the RP-2000 table nor the RP-2014 table explicitly incorporates public sector mortality experience
- SOA currently studying public sector mortality – exposure draft issued in August 2018
- Public safety vs. Teachers vs. General employees
- Exposure draft suggests 1-3% increase in actuarial liability for Public Safety, and 2-4% increase for General employees (vs. RP-2014 (MP-2017))

- ▶ **Traditional actuarial valuation reflects a “snapshot” of the current membership, plan provisions, and plan assets as of the valuation date**
 - Future hires – including any new “tiers” of lower benefits – are not reflected in the current valuation
 - As a result, it generally takes many years for significant reductions in the ADEC to be realized

- ▶ **Open Group forecast projects traditional valuation results many years into the future (75+ years), taking into account lower tiers of benefit for future new hires**
 - The projected future “traditional valuation” ADECs are translated into an equivalent long-term percentage of payroll contribution pattern
 - The resulting pattern of “open group” ADECs generally reflects lower employer contributions in earlier years, and higher contributions in the future
 - The open-group forecast technique **does not** change the plan sponsor’s long-term costs

► CAFR: Comprehensive Annual Financial Report

- CAFR is “a set of U.S. government financial statements comprising the financial report of a state, municipal or other governmental entity that complies with the accounting requirements promulgated by the Government Accounting Standards Board” *
- Pension is just one item of many covered in the CAFR
- Different set of rules vs. funding

* Source: Accounting for Governmental and Nonprofit Entities (15th Ed.) (Earl Wilson, 2010)

- **GASB 67/68** – current financial reporting standards for pension plans
- Balance sheet entry = Net Pension Liability (NPL)
- $\text{NPL} = \text{Total Pension Liability} - \text{Plan Fiduciary Net Position}$
- **NPL** is the unfunded actuarial liability determined on an EAN basis, and using Market Value of Assets
- Also calculate an annual “pension expense” amount that is recorded in the financials

* Source: *Accounting for Governmental and Nonprofit Entities (15th Ed.)* (Earl Wilson, 2010)

- Additional disclosure items
 - Money-weighted rate of return (10 years)
 - ADEC vs. Actual Employer Contribution (10 years)
 - NPL, including annual reconciliation (10 years)
 - +/- 1% discount rate sensitivity : NPL
 - Target asset allocation and Expected Return basis
- Generally more rapid recognition of gains/losses, plan amendments, assumption changes
- Pension expense much more volatile than ADEC
- May need “depletion date projection” if not contributing ADEC



Questions

As you know, in recent years BERS has been using the Open Group method, as developed by Buck Consulting, to develop annual funding policy contributions. Hooker & Holcombe recommends that BERS not continue with the Buck Open Group calculation method, and instead suggests BERS consider the Direct Rate Smoothing method, which employs a modified open group approach.

The goal is still on appropriately capturing now some of the savings the system will see as staff retire under no longer available and more expansive benefits and new staff are hired with lesser benefits. A key factor of the recommendation is that this is done in a conservative manner that meets accepted actuarial standards and does not put an unjust, significant tax/rate burden, or employee contribution burden, out in the future. Moving from the Buck's Open Group methodology, to the H & H Direct Rate Smoothing with a "Collar," achieves this goal, and does not put us so far outside the norm of other public pension methodologies (as does the Buck's Open Group).

Direct Rate Smoothing

-) Is an established actuarial method
-) Creates a path toward a pre-defined funding target over a 5-year time horizon. The lower benefits earned by future employees are taken into account, though over a shorter timeframe (modified open group).
 - o Valuation would include the normal cost + 20-year amortization of past service liability applied at the fifth year of the step-down period. As defined by actuaries, best practice is a 15-20 year amortization period.
-) Provides a higher level of funding cost and stability from year-to-year.
-) Better ensures that an unfair burden to pay for costs on future taxpayers or employees

Open Group

-) Considers lower benefits earned by future employees over several decades, and amortized over up to 30 years
-) Is subject to greater variability of future outcomes due to the 25-30 year time horizon, a timeframe that is longer than actuarially-recommended best practice
-) Shifts an inappropriate level of liability for current employee costs to future generations of taxpayers and employees
-) Was perhaps implemented more aggressively than we requested of Buck
-) Neither H & H or Buck are/were aware of any other public pensions utilizing this method

Direct Rate Smoothing does not define a specific approach, but rather allows for some flexibility in assumptions. Direct Rate Smoothing model would be updated every five years, as each experience study is completed, to ensure assumptions are aligned with plan experience. Direct Rate Smoothing involves a *step down* from the traditional valuation calculated ADEC over up to 5 years.

A modified open group model is proposed whereby for FY 19's contribution we stepdown the open group modified ADEC to 97%, which is in line with our experience with the Buck Open Group method, and a 5-year step down period, which is consistent with the frequency of our experience study. The model would include a collar of +/- \$300k, (ADEC can't increase or decrease yearly by more than \$300K), which would constrain the year-to-year variability in cost.

With the 97% stepdown, the \$300K "collar", ten year smoothing, and other changes currently within and proposed for methods and assumptions, we create a reasonably conservative, and hopefully more stable method to our system that over the next several years should see, subject to an unforeseen significant market downturn similar to 2008/2009, growth in our funding level. BERS can review this approach in conjunction to the soon-to-be completed updated 5 year experience study.

Recommended: 5 Year Step Down from 97% of ADEC

Fiscal Year Ending	Projected City Funding Policy Contribution	Projected Actuarial Value Of Assets*	Projected Funded Ratio
2019	9,878,000	193,774,000	74.7%
2020	9,770,000	204,230,000	75.9%
2021	9,661,000	214,752,000	77.0%
2022	9,553,000	225,260,000	78.0%
2023	9,444,000	235,732,000	79%

*Beginning of fiscal year



BURLINGTON EMPLOYEES' RETIREMENT SYSTEM

Robert Hooper
Chairman of the Board
Munir Kasti
Vice-Chairman

****SPECIAL****

Retirement Board Meeting Agenda
City Hall Conference Room 12
Monday October 15, 2018 3:00pm

Stephanie Hanker
Retirement Administrator
802-865-7097
VT Relay – dial 711

1. Agenda
2. Public Forum
3. Educational Session – Actuary Hooker & Holcombe
4. Adjourn

Non-Discrimination

The City of Burlington will not tolerate unlawful harassment or discrimination on the basis of political or religious affiliation, race, color, national origin, place of birth, ancestry, age, sex, sexual orientation, gender identity, marital status, veteran status, disability, HIV positive status or genetic information. The City is also committed to providing proper access to services, facilities, and employment opportunities. For accessibility information or alternative formats, please contact Human Resources Department at 865-7145.

Draft
October 15, 2018
Burlington Employees' Retirement Board
Special Meeting
City Hal, Conference Room 12

Board Members Present:

- Beth Anderson
- Matt Dow (3:25pm)
- Pat Robins
- David Mount
- Munir Kasti (3:25pm)

Others Present:

- Stephanie Hanker
- Kim Sturtevant
- Steven Lemanski, H&H
- Karen Paul – Public
- Romana Kurevija - Public

Meeting Began 3:10pm

1. **Agenda:**

No quorum to adopt agenda

2. **Public Forum:**

No questions or statements from members of public in attendance

3. **Educational Session – Actuary Hooker & Holcombe:**

Steve Lemanski presented an educational session to board members titled Public Sector Actuarial Science 101.

4. **Adjourn:**

Meeting ended 4:20pm