Actuarial Valuation & Levy Adequacy Analysis

FPDR

January 27, 2015

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Introduction

- Milliman has completed its June 30, 2014 actuarial valuation of the FPDR program
  - Actuarial valuations are performed biennially
  - The valuation was the first conducted since 2013 legislative changes
  - It also reflects assumption changes adopted from the actuarial experience study presented at the May 2014 FPDR Board meeting
- We have also completed an analysis assessing the likelihood that the permitted levy under the City Charter will be adequate to fund the FPDR program, including contributions to Oregon PERS for FPDR Three members
  - The analysis can be used by interested parties to assess the magnitude and potential volatility of future FPDR levies and to quantify several likely sources of levy volatility

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Valuation – Uses & Limitations

- The actuarial valuation will provide the basis for two fiscal years of financial statement reporting information for both FPDR and the City of Portland
- Results as of June 30, 2014 will be rolled forward for use in financial reporting at June 30, 2015 and June 30, 2016
- The pay-as-you-go structure of FPDR benefits means that the valuation is not used for:
  - Establishing the funded status of the FPDR program
  - Providing guidance regarding contribution policy

Benefit Provisions Valued

- The valuation reflects two legislative changes affecting member benefits made during 2013
- Senate Bill 822 eliminated tax offset benefits for retirees not subject to Oregon income tax because of residency
- Senate Bill 861 limited the post-retirement COLA paid to retirees from Oregon PERS to no more than 1.25%
  - By rule, the FPDR Two COLA in a year is limited to no more than the adjustment paid to Oregon PERS retirees, so the Oregon PERS legislation also affects FPDR Two members

Projected Pension Benefit Payments

- An actuarial valuation is a very long-term calculation model
  - In total, retired and disabled FPDR members and their beneficiaries are currently receiving retirement pensions and long-term disability income replacement payments of approximately $8 to $9 million per month
  - In our valuation model, those payments are forecast to increase for the next 20 years on a non-inflation adjusted basis
    - The subsequent decline is gradual, with payments not receding to current levels (in non-inflation adjusted dollars) until around the year 2060
- Given the very long-term nature of the modeling, assumptions play a key role in the calculations

Assumptions

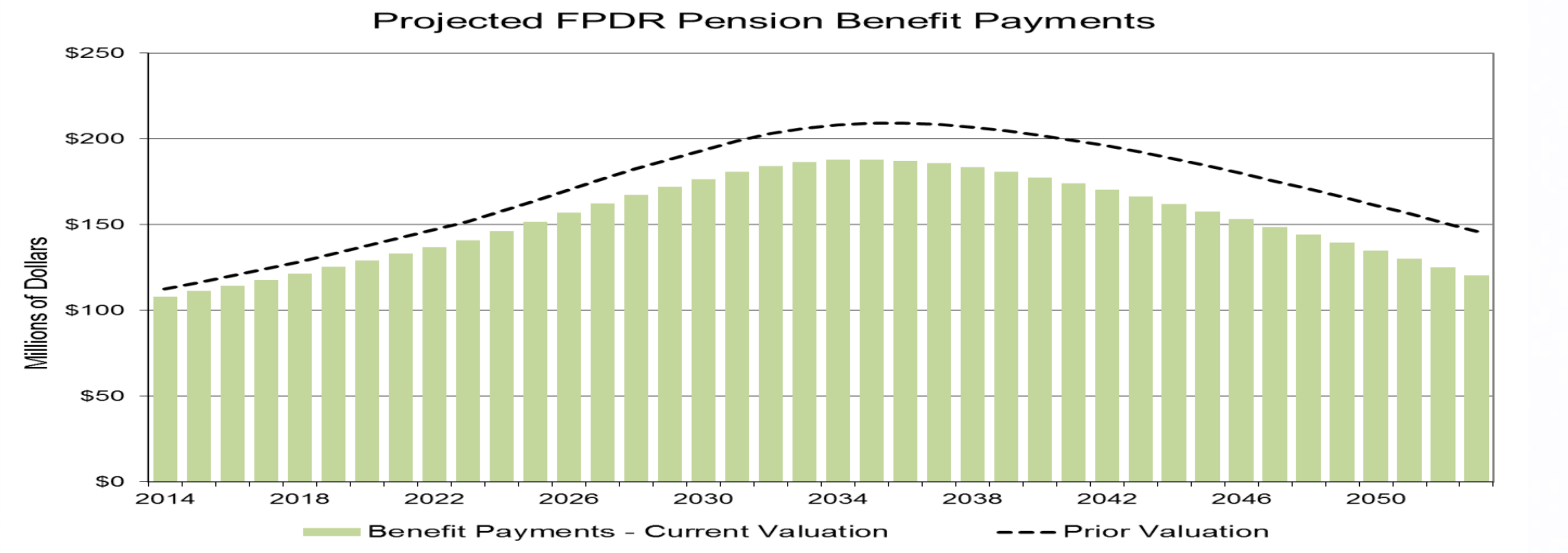
- This valuation reflects assumptions from the 2014 actuarial experience study
  - Details of the experience study were presented in May 2014
- The study analyzed economic and demographic assumptions
  - For demographic assumptions, we reviewed 4 to 5 years of historical member experience to determine assumptions
- Changes adopted based on the study:
  - Valuation discount rate basis changed to match new GASB approach
  - Updated mortality assumption to reflect increased life expectancies
  - Modestly lowered salary increase assumption at most ages
  - Lowered assumed rate of disability incidence
  - Adjusted retirement and withdrawal assumptions

Actuarial Valuation – Development of Liabilities

- A valuation calculates projected FPDR benefit payments by year for the FPDR membership group as of the valuation date
  - The projections combine the member and beneficiary census data with all of the long-term actuarial assumptions
- Those projected payments are then converted into a net present value as of the valuation date using a discount rate assumption that reflects the time value of money
- A *cost allocation method* attributes a portion of the net present value for current actives to their service already rendered
  - This is called the ***actuarial accrued liability*** for the actives
- The portion of the net present value attributed to the upcoming year is called the ***normal cost*** for the actives

Actuarial Valuation – Projected Benefits

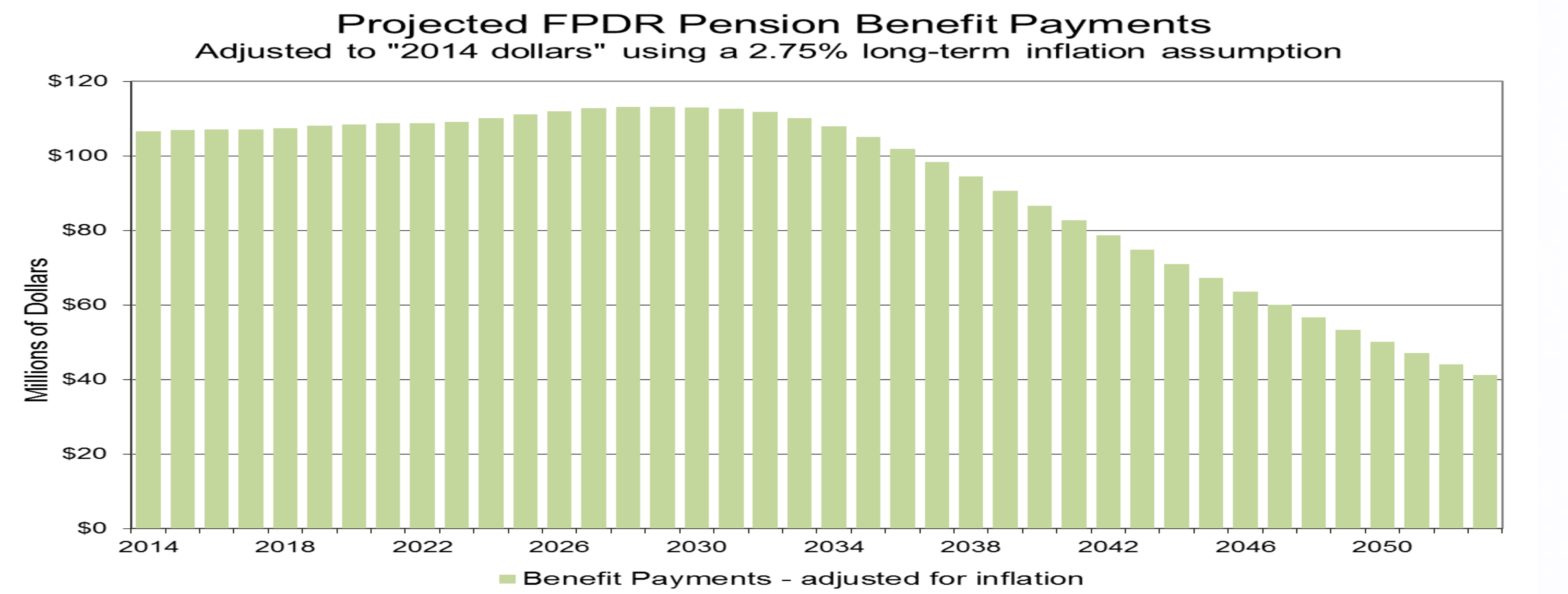
- This chart shows projected FPDR pension benefit payments on a non-inflation adjusted basis



- Benefits projected to increase for 20 years and then decrease thereafter
- Decrease since prior valuation primarily due to legislative changes

Actuarial Valuation – Projected Benefits

- This chart shows the same payments on an inflation-adjusted basis using our long-term inflation assumption



- Once almost all FPDR Two members have retired, benefits will then begin to decrease over time when measured on this inflation-adjusted basis

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Actuarial Valuation Results

($ in millions)	6/30/2012 Valuation	6/30/2014 Valuation
Discount Rate	3.50%	4.29%
Cost Allocation Method	Entry Age Normal	Entry Age Normal
Actuarial Accrued Liability	$2,899.2	$2,488.3
Normal Cost	$82.8	$54.8
Projected Base Pay for Next Year	$137.5	$138.3

- This is the first valuation performed since new GASB financial reporting requirements took effect
- A 4.29% discount rate was used for this valuation
  - Same assumption used for June 30, 2014 financial reporting
  - Reflects 20-year municipal bond index, per new financial reporting standards
- The *Annual Required Contribution*, which had been calculated under the previous accounting standard, no longer exists

Actuarial Valuation Results

Actuarial Accrued Liability Changes

($ in millions)	Actuarial Accrued Liability
6/30/2012 Actuarial Accrued Liability	**$2,899.2**
Expected increase	$159.8
Plan provisions change	($293.4)
Experience (gain)/loss – salary	($29.5)
Experience (gain)/loss – other	($12.4)
Assumption change – discount rate	($274.2)
Assumption change – other	$38.8
6/30/2014 Actuarial Accrued Liability	**$2,488.3**

Primary causes of decrease:

Legislated changes

Higher discount rate

- More details can be found in our formal actuarial valuation report

Levy Analysis - Total Requirements Calculation

- Our model includes separate components to develop the ***Total Requirements*** for FPDR
  - ***Pay-as-you go costs subcomponent***
    - FPDR One and FPDR Two retiree payments, including death, disability and disability-related medical
    - FPDR Three death, disability and disability-related medical
    - Administrative and operating expenses for the program
  - ***Pre-funded costs subcomponent*** (charged on FPDR Three payroll)
    - Variable contributions to the Oregon PERS (OPERS) defined benefit program, in which FPDR Three members are eligible for OPSRP benefits
      - Set by the OPERS Board, and includes a charge for the value of benefits currently being earned and a shortfall amortization charge for OPERS unfunded liability
    - Fixed 9% of payroll contribution to the account balance-based Individual Account Program (IAP) administered by OPERS

Transition to FPDR Three

- During the projection period of our analysis, the FPDR levy will be funding two generations of FPDR members simultaneously
  - FPDR One and FPDR Two members funded on a pay-as-you-go basis during their retirement years
  - Pre-funding of FPDR Three members' retirement benefits during their working careers
- In addition, disability and administrative costs are funded on a pay-as-you-go basis
- Higher levies and near-term costs are typical of a transition from a pay-as-you-go system to a pre-funded system

Transition to FPDR Three

- Ultimately, the long-term cost of any benefit program is:

Cost = Benefits Paid + Administrative Expenses – Investment Earnings

- The effects of the 2006 City Charter reform on cost are:
  - Establishment of decreased benefit levels for FPDR Three
  - The pre-funded nature of FPDR Three benefits creates the potential for investment earnings
- The cost-saving effects of the 2006 reform accrue very slowly, with the most dramatic impact likely to occur more than 20 years out, after nearly all FPDR Two retirees have commenced their pay-as-you-go benefits

Variability in Analysis

- A levy adequacy analysis is not a guarantee of what will occur, and our model attempts to illustrate the potential variability of outcomes
- The two largest factors that drive levy variability are actual:
  - Changes in Real Market Value (RMV) that deviate from the baseline forecast
  - Oregon PERS investment experience varying from baseline forecast
    - Variability due to this factor increases over time as a greater percentage of total payroll becomes FPDR Three
- In many of the poor economic scenarios modeled, low RMV growth and poor OPERS investment results are linked, leading to a leveraged upward effect on the levy calculated as a fraction of RMV

Basis for the Levy Adequacy Model

- June 30, 2014 FPDR census
- Plan provisions reflecting 2006 and 2012 Charter reforms, along with 2013 legislative changes
- RMV provided by the City of $92.6 billion as of January 2014, which was used in the 2014 levy request to fund FPDR for the 2014-2015 fiscal year (also known as fiscal 2015)
- RMV growth from 2014 to 2015 of 7.0% and median annual growth in subsequent years of 4.5%, based on input from the City of Portland's economist
  - A wide variety of potential RMV growth patterns were modeled
- A financial model projecting Oregon PERS contributions using the most recent valuation and 11/30/2014 investment returns

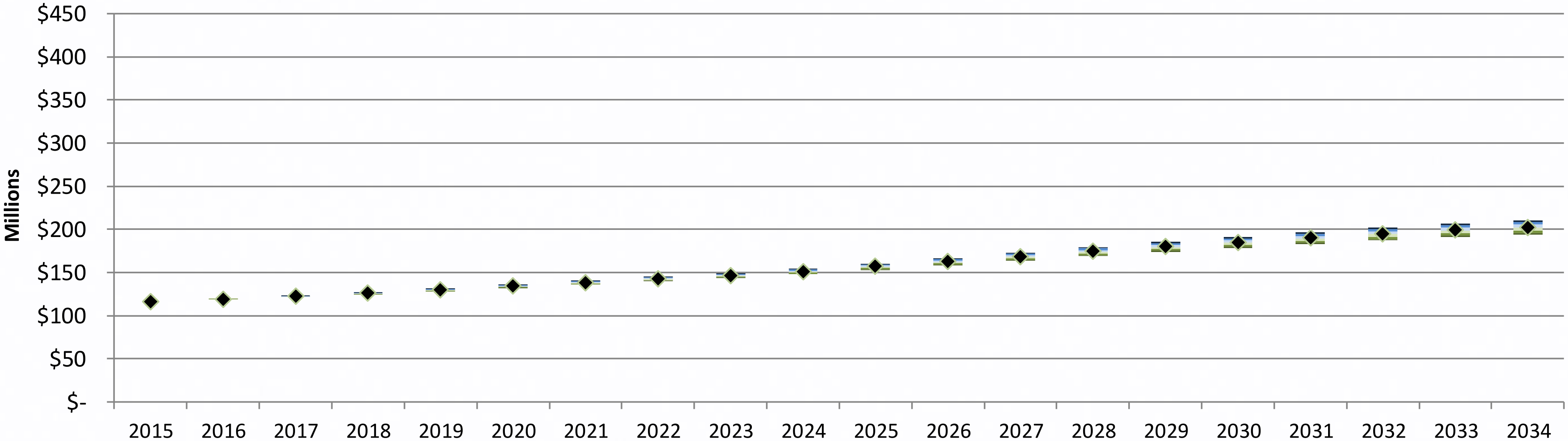
Interpreting Analysis Results

- Results are shown as a probability distribution, rather than a single amount
  - The distribution is based on a stochastic simulation using 10,000 trials
    - The economic scenarios were developed by Milliman's national team that specializes in capital market models
- In the charts, the dots represent median outcomes
- We graphically display results from the 5^{th} to 95^{th} percentiles, so ten percent of model outcomes fall outside of the depicted range

Total Requirements

Pay-As-You-Go Costs Subcomponent

- Relatively predictable; increasing until FPDR Two actives retire; FPDR Three disability and inflation-linked values of future FPDR Two benefits add volatility in later years

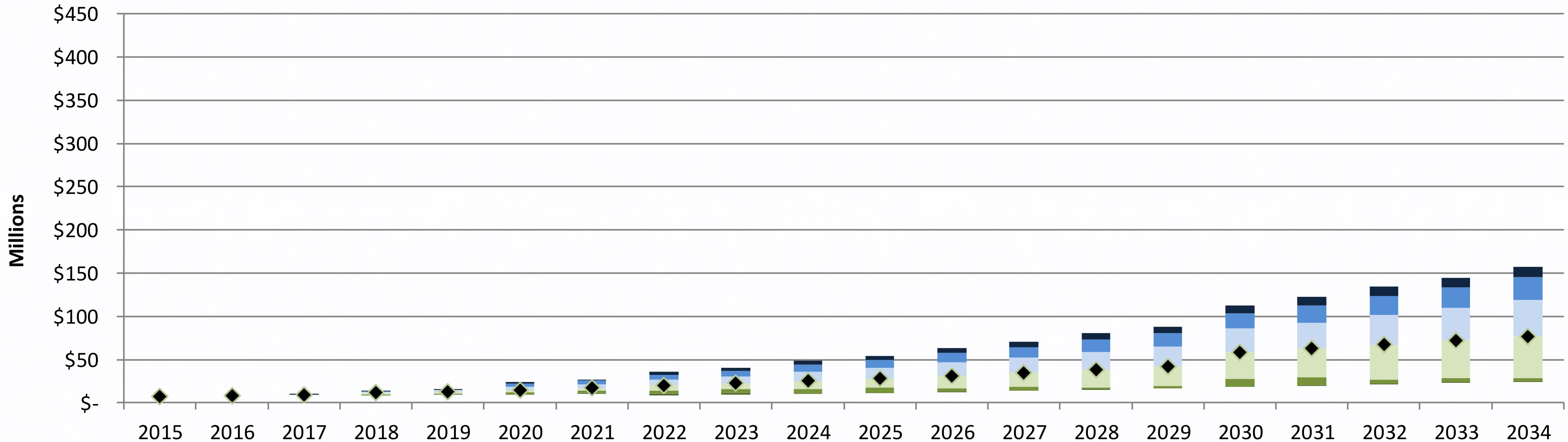


FY Ending 6/30		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
5th		115.3	118.5	122.7	126.7	130.9	135.6	140.0	144.7	149.1	154.0	160.1	166.4	172.8	179.2	185.4	190.8	196.5	202.1	206.9	210.5
10th		115.3	118.5	122.5	126.4	130.6	135.2	139.5	144.1	148.5	153.3	159.3	165.5	171.7	178.0	184.0	189.4	195.0	200.3	205.0	208.5
25th		115.3	118.5	122.2	125.9	130.0	134.5	138.7	143.2	147.4	152.0	157.9	163.8	169.9	175.9	181.8	187.0	192.3	197.4	202.0	205.2
50th		115.3	118.5	121.9	125.5	129.4	133.7	137.8	142.2	146.3	150.7	156.4	162.1	167.9	173.8	179.4	184.4	189.5	194.4	198.6	201.7
75th		115.3	118.5	121.6	125.0	128.8	133.0	137.0	141.2	145.2	149.5	154.9	160.5	166.1	171.7	177.2	181.8	186.7	191.3	195.4	198.3
90th		115.3	118.5	121.3	124.6	128.2	132.4	136.2	140.3	144.2	148.4	153.6	159.0	164.5	169.9	175.1	179.6	184.3	188.7	192.6	195.3
95th		115.3	118.5	121.1	124.3	127.9	131.9	135.7	139.8	143.6	147.7	153.0	158.2	163.5	168.8	173.9	178.3	182.9	187.2	191.0	193.7

Includes administrative & operating expenses and short-term disability and medical costs

Total Requirements
Pre-Funded Costs Subcomponent

- Increases as the portion of payroll that is FPDR Three grows; more volatile than pay-as-you-go costs since OPSRP contribution rates are linked to variable OPERS investment results

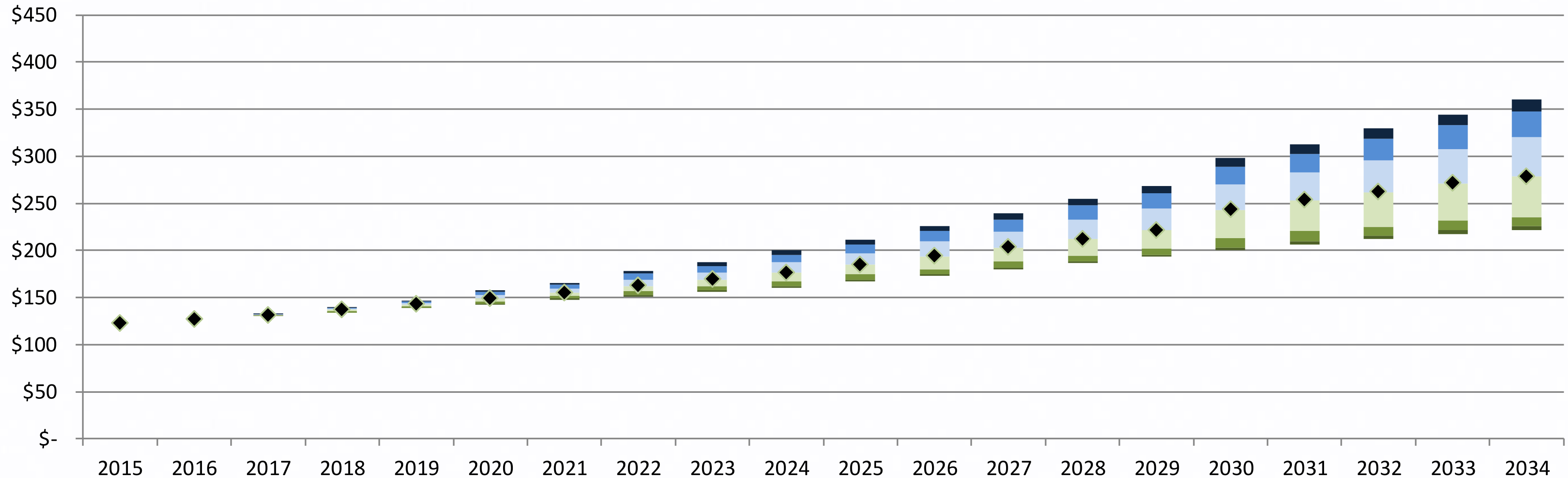


FY Ending 6/30		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
5th		7.1	8.1	9.7	13.7	15.8	24.0	27.3	35.7	40.4	48.8	54.1	63.3	70.4	80.3	88.4	112.4	122.3	134.5	144.9	157.6
10th		7.1	8.1	9.6	13.5	15.4	22.7	25.7	32.8	36.9	44.3	49.3	58.1	64.5	73.7	80.9	103.9	112.8	124.0	133.8	145.2
25th		7.1	8.1	9.5	13.0	14.9	19.0	21.7	26.8	30.2	36.4	40.4	47.1	52.2	59.1	64.9	85.8	92.9	101.7	109.7	119.0
50th		7.1	8.1	9.4	11.6	13.2	15.0	17.0	20.3	22.8	25.4	28.2	31.5	35.0	38.4	42.1	58.4	63.4	67.3	72.5	76.8
75th		7.1	8.1	9.3	9.5	10.8	12.2	13.8	14.4	16.2	16.2	18.0	17.1	19.0	17.5	19.3	27.6	30.0	26.6	28.7	29.1
90th		7.1	8.1	9.2	8.9	10.2	9.8	11.2	10.0	11.3	10.6	11.8	12.9	14.3	15.6	17.1	19.1	20.7	22.1	23.9	25.4
95th		7.1	8.1	9.2	8.8	10.0	9.3	10.5	8.6	9.6	10.2	11.3	12.5	13.8	15.1	16.5	18.3	19.8	21.2	22.9	24.4

Excludes administrative & operating expenses and short-term disability and medical costs

Total Requirements

- This is the combination of the two subcomponents (pay-as-you-go costs; pre-funded costs)



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5th		122.4	126.6	132.4	139.9	146.1	157.9	165.4	178.3	187.1	199.9	211.0	225.9	239.0	254.8	268.6	297.7	312.5	329.3	344.5	360.6
10th		122.4	126.6	132.2	139.4	145.4	156.3	163.5	175.2	183.5	195.4	205.8	220.4	233.0	247.7	260.8	288.5	302.8	318.7	332.8	347.3
25th		122.4	126.6	131.8	138.4	144.2	152.8	159.5	169.1	176.6	187.1	196.7	209.2	220.2	232.9	244.5	270.3	282.6	295.8	307.9	320.6
50th		122.4	126.6	131.3	137.0	142.5	148.9	155.1	162.3	169.0	176.2	184.7	193.8	203.2	212.1	221.4	243.1	253.1	261.8	271.2	278.2
75th		122.4	126.6	130.9	135.2	140.5	145.9	151.6	156.4	162.3	167.0	174.4	180.1	187.9	194.0	201.6	212.9	220.4	224.7	231.5	234.9
90th		122.4	126.6	130.5	134.2	139.2	143.4	148.8	152.3	157.6	161.7	168.5	174.7	181.9	188.5	195.5	203.1	209.8	215.4	221.3	225.5
95th		122.4	126.6	130.3	133.7	138.6	142.3	147.5	150.7	155.9	160.1	166.7	172.9	179.8	186.3	193.0	200.0	206.2	212.0	217.7	221.9

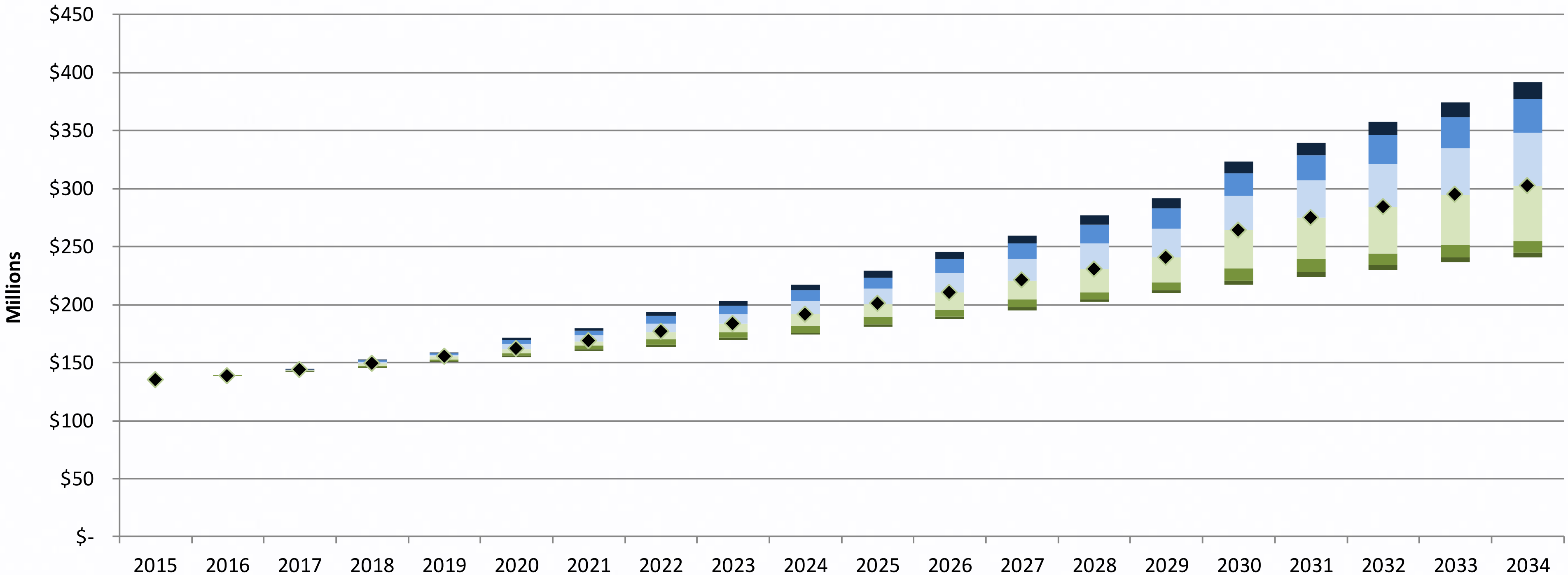
Includes administrative & operating expenses and short-term disability and medical costs

Development of Final Levy

- The Total Requirements shown on the prior slide are the estimate of the funds needed for the operation of FPDR
- Several adjustments are made to the Total Requirements amount to develop a ***Final Levy*** for Board and Council review
  - Decrease to account for other revenue sources
  - Increase to reflect the effects of discounts and delinquencies
  - Increase to reflect the effects of tax compression on some properties
- Based on discussions with the City Economist and FPDR, the net effects of these three adjustments for years after fiscal 2014-2015 was approximately a 9% increase
  - Details are in the appendix

Final Levy

- This shows the estimated Final Levy request as a dollar amount



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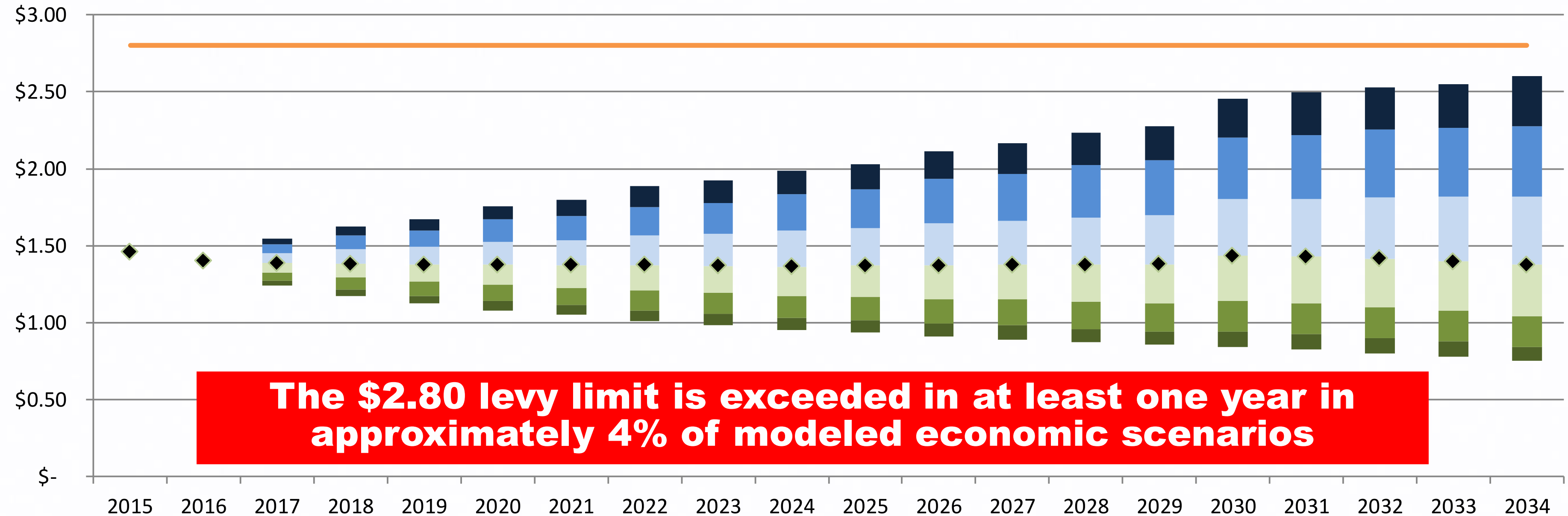
10th	135.0	138.6	144.3	151.9	158.3	169.8	177.6	190.3	199.3	212.2	223.5	239.4	253.0	269.0	283.3	313.3	328.9	346.2	361.5	377.2
25th	135.0	138.6	143.9	150.8	157.0	166.0	173.3	183.7	191.8	203.2	213.6	227.3	239.2	253.0	265.6	293.6	306.9	321.3	334.4	348.3
50th	135.0	138.6	143.4	149.2	155.1	161.7	168.5	176.3	183.5	191.4	200.6	210.5	220.7	230.4	240.5	264.0	275.0	284.3	294.6	302.2
75th	135.0	138.6	142.9	147.3	152.9	158.4	164.6	169.9	176.3	181.3	189.4	195.6	204.1	210.7	219.0	231.2	239.4	244.1	251.4	255.1
90th	135.0	138.6	142.5	146.2	151.6	155.8	161.7	165.4	171.2	175.6	183.1	189.8	197.6	204.7	212.4	220.6	227.9	234.0	240.4	245.0
95th	135.0	138.6	142.3	145.6	150.8	154.5	160.2	163.7	169.3	173.9	181.1	187.9	195.3	202.4	209.7	217.2	223.9	230.2	236.5	241.0

Includes administrative & operating expenses and short-term disability and medical costs

Final Levy

- This shows the estimated Final Levy request as a rate per $1,000 of RMV; the City Charter limits the levy to $2.80



FY Ending 6/30	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
5th	1.46	1.40	1.54	1.63	1.67	1.76	1.80	1.89	1.92	1.99	2.03	2.11	2.16	2.23	2.28	2.46	2.50	2.53	2.55	2.60
10th	1.46	1.40	1.51	1.57	1.60	1.67	1.69	1.75	1.78	1.83	1.87	1.93	1.97	2.03	2.06	2.20	2.22	2.25	2.26	2.28
25th	1.46	1.40	1.45	1.47	1.49	1.52	1.53	1.57	1.58	1.60	1.61	1.64	1.66	1.68	1.70	1.80	1.81	1.81	1.82	1.82
50th	1.46	1.40	1.39	1.38	1.38	1.38	1.37	1.37	1.37	1.36	1.37	1.37	1.38	1.38	1.38	1.43	1.43	1.41	1.40	1.37
75th	1.46	1.40	1.33	1.29	1.27	1.25	1.23	1.21	1.19	1.17	1.17	1.15	1.15	1.13	1.12	1.14	1.13	1.10	1.08	1.04
90th	1.46	1.40	1.27	1.21	1.17	1.14	1.11	1.08	1.06	1.03	1.01	0.99	0.98	0.96	0.94	0.94	0.92	0.90	0.88	0.84
95th	1.46	1.40	1.24	1.17	1.13	1.08	1.05	1.01	0.98	0.95	0.94	0.91	0.89	0.87	0.86	0.84	0.82	0.80	0.78	0.75

Includes administrative & operating expenses and short-term disability and medical costs

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Other Sources of Levy Volatility

- The levy analysis model depicts volatility associated with RMV changes and Oregon PERS investment returns, but does not include all potential sources of volatility
- Other potential sources of volatility not modeled include
  - Potential correlated effects of market conditions on levels of tax compression and/or levels of tax delinquency
  - Effects of Oregon property tax law changes and/or new levies
  - Legal challenges to Senate Bill 822 and 861 benefit changes
  - Demographic experience different from assumption (e.g. retirement)
  - Growth in FPDR workforce or change in workforce composition
  - Changes to Oregon PERS assumptions and methodology for setting employer contribution rates

Certification

This presentation summarizes key results of an actuarial valuation as of June 30, 2014 and stochastic levy adequacy analysis for the fiscal years 2015 to 2034 of the Fire & Police Disability & Retirement Fund ("FPDR" or "the Fund") sponsored by the City of Portland. For complete actuarial valuation results, including cautions regarding the limitations of use of valuation calculations, please refer to our formal Actuarial Valuation Report as of June 30, 2014 ("the Valuation Report") published on January 15, 2015. The Valuation Report, including all supporting information regarding data, assumptions, methods and provisions, is incorporated by reference into this presentation.

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

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

A valuation report is only an estimate of the Fund's financial condition as of a single date. It can neither predict the Fund's future condition nor guarantee future financial soundness. Actuarial valuations do no affect the ultimate cost of Fund benefits, only the timing of Fund contributions or cost recognition. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. Likewise an actuarial projection, even if stochastic, is still determined by underlying assumptions. If different assumptions are used projection results may differ significantly. No one set of assumptions is uniquely correct.

Future actuarial measurements may differ significantly from the current measurements summarized in this presentation due to such factors as the following: Fund experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in Fund benefit provisions or applicable law.

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Milliman’s work is prepared solely for the internal business use of the City of Portland and FPDR.

Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. No third party recipient of Milliman’s work product should rely upon it. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are pension actuaries. Milliman’s advice is not intended to be a substitute for qualified legal or accounting counsel.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

Appendix

Actuarial Basis

Data

We have based our calculation of the liabilities on the data supplied by the FPDR and summarized in the data exhibits of the Valuation Report.

Assets as of June 30, 2014, were based on values provided by FPDR and the City of Portland and are detailed in the Valuation Report.

Methods / Policies

Actuarial Cost Method: Entry age normal, as described in the Valuation Report.

Provisions

Provisions valued are as detailed in the Valuation Report and reflect benefit provisions in effect as of June 30, 2014.

Two legislative changes occurred since the previous valuation that affected the plan provisions reflected in this valuation.

- Senate Bill 822, signed into law in May 2013, eliminated the Oregon State Income Tax Adjustment (“tax offset benefits”) for retirees and payees not subject to Oregon income tax because of residency.
- Senate Bill 861, signed into law in October 2013, limited the post-retirement COLA payable under the Oregon PERS system to no more than 1.25% beginning in 2014. Based on requirements of the City Charter and FPDR administrative practices, we understand this also means the COLA payable for FPDR Two retirees will not exceed 1.25% in the future.

Appendix

Actuarial Basis

Assumptions for Valuation Calculations

As described in the Valuation Report.

Assumptions for Levy Adequacy Analysis

As described in the Valuation Report except where modified by the deviations and additions noted in this Appendix.

Real Market Value (RMV) of real estate subject to property taxes: $92.618 billion as of the beginning of 2014 as reported by the City and FPDR. It is our understanding that amount served as the basis for calculations for property tax bills sent in October 2014 to fund FPDR for the fiscal year running from July 1, 2014 to June 30, 2015 (FYE 2015). No estimate is made for urban renewal excess in the model per our understanding (from consultation with TSCC) that county assessors do not track urban renewal excess value for RMVs. Since assessors lack that information, the RMV amount without any reduction for urban renewal excess is an appropriate determination basis for evaluating the $2.80 levy limit.

Increase in RMV: Based on consultation with the City's economist, 7% growth in the first year of our model with 4.5% geometric average annual compounded growth thereafter. Growth patterns vary in our stochastic model with the exception of the first year.

Administrative & Operating Expenses: A component of the Total Requirements, based on consultation with FPDR this is modeled as $3.24 million in the first year of our model and in subsequent years is assumed to increase with CPI, which varies in our stochastic model.

Short-Term Disability & Disability-Related Medical Costs: A component of the Total Requirements, based on consultation with FPDR staff this is modeled as $4.65 million in the first year of our model and in subsequent years it is assumed to increase with CPI plus 2.75%, with CPI varying in our stochastic model.

Appendix

Actuarial Basis

Assumptions for Levy Adequacy Analysis (continued)

IAP Contribution to OPERS for FPDR Three members: A component of the Total Requirements, assumed to be 9% of FPDR Three payroll throughout the payment period.

OPSRP Contribution to OPERS for FPDR Three members: A component of the Total Requirements. This will vary based on future investment experience of the OPERS program. It is assumed in this model that the current OPERS assumptions and rate calculation methods will remain consistent throughout the projection period. Detailed information on those methods can be found in the December 31, 2013 System-Wide Actuarial Valuation Report for Oregon PERS.

Overtime effect on FPDR Three base payroll subject to OPERS contributions: Throughout the projection it is assumed that overtime pay subject to OPERS contributions will be 10% of base FPDR Three payroll.

Adjustments to Total Requirements to Estimate Final Levy: Three adjustments are made as detailed below. For years after FYE2018 of our model, the net combined adjustment is to increase Total Requirements by 8.6%.

Other sources of revenue: Multiply by 0.971 (equal to one hundred percent minus 2.9 percent)

Adjustment for property tax discounts and delinquencies: Multiply by 1.05152 (equal to one divided by one minus 4.9 percent)

Adjustment for estimated effects of tax compression: Based on conversations with FPDR and the City's economist, multiply by the following factors:

FYE2016 – 1.07296 (equal to one divided by one minus 6.8 percent)

FYE2017 – 1.06952 (equal to one divided by one minus 6.5 percent)

FYE2018 – 1.06724 (equal to one divided by one minus 6.3 percent)

FYE2019 – 1.06610 (equal to one divided by one minus 6.2 percent)

Later fiscal years – 1.06383 (equal to one divided by one minus 6.0 percent)

Appendix

Actuarial Basis

Assumptions for Levy Adequacy Analysis (continued)

CPI: Varies in our stochastic model. Average geometric average annual compounded growth of 2.75%.

Oregon PERS Investment Returns: Return for calendar year 2014 is assumed to be 7.52%, which is consistent with year-to-date returns as of November 30, 2014 as published by Oregon Treasury. Returns for 2015 and beyond vary in our stochastic model. Average geometric annual compounded growth for the post-2014 period is approximately 7.3%.

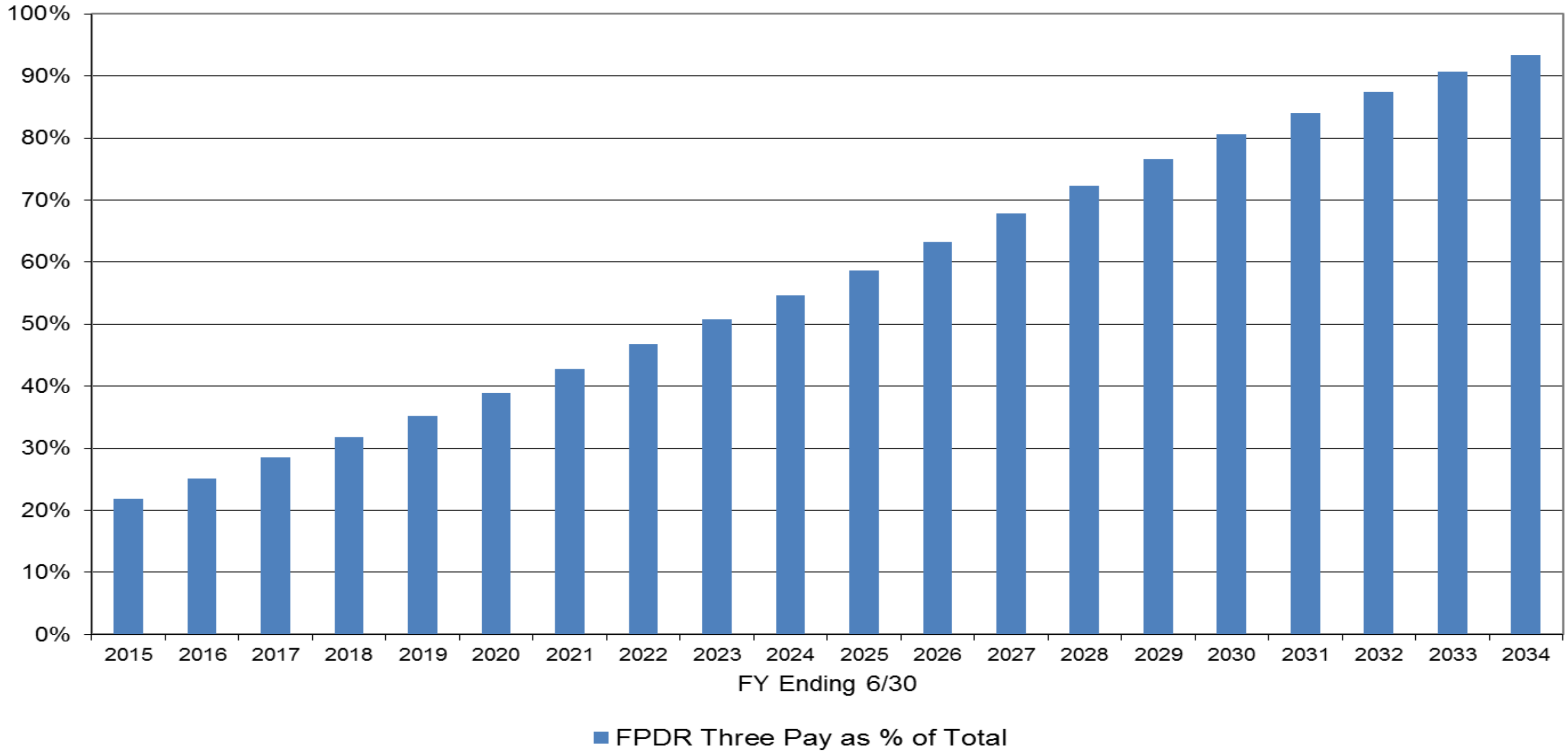
COLA increases: For FPDR One members, COLA increases are assumed to be equal to the projected wage growth in a given year and are assumed to remain levels in years where projected wage growth is negative. For FPDR Two and Three retirement-related benefits for the FPDR and OPERS programs, COLA increases are assumed to be 1.25% annually.

Wage growth: Varies in our stochastic model. Each year's projected wage growth is equal to projected CPI plus 1.00%.

New entrants: The number of active participants in FPDR is assumed to remain stable over the projection period, with new hires replacing participants leaving employment such that overall headcount is constant. No new members are assumed to be eligible for FPDR One or FPDR Two benefits; all new entrants are assumed to become members under the FPDR Three/OPSRP benefit formula. The age, gender, and starting salaries for new entrants were assumed to be consistent with the demographics observed from recent FPDR Three hires.

Appendix

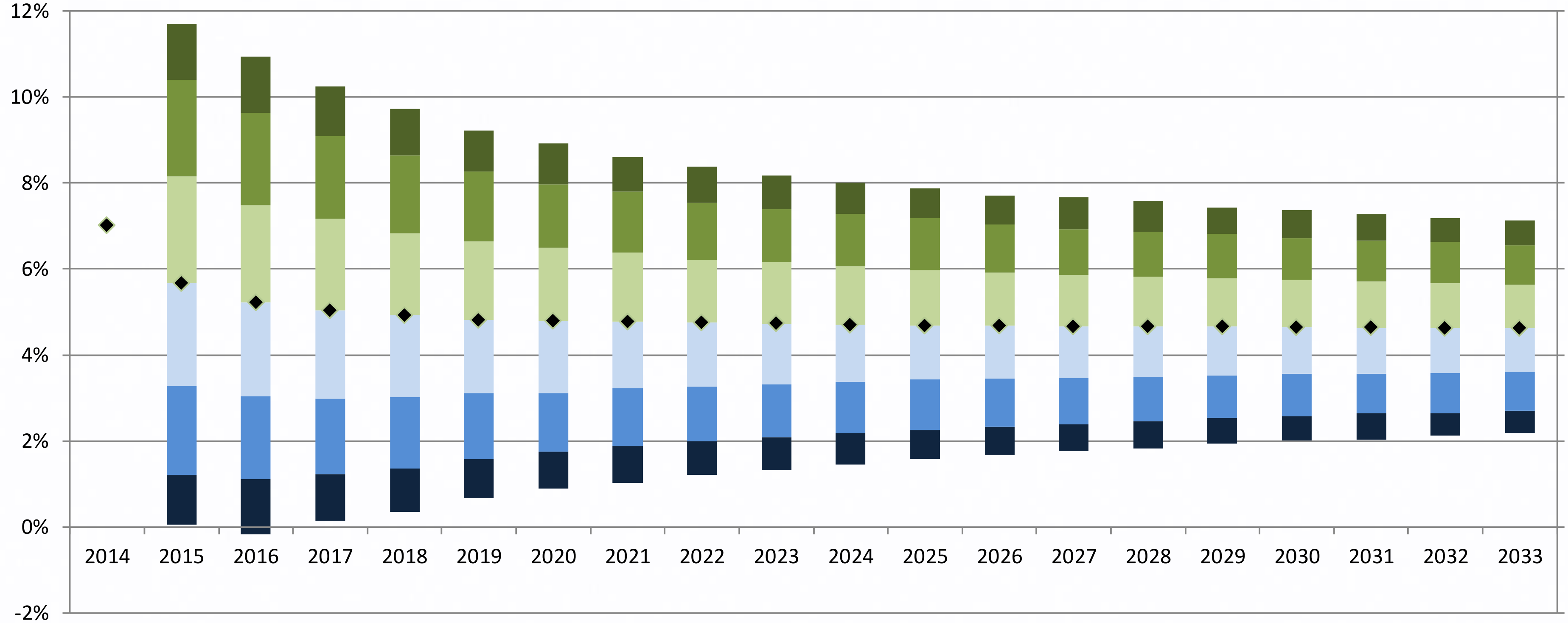
Proportion of Active Payroll that is FPDR Three



FY Ending 6/30	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
FPDR Three Pay as % of Total	22%	25%	29%	32%	35%	39%	43%	47%	51%	55%	59%	63%	68%	72%	77%	81%	84%	87%	91%	93%

Appendix

Cumulative Annualized Geometric Growth in RMV

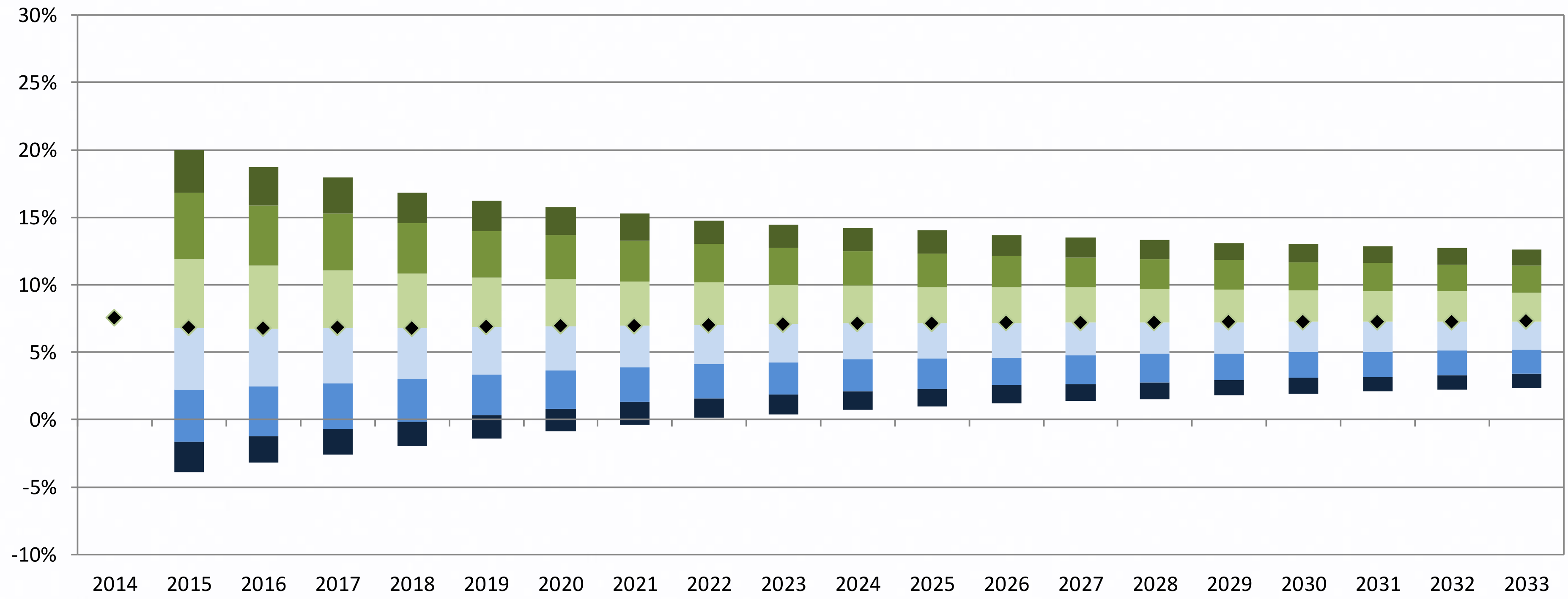


CY Ending 12/31	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
95th	7.0%	11.7%	10.9%	10.3%	9.7%	9.2%	8.9%	8.6%	8.4%	8.2%	8.0%	7.9%	7.7%	7.7%	7.6%	7.4%	7.4%	7.3%	7.2%	7.1%
90th	7.0%	10.4%	9.6%	9.1%	8.6%	8.3%	8.0%	7.8%	7.5%	7.4%	7.3%	7.2%	7.0%	6.9%	6.9%	6.8%	6.7%	6.7%	6.6%	6.6%
75th	7.0%	8.2%	7.5%	7.2%	6.8%	6.6%	6.5%	6.4%	6.2%	6.1%	6.1%	6.0%	5.9%	5.9%	5.8%	5.8%	5.7%	5.7%	5.7%	5.6%
50th	7.0%	5.7%	5.2%	5.0%	4.9%	4.8%	4.8%	4.8%	4.8%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.6%	4.6%	4.6%	4.6%
25th	7.0%	3.3%	3.0%	3.0%	3.0%	3.1%	3.1%	3.2%	3.3%	3.3%	3.4%	3.4%	3.5%	3.5%	3.5%	3.5%	3.6%	3.6%	3.6%	3.6%
10th	7.0%	1.2%	1.1%	1.2%	1.4%	1.6%	1.8%	1.9%	2.0%	2.1%	2.2%	2.3%	2.3%	2.4%	2.5%	2.5%	2.6%	2.6%	2.7%	2.7%
5th	7.0%	0.0%	-0.2%	0.1%	0.4%	0.7%	0.9%	1.0%	1.2%	1.3%	1.5%	1.6%	1.7%	1.8%	1.8%	1.9%	2.0%	2.0%	2.1%	2.2%

Milliman

Appendix

Cumulative Annualized Geometric Investment Return on Oregon PERS Fund



CY Ending 12/31		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
95th		7.5%	20.0%	18.7%	17.9%	16.9%	16.2%	15.8%	15.3%	14.7%	14.4%	14.2%	14.0%	13.7%	13.5%	13.3%	13.1%	13.0%	12.9%	12.7%	12.6%
90th		7.5%	16.8%	15.9%	15.3%	14.6%	14.0%	13.7%	13.3%	13.0%	12.7%	12.5%	12.3%	12.2%	12.0%	11.9%	11.8%	11.7%	11.6%	11.5%	11.4%
75th		7.5%	11.9%	11.4%	11.1%	10.8%	10.5%	10.4%	10.2%	10.2%	10.0%	9.9%	9.8%	9.8%	9.8%	9.7%	9.6%	9.6%	9.5%	9.5%	9.4%
50th		7.5%	6.8%	6.7%	6.8%	6.8%	6.9%	6.9%	7.0%	7.0%	7.1%	7.1%	7.1%	7.2%	7.2%	7.2%	7.2%	7.2%	7.3%	7.2%	7.3%
25th		7.5%	2.2%	2.4%	2.7%	3.0%	3.3%	3.6%	3.9%	4.1%	4.3%	4.5%	4.6%	4.6%	4.8%	4.9%	4.9%	5.0%	5.0%	5.1%	5.2%
10th		7.5%	-1.6%	-1.2%	-0.7%	-0.2%	0.3%	0.8%	1.3%	1.6%	1.8%	2.1%	2.3%	2.6%	2.6%	2.7%	2.9%	3.1%	3.2%	3.3%	3.4%
5th		7.5%	-3.9%	-3.2%	-2.6%	-2.0%	-1.4%	-0.8%	-0.4%	0.1%	0.4%	0.7%	1.0%	1.2%	1.4%	1.5%	1.8%	1.9%	2.1%	2.2%	2.3%