

## **Pennsylvania Municipal Retirement System**

### **Actuarial Valuation as of January 1, 2014**

**Produced by Cheiron**

**April 2015**

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April 30, 2015

Pennsylvania Municipal Retirement Board of the  
Pennsylvania Municipal Retirement System  
c/o Stephen W. Vaughn, Secretary  
P.O. Box 1165  
Harrisburg, PA 17108-1165

***Re: PMRS 2014 Actuarial Valuation Report***

Dear Members of the Board:

At your request, we have conducted the annual actuarial valuation of the Pennsylvania Municipal Retirement System (System) as of January 1, 2014. This report includes the valuation of the four county plans and reflects a roll forward of all other plans administered by the System. The roll forward reflects an explicit valuation of the retirees as of January 1, 2014, with a roll forward of the active and terminated vested liabilities with an adjustment for the liabilities associated with new retirees that are being explicitly valued. The results of the valuation are contained in this report.

The purpose of this report is to present the annual actuarial valuation of the Pennsylvania Municipal Retirement System which is discussed in more detail in the Foreword section of this report. This report was prepared for Pennsylvania Municipal Retirement Board of the Pennsylvania Municipal Retirement System for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users. This report contains analyses which combine asset and liability performance and projections. This is an Agent Multiple Employer retirement system (as defined under GASB 67/68) for participating municipalities and counties. Assets and liabilities are separately accounted for and reported to the Public Employee Retirement Commission of the Commonwealth of Pennsylvania. This report reflects aggregate valuation results for the System. The report provides statistics on employer contribution levels for the traditional defined benefit portion of the municipal plans participating in the system as of the valuation date, the updated methods and assumptions effective January 1, 2014, as well as disclosures under the Governmental Accounting Standards Board Statement #25 for the entire System.

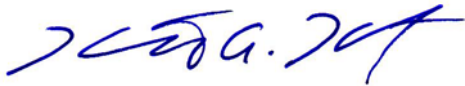
Your attention is called to the Foreword and Board Summary in which we refer to the general approach employed in the preparation of this report, a big picture view of the System, historical trends developed by Cheiron, and future stress testing of the System. The trend data developed prior to January 1, 2007 was developed by the prior actuary. We also comment on the sources and reliability of both the data and the actuarial assumptions on which our findings are based. Those comments are the basis for our certification that this report is complete to the best of our knowledge and belief. All municipalities that were required to file an Act 205 form as of January 1, 2013, had their liabilities actuarially adjusted and included in this report to represent a valuation of the System from year to year; however, only liabilities for the four county plans participating in the System were valued based on actual data as of January 1, 2014. Therefore,

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county plans reported to the state for the 2014 Act 293 Filing represent the actual actuarial values. We rely on future System experience conforming to the underlying assumptions. To the extent that actual System experience deviates from the underlying assumptions, the results would vary accordingly.

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

Sincerely,  
Cheiron



Kenneth A. Kent, FSA, FCA  
Principal Consulting Actuary



Karen M. Zangara, FSA  
Principal Consulting Actuary

cc: Anthony J. Bucci, Jr.  
Kristine Cline

## FOREWORD

Cheiron has performed the actuarial valuation of the Pennsylvania Municipal Retirement System (System) as of January 1, 2014. The purpose of this report is to:

- 1) **Measure and disclose**, as of the valuation date, the financial condition of the System;
- 2) **Indicate trends** in the financial progress of the System;
- 3) **Provide specific information** and documentation required by the Governmental Accounting Standards Board (GASB).

An actuarial valuation establishes and analyzes System assets and liabilities on a consistent basis and traces the progress of both from one year to the next. It includes measurement of the System's investment performance as well as an analysis of actuarial liability gains and losses.

**Section I** presents a summary containing our findings and disclosing important trends experienced by the System in recent years.

**Section II** contains details on various asset measures, together with pertinent performance measurements.

**Section III** shows similar information on System liabilities, measured for actuarial, accounting, and government reporting purposes.

**Section IV** shows the distribution of the county plans' contribution rates by component.

**Section V** includes the required disclosures under GASB Statement Number 25.

The appendices to this report contain a summary of the System's membership at the valuation date, and the actuarial methods and assumptions used in the valuations.

As this System is an Agent Multiple Employer retirement system in which each of the participating municipalities are entitled to define and submit to the Board the benefit provisions for their respective employees, the actual plan provisions are not included in this report. We based our results on the plan provisions defined and submitted to the State under the 2013 Act 205 filings and 2014 Act 293 filings in preparing this valuation as provided by the System. Because the System is bound by Act 293 to complete a biennial valuation for each county, we have developed liabilities for 2014 for all county plans required to submit a valuation as of January 1, 2014. For the municipalities valued as of January 1, 2013 we used the 2013 results to estimate the liabilities for the active and deferred vested participants in these plans to provide an overall measure of the funded status of the System. This method is referred to as a "roll forward" and is used throughout this report in all 2014 calculations for the municipalities to provide a reasonable estimate of the aggregate System results. All retiree liabilities (including municipalities) are valued as of January 1, 2014 based upon updated data as of this date. For new retirees, their liabilities from January 1, 2013 were subtracted from the active and vested terminated liabilities that were rolled forward. In aggregate, this method decreased the active and

## FOREWORD

vested terminated rolled forward liabilities as of January 1, 2014 by about \$80.9 million for the municipal defined benefit plans.

In preparing our report, we relied on information (some oral and some written) supplied by the System's staff. This information includes, but is not limited to, 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 #23.

The actuarial assumptions reflects the Board's understanding of the likely future experience of the System, and the assumptions as a whole represent the best estimate for the future experience of the System based on the trends and results of periodic experience analysis performed as required under Act 205. The results of this report 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.

Future valuation reports may differ significantly from the current report presented in this document due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

Finally, in preparing this report, we have conformed to generally accepted actuarial principles and practices which are consistent with the Code of Professional Conduct, and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board.

To the extent the laws of the Commonwealth of Pennsylvania and/or the administrative practices of the System differ from Actuarial Standards of Practice, we have identified such deviations within the assumption section of this report.

**SECTION I**  
**BOARD SUMMARY**

**General Comments**

The primary purpose of the actuarial valuation and this report is to disclose the following as of the valuation date:

- The overall financial condition of the Pennsylvania Municipal Retirement System,
- Biennial valuation of the county plans participating in the System,
- Past trends and expected future trends in the System's financial condition, and
- Information required by the Governmental Accounting Standards Board (GASB).

In this Section, we present a summary of the principal valuation results. This includes the basis upon which the January 1, 2014 valuation was completed and an examination of the current financial condition of the System. In addition, we present a review of the key historical trends followed by the System's projected financial outlook.

The county plans are valued every other year. Throughout our report, our discussion will address changes from January 1, 2012, the last time the county plans were valued, to January 1, 2014. In other parts of the discussion, we address the overall status of the System. In this case, we compare results from January 1, 2013 to January 1, 2014 to identify the changes in the overall System's funded status.

**A. Valuation Basis**

The January 1, 2014 valuation results are based on the same actuarial assumptions used in the January 1, 2013 valuation. Since the last county valuation date, the Board has adopted a reduction in the assumed interest/discount rate from 6.0% to 5.5%. Because this change was adopted beginning with the January 1, 2013 valuation, the results in the county's January 1, 2012 valuation do not reflect this assumption change.

Below we identify a number of key results of this valuation.

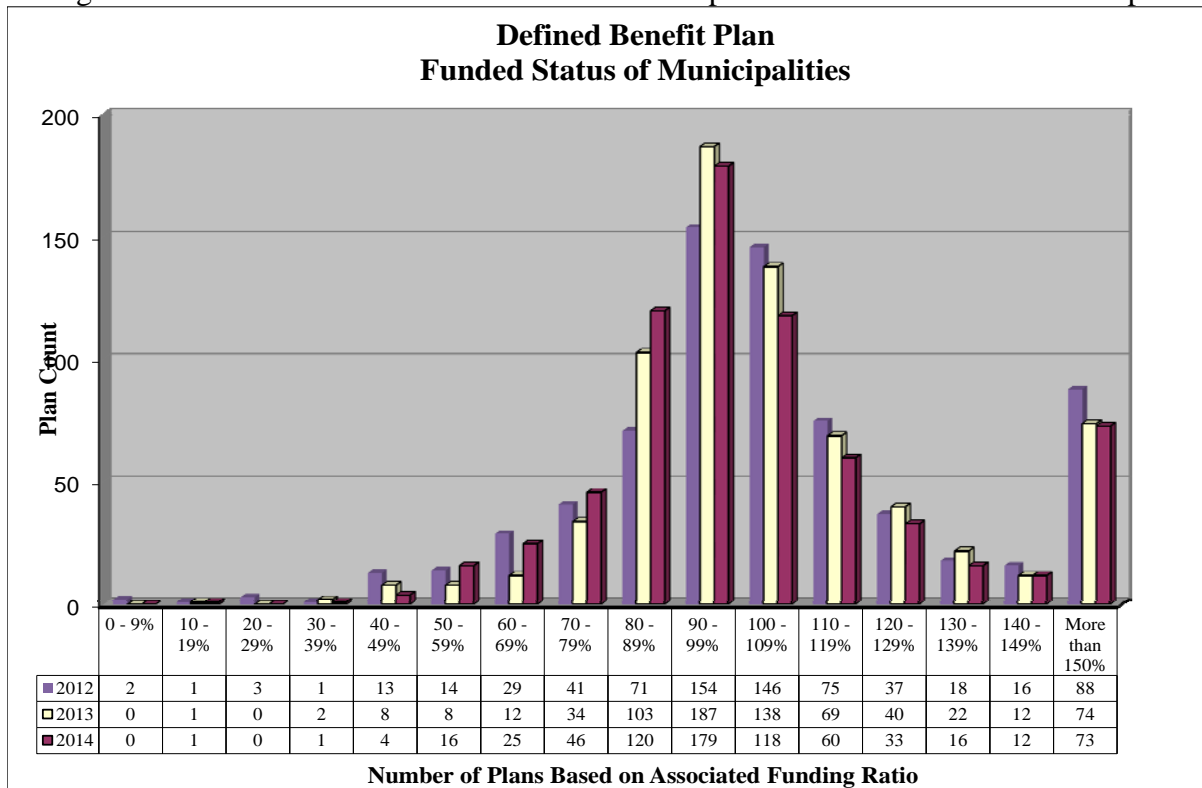
- *Unfunded Actuarial Liability (UAL)*: The UAL is the excess of the System's Actuarial Liability (AL) over the Actuarial Value of Assets (AVA). Because the System is made up of many plans, some with UAL and others with surplus (when the AVA is greater than the AL), the aggregate changes for each of these values combined provides the net funded level of the System. In aggregate, the System continues to be in a net deficit position which has increased from \$16.9 million as of January 1, 2013 to \$32.9 million as of January 1, 2014. This occurred partly because the liabilities increased due to the decrease in the discount rate from 6.0% to 5.5% for the 2013 municipal valuations and 2014 county valuations. Therefore, the timing of the contributions paid during 2013 were based upon the valuation results using the prior assumptions from the 2011 valuation representing lower required contributions. This delay creates additional losses.

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- On a snap shot basis comparing the Market Value of Assets (MVA) to AL provides information of the progress of the System’s funding status. As of January 1, 2014 the AL exceeded the MVA resulting in an unfunded liability of \$54.0 million. This represents an improvement compared to the unfunded liability of \$241.6 million as of January 1, 2013 or a net \$187.6 million dollar improvement over last year.
- *Funding Ratio:* This is the ratio of the System’s AVA to AL. The funding ratio decreased from 99.1% as of January 1, 2013 to 98.4% as of January 1, 2014. The decrease reflects the two-year contribution delay. While liabilities were increasing based upon the 5.50% discount rate assumption, the contributions paid were based upon the 2011 valuation results which had lower liabilities based upon the 6.00% discount rate assumption.
- *System Experience:* On an actuarial asset value basis the return is 5.50% based upon the rate guaranteed by PMRS. However on a market asset basis the average investment return for the year ending December 31, 2013 was actually 18.8%. This favorable return has just about covered the balance of the 2009 investment loss.

The following chart shows a distribution of the funded status using actuarial value of assets of the plans covered by the System in 2012, 2013, and 2014. From this comparison it would appear that the individual funding ratios of the member municipalities over 100% funded last year have decreased. This reflects the use of surplus to offset the annual cost of benefits. Therefore, when rolling forward the liabilities the funded status is anticipated to decline for these municipalities.





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 BOARD SUMMARY**

**B. Current Financial Condition**

On the following pages, we summarize the key results of the January 1, 2014 valuation and how they compare to the results from the January 1, 2013 valuation.

1. System Membership:

As shown in Table I-1 below, total membership in the Retirement System increased by 2.1% from 2013 to 2014. The active participant counts reported for the Traditional Defined Benefit Plans increased by 1.0%. The aggregate covered payroll of the System increased by 3.3% and the average salary increased by 1.8%.

<b>Table I-1</b>			
<b>Membership Total</b>			
	<b>January 1, 2014</b>	<b>January 1, 2013</b>	<b>% Change</b>
Traditional Defined Benefit Actives	7,676	7,599	1.0%
Cash Balance Benefit Actives	1,185	1,131	4.8%
Terminated Vesteds	1,058	1,149	-7.9%
Participants Receiving Benefit Payments	4,423	4,160	6.3%
Beneficiaries	520	520	0.0%
Total System Members	14,862	14,559	2.1%
Annual Salaries*	\$434,603,924	\$420,787,345	3.3%
Average Salary per Active Member	49,047	48,200	1.8%

\* Annualized salary for traditional defined benefit plan participants and actual salary for cash balance participants

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**SECTION I**  
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Table I-2 is a summary of the demographic make-up of the traditional defined benefit and cash balance plans in the System.

Category	Table I-2 Demographic Make-up of the System		Percent Change
	Valuation as of January 1, 2014	Valuation as of January 1, 2013	
Number of plans:			
Traditional Defined Benefit Plans	716	714	0.28%
Cash Balance Plans	268	251	6.77%
Active Employees in Traditional Defined Benefit Plans:			
Count	7,676	7,599	1.01%
Average Age	48.3	48.2	0.17%
Average Service	12.8	13.1	-2.06%
Total Payroll*	\$ 389,410,214	\$ 376,296,674	3.48%
Average Pay	\$ 50,731	\$ 49,519	2.45%
Active Employees in Cash Balance Plans:			
Count	1,185	1,131	4.77%
Average Age	50.7	50.3	0.74%
Average Service	12.4	12.3	1.39%
Total Payroll*	\$ 45,193,710	\$ 44,490,671	1.58%
Average Pay*	\$ 38,138	\$ 39,337	-3.05%
Total Active PMRS Participants	8,861	8,730	
Inactive Participants in Traditional Defined Benefit Plans:			
Deferred Pension	753	800	-5.88%
Return of Contributions	14	51	-72.55%
Deferred Vested Participants in Cash Balance Plans	291	298	-2.35%
Pensioners:			
Count	4,423	4,160	6.32%
Average Age	69.4	69.6	-0.32%
Average Monthly Benefit	\$ 1,252	\$ 1,202	4.13%
Number of New Awards	431	391	10.23%
Average New Monthly Benefit	\$ 1,706	\$ 1,370	24.53%
Number Receiving Legislated COLA	193	175	10.29%
Survivor Beneficiaries:			
Count	520	520	0.00%
Average Age	74.6	73.2	1.84%
Average Monthly Benefit	\$ 771	\$ 806	-4.35%
Total Inactive PMRS Participants	6,001	5,829	2.95%

\*Annualized salaries paid during the prior Plan year.

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2. System Assets and Liabilities:

Table I-3 presents a comparison between the January 1, 2013 and January 1, 2014 System assets, liabilities, unfunded actuarial liability, and funding ratios for traditional defined benefit non-county, traditional defined benefit county, and non-county cash balance plans. While this valuation was prepared to support the county plans, we were provided non-county participant data and *rolled forward* the active and vested terminated liabilities from the 2013 valuation for estimation purposes for these plans. Retiree liabilities were explicitly valued. The total funding ratio decreased from 99.1% as of January 1, 2013 to 98.4% as of January 1, 2014.

However on a Market Value of Asset basis the increase in funding ratio demonstrates the underlying favorable investment returns for the year ending December 31, 2013. This funding ratio increased from 87.3% to 97.3% .

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<b>Table I-3</b>			
<b>Total Plan Assets and Liabilities (\$ thousands)</b>			
	<b>Final</b>		<b>% Change</b>
	<b>January 1, 2014</b>	<b>January 1, 2013</b>	<b>to Baseline</b>
<b>Traditional Defined Benefit (Non-county) Plans:</b>			
Actives	\$ 997,992	\$ 982,801	1.5%
Terminated Vested	56,837	70,734	-19.6%
In Pay Status	752,243	673,113	11.8%
Total Actuarial Liability	\$ 1,807,072	\$ 1,726,648	4.7%
Actuarial Value of Assets <sup>1</sup>	1,787,947	1,722,290	3.8%
Unfunded/(Surplus) of Actuarial Liability	\$ 19,125	\$ 4,358	338.8%
<b>Traditional Defined Benefit (County) Plans:</b>			
Actives	\$ 60,238	\$ 48,840	23.3%
Terminated Vested	8,554	8,440	1.4%
In Pay Status	35,797	34,691	3.2%
Total Actuarial Liability <sup>2</sup>	\$ 104,589	\$ 91,971	13.7%
Actuarial Value of Assets <sup>1</sup>	102,364	94,898	7.9%
Unfunded/(Surplus) of Actuarial Liability	\$ 2,225	\$ (2,927)	-176.0%
<b>Cash Balance Plans:</b>			
Actives	\$ 65,489	\$ 59,243	10.5%
Terminated Vested	11,720	11,441	2.4%
In Pay Status	16,352	14,269	14.6%
Total Actuarial Liability	\$ 93,561	\$ 84,953	10.1%
Actuarial Value of Assets <sup>1</sup>	93,561	84,953	10.1%
Unfunded/(Surplus) of Actuarial Liability	\$ 0	\$ 0	0.0%
<b>Total of All Plans</b>			
Actives	\$ 1,123,719	\$ 1,090,884	3.0%
Terminated Vested	77,111	90,615	-14.9%
In Pay Status	804,392	722,073	11.4%
Total Actuarial Liability	\$ 2,005,222	\$ 1,903,572	5.3%
Market Value of Assets (MVA)	\$ 1,951,247	\$ 1,661,926	17.4%
Actuarial Value of Assets (summation of above) <sup>1</sup>	\$ 1,983,872	\$ 1,902,141	4.3%
Expenses in Excess of Assessment	3,412	3,126	9.1%
Actuarial Value of Asset Adjustment <sup>3</sup>	(15,010)	(18,563)	-19.1%
Final Actuarial Value of Assets <sup>4</sup>	\$ 1,972,274	\$ 1,886,704	4.5%
Unfunded/(Surplus) using Actuarial Value	\$ 32,948	\$ 16,868	95.3%
Funding Ratio on Actuarial Asset Value	98.4%	99.1%	-0.8%
Unfunded/(Surplus) using Market Asset Value	\$ 53,975	\$ 241,646	-77.7%
Funding Ratio on Market Asset Value	97.3%	87.3%	11.5%

<sup>1</sup> The assets shown above are attributable to the traditional defined benefit, cash balance, non-county and county plans based upon updated data and information provided.

<sup>2</sup> Municipal plan liabilities are estimated in even years based upon a roll forward of the prior year's liabilities.

<sup>3</sup> The actuarial value of asset adjustment reflects the total estimated assets of the plan.

<sup>4</sup> The final actuarial value of assets reflect the asset value based upon member, municipal, retiree, disability, and DROP reserve accounts, as approved by the Board and provided by PMRS.

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Table I-4 presents a summary of the January 1, 2014 County traditional defined benefit plans that are in a surplus or underfunded position.

<b>Table I-4</b>		
<b>Funded Status of County Plans</b>		
	<b>January 1, 2014</b>	<b>January 1, 2012</b>
<b>A. County Plans in a surplus position</b>		
1. Number of plans with a surplus	1	3
2. Assets in plans with a surplus	\$24,319,632	\$88,343,130
3. Actuarial Liability in plans with a surplus	<u>\$24,018,801</u>	<u>\$86,067,619</u>
4. Amount of surplus (2. – 3.)	\$300,831	\$2,275,511
<b>B. County Plans in an underfunded position</b>		
1. Number of underfunded plans	3	1
2. Assets in underfunded plans	\$78,044,252	\$2,468,541
3. Actuarial Liability in underfunded plans	<u>80,569,728</u>	<u>4,323,897</u>
4. Amount of (unfunded) liability (2. – 3.)	(\$2,525,476)	(\$1,855,356)

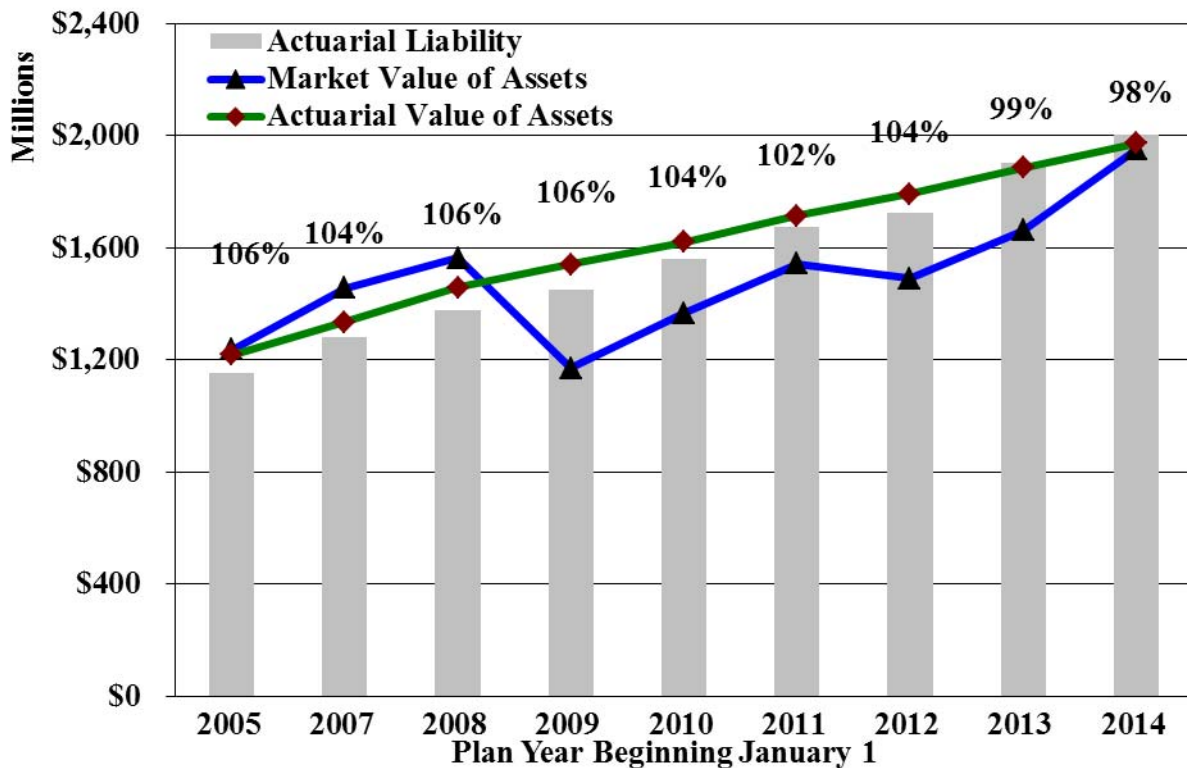
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**C. Historical Trends**

Even though the attention given to the valuation reflects the most recently computed actuarial liability and funding ratio, it is important to remember that each valuation is merely a snapshot of the long-term progress of the System. It is equally important to judge a current year's valuation result relative to historical trends, as well as trends expected into the future.

In the chart below, we present the historical trends for the total System (traditional defined benefit, cash balance, county and non-county) market and actuarial value of assets compared to the total System (traditional defined benefit, cash balance, county and non-county) actuarial liabilities. We have included the funding ratio across the top of each bar to show the progress of the Retirement System since 2005.

**Pennsylvania Municipal Retirement System Assets and Liabilities – 2005 to 2014**

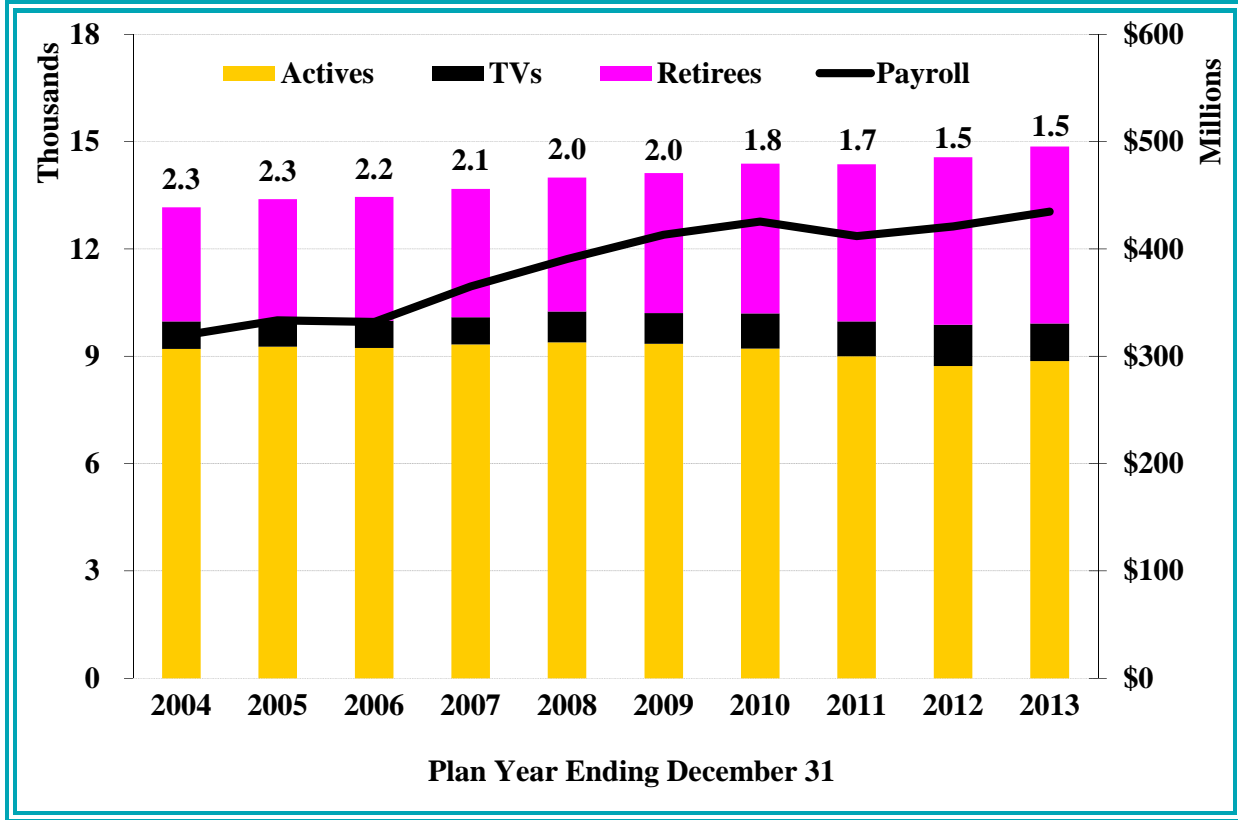


This graph demonstrates that the System's funding ratio (Actuarial Value of Assets divided by the Actuarial Liability) declined over the given period, primarily in 2013, because the discount rate assumption decreased from 6.0% to 5.5%. However, the funded ratio on a Market Value of Assets basis is more important to understand the underlying System's risks and recovery. The 2014 Market Value of Assets is just slightly less than the Actuarial Liability, such that on a market value basis, the funded ratio would be 97.3% reflecting a System return of 18.8% in 2013.

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**Pennsylvania Municipal Retirement System Participant Counts – end of year 2004 to 2013**



The chart above shows a comparison of the demographic makeup of the System over the last ten years. The number above the bars represents the ratio of active to inactive participants which is decreasing at a steady pace. A retirement system has a life cycle of its own, reaching maturity when as many or more of the covered participants are non-active (retirees and terminated vested participants (TVs)). When this occurs, the ratio moves closer to and sometimes below 1.0. For the System, the fact that this ratio is still relatively high indicates that contribution income is significant and net negative cash flows are small, at approximately 1.1% of assets as illustrated in the next chart. However, there has been a steady decline of this ratio over the past ten years and the maturity of the plans in aggregate should continue to be monitored.

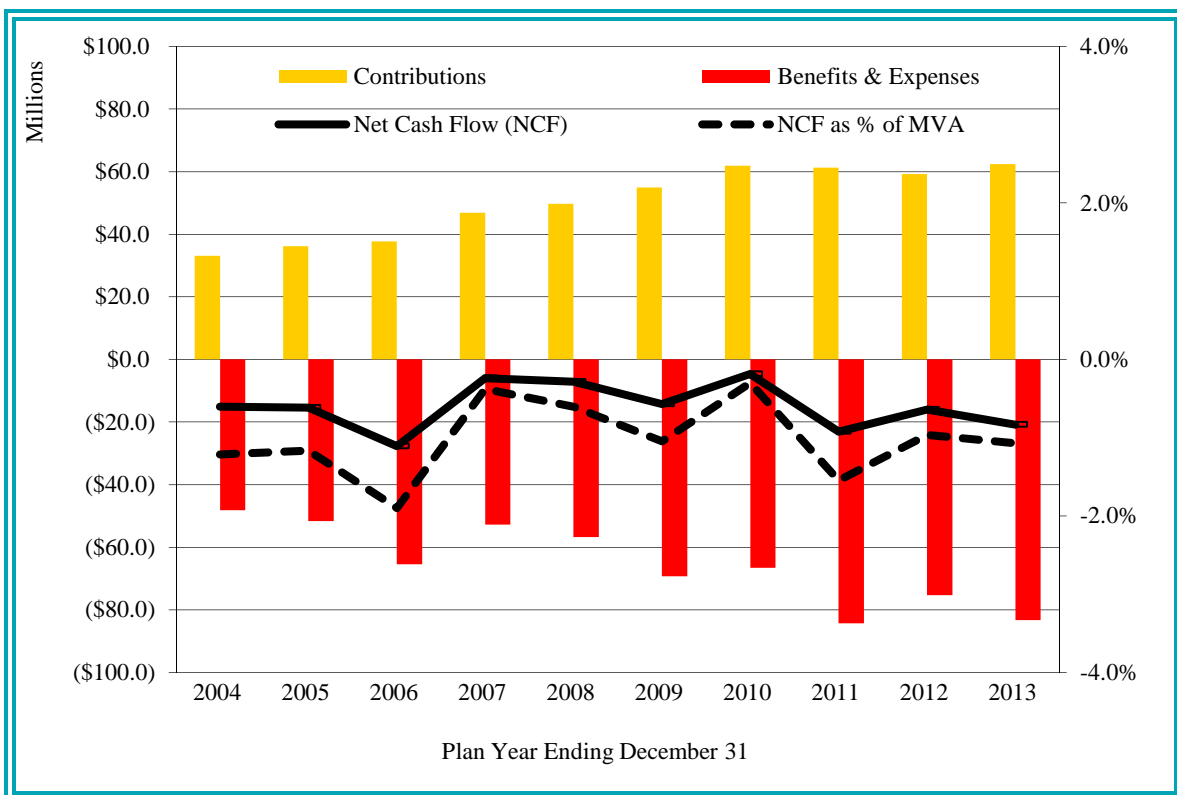
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This next graph tracks the cash flow since 2004. An important risk element of a retirement system is the implication of cash flow and resources for paying benefits. If the level of benefit payments exceeds expected contributions plus expenses, then additional cash from existing assets are needed to make the benefit payments. This is referred to as negative cash flow which is typical among retirement systems where the number of retirees increase relative to the active participants. On the right-hand side, we show the net cash flow as a percent of assets. As the graph below illustrates, the net negative cash flow falls within the range of 0.3% to 2.0% of total assets. This implies that along with proceeds from contributions, an additional amount of cash generated from asset investments must be identified to pay benefits. Another way to consider this is that for the total value of assets to grow, the fund needs a minimum return between 0.3% and 2.0%.

The volatility of the net cash flow is not only a function of contributions and benefit payments, but also reflects transfer of funds into the System from new participating municipalities and asset outflows to municipalities that choose to leave the System.

**Pennsylvania Municipal Retirement System Cash Flows – 2004 through 2013**





**SECTION I**  
**BOARD SUMMARY**

**D. Projected Financial Trends**

Our analysis of the Pennsylvania Municipal Retirement System's projected financial trends is an important part of this valuation. In this section, we present our assessment of the implications of the January 1, 2014 valuation results on the future outlook in terms of benefit security (assets sufficient to cover liabilities) and the System's expected funding progression.

In the charts that follow, we project the Retirement System's resources and obligations. We assume the Act 205 contributions are made each year. The projections are provided under four different assumptions:

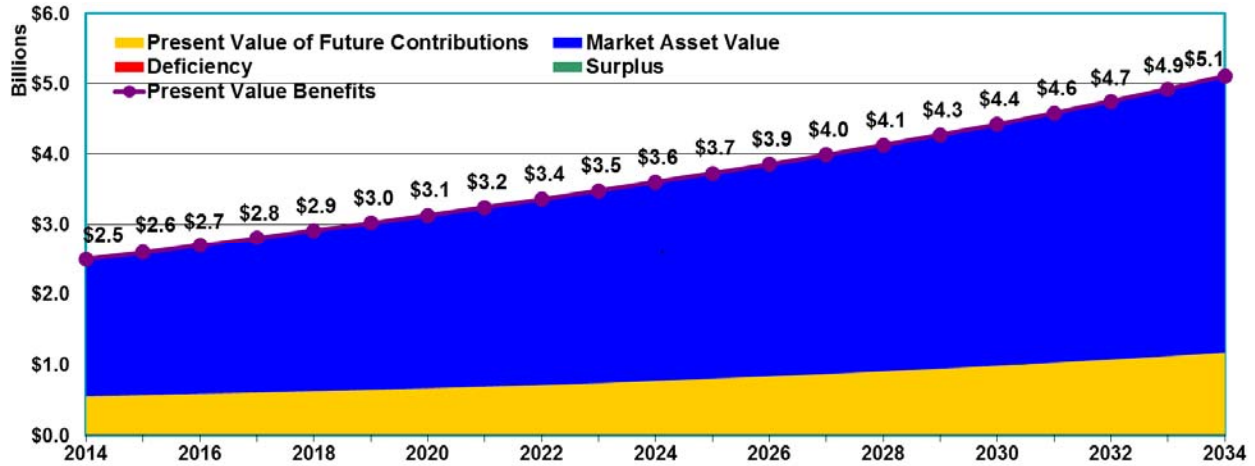
- 1) Assuming 5.50% investment returns each and every year,
- 2) Assuming 7.50% investment returns each and every year,
- 3) Assuming average investment returns over the projected period equal to a 5.50% but which vary each year based on Table I-5. We do this to demonstrate a more realistic projection because the System's return will never be level from year to year.
- 4) Assuming 20 years of varied returns equal to an overall average 7.50% investment return based on Table I-6.

The projections that follow show how the total obligations of the System, assuming the current active population, remain constant (shown by the purple line). This is an open group projection which means when an active participant is expected to change status, they are assumed to be replaced. The area under the curve represents the *Present Value of Benefits*. This amount takes into account the value of all benefits earned up to this point of time called the actuarial liability plus benefits assumed to be earned into the future. This represents the total PMRS obligation over time.

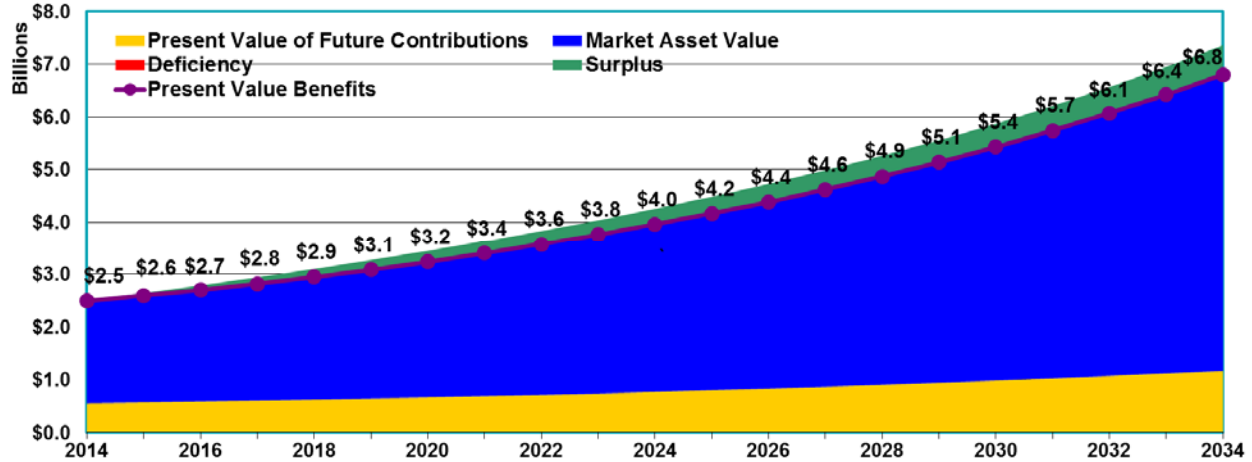
To meet these obligations, the System has resources which include the Market Value of Assets (in blue) and the present value of future contributions (in gold). To the extent these two sources are insufficient to meet the obligations today or in the future, the result will be a deficit (in red). If the resources are more than enough, the result will be a surplus (green). For this System, given that the investment crediting return rate for all municipalities is guaranteed currently at 5.5% the only resource to cover a deficit or create surplus is through average future investment returns anticipated in excess of the 5.5% rate. Under the current projection, there is a slight deficiency that remains over the projection period because the 5.5% rate does not increase.

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This next graph shows the implications if the assets are projected to grow at the rate of 7.5%,



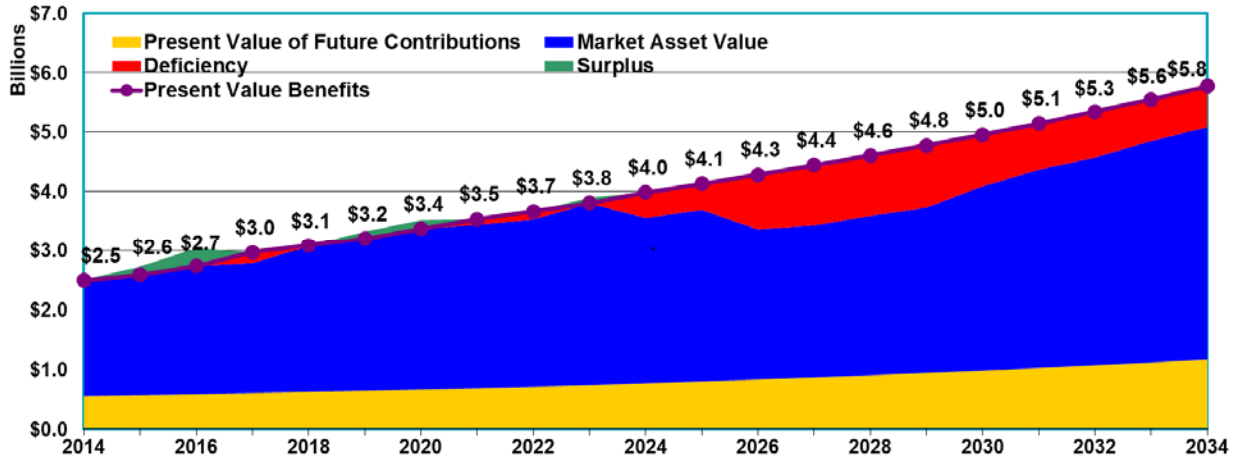
Both graphs show the plans in current surplus positions with the 5.5% assumption simply keeping the surplus relatively stable at a relatively small margin of surplus while the 7.5% assumption continues to increase the surplus margin as anticipated over time.

The System’s return on assets each year will not equal exactly 5.5% but will, over the long run, have a high likelihood of achieving this rate of return. Based on the hypothetical future return rates in Table I-5 below, which yield an average 5.5% rate of return over the projection period, the projected funded status will show higher and lower levels of funding based upon the market value of assets.

Fiscal Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Return	12.00%	15.00%	-10.00%	14.00%	11.00%	8.00%	-2.00%	4.00%	14.00%	-10.00%
Fiscal Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Return	6.00%	-10.50%	4.00%	7.50%	6.50%	14.00%	10.00%	7.00%	8.75%	6.90%

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

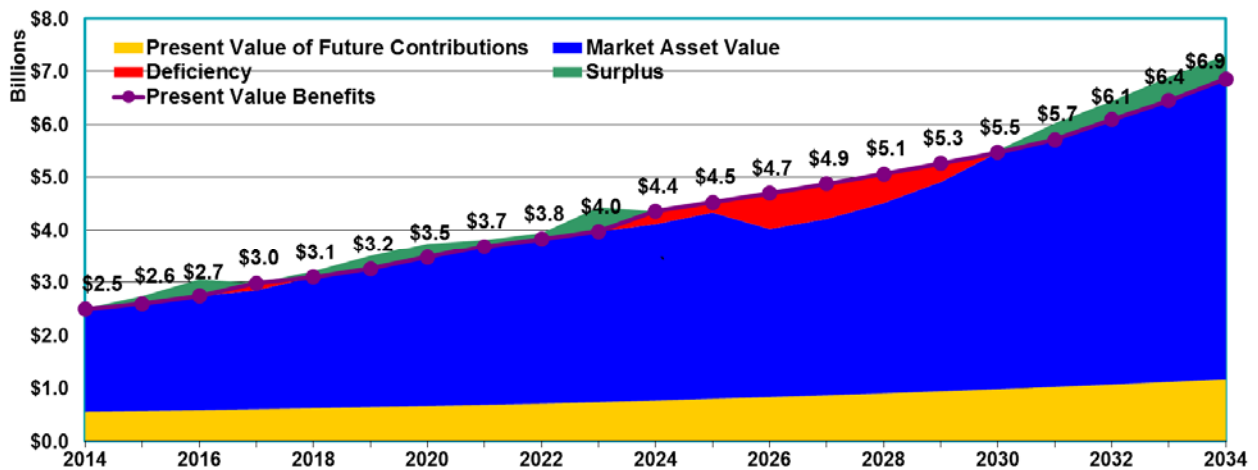
SECTION I  
 BOARD SUMMARY



Based on this illustration, there is potential for the System to have funding level improvement which reflects some of the real expectations for future returns. However without returns averaging in excess of 5.5% the fund can go from surplus to deficit due to market volatility over time and the negative cash flows anticipated.

The potential volatility is even more apparent when we project investment returns that vary but now are expected to produce an average return over time of 7.5% as summarized in Table I-6. The fund could come out of deficit before returning to a surplus position at the end of the period.

Fiscal Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Return	12.50%	15.00%	-8.00%	17.00%	12.00%	9.00%	3.00%	5.00%	16.00%	-8.00%
Fiscal Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Return	7.50%	-8.00%	7.00%	10.00%	12.00%	16.00%	12.00%	9.00%	9.00%	7.50%



**SECTION II  
 ASSETS**

The System’s assets play a key role in the financial operation and in the decisions the Board may make with respect to future deployments. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets can impact benefit levels, Municipal and County contributions, and the ultimate security of participants’ benefits.

In this section, we present detailed information on total (county & non-county) System assets including:

- **Disclosure** of System assets at December 31, 2013 and December 31, 2012;
- Statement of the **changes** in market values during the year;
- Development of the **actuarial value of assets**; and
- Allocation of **excess interest**.

**Disclosure**

The market value of assets represents a “snap-shot” or “cash-out” value, which provides the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace.

The actuarial values are a reflection of the market values and the aggregate reserves being credited to each participating employer. They are used for evaluating the System’s ongoing liability to meet its obligations to pay benefits when due.

Table II-1 summarizes at the market value of assets by asset class.

<b>Table II-1</b>				
<b>Statement of Assets at Market Value December 31 (\$ Thousands)</b>				
	<b>2013</b>		<b>2012</b>	
<b>Assets</b>				
Equity Investments	\$	1,331,140	\$	1,040,179
Accounts Receivable		4,495		3,537
Fixed Income Investments		326,179		379,859
Real Estate Investments		294,355		243,406
Fixed Assets		145		183
Accounts Payable		(2,316)		(1,853)
Investment Purchases Payable		(2,751)		(3,385)
<b>Total Market Value of Assets</b>	<b>\$</b>	<b>1,951,247</b>	<b>\$</b>	<b>1,661,926</b>

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**SECTION II**  
**ASSETS**

Table II-2 summarizes the transaction of the assets during the year leading up to our valuation.

<b>Table II-2</b>	
<b>Changes in Market Value in (\$ Thousands)</b>	
<b>Market Value of Assets – January 1, 2013</b>	<b>\$ 1,661,926</b>
<b><u>Additions</u></b>	
Contributions:	
Plan Members	\$ 22,416
Municipal Employers	39,706
Assessments	312
<b>Total Contributions</b>	<b>\$ 62,434</b>
Investment Income:	
Net Appreciation In Fair Value Of Investments	\$ 294,108
Short-Term And Other Investments	93
Common And Preferred Stock	10,266
Real Estate Equity	8,407
International Equities	5,089
Miscellaneous Income	0
Less Investment Expenses	(7,766)
<b>Net Investment Income</b>	<b>\$ 310,197</b>
<b>Total Additions</b>	<b>\$ 372,631</b>
<b><u>Deductions</u></b>	
Annuity Benefits	\$ (69,231)
Terminations	(10,356)
Administrative Expenses	(3,724)
<b>Total Deductions</b>	<b>\$ (83,311)</b>
<b>Market Value of Assets – January 1, 2014</b>	<b>\$ 1,951,247</b>

From Table II-2 it is important to recognize that benefit payouts plus expenses of \$83.3 million exceeds contribution income of \$62.4 million for a net negative cash flow of \$20.9 million, which is about 1% of the market value of assets.

**SECTION II  
 ASSETS**

**Actuarial Value of Assets**

The actuarial value of assets is developed based on the individual municipal account balances maintained by PMRS, also referred to as reserves.

This asset valuation method also takes into account the calculation of *excess interest* which is derived from income in excess of the long-term investment return assumption and when market asset values exceed the actuarial asset value. The steps in the determination of the actuarial asset value as of December 31, 2013 are shown below. The difference between the market value of assets and the actuarial value of assets is considered the surplus when this value is positive. However the market value of assets is less than the reserves by \$21.0 million as of December 31, 2013. This deficit represents 1.1% of the Market Value of Assets which is an improvement from 13.5% as of December 31, 2012. Based on the funding structure of the System, it is currently anticipated that this difference will be made up by future investment returns in excess of the long-term crediting assumption of 5.5%.

<b>Table II-3</b>	
<b>Development of Actuarial Value of Assets (\$ Thousands)</b>	
1. Prior Year Actuarial Value:	\$ 1,886,704
2. Total Audited Reserve Accounts:	\$ 1,968,862
3. Expected Administrative Expenses Net of Assessment:	<u>3,412</u>
4. Preliminary Actuarial Value (2+3):	\$ 1,972,274
5. Current Year Market Value of Assets:	1,951,247
6. Prior Year Market Value of Assets:	1,661,926
7. New Surplus {Minimum of [(5-4)&(5-4)-(6-1)]}: <i>(Note: (5-4) = 1,972,274 - 1,968,862 = 3,412; (6-1) = 1,951,247 - 1,661,926 = 289,321)</i>	(21,027)
8. Percentage of New Surplus Credited as Excess Interest: <sup>a</sup>	0.000%
9. Excess Interest (Maximum of 0 and (7x8)) available:	\$ 0
10. Excess Interest awarded	\$ 0
<b>11. Current Year Actuarial Value of Assets (4+10):</b>	<b>\$ 1,972,274</b>

*a See Table II-4b*

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**SECTION II  
 ASSETS**

**Excess Interest Allocation**

Each year, municipalities may be eligible to receive a supplemental allocation of investment monies beyond the regular 5.5% interest rate. This “excess interest” award is derived as a portion of “new surplus” created during the year. “Surplus” refers to the excess of market value over the actuarial value of assets. Once the preliminary actuarial asset value has been determined, a formula is used to determine the new surplus. Depending on the relative size of surplus to market value “margin,” between 10% and 90% of new surplus will be designated as “excess interest.”

For the year ended December 31, 2013 there was no surplus because the market value of assets is less than the actuarial value of assets. The calculation in Table II-4a details the calculation that leads to no excess interest for this year.

<b>Table II-4a</b>	
<b>Determination of Excess Interest (\$ Thousands)</b>	
1. Assets	
a. Market value	\$ 1,951,247
b. Preliminary Actuarial Value	<u>1,972,274</u>
c. Available Surplus (1a. - 1b.)	<b>\$ (21,027)</b>
2. Reserves	
a. Members	\$ 416,473
b. Municipal	769,572
c. Disability	165
d. Retired	782,283
e. DROP Participant Reserve Account	<u>369</u>
f. Total (2a. + 2b. + 2c. + 2d. + 2e.)	<b>\$ 1,968,862</b>
3. Last year's surplus	\$ 0
4. New surplus (1c. - 3.)	\$ (21,027)
5. Excess percent of New Surplus (see Table II-4b)	0.000%
6. Excess Interest Awarded	\$ 0
7. Percent of reserve {6. / (2f. - 2c.)}	0.00%
8. Trial Surplus (1c. - 6.)	\$ (21,027)
9. Trial margin percent {8. / 1a.}	0.00%

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**SECTION II**  
**ASSETS**

1. Market Value of Assets	\$	1,951,247
2. Available Surplus	\$	0
3. Margin (2. / 1.)		0.00%
4. New Surplus	\$	0
5. New Margin (4. / 1.)		0.00%
6. Excess Percent $(10\% + 8*3.) / (100\% + 8*5.)$		0.00%

Because there is a net deficit, there is no excess interest to award to participating municipalities and counties.



PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**SECTION III  
 LIABILITIES**

**Disclosure**

The present value of all benefits is the measure of the total expected obligations of the System reflecting the expected future benefit accruals of active participants and the payout stream of all benefits. When compared to the market asset value and present value of future contributions the balance (surplus)/deficit is a measure of the System's risk in providing for these obligations.

The actuarial liabilities are used for funding calculations and to roll-forward for GASB 67 disclosures. This liability is calculated taking the present value of benefits less the present value of future normal costs under the **Entry Age Normal** funding method.

The following table presents the total benefit liabilities reflecting actual County measured liabilities and roll-forward liabilities for the municipalities for the 2014 valuation.

<b>Table III-1</b>		
<b>Obligation Deficit/(Surplus) Analysis of All PMRS Plans</b>		
	<b>January 1, 2014</b>	<b>January 1, 2013</b>
<b><u>Present Value of All Benefits - Total Obligation</u></b>		
Active Participant Benefits	\$ 1,607,548,049	\$ 1,592,032,950
Retiree and Inactive Benefits	<u>881,502,593</u>	<u>812,688,102</u>
<b>Present Value of Benefits (PVB)</b>	<b>\$ 2,489,050,642</b>	<b>\$ 2,404,721,052</b>
Present Value of Future Contributions (PVFC)	(551,265,960)	(563,527,123)
Municipal Market Value of Assets (MVA)	<u>(1,951,247,370)</u>	<u>(1,661,926,239)</u>
<b>Net (Surplus)/Deficit of Resources to Obligation (PVB + PVFC + MVA)</b>	<b>\$ (13,462,688)</b>	<b>\$ 179,267,689</b>
<b><u>Actuarial Liability</u></b>		
Present Value of Benefits (PVB)	\$ 2,489,050,642	\$ 2,404,721,052
Present Value of Future Normal Cost Contributions (PVFNC)	<u>(483,828,535)</u>	<u>(501,148,991)</u>
<b>Actuarial Liability (AL = PVB + PVFNC)</b>	<b>\$ 2,005,222,107</b>	<b>\$ 1,903,572,061</b>
Actuarial Value of Assets (AVA)	<u>(1,972,273,674)</u>	<u>(1,886,703,664)</u>
<b>Net Unfunded/(Surplus) (AL + AVA)</b>	<b>\$ 32,948,433</b>	<b>\$ 16,868,397</b>

## SECTION IV CONTRIBUTIONS

In the process of evaluating the financial condition of any pension plan, the actuary analyzes the assets and liabilities to determine what contributions are needed based upon the funding policy established for the Plan. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that are both stable and predictable.

For each of the plans covered by the System, the funding cost method as stipulated by law to be applied in the determination of the liability is the **Entry Age Normal Actuarial Cost Method**. Based upon this cost method, the statutory methods for funding any unfunded liability, there are four components that are used to determine the total contribution: the **normal cost**, the amortization of **initial unfunded actuarial liability**, and any amortizations of **increases/decreases in the unfunded actuarial liability / or adjustment for surplus** expressed as a percent of payroll, and expenses applied at the rate of \$20 per participant.

The statutory funding method requires that increases/decreases resulting from experience gains or losses get amortized over the lesser of 20 years or the future working life of the active participants. Increases/decreases from assumption changes are amortized over 15 years or the future working life of the active participants. Changes in liabilities as a result of changes in benefits are amortized over 20 years if state mandated, otherwise over 10 years for active employees and 1 year for inactive employees. There are exceptions to some of these rules for plans in differing levels of “distress” as defined by under Act 205.

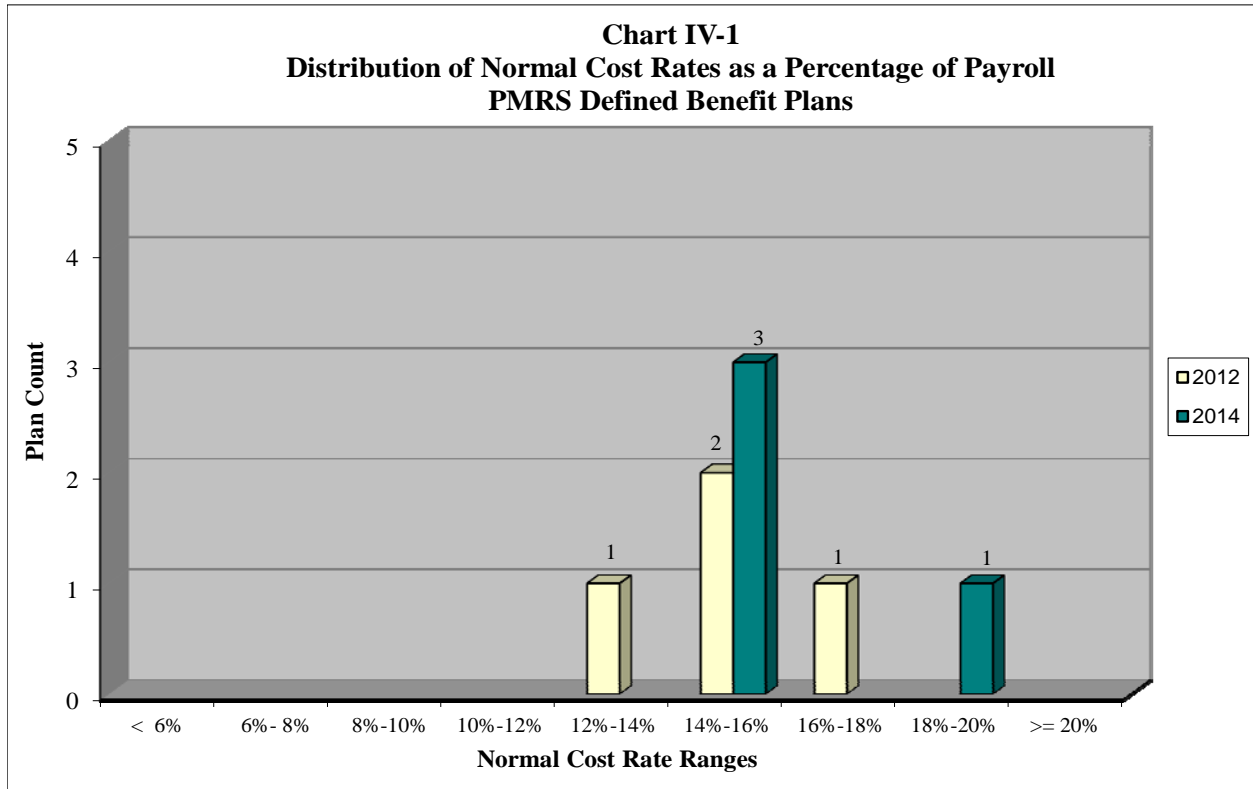
For plans with a surplus, the contribution rate is the normal cost offset by 10% of the surplus again expressed as a percent of payroll. This report provides an analysis of the aggregate assets and liabilities but not the aggregation of the Minimum Municipal Obligations required for each participating municipality covered by the 2013 Act 205 forms. The combination of underfunded and surplus plans would not necessarily be informative in reviewing the overall funded status of the System.

Below we describe the cost components and provide graphically the distribution of costs among the participating municipalities.

The normal cost rate (i.e., normal cost as a percent of payroll) is determined in the following steps. First, for a typical new entrant an individual normal cost rate is determined by taking the present value, as of entry age into the plan, of that member’s projected future benefits. This value is then divided by the present value, also at entry age, of the member’s expected future salary during their working lifetime. Finally, the total normal cost rate is reduced by the member contribution rate to produce the employer normal cost rate. If a plan provides for a Separate Member Annuity through required member contributions, this contribution rate is then added to the total normal cost rate to determine the final total normal cost rate.

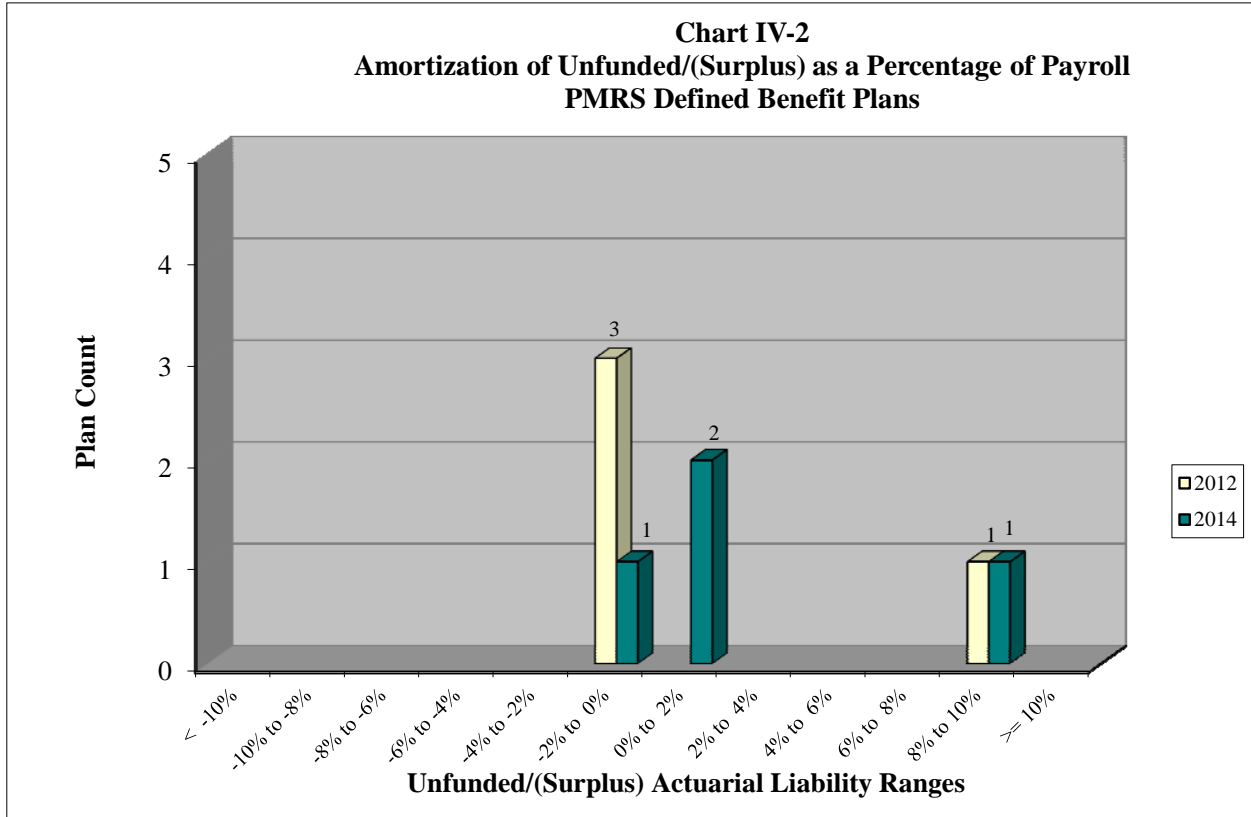
**SECTION IV  
CONTRIBUTIONS**

The following chart is a summary of the normal cost rates determined for the traditional defined benefit County plans as of January 1, 2012 and January 1, 2014. In each of the following charts the net increases reflect the change in the investment/discount rate assumption to 5.5%.



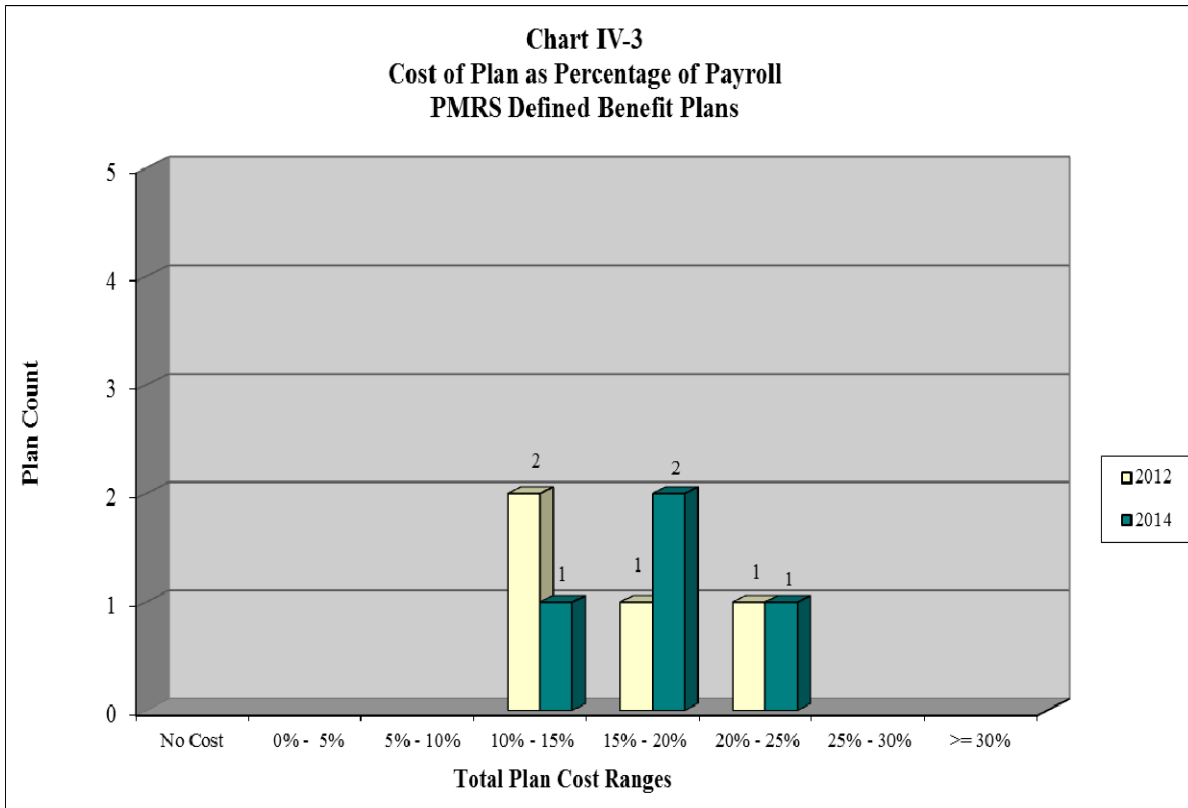
**SECTION IV  
 CONTRIBUTIONS**

Chart IV-2 below is a summary of the unfunded/(surplus) actuarial liability amortization costs defined as a percent of covered payroll of each plan's active members, determined for the traditional defined benefit County plans as of January 1, 2012 and January 1, 2014.



**SECTION IV  
 CONTRIBUTIONS**

Chart IV-3 below is a summary of the total costs as a percentage of covered payroll, representing the sum of the normal cost and amortization of unfunded/(surplus) offset determined for the traditional defined benefit County plans as of January 1, 2012 and January 1, 2014.



**SECTION V**  
**ACCOUNTING STATEMENT INFORMATION**

GASB Statement No. 25 (GASB 25) established standards for disclosure of pension information by public employee retirement systems and governmental employers in notes to financial statements and supplementary information. After this year reporting will be based only on GASB Statement No. 67, which initially begins for the fiscal year ending December 31, 2014.

The GASB 25 actuarial liability is the same as the actuarial liability amount calculated for funding purposes.

The actuarial liability is determined assuming that the System is on-going and participants continue to terminate employment, retire, etc., in accordance with the actuarial assumptions. Liabilities are discounted at the assumed valuation interest rate of 5.50% per annum.

GASB 25 requires the actuarial liability be compared with the actuarial value of assets for funding purposes. The relevant amounts as of January 1, 2014 are exhibited in Table V-1.

Tables V-2 through V-7 are exhibits which can be used with the System's Comprehensive Annual Financial Report:

- Table V-2 is the Note to Required Supplementary Information;
- Table V-3 is the Solvency Test which shows the portion of Actuarial Liability covered by Assets;
- Table V-4 is the Funded Status of Actuarial Liabilities;
- Table V-5 is the Schedule of Retirees and Beneficiaries;
- Table V-6 is the Schedule of Total Membership; and
- Table V-7 is the Schedule of Total Membership Funded Status of Actuarial Liabilities.

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
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**SECTION V**  
**ACCOUNTING STATEMENT INFORMATION**

<b>Table V-1</b>		
<b>Accounting Statement Information</b>		
	<b>January 1, 2014</b>	<b>January 1, 2013</b>
<b>A. GASB No. 25 Basis<sup>1</sup></b>		
1. Actuarial Liabilities for retirees and beneficiaries currently receiving benefits and terminated not yet receiving benefits	\$ 881,502,593	\$ 812,688,102
2. Actuarial Liabilities for current employees	<u>1,123,719,514</u>	<u>1,090,883,959</u>
3. Total Actuarial Liability (1. + 2.)	\$ 2,005,222,107	\$ 1,903,572,061
4. Net Final Actuarial Assets available for benefits	<u>1,972,273,674</u>	<u>1,886,703,664</u>
5. Unfunded/(Surplus) Actuarial Liability (3. - 4.)	\$ 32,948,433	\$ 16,868,397

<sup>1</sup> The January 1, 2013 numbers reflect the 2013 assumption change to a 5.5% discount rate

**SECTION V**  
**ACCOUNTING STATEMENT INFORMATION**

**Table V-2**  
**NOTE TO REQUIRED SUPPLEMENTARY INFORMATION**

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the date indicated. Additional information as of the latest actuarial valuation follows.

Valuation date	January 1, 2014
Actuarial cost method	Entry Age Normal
Amortization method	Level dollar for Plan Bases and an average for Aggregate Gain/Loss, 10% of surplus is credited against aggregate cost where applicable
Actuarial assumptions:	
Investment rate of return*	5.50%
Projected salary increases*	3.0%-8.3%
*Includes inflation at	3.0%
Cost-of-living adjustments	ad hoc

The actuarial assumptions used have been adopted by the System's Board based on the most recent review of the System's experience completed in 2010.

The rate of employer contributions to the System is composed of the normal cost, amortization of the unfunded actuarial liability and an allowance for administrative expenses. The normal cost is a level percent of payroll cost which, along with member contributions, will pay for projected benefits at retirement for the average plan participant. The actuarial liability is that portion of the present value of projected benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and the funds accumulated as of the same date is the unfunded actuarial liability. The allowance for administrative expenses is based upon the System's actual administrative expenses.



PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**SECTION V**  
**ACCOUNTING STATEMENT INFORMATION**

**Table V-3**  
**SOLVENCY TEST**  
Aggregate Accrued Liabilities for  
Active Member  
Employer

Valuation Date January 1,	Active Member (1)*	Retirees & Beneficiaries (2)	Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Accrued Liabilities Covered by Reported Assets		
					(1)	(2)	(3)
2014	\$416,472,872	\$881,502,593	\$707,246,642	\$1,972,273,674	100%	100%	95%
2013	418,163,830	812,688,102	672,720,129	1,886,703,664	100%	100%	97%
2012	407,199,633	639,260,852	680,756,784	1,792,809,433	100%	100%	110%
2011	395,048,320	655,645,661	623,210,164	1,713,751,974	100%	100%	106%
2010	348,126,106	589,362,501	622,868,929	1,620,150,779	100%	100%	110%
2009	333,142,928	538,733,517	579,760,819	1,540,152,742	100%	100%	115%

\* This includes the sum of the active member employee contribution balances, the member separate annuity account balances, the municipal for separate annuity account balances, and the excess interest allocations.

**Table V-4**  
**Funded Status of Actuarial Liabilities**  
**GASB Statement No. 25 Disclosure**

Valuation Date January 1,	Actuarial Value of Assets (A)	Actuarial Liability (AL) Entry Age (B)	Unfunded AL (Surplus) (B-A)	Funded Ratio (A/B)
2014	\$1,972,273,674	\$2,005,222,107	\$32,948,433	98.4%
2013	1,886,703,664	1,903,572,061	16,868,397	99.1%
2012	1,792,809,433	1,727,217,269	(65,592,164)	103.8%
2011	1,713,751,974	1,673,904,145	(39,847,829)	102.4%
2010	1,620,150,779	1,560,357,536	(59,793,243)	103.8%
2009	1,540,152,742	1,451,637,264	(88,515,478)	106.1%

The actuarial assumptions as of January 1, 2014 are shown in the assumptions and methods section. The above information was derived from the following membership data and number of pension plans, as provided by the System.

Valuation Date	Valuation of Defined Benefit Liabilities		Cash Balance Plans
	Explicit Valuation	Roll-Forward	
January 1, 2014	4	712	268
January 1, 2013	710	4	251
January 1, 2012	4	705	240
January 1, 2011	702	5	229
January 1, 2010	5	691	202
January 1, 2009	691	5	203
January 1, 2008	4	688	183

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**SECTION V**  
**ACCOUNTING STATEMENT INFORMATION**

The table below is a schedule of the changes to the retiree and beneficiary rolls over the last six years.

Valuation Date	Average			Average			Annual Annuities	Percentage Increase in Annuities	Average Annual Annuities	Percent Increase in Average Annuities
	Added to roll	Annual Annuities Added	Annual Benefit Increase	Deleted from roll	Annual Annuities Removed	Number on roll				
2014	431	\$20,472	\$430	168	\$16,043	4,943	\$71,257,797	9.5%	\$14,416	3.7%
2013	391	16,440	443	105	8,288	4,680	65,046,544	9.5%	13,899	2.8%
2012	438	16,404	885	228	14,252	4,394	59,411,245	7.5%	13,521	2.4%
2011	396	18,624	432	121	8,981	4,184	55,257,189	13.0%	13,207	5.6%
2010	296	16,030	623	137	9,458	3,909	48,897,954	7.7%	12,509	3.3%
2009	271	13,883	790	119	11,494	3,750	45,414,210	5.9%	12,110	1.6%

The table below is a summary of the total membership over the last six years.

Valuation Date	Active Members:		Retirees	Beneficiaries	Deferred Pensions	Inactive Members	Total
	Defined Benefit	Cash Balance					
2014	7,676	1,185	4,423	520	1,044	14	14,862
2013	7,599	1,131	4,160	520	1,098	51	14,559
2012	7,836	1,158	3,899	495	952	21	14,361
2011	8,091	1,119	3,707	477	945	42	14,381
2010	8,357	994	3,449	460	834	23	14,117
2009	8,411	978	3,289	461	847	0	13,986

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**SECTION V**  
**ACCOUNTING STATEMENT INFORMATION**

The table below is a schedule of the total membership over the last four years.

<b>Table V-7</b>				
<b>Schedule of Total Membership</b>				
<b>Funded Status of Actuarial Liabilities</b>				
	<b>2014</b>	<b>As of January 1<sup>a</sup></b>		<b>2011</b>
		<b>2013</b>	<b>2012</b>	
a. Retirees currently receiving benefits	4,423	4,160	3,899	3,707
b. Beneficiaries currently receiving benefits	520	520	495	477
c. Terminated vested employees entitled to future benefits from Defined Benefit Plans	753	800	723	711
d. Terminated non-vested employees entitled to contribution refunds from Defined Benefit Plan:	14	51	21	42
e. Active employees in defined benefit plans	7,676	7,599	7,836	8,091
i. Aggregate Salary <sup>b</sup>	\$389,410,214	\$376,296,674	\$366,882,467	\$383,802,844
ii. Vested <sup>c</sup>	4,881	4,885	4,964	4,992
iii. Non-vested	2,795	2,715	2,872	3,099
f. Participants in cash balance plans	1,476	1,429	1,387	1,353
i. Aggregate Salary	\$45,193,710	\$44,490,671	\$41,143,383	\$41,683,065
ii. Active	1,185	1,131	1,158	1,119
iii. Inactive	291	298	229	234

*a Includes traditional defined benefit non-county plans, traditional defined benefit county plans, and cash balance plans*

*b Actual salary for preceding valuation date*

*c Count of vested participants estimated based on service as of the valuation date*

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**APPENDIX A**  
**MEMBERSHIP INFORMATION**

**Distribution of All Active Members  
 by Age and Service as of January 1, 2014**

COUNTS BY AGE/SERVICE

Age	Service										Total
	1 year or less	1 to 2	2 to 3	3 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 & up	
Under 20	3	1	0	0	0	0	0	0	0	0	4
20 to 24	86	46	18	14	6	0	0	0	0	0	170
25 to 29	116	97	64	96	113	3	0	0	0	0	489
30 to 34	75	60	48	110	234	95	1	0	0	0	623
35 to 39	54	67	40	90	224	219	41	3	0	0	738
40 to 44	66	65	52	98	238	272	174	90	8	0	1,063
45 to 49	95	62	51	87	284	284	229	163	82	7	1,344
50 to 54	70	56	48	88	263	270	198	226	160	130	1,509
55 to 59	81	41	49	79	255	240	236	201	152	253	1,587
60 to 64	39	20	18	46	139	154	112	118	115	171	932
65 & up	7	14	6	16	72	73	68	57	38	51	402
<b>Total</b>	<b>692</b>	<b>529</b>	<b>394</b>	<b>724</b>	<b>1,828</b>	<b>1,610</b>	<b>1,059</b>	<b>858</b>	<b>555</b>	<b>612</b>	<b>8,861</b>

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**APPENDIX A  
 MEMBERSHIP INFORMATION**

**Distribution of Active Defined Benefit Members  
 by Age and Service as of January 1, 2014**

COUNTS BY AGE/SERVICE

Age	Service										Total
	1 year or less	1 to 2	2 to 3	3 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 & up	
Under 20	3	1	0	0	0	0	0	0	0	0	4
20 to 24	78	43	14	14	6	0	0	0	0	0	155
25 to 29	107	92	57	85	97	3	0	0	0	0	441
30 to 34	70	49	44	97	207	87	1	0	0	0	555
35 to 39	51	55	31	82	204	198	38	3	0	0	662
40 to 44	59	50	45	86	209	237	155	83	7	0	931
45 to 49	79	50	41	74	239	253	210	148	71	5	1,170
50 to 54	61	45	35	73	229	237	161	202	144	120	1,307
55 to 59	73	30	37	62	220	205	191	174	138	225	1,355
60 to 64	35	16	14	32	116	130	91	101	99	148	782
65 & up	6	10	3	12	61	62	54	41	29	36	314
<b>Total</b>	<b>622</b>	<b>441</b>	<b>321</b>	<b>617</b>	<b>1,588</b>	<b>1,412</b>	<b>901</b>	<b>752</b>	<b>488</b>	<b>534</b>	<b>7,676</b>

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**APPENDIX A**  
**MEMBERSHIP INFORMATION**

**Distribution of Active Cash Balance Members  
 by Age and Service as of January 1, 2014**

COUNTS BY AGE/SERVICE

Age	Service										Total	
	1 year or less	1 to 2	2 to 3	3 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 & up		
Under 20	0	0	0	0	0	0	0	0	0	0	0	0
20 to 24	8	3	4	0	0	0	0	0	0	0	0	15
25 to 29	9	5	7	11	16	0	0	0	0	0	0	48
30 to 34	5	11	4	13	27	8	0	0	0	0	0	68
35 to 39	3	12	9	8	20	21	3	0	0	0	0	76
40 to 44	7	15	7	12	29	35	19	7	1	0	0	132
45 to 49	16	12	10	13	45	31	19	15	11	2	0	174
50 to 54	9	11	13	15	34	33	37	24	16	10	0	202
55 to 59	8	11	12	17	35	35	45	27	14	28	0	232
60 to 64	4	4	4	14	23	24	21	17	16	23	0	150
65 & up	1	4	3	4	11	11	14	16	9	15	0	88
<b>Total</b>	<b>70</b>	<b>88</b>	<b>73</b>	<b>107</b>	<b>240</b>	<b>198</b>	<b>158</b>	<b>106</b>	<b>67</b>	<b>78</b>	<b>0</b>	<b>1,185</b>

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

APPENDIX A  
 MEMBERSHIP INFORMATION

**Inactive Benefit Payment Distribution  
 as of January 1, 2014**

COUNTS BY BENEFIT/AGE: RECEIVING PAYMENTS

Age	Monthly Benefit	Count
x < 30	\$1,160	3
30 <= x < 35	\$1,499	4
35 <= x < 40	\$4,258	13
40 <= x < 45	\$9,600	22
45 <= x < 50	\$39,587	56
50 <= x < 55	\$226,170	144
55 <= x < 60	\$745,718	424
60 <= x < 65	\$1,367,181	878
65 <= x < 70	\$1,450,893	1,132
70 <= x < 75	\$930,695	853
75 <= x < 80	\$564,791	611
80 <= x < 85	\$339,373	411
85 <= x	\$257,224	392
<Total>	\$5,938,150	4,943

DEFINED BENEFIT PLANS

COUNTS BY BENEFIT/AGE: DEFERRED PAYMENTS

Age	Monthly Benefit	Count
x < 30	\$1,096	4
30 <= x < 35	\$18,091	22
35 <= x < 40	\$40,144	36
40 <= x < 45	\$87,862	82
45 <= x < 50	\$174,643	137
50 <= x < 55	\$197,799	188
55 <= x < 60	\$221,045	218
60 <= x < 65	\$100,761	60
65 <= x < 70	\$31,561	3
70 <= x < 75	\$1,377	3
75 <= x < 80	\$0	0
80 <= x < 85	\$0	0
85 <= x	\$0	0
<Total>	\$874,379	753

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**APPENDIX A**  
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<b>Pensions in Payment on January 1, 2014 by Type and Amount</b>							
<b>Monthly Amount</b>	<b>Total</b>	<b>Pension Type</b>					
		<b>Normal</b>	<b>Involuntary early</b>	<b>Voluntary early</b>	<b>Service disability</b>	<b>Non-service disability</b>	
Total	4,942	4,148	231	444	34	85	
Under \$100	234	203	21	8	1	1	
\$ 100 - \$199	297	246	35	15	1	0	
200 - 299	285	221	39	24	1	0	
300 - 399	307	252	22	30	0	3	
400 - 499	272	224	18	28	2	0	
500 - 599	304	250	16	29	1	8	
600 - 699	240	200	11	24	1	4	
700 - 799	255	197	13	37	0	8	
800 - 899	229	177	8	27	1	16	
900 - 999	208	162	9	24	3	10	
1,000 - 1,199	402	320	15	47	7	13	
1,200 - 1,399	309	251	7	41	4	6	
1,400 - 1,599	270	227	5	26	6	6	
1,600 - 1,799	200	179	3	16	1	1	
1,800 - 1,999	194	170	3	18	0	3	
2,000 - 2,199	163	143	2	16	1	1	
2,200 - 2,399	136	124	2	9	1	0	
2,400 - 2,599	106	100	0	4	1	1	
2,600 - 2,799	89	78	2	6	1	2	
2,800 - 2,999	73	71	0	1	0	1	
3,000 - 3,499	151	143	0	7	1	0	
3,500 - 3,999	108	102	0	5	0	1	
4,000 and over	110	108	0	2	0	0	



PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**APPENDIX A  
 MEMBERSHIP INFORMATION**

<b>Pensions Awarded in Prior Ten Years, by Type and Monthly Amount</b>										
<b>Year Ended December 31:</b>	<b>Total</b>		<b>Normal</b>		<b>Involuntary early</b>		<b>Voluntary early</b>		<b>Disability</b>	
	<b>Number</b>	<b>Average Monthly Amount</b>	<b>Number</b>	<b>Average Monthly Amount</b>	<b>Number</b>	<b>Average Monthly Amount</b>	<b>Number</b>	<b>Average Monthly Amount</b>	<b>Number*</b>	<b>Average Monthly Amount</b>
2004	247	1,126	189	1,185	35	994	13	653	10 (1)	1,100
2005	264	1,270	217	1,290	23	1,257	11	639	13 (4)	1,493
2006	252	1,069	192	1,082	19	572	32	1,196	9 (2)	1,373
2007	236	1,065	227	1,056	6	1,259	-	-	3 (0)	1,350
2008	271	1,157	223	1,150	7	843	36	1,259	5 (3)	1,162
2009	296	1,336	249	1,412	17	339	26	1,300	4 (0)	1,067
2010	396	1,552	341	1,632	13	364	37	1,250	5 (0)	1,407
2011	438	1,367	352	1,496	37	459	40	1,180	9 (3)	888
2012	390	1,370	341	1,421	20	520	22	1,614	7 (2)	709
2013	431	1,706	364	1,800	17	905	34	1,280	16 (2)	1,319

\* Numbers of service-related disability pensions are shown in parentheses.

**APPENDIX B  
 ACTUARIAL ASSUMPTIONS AND METHODS**

**Actuarial Assumptions:**

The current PMRS actuarial assumptions used in this valuation are as follows.

**A. Healthy Life Mortality:**

**Rates of Pre-Retirement Mortality**

Males: RP 2000 with 1 year set back  
 Females: RP 2000 with 5 year set back

**Rates of Post-Retirement Mortality**

Males and females: RP 2000 Sex-Distinct Mortality Table

The current mortality assumptions, while not reflecting projections for improvements as recommended under Actuarial Standard of Practice No. 35 are subject to experience review every four years at which time the Board receives recommendations of changes to reflect changes in experience over those expected from the tables applied over the five year period preceding the experience analysis. Such experience review is required by State statute.

In addition the retired life reserves measured by PMRS is annually reviewed against the actuarial liability for retirees to ensure they are within a reasonable level of difference which has been proven to remain consistent year by year as a reflection of the effectiveness of the reserves and the underlying actuarial assumption for mortality.

**B. Disabled Life Mortality Rates:**

Males and females: RP 2000 with 10 year set forward

**C. Termination Rates Before Retirement**

<b>Termination Rates for Municipal Participants</b>		
<b>Service</b>	<b>Number of Active Members in Plan</b>	
	<b>&lt;25</b>	<b>25+</b>
<b>&lt; 1</b>	20.0%	20.0%
<b>1</b>	20.0%	20.0%
<b>2</b>	12.0%	15.0%
<b>3</b>	10.0%	12.0%
<b>4</b>	8.0%	7.0%
<b>5</b>	6.0%	7.0%
<b>6</b>	4.0%	6.0%
<b>7</b>	3.0%	5.0%
<b>8</b>	3.0%	5.0%
<b>9</b>	2.5%	5.0%
<b>10+</b>	2.5%	3.0%

PENNSYLVANIA MUNICIPAL RETIREMENT SYSTEM  
 ACTUARIAL VALUATION AS OF JANUARY 1, 2014

**APPENDIX B**  
**ACTUARIAL ASSUMPTIONS AND METHODS**

<b>Termination Rates for Uniformed Participants</b>		
<b>Service</b>	<b>Number of Active Members in Plan</b>	
	<b>&lt;25</b>	<b>25+</b>
<b>&lt; 1</b>	14%	13%
<b>1</b>	14%	10%
<b>2</b>	12%	7%
<b>3</b>	10%	7%
<b>4</b>	6%	6%
<b>5</b>	4%	5%
<b>6</b>	3%	4%
<b>7</b>	2%	3%
<b>8</b>	2%	3%
<b>9</b>	1%	3%
<b>10+</b>	1%	3%

**D. Disability Incidence Rates:**

**Municipal** - 40% of 1964 OASDI (Social Security) Experience for Males. Sample rates are:

<b>Age</b>	<b>Valuation Rate (%)</b>
25	0.034%
35	0.059
45	0.144
55	0.404
65	0.928

**Uniformed plans** – 60% of 1964 OASDI (Social Security) Experience for Males. Sample rates are:

<b>Age</b>	<b>Valuation Rate (%)</b>
25	0.051%
35	0.088
45	0.216
55	0.605
65	1.393

Type of Disability:

- (a) 15% of disablements are assumed to be service related for municipal plans, and
- (b) 50% of disablements are assumed to be service related for uniform plans.

**APPENDIX B  
 ACTUARIAL ASSUMPTIONS AND METHODS**

**E. Workers Compensation:** Service-related disability benefits payable from municipal plans are offset by 25% of final average salary.

**F. Salary Scale:**

<b>Salary Scale</b>	
<b>Age</b>	<b>Total Rate (%)* (including inflation)</b>
25	8.30%
30	6.40%
35	5.60%
40	5.00%
45	4.20%
50	4.10%
55	3.90%
60	3.70%
65	3.00%

\*Add 2% for each of the first three years of service.

**G. Rates of Retirement:**

(a) Municipal Members:

<b>Age</b>	<b>Municipal Rate of Retirement<sup>1</sup></b>
Under 46	5%
46 – 54	15
55 – 59	10
60 – 61	10
62	30
63 – 64	20
65	35
66 – 74	15
75	100

<sup>1</sup> Rates indicated are adjusted by adding 5% (and 10% for ages 60-62 under current rate assumptions) for the year in which the member is first eligible for normal retirement.

**APPENDIX B  
 ACTUARIAL ASSUMPTIONS AND METHODS**

(b) Uniformed Members:

<b>Retirement Rates for Uniform Participants</b>	
<b>Age</b>	<b>Rates for all Plans</b>
<49	0%
50	20%
51	10%
52	10%
53	10%
54	10%
55	20%
56	25%
57	25%
58	30%
59	30%
60	40%
61	50%
62	50%
63	60%
64	70%
65	80%
66+	100%

**H. Marital Status and Spouse’s Age (if applicable):**

85% of active members are assumed to be married for retirees with the 50% J&S form of payment. Male spouses are assumed to be three years older than female spouses.

**I. Social Security Projections (if applicable):**

- (a) The Social Security Taxable Wage Base will increase by 3.5% compounded annually;
- (b) The Consumer Price Index will increase 3.0% compounded annually; and
- (c) The Average Total Wages of All Workers will increase by 3.5% compounded annually.

**J. Post-Retirement Cost of Living Increases (if applicable):** 3.0% per year, subject to plan limitations.

**APPENDIX B**  
**ACTUARIAL ASSUMPTIONS AND METHODS**

**K. Investment Return Assumption:**

5.50% compounded annually, net of investment expenses.

**L. Administrative Expenses:**

The expense assumption is based upon the expected expenses for the current year.

**Actuarial Methods:**

Contribution requirements are individually determined for each participating municipality, on an actuarial basis as described below, at least biennially. The frequency of the actuarial valuation is determined by applicable Commonwealth statute (Act 205 of 1984 and Act 293 of 1972). The following actuarial methods were adopted effective January 1, 1985, unless indicated otherwise.

**Actuarial Value of Assets:**

Sum of all audited reserve accounts as of the valuation date, including Member, Municipal, Retired, Disability, and DROP Reserves, and a one-year administration expense reserve, plus the portion of any additional investment income to be distributed as “excess interest.” The actuarial value can never be less than 90 percent of fair market value.

Each year, municipalities may receive an excess interest allocation derived as a portion of new surplus created during the prior year based on the current financial standing of the System. “Surplus” refers to the excess of fair market value over the actuarial value of assets. Once the preliminary actuarial asset value has been determined, a formula is used to allocate the new surplus. Generally, depending on the relative size of surplus to fair market value, between 10 percent and 90 percent of the new surplus will become excess interest.

Based on the unique legislative structure of PMRS, because assets are set equal to reserves under the System, they do not necessarily relate directly or indirectly with the current market value of assets as required under Actuarial Standard of Practice Statement No. 44 which states under Section 3.3:

*“...the actuary should select an asset valuation method that is designed to produce actuarial values of assets that bear a reasonable relationship to the corresponding market values. The qualities of such an asset valuation method include the following:*

- a. The asset valuation method is likely to produce actuarial values of assets that are sometimes greater than and sometimes less than the corresponding market values.*
- b. The asset valuation method is likely to produce actuarial values of assets that, in the actuary’s professional judgment, satisfy both of the following:*
  - 1. The asset values fall within a reasonable range around the corresponding market values. For example, there might be a corridor centered at market value, outside of which the actuarial value of assets may not fall, in order to assure that the difference from market value is not greater than the actuary deems reasonable.*

**APPENDIX B**  
**ACTUARIAL ASSUMPTIONS AND METHODS**

2. *Any differences between the actuarial value of assets and the market value are recognized within a reasonable period of time. For example, the actuary might use a method where the actuarial value of assets converges toward market value at a pace that the actuary deems reasonable, if the investment return assumption is realized in future periods.*

*In lieu of satisfying both (1) and (2) above, an asset valuation method could satisfy section 3.3(b) if, in the actuary's professional judgment, the asset valuation method either (i) produces values within a sufficiently narrow range around market value or (ii) recognizes differences from market value in a sufficiently short period."*

**On this basis, the administrative rules adopted by the PMRS Board in conjunction with Pennsylvania Municipal Retirement System Law, which are not subject to comply with Actuarial Standards of Practice (ASOP), when defining the Actuarial Value of Assets, does not necessarily meet the requirement of ASOP 44 Selection and Use of Asset Valuation Methods for Pension Valuation.**

**Actuarial Cost Method:**

Entry Age Normal Actuarial Cost Method.

Entry age is defined as attained age less credited service. The normal cost rate is derived as a level percent of future compensation of current employees, on an individual basis. This rate is applied to the projected payroll and projected employee contributions are deducted. Actuarial gains (or losses), including the effect of contributions greater or lesser than the previously determined actuarial level, are reflected by decreases (or increases) in the unfunded actuarial liability. Under Act 205 of 1984, and updated by Act 44, the unfunded actuarial liability is amortized as a level dollar amount over the lesser of:

- (a)
  - (i) 30 years, with respect to the initial liability as of 1/1/85 (or first valuation);
  - (ii) 20 years, with respect to actuarial gains and losses;
  - (iii) 15 years, with respect to changes due to actuarial assumptions;
  - (iv) 20 years, with respect to changes due to plan provisions (if state mandated);
  - (v) 10 years, with respect to changes in benefits for currently active members and 1 year of retired members (if local benefit changes); or
- (b) The average assumed working lifetime of active employees as of the date the liability was established. If there are no active employees, the unfunded liability is amortized one year after the liability was established.

**APPENDIX B**  
**ACTUARIAL ASSUMPTIONS AND METHODS**

With the two exceptions which follow, the funding method is applied individually with respect to each municipality:

- 1) Retired and disabled members are paid monthly benefits from the System's Retired Reserve account, which at the time of retirement receives a transfer from the municipal and member accounts in an amount actuarially determined to be sufficient to pay all future benefits for the member (and, if applicable, a surviving beneficiary). Thus, post-retirement experience is pooled with the System. (However, this procedure does not apply to the legislated ad-hoc adjustments effective January 1, 1989.)
- 2) A disabled member's pension is met in part from the amount that can be provided by the value of that portion of the member's accrued benefit attributable to municipal contributions, with the balance of the pension being provided by the appropriate transfer from the Disability Reserve Account. The amount of annual transfer from the accumulated municipal contributions to the Disability Reserve Account is determined on the one year term cost basis, i.e., the expected cost of disabilities in the coming year.

**Method to estimate roll forward liabilities:**

The defined benefit pension plans for municipalities are valued explicitly every odd calendar year. For the even calendar years, the liabilities for these plans are estimated by rolling forward the liabilities associated with the active and vested terminated employees from the prior year valuation date to the current year. The retiree liabilities for these municipal pension plans are explicitly valued every year. Therefore, in order to not double count liabilities for the new retirees as of January 1, 2014, the prior year liabilities for these new retirees are excluded from the rolled forward liabilities.

**Changes in Actuarial Assumptions and Methods:**

There were no changes in the actuarial assumptions from last year to this year for the municipal plans. For the county plans there was a change in the investment return assumption, which decreased from 6.00% in 2012 to 5.50% in 2014 for the county plans.

The valuation programming was improved to ensure the disability decrements were not applied for any county plans that do not provide any additional benefits if an active participant becomes disabled from active status.