Comprehensive Annual Financial Report
for the year ended December 31, 2018

2018

Working Together



Responsible actions take us forward

OPERS

Ohio Public Employees Retirement System

Prepared by OPERS Finance Division Staff

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Table of Contents

Annual Report Organization 2

Introductory Section (unaudited) 3

The OPERS Board of Trustees 4
Organizational Structure 5
Letter of Transmittal 6
Awards and Recognition 15

Financial Section 19

Independent Auditors' Report 20
Management's Discussion and Analysis—Unaudited 22
Financial Statements
- Combining Statement of Fiduciary Net Position 36
- Combining Statement of Changes in Fiduciary Net Position 38
- Notes to Combining Financial Statements 40

Required Supplementary Information—Unaudited 76
- Schedules of Changes in Net Pension Liability and Related Ratios 76
- Schedules of Member and Employer Contributions—Defined Benefit Plans 80
- Schedule of Investment Returns—Defined Benefit 83
- Schedule of Changes in Net OPEB Liability and Related Ratios 84
- Schedule of Employer Contributions—Health Care 85
- Schedule of Investment Returns—Health Care 85
- Notes to Required Supplementary Information 86

Additional Information
- Administrative Expenses 88
- Schedule of Investment Expenses 88

Investment Section (unaudited) 89

Report from the Chief Investment Officer on Investment Activities 90
Independent Investment Consultant's Report 94
Overview 96
Total Investment Summary 97
Total Investment Returns 99
Historical Investment Returns 100
Lists of Largest Assets Held 101
Schedules of Brokerage Commissions Paid 102
Schedule of Fees to External Asset Managers 104
Schedule of External Asset Managers 105
Defined Benefit Portfolio 107
Health Care Portfolio 113
Defined Contribution Portfolio 119
Ohio Investments 122
Investment Objectives and Policies 123
Asset Class Policies 129
Investment Rates by Portfolio 133
Structure and Relationship of Investment Policies 134

Actuarial Section (unaudited) 135

Letter from the Actuary 136
Summary of Assumptions 139
Schedules of Average Defined Benefits Paid 149
Actuarial Valuation Data—Pension 150
Schedules of Retirees and Beneficiaries Added to and Removed from Rolls 152
Schedules of Funding Progress 153
Short-Term Solvency Test 156
Actual vs. Recommended Contribution Rates 157
Analysis of Financial Experience 158

Statistical Section (unaudited) 161

Overview 162
Net Position by Plan 163
Statutory Fund Balance by Plan 164
Fiduciary Net Position by Year 166
Changes in Fiduciary Net Position 170
Additions by Source 178
Deductions by Type 182
Benefits by Type 186
Pension Benefits by Type 188
Health Care Expenses by Type 189
Refunds by Type 190
Number of Refund Payments by Plan 190
Funds Restricted for Member Health Care Accounts.... 192
Pension Assets vs. Pension Liabilities 193
Health Care Assets vs. Health Care Liabilities 195
Investment Rates by Portfolio 197
Number of Retirees/Benefit Recipients by Category 198
Number of Covered Lives by Category 200
Schedule of Retirees by Benefit Type and Amount 201
Number of New Pension Retirees 202
Schedules of Average Benefits (Traditional Pension Plan and Combined Plan) 204
Member Counts by Plan 206
Pension Benefits and Retirees by Ohio County 210
Retirees by Geographical Location 211
Contribution Rates 212
Number of Employer Units 214
Principal Participating Employers 215

Plan Statement (unaudited) 217

Employer composition and membership information

For actuarial purposes, participating employers are divided into State, Local, Law Enforcement and Public Safety divisions. A complete description of the OPERS membership is contained in the Plan Statement Section of this document, beginning on page 217.

Annual report organization

This annual report is divided into six sections, listed as each appears in this document:

1 **Introductory Section**—with the Letter of Transmittal, organizational chart, and recognition awards garnered in 2018

2 **Financial Section**—with the Independent Auditors' Report, Management's Discussion and Analysis, the financial statements of the System, Required Supplementary Information and Additional Information

3 **Investment Section**—with the Chief Investment Officer's report on investment activity, Independent Investment Consultant's Report, investment policies, investment results, and various investment schedules

4 **Actuarial Section**—with the Actuary's Certification Letter and the most recent results of the annual actuarial valuations for pension and health care

5 **Statistical Section**—with significant data pertaining to the System

6 **Plan Statement**—with membership information and details about the retirement plans offered through OPERS

Fulfilling our commitment may require change

The information provided in this annual report reflects the OPERS commitment to the highest possible standards in financial reporting and fiscal responsibility. We recognize, accept and embrace our duty to provide the highest possible service, invest for the strongest possible results, and strive to keep administrative costs low.

Every activity, every action, every decision is made to help ensure the sustainability of the System. Why? So that OPERS is in the position to fulfill our commitment to all generations of retirees—current and future.

Sometimes, the right choice—the responsible choice—requires change. Only with responsible change can OPERS continue to provide the financial security enjoyed by current retirees and to be enjoyed by the retirees of the future.

Change is deemed necessary only after analysis, study, vetting multiple options and communication to all stakeholders. Even then, the tradition has been to deploy changes on an incremental basis to ensure no one stakeholder group or retiree generation is impacted unfairly.

Why are so many steps involved before a change is fully implemented? Simply put, we do so to ensure all stakeholders are involved in the responsible actions necessary to take us forward.

OPERS

Board of Trustees members as of January 2019

Stairs, left to right: James Tilling, General Assembly Appointed Investment Expert; Matthew Damschroder, Director Department of Administrative Services (Statutory Member); Harold Charles Elliott, Governor-Appointed Investment Expert; Tim Steitz, Representative for Retirees; Lance Osborne, Treasurer-Appointed Investment Expert

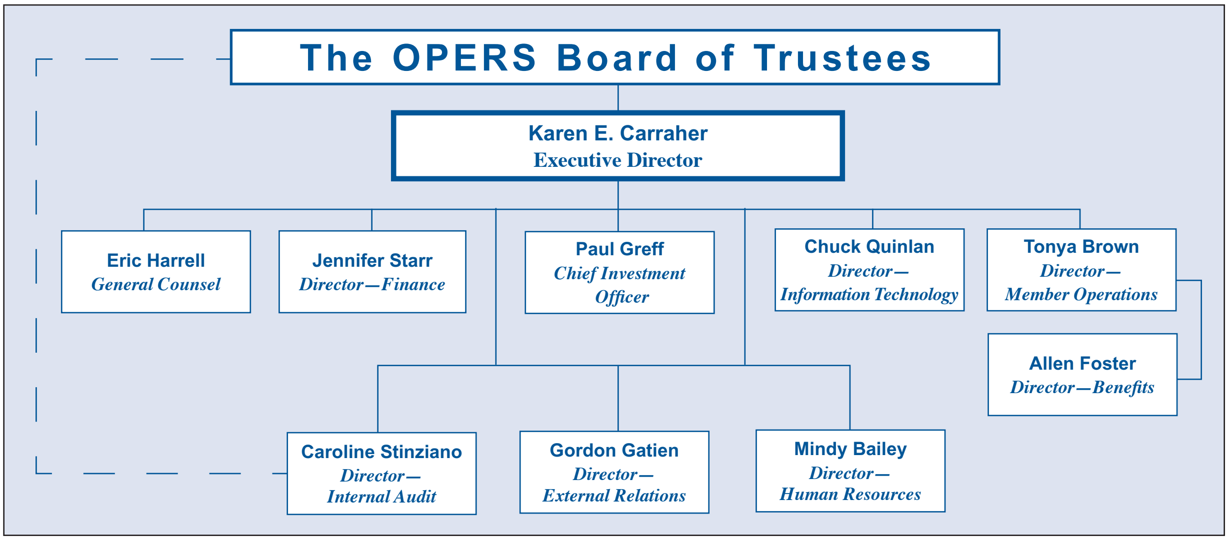
Bottom row, left to right: Julie Albers, Representative for County Employees; Chris Mabe, Representative for State Employees and Board Vice Chair; Randy Desposito, Representative for Non-Teaching College/University Employees; Cinthia Sledz, Representative for Miscellaneous Employees; Steve Toth, Representative for Retirees; Ken Thomas, Representative for Municipal Employees and Board Chair

The 11-member Board of Trustees (Board) is the governing body of the Ohio Public Employees Retirement System (referred to as OPERS, System or Fund). The Board is ultimately responsible for the administration and management of all OPERS activities including oversight of investment activities.

The Board is comprised of seven individuals who are elected by the specific stakeholder group each represents: college/university employees, state employees, miscellaneous employees, county employees, municipal employees, and two retiree elected representatives. Three individuals with investment expertise are appointed by Ohio's Governor, Treasurer, and jointly by the Ohio Legislature. The Board is completed by the Director of the Ohio Department of Administrative Services who serves on the Board by virtue of office.

The Board appoints the Executive Director, an actuary, and other advisors necessary for the transaction of business. By law, the Treasurer of the state of Ohio is custodian of the OPERS funds.

The Board typically meets monthly and receives no compensation, but is reimbursed for necessary expenses.



Leadership Team

Leadership Team (left to right): Eric Harrell, General Counsel; Tonya Brown, Director—Member Operations; Jennifer Starr, Director—Finance; Gordon Gatien, Director—External Relations; Allen Foster, Director—Benefits; Karen Carraher, Executive Director; Chuck Quinlan, Director—Information Technology; Paul Greff—Chief Investment Officer; Caroline Stinziano, Director— Internal Audit; Mindy Bailey, Director—Human Resources

Advisors to the Board of Trustees

Investment Policy

NEPC, LLC
Cambridge, Massachusetts

AON Hewitt Investment Consulting, Inc.
Chicago, Illinois

Actuary

Gabriel, Roeder, Smith & Company
Southfield, Michigan

Auditor

CliftonLarsonAllen LLP
Toledo, Ohio
(under contract with the Auditor of State)

See pages 104-105 for a list of investment fees and external asset managers.

OPERS Ohio Public Employees Retirement System

277 East Town Street Columbus, Ohio 43215-4642 1-800-222-7377 www.opers.org

June 14, 2019

Dear Chairman and Members of the Board of Trustees:

On behalf of all management and staff, it's our pleasure to present you with the *2018 Comprehensive Annual Financial Report* (CAFR or annual report). This document reflects the ongoing commitment of activities undertaken by the Ohio Public Employees Retirement System (OPERS or System) for the fiscal year ended December 31, 2018.

Our theme, *Working Together—Responsible Actions Take Us Forward* reflects the importance of working with our members and employers to make responsible decisions, no matter how tough, that will ensure the System is positioned to continue to provide benefits long into the future.

Since OPERS is a mature plan, we face the challenges of a mature plan. With our larger portfolio, we:

- Are more impacted by market downturns;
- Have fewer active members supporting the unfunded debt;
- Have only limited ability to make changes to yield meaningful reductions in liabilities—needed as we anticipate a membership shift to more retirees than active members; and
- Continue to struggle to provide financial support to our members for health care.

While these challenges, and many others not listed, are daunting, we believe that it is only by facing these challenges and working together with our members that we will be able to find solutions. The 2018 activities reported here illustrate our focus on working together on actions that move OPERS forward with the goal of delivering on our commitment of providing a secure retirement for our members—present and future.

As we work to address challenges, we remain grounded by five overarching plan goals—designed to help us evolve. Specifically, the goals:

- Provide a stable pension for all OPERS retirees
- Continue to provide a meaningful retiree health care program
- Minimize drastic plan design changes
- Be financially positioned to react to market volatility
- Maintain intergenerational equity

Overview of OPERS—Responsible Actions

One of OPERS strengths has been the Board and staff's ability to anticipate and willingness to face challenges early rather than wait for a crisis. While this is the prudent thing to do, it is also the difficult thing to do. Responsible actions often involve change and change is difficult and often unwanted by members. And while change can be tiring, it is important to continue to embrace change to keep the System strong.

OPERS was established and exists solely for the purpose of providing retirement, disability and survivor benefits to Ohio's public employees. Created by legislation in 1933, OPERS began operations January 1, 1935, prior to the Social Security Administration. In 1974, OPERS added access to health care—an element of significant importance to retirees yet is neither mandated nor guaranteed. In 2003, OPERS increased the pension plan options offered to three distinct plans. More information on current benefits can be found in the Plan Statement starting on page 217.

Since then, the ongoing commitment to evolving for the future through responsible actions has guided this System. OPERS has a tradition of strong financial stewardship of the funds entrusted us—we work to ensure pension funds are sustainable. To do this, we must forecast future events and evaluate options before making responsible decisions in sufficient time to communicate and implement change. Since we understand change can be difficult, we work to allow sufficient time to plan for changes.

As of year-end 2018, OPERS served approximately 1,145,000 members, including almost 213,000 retirees and beneficiaries. In addition, the System works with approximately 3,700 public employers. With a net asset base of $94.1 billion, OPERS is the largest public pension system in Ohio and the 12th largest public pension system in the nation. These numbers clearly demonstrate OPERS' importance as an economic driver for the state of Ohio.

The year 2018 was not a good year for financial markets. OPERS is a long-term investor. Consequently, we know we will have good years with strong returns such as 2017 and years with negative returns such as 2018. While we would like strong returns every year, we understand that as a function of being in the market, we must accept years of negative returns as well as years of strong returns. As a result, our funding plan must be based on long-term, realistic investment return expectations. Our actions and reactions to market swings must be responsible and measured. We cannot over-react to years with poor investment returns nor can we over-react with exuberance to years with great investment returns. That long-term outlook is developed by continuously working with investment experts and actuarial consultants, constantly re-evaluating, always mindful of the ever-present market volatility.

Reflected here, the 2018 activities demonstrate our commitment to taking responsible actions that advance the System toward attaining our goals. As with all years, anticipated and unanticipated changes provided opportunities and challenges. We focused on maximizing the opportunities and minimizing the impact of unexpected events. For your review, here are our highlights.

Key Activities in 2018

Investments

The investment results are an important focus for us since investment returns provide approximately two-thirds of the funding for a retiree's ultimate pension. The key components of investment management of a portfolio such as OPERS' are asset allocation and diversification, both of which are regularly reviewed.

OPERS' long-term investment goal is to attain a return over the long-term that will provide adequate funding for the benefits. We recognize that yearly returns will vary with market volatility, but the goal is to structure an investment portfolio that will provide long-term returns. This long-term approach is balanced keeping in mind the short-term liquidity needs and liability due dates.

Overall, 2018 began with positive returns but the year ended with a downturn during the last portion of the year that erased all gains during the year. Overall, the total OPERS portfolio for 2018 returned a loss of 3.38%. This negative return reflects a stark comparison to the strong investment market of 2017 in which the total OPERS portfolio returned a gain of 16.62%. The contrast between 2017 and 2018 demonstrates the volatility of the investment market. The 2018 return was less than the target actuarial return, but was slightly above the benchmark return loss of 3.47%.

OPERS' total portfolio is made up of underlying portfolios that fund pension benefits and the health care program.

The underlying investment portfolios are: the Defined Benefit portfolio, the Defined Contribution portfolio, and the Health Care portfolio. By portfolio, the 2018 returns were:

- Defined Benefit portfolio returned a loss of 2.99%, compared to the benchmark return loss of 3.07%, and the anticipated actuarial funding plan rate of 7.20%.
- The Defined Contribution portfolio returned a loss of 6.65%, compared to the benchmark return loss of 6.64%.
- The Health Care portfolio returned a loss of 5.76%, compared to the benchmark return loss of 5.96% and the anticipated actuarial funding plan rate of 6.00%.

A complete discussion of investment returns, activities, asset allocation strategy, safeguards, and policies governing those activities can be found in the Investment Section, beginning on page 89. Additionally, information on investment fees and commissions can be found beginning on page 102.

Long-Term Assumed Rate of Return

To achieve the required funding necessary to provide the pension benefits and health care coverage, OPERS collects member and employer contributions and invests those assets. The investment assets are expected to earn a targeted investment return over the long-term. As the System has matured, the investment earnings have become the largest source of funding for the benefits.

Establishing the long-term investment return assumption is an important element in managing the funding. OPERS has independent actuarial consultants perform periodic evaluations of the reasonableness of all funding assumptions and make recommendations. Establishing the long-term investment return assumption (also referred to as the discount rate) involves forward-looking market projections. While the complete assumption study, referred to as the experience study, is performed every five years, the independent actuarial consultants review the reasonableness of assumptions every year to ensure market conditions and other events do not necessitate a change in assumptions.

The last experience study was completed in 2016 and was based on a review of the years 2010-2015. At that time, the forward-looking long-term pension investment return assumption was reduced from 8.0% to 7.5%. In October 2018, the long-term investment return assumption for pension was modified from 7.5% to 7.2% based on changes in the market outlook. Similarly, the long-term investment return assumption for the Health Care portfolio was reduced from 6.5% to 6.0%. The Health Care portfolio long-term investment earnings assumption is lower than the Defined Benefit portfolio as the Health Care portfolio has a shorter duration and thus has more liquid assets and excludes the illiquid assets that provided relatively favorable returns for the Defined Benefit portfolio. OPERS does not anticipate additional changes to be considered until the next scheduled experience study to be completed in 2021, unless investment market conditions deteriorate substantially.

Establishing a realistic long-term investment earnings assumption is a responsible and necessary function of adequately funding the plan. Too high of an assumption will ultimately result in benefit reductions while too low of an assumption may result in an overcorrection through benefit changes. Both will result in a mismatch of funding burden on future generations for today’s obligations. Thus, continued monitoring and assessment of assumptions is a responsible action and a best practice in managing the Plan.

Changes to the long-term assumed rate of return have a significant impact on the liabilities. The change in the long-term assumed rate of return for the Defined Benefit portfolio from 7.5% to 7.2% increased the pension liabilities by $3.4 billion. Similarly, the reduction in the long-term assumed rate of return for the Health Care portfolio from 6.5% to 6.0% increased the health care liabilities by $1.0 billion. These decisions, while challenging, were the right thing to do and demonstrate the System’s responsible actions.

Funding

The combination of the impact of the poor investment year and the increase in liabilities resulting from the reduction in the long-term investment return assumption is reflected in the key funding measures. The pension funded ratio decreased from 81% to 78%. The funded ratio reflects OPERS has accumulated 78% of the assets necessary to fund the liability for both active and retired members. By law, OPERS is obligated to pay certain benefits that have commenced with retirees. To make these payments each year, OPERS transfers funds from the active member funding (the Employers’ Accumulation Fund) to the retired member funding (the Annuity and Pension Reserve Fund and the Survivors’ Benefit Fund). Thus, the active member funding is 39%. The amortization period reflects how long it will take to fund remaining liabilities based on the current actuarial assumptions. The OPERS amortization period increased significantly from 18 years to 27 years. However, this is still within the statutorily required 30-year period of time.

To improve the pension funding position, the System will need to take steps to reduce the $24 billion unfunded liability. As always, the System will work responsibly and in partnership with members to address the issues.

The Actuarial Section, beginning on page 135, provides complete schedules of funding progress for pension and health care.

Health care—Working together toward a solution

Although health care is neither mandated nor guaranteed, the Board, management and staff, recognize the importance to our members of providing access to meaningful health care as it is a significant component of a secure retirement. This dedication to maintaining access to meaningful health care has become increasingly expensive as OPERS retirees, similar to national trends, have increased in number, have longer life expectancies, and health care costs continue to increase significantly faster than inflation.

Two major issues combined to create the immediate health care challenge. First, we anticipate that health care expenses will continue to grow as the number—and life expectancies—of our retirees continues to grow. Second, the funding status of the pension requires that all contributions be allocated to improve the pension funding. Thus, until the pension funding improves, there is no funding source for health care for the foreseeable future. As a result, we are working with members, retirees and stakeholders to evaluate additional changes to extend the time the current trust can fund health care expenditures.

This most recent health care project kicked off during 2018. We have launched a series of education sessions to provide retirees and members with the appropriate background. The education sessions are being followed by presentations with various options from which we will solicit member feedback. Ultimately, these options will be narrowed, and member feedback will be solicited on the narrower field of options. The 2019 year is expected to include extensive communications and feedback mechanisms culminating in a responsible solution.

The health care trust fund has approximately $12 billion and is projected to provide funding for approximately 13 years under the current health care program design. The Plan Statement, found on page 217 of this CAFR, includes more information on the current health care program.

Other Key 2018 activities

Internal processes and investment in technology—The System's goal is to provide excellent service to ever-increasing numbers without the commensurate increase in staff. The internal technology and business process redesign project attained its targeted milestones and was completed in 2018. The internal technology enhancements provide for more responsive features for members. The result of this multi-year technology improvement is the System's reduction of staff yielding a savings of approximately $4.0 million.

Outreach and education—Customer service is always a high priority and education is critical during times of anticipated change. We work to ensure all stakeholders—especially current retirees and our members—the retirees of tomorrow, understand the challenges, can provide feedback on options and ultimately understand the outcome. We work to provide plain-language information on plan types, benefits options, the financial realities of retirement and more to each audience. Here's an overview of our outreach and education for 2018:

- Hundreds of thousands of members received accurate, personalized, account information via an annual account statement to help ensure each understands the status of benefits earned.
- More than 830 educational seminars and webinars were conducted throughout the state.
- The OPERS website attracted almost 1,600,000 individual hits, while the Member Services Call Center fielded almost 400,000 calls.
- Staff conducted specialized seminars throughout the state to educate on the pension and health care funding challenges and to ensure members were informed of the process that will be used to consider options.
- In addition to print where requested, OPERS deployed electronic distribution for communication via email blasts, social media outlets and a newly revised, user friendly website.

Special retiree Board seat election—Following the death of a Board retiree representative, OPERS conducted a special election to fill that vacant seat.

Report Contents and Structure

This CAFR is designed to comply with the reporting requirements of GASB and in accordance with the Governmental Accounting Standards Best Practices. The responsibility for the accuracy of the data presented here, as well as the completeness and fairness of the presentation, rests with OPERS management.

The management of OPERS is responsible for internal accounting controls designed to provide reasonable assurance for the safeguarding of assets and the reliability of financial records. The concept of reasonable assurance recognizes the relationship between the cost of a control and the benefit likely to be derived, based on the judgment of management. We believe the established internal accounting controls are adequate to meet the purpose for which they were intended.

The financial statements presented in this report, supporting schedules, and statistical tables are presented fairly in all material aspects. These assertions can be made because OPERS has established a comprehensive internal control framework designed to protect assets from loss and to compile sufficient reliable information for the preparation of the OPERS financial statements in conformity with generally accepted accounting principles. Even effective internal controls may not prevent or detect misstatements and can provide only a reasonable assurance with respect to financial statement preparation.

The System's external auditors, CliftonLarsonAllen LLP, conducted an independent audit of the financial statements in accordance with U.S. generally accepted government auditing standards. This audit and the financial statements are described in the Financial Section, beginning on page 19.

Additionally, readers are encouraged to refer to the Investment Section for information on investment policies and strategies, safeguards on investments, and yield.

2018 Financial Highlights

Funded Status: Funded status measures the progress of accumulating the funds necessary to meet future obligations. We are dedicated to maintaining and enhancing the stability of this System. As a result, OPERS has remained in compliance within the 30-year funding window required by law.

The December 31, 2018 valuation funded status is 77.5%. The unfunded liability is expected to be funded within 27 years on a funding basis. As discussed previously, these results reflect the combined impact of a down investment market combined with an increase in the liabilities resulting from reducing the long-term investment return assumption from 7.5% to 7.2%. For more information on assumptions, refer to the Actuarial Section beginning on page 135.

As of the December 31, 2017 health care actuarial funding valuation (the most recent), OPERS was 65.4% funded. In the absence of employer contributions, the health care fund is expected to become insolvent after 13 years.

Retirement Contributions: Employee contributions, employer contributions, and income from investments provide the funds necessary to finance retirement benefits. Approximately two-thirds of OPERS revenue from which benefits are paid is generated from investment returns. The remaining funding comes from employee and employer contributions. The System reports a total of $1.5 billion in member and $2.0 billion in employer contributions for the year ended December 31, 2018. Total net position is $94.1 billion as of December 31, 2018.

Expenses: Expenses (including pension benefit payments, health care coverage payments and account refunds) for fiscal year 2018 were $7.4 billion. In 2018, OPERS paid $6.1 billion in pension benefits and $0.9 billion in health care to more than 212,000 OPERS retirees and their beneficiaries. Because approximately 90% of all OPERS retirees remain in Ohio, that figure represents a significant driver for Ohio's economy.

Administrative Costs: OPERS management remains diligent in monitoring and, where possible, reducing or containing expenses. Administrative costs are paid through investment returns generated; our goal is always to be responsible stewards of public funds. Administrative costs in 2018 were $120.0 million, including investment expenses.

Complete details of all administrative expenses are included in the Financial Section, on page 88. In addition, the Management's Discussion and Analysis, beginning on page 22, has a more detailed discussion of the OPERS funded status and provides a complete analysis of the additions and deductions to Plan Net Position.

Professional Services

Professional services are provided to OPERS by consultants appointed by the Board. Actuarial services are provided by Gabriel, Roeder, Smith & Company, Southfield, Michigan. The investment advisors to the Board for all the plans are NEPC, LLC, Cambridge, Massachusetts; and AON Hewett Investment Consulting, Inc., Chicago, Illinois. The financial records of the System are audited by CliftonLarsonAllen, LLP, Certified Public Accountants, Toledo, Ohio, under contract with the Ohio Auditor of State.

Acknowledgments

This CAFR is the result of the combined teamwork of the System's staff under the direction of the Board. Our sincere appreciation is extended to all who assisted in and contributed toward the completion of this document.

This annual report is designed to provide complete and reliable information for transparent communication and to serve as a resource. We take our fiscal responsibility very seriously. We are effective and diligent managers of the assets held in trust for members of this System.

As stewards of public assets, we must take actions and make the responsible decisions that will carry this organization forward so that we can deliver on an important component of financial retirement security for all generations in our membership. This organization is led by a dedicated and diligent Board that works tirelessly with OPERS management and staff to help position us for the future. We all have a fiduciary responsibility to make decisions in the best interest of all one million members. We have a responsibility to be prudent stewards and to look forward and prepare for the challenges we see, not wait for them to occur. We are pleased to report the activities of 2018. We will continue to take responsible actions to position OPERS to be a strong pension system and we will do this working with members, retirees and stakeholders. We are honored to be associated with, appreciate and acknowledge the efforts of all involved as, together, we prepare for and step into the future.

Respectfully Submitted,

Karen E. Carraher

Karen E. Carraher, CPA

Executive Director

Jennifer H. Starr

Jennifer H. Starr, CPA

Chief Financial Officer

Jennifer Starr and Karen Carraher standing with 35 years of awards for excellence in financial reporting.

Fiduciary Responsibilities

The Board and executive management of OPERS are fiduciaries of the pension and health care trust funds. Fiduciaries are charged with the responsibility of assuring that the assets of OPERS are used exclusively for the benefit of plan participants and their beneficiaries.

Request for Information

This financial report is designed to provide the Board, our membership, taxpayers, investment managers, and creditors with an overview of OPERS finances and accountability for the money received. Questions concerning any of the information provided in this report or requests for additional information should be addressed to:

Ohio Public Employees Retirement System
Director—Finance
277 East Town Street
Columbus, Ohio 43215-4642

OPERS has been recognized by national financial experts and organizations for commitment to the highest possible fiscal standards. We are honored to have been recognized with the following awards:

- ***2017 Certificate of Achievement***—For the 35th consecutive year, the Government Finance Officers Association of the United States and Canada (GFOA) awarded OPERS a Certificate of Achievement for Excellence in Financial Reporting for its *Comprehensive Annual Financial Report* for the fiscal year ended December 31, 2017. In order to be awarded a certificate of achievement, a government organization must publish an easily readable and efficiently organized comprehensive annual financial report that satisfies both generally accepted accounting principles and applicable legal requirements.

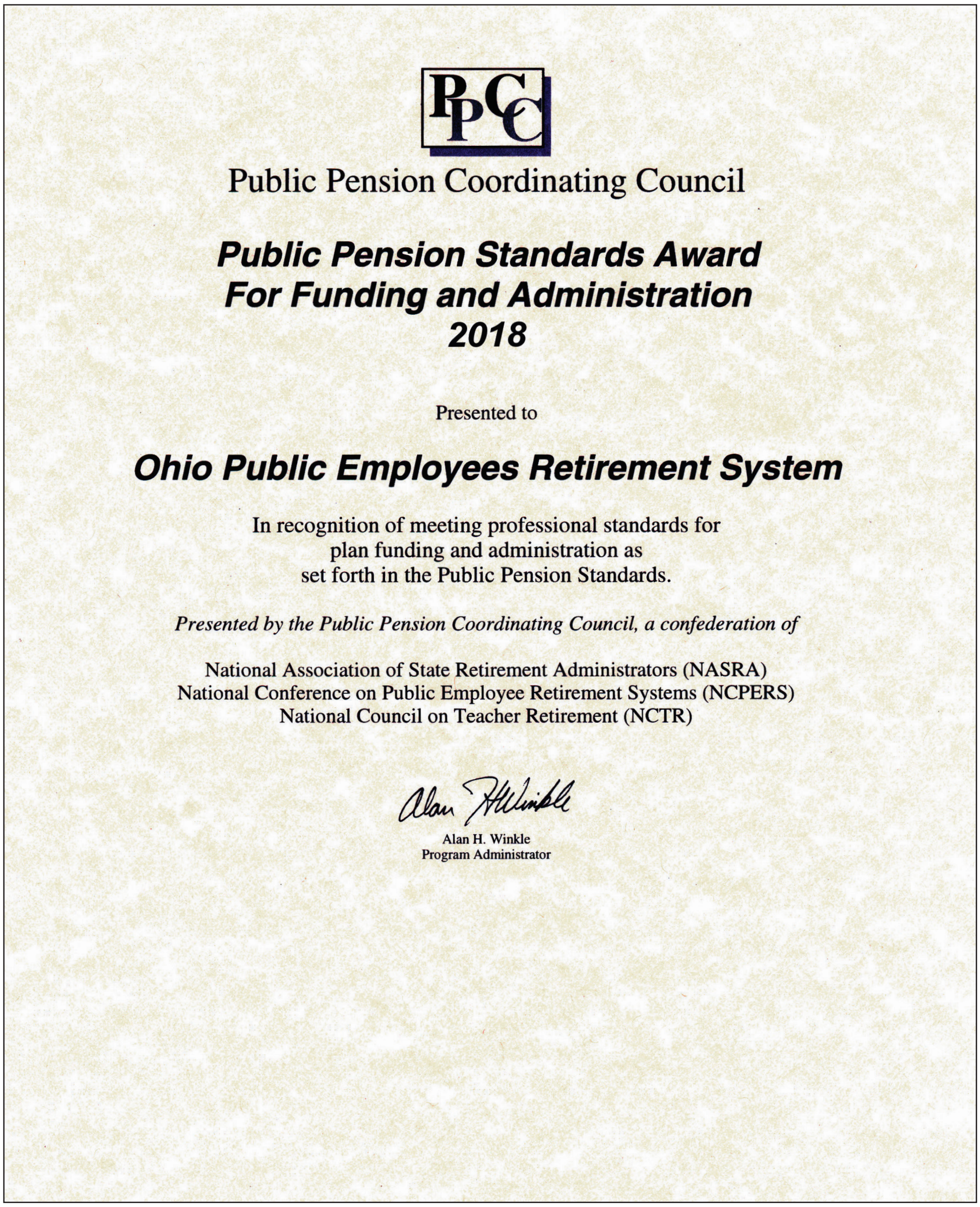
Certificate of Achievement for Excellence in Financial Reporting

- ***2017 Award for Outstanding Achievement***—For the eighth consecutive year, OPERS has received the GFOA Award for Outstanding Achievement in Popular Annual Financial Reporting for its *Popular Annual Financial Report* for the fiscal year ended December 31, 2017. This award is a prestigious national award recognizing conformance with the highest standards of creativity, presentation, understandability, and reader appeal for preparation of governmental popular reports. OPERS has received this award for each year we have produced a Popular Annual Financial Report.

Award for Outstanding Achievement in Popular Annual Financial Reporting

- ***2018 Public Pension Standards Award***—Issued by the Public Pension Coordinating Council, this award recognizes OPERS for demonstrating a high level of plan design, funding, member communications and administrative practices. The standards serve as a benchmark by which all public defined benefit plans are managed.

2018 Public Pension Standards Award


PPCC

Public Pension Coordinating Council

Public Pension Standards Award
For Funding and Administration
2018

Presented to

Ohio Public Employees Retirement System

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

Presented by the Public Pension Coordinating Council, a confederation of

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

Alan H. Winkle
Program Administrator

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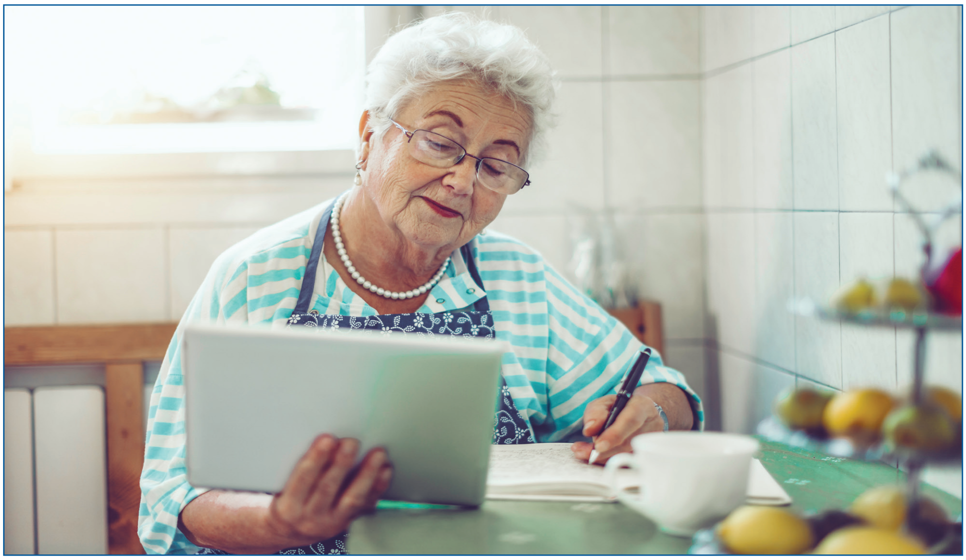

Financial responsibility—what's your financial IQ?

Most financial experts agree that true financial security only comes with knowledge about finances and active planning for the future. To that end, all OPERS stakeholders are urged to accept personal financial responsibility. At every stage in a member's career, financial responsibility with an eye to the future is essential. After all, eligible to retire does not mean required to retire—members should retire ONLY when they are financially secure. Consider these facts:

- Many financial experts caution that pension plans should only account for about half of a retiree's income—the other half should come from other sources (savings, investments, annuities or individual retirement accounts (IRAs)).
- New to your public career? Most retirees will tell you that retirement comes around in the blink of an eye. Take actions now to ensure you have a secure retirement. Start by creating a personal budget you can stick to—establish goals and know exactly what you have (assets) and what you owe (liabilities).
- At any point in your career, establish a savings system that works for you—remember small actions can add up to big accounts. Emergencies happen in life—make sure you have an emergency savings account.
- Use credit responsibly and understand the importance of a strong credit score. Your credit score is a big factor in determining how much interest you'll pay when going for a loan.
- Strong finances are more than just dollars and cents. Studies show that the price of chronic, unresolved money problems can cause low self-esteem and can even affect your focus and your health. Simply put, when you're stressed about finances, it's more difficult to learn, remember or solve problems—reducing your effectiveness at work and at home.

Looking for more information? The OPERS website has a Financial Wellness kit that will help.

OPERS

CliftonLarsonAllen LLP
CLAconnect.com

INDEPENDENT AUDITORS' REPORT

Board of Trustees
The Ohio Public Employees Retirement System, and
The Honorable Keith Faber, Auditor of State

Report on the Financial Statements

We have audited the accompanying financial statements of the Ohio Public Employees Retirement System (OPERS), which comprise the combining statement of fiduciary net position as of December 31, 2018, and the related combining statement of changes in fiduciary net position for the year then ended and the related notes to the financial statements, which collectively comprise OPERS' basic financial statements, as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of OPERS as of December 31, 2018, and the respective changes in its fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

A member of Nexia International

Board of Trustees
The Ohio Public Employees Retirement System, and
The Honorable Keith Faber, Auditor of State

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, the schedules of changes in net pension liability and related ratios – traditional pension plan, combined plan and member directed plan, member and employer contributions – traditional plan, employer contributions – traditional plan, combined plan and member-directed plan, investment returns – defined benefit portfolio, changes in net OPEB liability and related ratios – health care, employer contributions – health care, investment returns – health care portfolio, and notes to required supplementary information, as listed in the table of contents, be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise OPERS' basic financial statements. The additional information, including the administrative expenses and schedule of investment expenses, as listed in the table of contents, is presented for purposes of additional analysis and are not a required part of the basic financial statements.

The additional information, as listed in the table of contents, is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the additional information, including the administrative expenses and schedule of investment expenses, as listed in the table of contents, is fairly stated, in all material respects, in relation to the basic financial statements as a whole.

The introductory, investment, actuarial and statistical sections, as listed in the table of contents, have not been subjected to the auditing procedures applied in the audit of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on it.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated June 14, 2019 on our consideration of OPERS' internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to solely describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of OPERS' internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering OPERS' internal control over financial reporting and compliance.

CliftonLarsonAllen LLP

CliftonLarsonAllen LLP

Toledo, Ohio
June 14, 2019

The management of the Ohio Public Employees Retirement System (OPERS or System) offers readers of the System's financial statements this narrative overview of the financial activities of OPERS for the year ended December 31, 2018. This narrative is intended to supplement the System's financial statements. Readers are encouraged to consider the information presented here in conjunction with the financial statements that begin on page 36.

The *OPERS Comprehensive Annual Financial Report* (CAFR or annual report) presents financial statements for the most recent year end. Users of this CAFR can refer to the Statistical Section, beginning on page 161, for historical financial information.

Overview of the Financial Statements

The following discussion and analysis are intended to serve as an introduction to the OPERS financial statements. The basic financial statements include:

1. Combining Statement of Fiduciary Net Position
2. Combining Statement of Changes in Fiduciary Net Position
3. Notes to Combining Financial Statements

As mandated, this CAFR also contains the following schedules, referred to as Required Supplementary Information:

1. Schedules of Changes in Net Pension Liability and Related Ratios—Traditional Pension Plan, Combined Plan and Member-Directed Plan
2. Schedule of Member and Employer Contributions—Traditional Pension Plan
3. Schedules of Employer Contributions—Traditional Pension Plan, Combined Plan and Member-Directed Plan
4. Schedule of Investment Returns—Defined Benefit
5. Schedule of Changes in Net OPEB Liability and Related Ratios—Health Care
6. Schedule of Employer Contributions—Health Care
7. Schedule of Investment Returns—Health Care
8. Notes to Required Supplementary Information

Expenses associated with administering the System are presented immediately following the Notes to Required Supplementary Information in the following Additional Information schedules:

1. Administrative Expenses
2. Schedule of Investment Expenses

The financial statements contained in this annual report disclose financial data for each of the benefit plans and the health care trust described beginning below. Please refer to the Plan Statement, beginning on page 217, for a comprehensive description of the plan structures and benefits. These plans are established as separate legal entities in accordance with Internal Revenue Service (IRS) regulations and Ohio law and are summarized beginning below.

The Traditional Pension Plan

The Traditional Pension Plan is a defined benefit plan in which a member's retirement benefits are calculated on a formula that considers years of service and final average salary (FAS). The pension benefits are funded by both member and employer contributions, and investment earnings on those contributions.

The Combined Plan

The Combined Plan is a defined benefit plan with elements of a defined contribution plan. Under the Combined Plan, members earn a formula benefit similar to, but at a factor less than, the Traditional Pension Plan benefit. This defined benefit is funded by employer contributions and associated investment earnings. Additionally, member contributions are deposited into a defined contribution account in which the member self-directs the investment. Upon retirement or termination, the member may choose a defined contribution retirement distribution that is equal in amount to the member's contributions to the plan and investment earnings (or losses) on those contributions. Members may also elect to annuitize their defined contribution account balances.

The Member-Directed Plan

The Member-Directed Plan is a defined contribution plan in which members self-direct the investment of both member and employer contributions. The retirement distribution under this plan is equal to the sum of member and vested employer contributions, plus investment earnings (or losses) on those contributions. Employer contributions and associated investment earnings vest over a five-year period at a rate of 20% per year.

Upon retirement or termination, the member may choose a defined contribution retirement distribution, or may elect to use his/her defined contribution account balance to annuitize his/her benefit.

115 Health Care Trust

The 115 Health Care Trust (115 Trust or Health Care Trust) was established in 2014, under Section 115 of the Internal Revenue Code (IRC). The initial purpose of the 115 Trust was to fund health reimbursement arrangement (HRA) accounts for Medicare-enrolled retirees in conjunction with the implementation of the OPERS Medicare Connector (Connector) in 2016. This type of arrangement was not permissible by the IRS under OPERS' former health care trust structure. In 2016, OPERS received favorable rulings from the IRS allowing OPERS to consolidate all health care assets into the 115 Trust. As a result, the 401(h) Health Care Trust, which held funding for Traditional Pension Plan and Combined Plan health care, and the Voluntary Employees' Beneficiary Association Trust (VEBA), which held funding for Member-Directed Plan health care, closed on June 30, 2016 and the net positions transferred to the 115 Trust on July 1, 2016.

From 2016 forward, the 115 Trust includes the funds for retiree health care for the Traditional Pension, Combined and Member-Directed plans. The portion of the employer contribution rate allocated to fund health care for the Traditional Pension and Combined plans is comparable, as the same coverage options are provided to participants in both plans. Non Medicare-eligible retirees in these plans may receive an allowance to offset the premium of OPERS-sponsored health care coverage. Medicare-enrolled retirees in the Traditional Pension and Combined plans may have an allowance deposited into an HRA account to be used toward the health care program of their choice selected with the assistance of an OPERS vendor.

Upon separation or retirement of a Member-Directed Plan participant, the participant may use the vested funds in his/her retiree medical account for qualified health care expenses. Vesting requirements for Member-Directed health care have changed over the life of the plan. The plan originally required 10 years of participation to fully vest in the contributions and interest earned on the account. Effective January 1, 2009, contributions and interest vested with the participant over a five-year period. Effective July 1, 2015, new participants to the plan are required to participate for 15 years to become fully vested. Additional details on the OPERS health care program and the Member-Directed Plan health care vesting schedule can be found in the Plan Statement beginning on page 217.

Financial activity for each of the pension plans and the health care trust is reported in the basic combining financial statements described below.

Combining Statement of Fiduciary Net Position

The Combining Statement of Fiduciary Net Position is a point-in-time snapshot of fund balances at fiscal year-end for pension and health care. It reflects assets available to pay future benefits to retirees, and any liabilities owed as of the statement date. The resulting Net Position (equal to Assets less Liabilities) represents the value of assets held in trust for pension benefits and health care. (See Combining Statement of Fiduciary Net Position as of December 31, 2018 on pages 36-37 of this report.)

Combining Statement of Changes in Fiduciary Net Position

The Combining Statement of Changes in Fiduciary Net Position displays the effect of financial transactions that occurred during the fiscal year, where Additions less Deductions equal Net Increase (or Net Decrease) in net position. This Net Increase or Decrease in net position reflects the change in the value of fiduciary net position that occurred between the current and prior year. (See Combining Statement of Changes in Fiduciary Net Position for the year ended December 31, 2018 on pages 38-39 of this report.)

Notes to Combining Financial Statements

The Notes to Combining Financial Statements provide additional information that is essential for a comprehensive understanding of the data provided in the financial statements and is an integral part of the financial statements. These notes describe the accounting and administrative policies under which OPERS operates, and provide additional levels of detail for selected financial statement items. (See Notes to Combining Financial Statements, December 31, 2018 on pages 40-75 of this report.)

The financial statements described are prepared in accordance with Governmental Accounting Standards Board (GASB) pronouncements. Information on the significant accounting policies and recent GASB standards reviewed and adopted in the preparation of the financial statements can be found in Note 2 in the Notes to Combining Financial Statements beginning on page 48.

Because of the long-term nature of most pension plans, financial statements alone cannot provide sufficient information to properly reflect the ongoing plan perspective. Therefore, in addition to the financial statements, this annual report includes additional Required Supplementary Information (RSI) schedules and required notes. The RSI includes schedules of changes in net pension liability and net other post-employment benefit (OPEB), or health care, liability, investment returns for the defined benefit portion of the pension plans and for the health care trust, and schedules of employer contributions for both defined benefit pension plans and health care. The schedules of funding progress for defined benefit pension plans and health care have been included in the Actuarial Section of this document. Each of the schedules includes historical-trend information when required by standards, except for the initial year of implementation when historical information is unavailable as with GASB Statement No. 67 (GASB 67), *Financial Reporting for Pension Plans*, and GASB Statement No. 74 (GASB 74), *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans.*

Schedules of Changes in Net Pension Liability and Related Ratios—Traditional Pension Plan, Combined Plan and Member-Directed Plan

The Schedules of Changes in Net Pension Liability and Related Ratios (pages 76-79) include actuarial information regarding the increase (or decrease) of each element of the net pension liability between the beginning and end of the year for the OPERS defined benefit pension plans. The information reported in these schedules was calculated using the assumptions and requirements defined in GASB 67 (also referred to as the Accounting Basis throughout this document). The calculation method defined in GASB 67 requires different assumptions than are used to calculate the funded status of a plan (also referred to as the Funding Basis throughout this document). The key difference is the Accounting Basis schedule uses the fair value of assets rather than the smoothed value of assets used for the Funding Basis (refer to page 29 for additional information on actuarial smoothing techniques). Therefore, the GASB 67 Accounting Basis net pension liability results differ from the Funding Basis unfunded actuarial accrued liability results provided in the Schedule of Funding Progress included on page 29 of this section and in the Actuarial Section of this document beginning on page 135. GASB 67 breaks the link between accounting and funding. While these changes affect the accounting information disclosed in the Notes to Combining Financial Statements and RSI, they do not have an effect on the actuarial methods and assumptions used by OPERS to determine the employer contributions needed to fund the plans.

Historical information is not available prior to the GASB 67 implementation in 2014. The schedules will be expanded each subsequent year until they contain the required 10-year presentation.

Schedule of Member and Employer Contributions—Traditional Pension Plan

The Schedule of Member and Employer Contributions (page 80) presents historical-trend information regarding the value of total annual contributions required to be paid by the members and employers participating in the Traditional Pension Plan, and the actual amounts remitted. The information contained in this schedule reflects the required contributions based on the contribution rates approved by the OPERS Board of Trustees (Board). This schedule includes both member and employer contributions used to calculate the proportionate share by employer for the Traditional Pension Plan.

GASB Statement No. 68 (GASB 68), *Accounting and Financial Reporting for Pensions*, was issued by GASB in conjunction with GASB 67. GASB 68 applies to employers that participate in OPERS as well as other governmental employers that sponsor or contribute to pension plans. GASB 68 requires employers to recognize a proportionate share of the net pension liability in their financial statements, and includes other reporting changes. GASB 68 specifies that when different contribution rates are assessed for different classes of employees, the determination of the employer's proportionate share should reflect those relationships. The Traditional Pension Plan proportionate share calculation includes both member and employer contributions to recognize the differing benefits of members in the State, Local, Public Safety and Law Enforcement divisions. Members in the Public Safety and Law Enforcement divisions are prohibited from participating in the Combined Plan or Member-Directed Plan. The defined benefit pension portion of the Combined Plan is funded with employer contributions only. Annuitized defined contribution accounts for Member-Directed Plan retirees are funded with member contributions, vested employer contributions (if applicable) and investment gains/(losses) related to those contributions. Separate schedules showing employer-only contributions for the Traditional Pension Plan, Combined Plan and Member-Directed Plan are also included in RSI and described on the next page.

Schedules of Employer Contributions—Traditional Pension Plan, Combined Plan and Member-Directed Plan

The Schedules of Employer Contributions (page 81-82) provide historical-trend information regarding the value of total annual contributions required to be paid by employers for the employees participating in each plan, and the actual amounts remitted. The information contained in these schedules also reflects the required contributions based on the contribution rates approved by the Board. The Member-Directed Plan is a defined contribution plan with the option for retirees to annuitize their benefit. These annuities for Member-Directed retirees are funded with the accumulated member contributions, vested employer contributions, and gains or losses resulting from the member-selected investment options. All employer contributions deposited to the Member-Directed Plan are included in these schedules.

Schedule of Investment Returns—Defined Benefit

The Schedule of Investment Returns (page 83) provides information regarding the annual money-weighted rates of return on pension plan investments in the Defined Benefit portfolio, as required by GASB 67. Historical information is not available prior to the GASB 67 implementation in 2014. The schedule will be expanded each subsequent year until it contains the required 10-year presentation.

Schedule of Changes in Net OPEB Liability and Related Ratios—Health Care

The Schedule of Changes in Net OPEB Liability and Related Ratios (page 84) includes actuarial information regarding the increase (or decrease) of each element of the net OPEB liability between the beginning and end of the year for OPERS defined benefit health care plans. The values included in this schedule were calculated using the assumptions and requirements defined in GASB 74 (also referred to as the Accounting Basis throughout this document, similar to GASB 67). The calculation method defined in GASB 74 requires different assumptions than are used to calculate the funded status of a plan (also referred to as the Funding Basis throughout this document). Similar to GASB 67, the Accounting Basis requires the use of fair value of assets versus the smoothed value of assets used for the Funding Basis (refer to page 29 for additional information on actuarial smoothing techniques). Therefore, the GASB 74 Accounting Basis net OPEB liability results differ from the Funding Basis unfunded actuarial accrued health care liability results provided in the Schedule of Funding Progress included on page 30 of this section and in the Actuarial Section of this document beginning on page 135. Also similar to GASB 67, GASB 74 breaks the link between accounting and funding. While these changes will affect the accounting information disclosed in the Notes to Combining Financial Statements and RSI, they do not have an effect on the actuarial methods and assumptions used by OPERS to determine the employer contributions needed to fund the plans.

Historical information is not available prior to the GASB 74 implementation in 2017. The schedule will be expanded each subsequent year until it contains the required 10-year presentation.

Schedule of Employer Contributions—Health Care

The Schedule of Employer Contributions (page 85) presents historical-trend information regarding the value of actuarially determined health care contributions, and the actual amounts remitted. The information contained in this schedule also reflects the required contributions based on the contribution rates approved by the Board. Based on the provisions of GASB 74, all OPERS health care plans are considered to be defined benefit other post-employment plans (OPEB). Therefore, the information contained in this schedule includes health care funding for the Traditional Pension Plan, the Combined Plan and the Member-Directed Plan.

Schedule of Investment Returns—Health Care

The Schedule of Investment Returns (page 85) provides information regarding the annual money-weighted rates of return on investments in the Health Care portfolio, calculated and presented as required by GASB 74. Historical information is not available prior to the GASB 74 implementation in 2017. The schedule will be expanded each subsequent year until it contains the required 10-year presentation.

Notes to Required Supplementary Information

The Notes to Required Supplementary Information (page 86-87) provides background information, a summary of the actuarial assumptions used in determining contribution rates for valuation of the pension plans and health care, and explanatory detail to help in understanding the required supplementary schedules.

The following schedules are provided as Additional Information regarding the expenses associated with administering the System:

Administrative Expenses

The Administrative Expenses schedule reflects the total operating costs of managing the System, by major expense category (page 88).

Schedule of Investment Expenses

The Schedule of Investment Expenses summarizes the costs incurred in managing the investment assets of the System (page 88). These costs are reported as Investment Administrative Expenses in the Combining Statement of Changes in Fiduciary Net Position, and are reflected as a reduction in net investment income or loss.

Financial Highlights

- The investment portfolio reported a total loss of 3.38% for the year ended December 31, 2018, compared to a total gain of 16.62% in 2017. The total portfolio, as of year-end, is divided into three sub-portfolios: the Defined Benefit portfolio, the Health Care portfolio, and the Defined Contribution portfolio. The Defined Benefit portfolio reported an investment loss of 2.99% in 2018 compared to a gain of 16.82% in 2017. The Health Care portfolio reported an investment loss of 5.76% in 2018 compared to a gain of 15.25% in 2017. The Defined Contribution portfolio reported an investment loss of 6.65% in 2018 compared to a gain of 17.39% in 2017.
- Net position decreased by $7.3 billion to $94.1 billion as of December 31, 2018 compared to $101.4 billion in 2017. Net loss from investing activities totaled $3.3 billion in 2018 compared to net income from investing activities of $14.6 billion in 2017. Table 1 presents a two-year comparative history of Changes to Fiduciary Net Position.

Changes to Fiduciary Net Position (for the years ended December 31, 2018 and 2017) **Table 1**

	2018	2017	Amount Increase/ (Decrease) from 2017 to 2018	Percent Increase/ (Decrease) from 2017 to 2018
Member and Employer Contributions	$3,493,407,600	$3,411,695,981	$81,711,619	2.4%
Contract Receipts and Other Income	109,449,524	116,664,391	(7,214,867)	(6.2)
Net Income/(Loss) from Investing Activity	(3,350,345,567)	14,619,914,555	(17,970,260,122)	(122.9)
Total Additions	**252,511,557**	**18,148,274,927**	**(17,895,763,370)**	**(98.6)**
Benefits, Health Care and Account Refunds	7,432,963,218	7,235,012,080	197,951,138	2.7
Administrative and Other Expenses	102,310,563	98,267,236	4,043,327	4.1
Total Deductions	**7,535,273,781**	**7,333,279,316**	**201,994,465**	**2.8**
Net Increase/(Decrease) in Net Position	**(7,282,762,224)**	**10,814,995,611**	**(18,097,757,835)**	**(167.3)**
Net Position, Beginning of Year	101,425,819,836	90,610,824,225	10,814,995,611	11.9
Net Position, End of Year	**$94,143,057,612**	**$101,425,819,836**	**($7,282,762,224)**	**(7.2%)**

- OPERS continues its goal of ensuring financial stability of both the pension and health care funds. In 2016, the Board adopted changes to the pension and health care actuarial assumptions based on the results of an experience study for the period 2011 through 2015. The experience study incorporates both a historical review and forward-looking projections to determine the appropriate assumptions to maintain the pension plan on a path toward full funding. As reported in 2016, the most notable changes included a reduction in the long-term pension investment return assumption from 8.0% to 7.5% and a change in mortality tables for both pension benefits and health care coverage.

  In addition to the experience studies, conditions are monitored and assumptions are reviewed annually to ensure that the assumptions remain reasonable until the next scheduled experience study. If conditions change materially, it may become necessary to review and update assumptions in advance of the next scheduled experience study. In 2018, the Board adopted changes to further reduce the long-term pension investment return assumption from 7.5% to 7.2% and the long-term health care investment return assumption from 6.5% to 6.0%. (Refer to the Actuarial Section, beginning on page 135, for more information on actuarial assumptions.)

- OPERS presents current pension funding information in Table 2, which aligns with the year end of the financial statements presented in this document. As a result, the pension funding discussion includes information updated as of December 31, 2018. The health care funding presented in this document (refer to Table 3 on page 30) remains a year in arrears as the most recent health care funding information is as of December 31, 2017.

Schedule of Funding Progress—Funding Basis ($ in millions) **Defined Benefit Plans[1]—Table 2**

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Funding Years
2018	$108,705	$84,287	$24,418	77.5%	27
2017[e]	106,090	83,292	22,798	78.5	25
2017	102,656	83,292	19,364	81.1	18
2016	100,167	80,280	19,887	80.1	19
2015[a]	97,177	78,061	19,116	80.3	20
2015[b]	91,832	78,061	13,771	85.0	19
2014	89,285	74,865	14,420	83.8	21
2013	86,645	71,411	15,234	82.4	24
2012[c]	83,878	67,855	16,023	80.9	26
2012[d]	87,105	67,855	19,250	77.9	30
2011	84,530	65,436	19,094	77.4	30
2010[a]	80,485	63,649	16,836	79.1	24
2010[b]	79,630	60,600	19,030	76.1	29
2009	76,555	57,629	18,926	75.3	30

[a] Revised actuarial assumptions based on experience study.
[b] Results from original valuation prior to re-statement after completion of experience study.
[c] Results reflecting the provisions of Senate Bill 343.
[d] Results prior to the provisions of Senate Bill 343.
[e] Results after change in discount rate from 7.5% to 7.2%.
[1] Defined Benefit Plans include the Traditional Pension Plan, the defined benefit portion of the Combined Plan and purchased annuities in the Member-Directed Plan.

- As previously noted, the OPERS net investment loss for the year ended December 31, 2018 totaled $3.3 billion, a 3.38% loss on the total OPERS portfolio. Net investment loss for the defined benefit plans comprised $2.5 billion of this total, or a loss of 2.99%. The net investment loss for the Health Care portfolio was $0.7 billion, or a loss of 5.76%, and the Defined Contribution portfolio included an investment loss of $0.1 billion, or a loss of 6.65%. As with all mature retirement systems, OPERS' primary source of funding benefit payments in the future is investment income.
- To fully understand the funding status of a retirement system, it is often advisable to view actuarial data in conjunction with financial data. Both Tables 2 and 3 are presented on the Funding Basis. Under the Funding Basis, value of assets is based on the actuarial value of assets which smooths market gains and losses over a rolling four-year period, subject to a 12% market corridor. This differs from the Accounting Basis (or GASB 67 and GASB 74 basis), which calculates the funding status using the market value of assets.
- As a result of actuarial smoothing techniques, the fair value of assets may be significantly different from the funding value (actuarial value) of assets at a given point in time. This means that in periods of extended market decline the fair value of assets will usually be less than the funding, or actuarial value, of assets. Conversely, during periods of extended market gains, the fair value of assets will usually be greater than the funding, or actuarial value, of assets.

- To ensure the funding value of assets and the market value of assets remain within reasonable proximity of each other, OPERS uses a 12% market corridor in conjunction with its four-year smoothing. This policy, instituted by the Board in 2001, ensures that the funding value of assets is neither lower than 88% nor higher than 112% of the market value of the assets. At the end of 2017, the market value of assets exceeded the funding value by $3.8 billion. At the end of 2018, the market value of assets was lower than the funding value by $2.9 billion.
- By law, OPERS is obligated to pay certain benefits that have commenced with retirees. To make these payments each year, and to account for benefits that have commenced with retirees, OPERS transfers funds from the active member (the Employers' Accumulation Fund) to the retiree funds (the Annuity and Pension Reserve Fund and the Survivors' Benefit Fund). Thus, the active member funding is 39% and 49% as of December 31, 2018 and 2017, respectively, after this annual transfer.
- As noted previously, in October 2018, OPERS reduced the long-term pension investment earnings assumption from 7.5% to 7.2%. The net impact of this reduction in the assumption was to increase the pension liability by approximately $3.4 billion. At the same time, OPERS reduced the long-term health care investment earnings assumption from 6.5% to 6.0%. The net impact of this reduction in the assumption was to increase the health care liability by approximately $1.0 billion. These new long-term investment earnings assumptions reflect updated market conditions. Tables 2 and 3 reflect the liabilities under the old assumption and the revised assumption as of the end of 2017.
- As of December 31, 2018, the date of the latest actuarial valuation, the funded ratio for defined benefit pensions was 77.54%. In general, this means that for each dollar of future pension liability, OPERS had accumulated approximately $0.78 to meet that obligation. The funded ratio decreased from the revised 2017 to 2018 by 0.97%, due primarily to the investment loss of 2018. The December 31, 2018 actuarial report indicates that, if future activity proceeded according to assumptions, OPERS would accumulate sufficient assets to pay all pension liabilities for active members and retirees within 27 years on a Funding Basis compared to 25 years for revised 2017.

Schedule of Funding Progress—Funding Basis ($ in millions) — Health Care—Table 3

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Solvency Years[1]
2017[c]	$18,393	$12,021	$6,372	65.4%	13
2017	17,389	12,021	5,368	69.1	13
2016	19,924	12,098	7,826	60.7	12
2015[a]	19,224	11,933	7,291	62.1	Indefinite
2015[b]	18,515	11,933	6,582	64.5	Indefinite
2014	19,405	12,062	7,343	62.2	Indefinite
2013	19,784	12,031	7,753	60.8	Indefinite
2012	19,182	12,193	6,989	63.6	Indefinite
2011	31,020	12,115	18,905	39.1	10
2010[a]	30,531	12,320	18,211	40.4	11
2010[b]	26,929	11,267	15,662	41.8	11
2009	31,558	10,936	20,622	34.7	11
2008	29,623	10,748	18,875	36.3	11

[a] Revised actuarial assumptions based on experience study.
[b] Results from original valuation prior to re-statement after completion of experience study.
[c] Results after change in discount rate from 6.5% to 6.0%.
[1] Solvency Years represents an estimate of the number of years the fund will be able to provide health care under the intermediate actuarial assumptions. Indefinite indicates funds are expected to be sufficient to fund future health care needs.

- The funding objective is to meet long-term pension benefit obligations and, to the extent possible, fund post-employment health care. As of December 31, 2017, the date of the latest health care actuarial valuation under the Funding Basis, the revised actuarial liability for health care was $18.4 billion and the System had accumulated assets of $12.0 billion for that obligation leaving an unfunded actuarial accrued liability of $6.4 billion. The $6.4 billion unfunded actuarial accrued liability is a decrease from the 2016 unfunded actuarial accrued liability of $7.8 billion. The decrease consists of two components. Favorable investment results and continued savings from plan design changes reduced the 2016 liability by $2.5 billion. This decrease was offset by a $1.0 billion increase in the liability due to a change in the discount rate from 6.5% to 6.0%. Similarly, the funded ratio improved from 60.7% at the end of 2016 to 69.1% in 2017, but was reduced to 65.4% after the change in discount rate.
- Health care coverage is not statutorily guaranteed, and is subordinate to pension funding. In 2018, based on the pension funding status, OPERS increased the portion of the 14% employer contribution rate allocated to pension funding from 13% in 2017 to the full 14%. Correspondingly, the portion of the 14% employer contribution rate allocated to health care funding decreased from 1% in 2017 to zero percent in 2018. This allocation is expected to continue until the pension funding improves. The funding progress of health care is measured in terms of solvency years, or the number of years funds are projected to be available to pay health care expenses under the current plan design before health care would be reduced to a pay-as-you-go basis. As of December 31, 2017, the date of the latest health care actuarial valuation under the Funding Basis, health care funding is expected to remain solvent for 13 years. Refer to Table 3, on the previous page, for a comparative history of actuarial liabilities and solvency years for health care.

Analysis of Financial Activities

The OPERS funding objective is to meet long-term benefit obligations with investment income and contributions. The following discussion provides an analysis of the current-year financial activities. Comparative data is presented, where appropriate.

Additions to Fiduciary Net Position (Revenues)

The reserves needed to finance retirement benefits are accumulated primarily through the collection of member and employer contributions, and through investment income (net of investment expense). Revenues (Additions to Fiduciary Net Position) for the year 2018 were $0.3 billion, and include member and employer contributions of $3.5 billion, net loss from investment activities of $3.3 billion and other income totaling approximately $0.1 billion. Other income consists of purchased service agreements, employer interest and penalty charges, vendor performance guarantees, settlements, interplan activities, and miscellaneous other income or expense. Interplan Activity in Table 4 represents transactions between plans that are additions to plan assets. Additions to plan net position for the year 2017 were $18.1 billion, comprised of $3.4 billion in contribution revenues, $14.6 billion in net income from investment activities, and other income totaling approximately $0.1 billion. Refer to Table 4 for a comparative history of Additions to Fiduciary Net Position.

Additions to Fiduciary Net Position (Revenues) (for the years ended December 31, 2018 and 2017) **Table 4**

	2018	2017	Amount Increase/ (Decrease) from 2017 to 2018	Percent Increase/ (Decrease) from 2017 to 2018
Member Contributions	$1,455,771,629	$1,421,754,296	$34,017,333	2.4%
Employer Contributions	2,037,635,971	1,989,941,685	47,694,286	2.4
Contract and Other Receipts	81,169,718	93,061,535	(11,891,817)	(12.8)
Other Income, net	2,844,546	2,641,100	203,446	7.7
Interplan Activity	25,435,260	20,961,756	4,473,504	21.3
Net Income/(Loss) from Investing Activity	(3,350,345,567)	14,619,914,555	(17,970,260,122)	(122.9)
Total Additions	**$252,511,557**	**$18,148,274,927**	**($17,895,763,370)**	**(98.6%)**

Member and employer contributions for 2018, compared to 2017, increased by $81.7 million, or 2.4%. Member and employer contributions include amounts paid by active members and their employers for future retirement benefits. In general, as wages start to rise, the retirement contributions from active members, and their employers, also increase. These contributions can also be influenced by the number of active members that move to retirement. The 2018 increase in contributions is comparable to the 2017 increase in contributions of 2.5% and largely reflects the impact of wage increases.

Contracts and Other Receipts represents funds received for member purchase of service contracts, employer early retirement incentive programs, and funds received from other Ohio retirement systems for members with service credit under more than one retirement system. These receipts totaled $81.2 million in 2018, compared to $93.1 million received in 2017. This net decrease of $11.9 million is mainly comprised of a decrease of $8.4 million in retirement transfers from other Ohio retirement systems for members selecting a joint retirement option, $2.9 million decrease of purchases of service, $1.3 million decrease in delinquent contributions received, and $3.5 million decrease of early retirement incentive contributions, offset by an increase of $4.2 million in alternative retirement plan contributions due to an increase in the assessed mitigating rate from 1.5% in 2017 to 2.0% in 2018.

Other Income, net, is comprised of miscellaneous proceeds, gains or losses on the disposal of fixed assets and litigation settlements activity. Other income for 2018 was $2.8 million compared to $2.6 million in 2017. This activity typically fluctuates from year-to-year. In 2017, a favorable litigation settlement for $1.2 million is reflected in the other income amount, along with other miscellaneous receipts. In 2018, favorable litigation settlements for $1.3 million are reflected in the other income amount, along with other miscellaneous receipts.

Interplan Activity represents transfers to record activity occurring between the plans. This activity includes members changing from one plan to another. Interplan Activity in 2018 resulted in a net inflow of $25.4 million, compared to $21.0 million in 2017. Since this activity represents payments between plans, there is a corresponding interplan expense activity of the same amount in each year. (Refer also to the Deductions from Fiduciary Net Position discussion beginning on the next page.)

Net Income/(Loss) from Investing Activity represents total investment income/loss net of external management fees and administrative expenses. Investment income includes dividends, interest, and gains or losses on the sale of investments. OPERS reflects both income and management fees from external managers in this category.

Investment Administrative Expenses includes investment-specific expenses such as staff wages, professional services contracted by the Board, legal services and a share of the OPERS facility and operational costs. For a discussion on current-year activity within Net Income/(Loss) from Investing Activity, refer to the Financial Highlights section on page 28.

Deductions from Fiduciary Net Position (Expenses)

OPERS was created to provide retirement, survivor, and disability benefits to qualified members and their beneficiaries. The cost of such programs includes recurring benefit payments, elective refunds of contributions to members who terminate employment with a participating employer, and the cost of administering the System.

Expenses (Deductions from Fiduciary Net Position) for 2018 were $7.5 billion, an increase of $0.2 billion, or 2.8%, compared to 2017. Pension benefits and health care expenses comprise $7.0 billion and $6.8 billion in 2018 and 2017, respectively. Included within health care costs are $250.0 million and $242.7 million in 2018 and 2017, respectively, in health care-related receipts netted against health care expenses. Refunds of member contributions, including interest and additional payments on withdrawal where required by statute, fluctuate each year, but were $453.4 million in 2018, or 2.3% higher than 2017. Non-investment related administrative expenses decreased by $0.4 million to $76.9 million and represent 1.0% of the total expenses. Pension benefits and health care expenses paid on behalf of current retirees and their beneficiaries comprise approximately 92.6% of the total expenses reported. The remaining expenses are comprised of interplan activity transactions representing the expenses associated with members changing from one plan to another. Refer to Table 5, below, for a comparative history of Deductions from Fiduciary Net Position.

Deductions from Fiduciary Net Position (Expenses) (for the years ended December 31, 2018 and 2017) **Table 5**

	2018	2017	Amount Increase/ (Decrease) from 2017 to 2018	Percent Increase/ (Decrease) from 2017 to 2018
Benefits—Pension	$6,109,237,279	$5,839,789,809	$269,447,470	4.6%
Benefits—Health Care Expenses	870,284,919	952,001,573	(81,716,654)	(8.6)
Refunds	453,441,020	443,220,698	10,220,322	2.3
Administrative Expenses	76,875,303	77,305,480	(430,177)	(0.6)
Interplan Activity	25,435,260	20,961,756	4,473,504	21.3
Total Deductions	**$7,535,273,781**	**$7,333,279,316**	**$201,994,465**	**2.8%**

Pension benefits totaled $6.1 billion in 2018, an increase of $0.3 billion, or 4.6%, over 2017 benefits. This increase is comparable to the increase in 2017 from 2016 of 4.5%. The increase in 2018 reflects the combination of a net growth of 1.0% in the total number of retirees and beneficiaries receiving benefits, an annual simple cost-of-living adjustment granted on the retirees benefit anniversary, and demographic changes in the retiree population. As expected, with the majority of the 2012 changes to both pension and health care fully implemented, members are opting to work longer and the growth in new retirees is declining. The 8,352 new retirees in 2018 is less than the most recent 10-year average of 10,429. The cost of retirements will continue to increase as newer retirees with higher FAS replace deceased long-time retirees with lower FAS. The cumulative increase associated with the cost-of-living adjustments was $1.3 billion at the end of 2018. Refer to the Schedules of Average Benefits on page 204 of the Statistical Section for details related to the new retiree populations by year. Also refer to the Plan Statement beginning on page 217 for details on pension benefits.

Total health care expenses decreased by $81.7 million, or 8.6%, to $870.3 million in 2018, compared to 2017. Approximately $7.3 million of this decrease is related to the implementation of GASB 74 in 2017, which requires health care receipts, or payments, from retirees and health care vendors to OPERS, offset the related health care expenses incurred by OPERS during the year. In 2018, health care expenses were reduced by $250.0 million, compared to $242.7 million in 2017, including retiree-paid health care premiums, prescription rebates and federal subsidies. The remaining majority of the decrease reflects the continued savings from changes to the health care plan approved in 2012.

More than half of the health care expenses are comprised of medical, dental, vision, and prescription drug costs, as well as reimbursements to retirees for Medicare Part A premiums. Medical, dental, vision and disease-management costs, netted against health care receipts, represent approximately 35% of the total health care expenses for 2018 and 2017. Prescription drug costs comprised 16% of total health care expenses in 2018 and 2017. Medicare Part A premium reimbursements were approximately 3%, an increase from the 2% Medicare Part A premium reimbursement in 2017. Retirees who did not contribute to Medicare during their career, and to a lesser extent their spouses, may receive reimbursement of their Medicare Part A premium to qualify for participation in the Connector.

OPERS provides self-insured group health care and prescription drug plans for non-Medicare eligible recipients and their eligible dependents. Costs in self-insured plans will fluctuate based on overall market costs from claims experience, catastrophic claims and processing timing. The overall number of retirees and dependents in health care plans in 2018 decreased by 4.2%. As anticipated with the phase-out of spousal health care subsidy, the number of spouses and other dependents enrolled in OPERS coverage decreased by almost 6,000, or 13.7%, in 2017 and by an additional 4,700, or 12.9%, in 2018. Correspondingly, OPERS' total non-Medicare eligible medical (includes medical, dental, vision and disease management) health care cost decreased by 9.6% to $303.0 million (after netting $250.0 million in health care-related receipts against the costs), compared to $335.2 million in 2017 (after netting $242.7 million in health care-related receipts against the costs). Prescription drug costs decreased 7.9% to $136.6 million in 2018, compared to $148.3 million in 2017.

Beginning January 1, 2016, Medicare-enrolled retirees have the opportunity to select supplemental coverage through the Connector and may receive a deposit into an HRA account to be used for reimbursement of qualified health care expenses. In 2018, reimbursements of qualified medical expenses through the HRA for retirees and their qualified dependents decreased by 5.7% to $399.3 million, compared to 2017, as claims paid during 2018 decreased compared to 2017. Reimbursements of qualified medical expenses from health care accounts for Member-Directed Plan participants decreased by 36.7% to $4.1 million in 2018, compared to 2017, as claims paid during 2018 decreased compared to 2017. In addition, OPERS closed the wellness retiree medical account plan at the end of 2016 and transferred balances to the HRA for members with accounts in both plans starting in 2017. For those without an HRA, OPERS initiated automatic reimbursements of premiums paid to OPERS through pension deduction. These efforts resulted in an increase in the reimbursement of qualified medical expenses from the wellness accounts of $8.0 million in 2017, an increase of 115.1% over 2016. Premiums paid and transfer of balances to the HRA for 2018 totaled $1.6 million, a decrease of 89.3% from 2017 activity. For more information on activity in member health care accounts, refer to the table on page 192 of the Statistical Section.

Refunds of member accounts are at the discretion of the member, and vary from year-to-year. Members may refund their account if they have been separated from OPERS-covered employment for at least two months. However, upon retirement or termination, Combined Plan and Member-Directed Plan participants may choose to annuitize their benefit, receive a refund of their account balance or transfer their account balance to another organization. In 2018, member-elected refunds totaled $453.4 million, compared to $443.2 million in 2017. Accordingly, refunds represent disbursements of inactive member accounts. The number of refunded accounts of 24,429, in 2018, decreased by 3.7% when compared to 2017. However, the average member balance refunded in 2018 was approximately $18,600, compared to the 2017 average of approximately $17,500.

OPERS has consistently managed its administrative expense budget with no material variances in either 2018 or 2017. Administrative Expenses shown in Table 5 on page 33 do not include investment administrative expenses. Administrative Expenses totaled $76.9 million in 2018 compared to $77.3 million in 2017. The decrease in 2018 Administrative Expenses mainly includes staff savings from process automation included in the implementation of new technology.

Net Position Summary

Net position may serve over time as a useful indicator of OPERS' financial status (please refer to Table 6). At the close of calendar years 2018 and 2017, the net positions of OPERS totaled $94.1 billion and $101.4 billion, respectively. These plan net positions are available to meet OPERS ongoing obligations to plan participants and their beneficiaries, and to the extent possible, OPERS post-employment health care.

Net Position (as of December 31, 2018 and 2017) **Table 6**

	2018	2017	Amount Increase/ (Decrease) from 2017 to 2018	Percent Increase/ (Decrease) from 2017 to 2018
Current and Other Assets	$890,923,998	$1,114,376,196	($223,452,198)	(20.1%)
Cash and Investments at Fair Value	102,134,370,442	108,918,934,157	(6,784,563,715)	(6.2)
Capital Assets	127,110,017	131,801,306	(4,691,289)	(3.6)
Total Assets	**103,152,404,457**	**110,165,111,659**	**(7,012,707,202)**	**(6.4)**
Total Liabilities	**9,009,346,845**	**8,739,291,823**	**270,055,022**	**3.1**
Net Position, End of Year	**94,143,057,612**	**101,425,819,836**	**(7,282,762,224)**	**(7.2)**
Net Position, Beginning of Year	101,425,819,836	90,610,824,225	10,814,995,611	11.9
Net Increase/(Decrease) in Net Position	**($7,282,762,224)**	**$10,814,995,611**	**($18,097,757,835)**	**(167.3%)**

Summary

OPERS remains dedicated to keeping this System strong today and well into the future. OPERS continues to proactively manage the System in a manner that addresses issues and trends in a timely manner; thus contributing to the strength of the System. The funding levels and 2018 results are found, in detail, and by category, in this annual report.

Combining Statement of Fiduciary Net Position (as of December 31, 2018)

	Pension		
	Traditional Pension Plan	Combined Plan	Member-Directed Plan
Assets			
Cash and Cash Equivalents	**$3,374,454,554**	**$16,264,772**	**$255,302**
Receivables			
Members and Employers	265,651,566	8,550,299	9,766,461
Vendor and Other	1,541,186		
Investment Sales Proceeds	261,473,164	1,950,310	501,006
Accrued Interest and Dividends	239,821,043	1,576,032	57,112
Total Receivables	**768,486,959**	**12,076,641**	**10,324,579**
Investments			
Fixed Income	19,751,240,130	264,347,879	259,164,262
Domestic Equities	14,048,134,275	338,469,057	468,866,391
Real Estate	8,007,943,299	52,625,803	1,907,045
Private Equity	9,554,191,160	62,787,281	2,275,275
International Equities	14,011,707,958	212,072,476	230,267,143
Other Investments	11,866,003,831	77,979,821	2,825,820
Total Investments	**77,239,220,653**	**1,008,282,317**	**965,305,936**
Collateral on Loaned Securities	**8,116,371,929**	**52,042,473**	**1,997,738**
Capital Assets			
Land	2,626,888	82,647	82,550
Building and Building Improvements	77,982,471	2,453,477	2,450,607
Furniture and Equipment	112,277,427	4,402,775	3,320,709
Total Capital Assets	192,886,786	6,938,899	5,853,866
Accumulated Depreciation	(96,052,554)	(3,033,095)	(3,096,615)
Net Capital Assets	**96,834,232**	**3,905,804**	**2,757,251**
Prepaid Expenses and Other Assets	**2,062,788**		
TOTAL ASSETS	**89,597,431,115**	**1,092,572,007**	**980,640,806**
Liabilities			
Undistributed Deposits	2,490,097		
Benefits Payable	840,787		
Investment Commitments Payable	588,145,541	4,460,993	1,266,996
Accounts Payable and Other Liabilities	15,744,793		
Obligations Under Securities Lending	8,113,604,843	52,021,052	1,996,916
TOTAL LIABILITIES	**8,720,826,061**	**56,482,045**	**3,263,912**
Net Positions Held in Trust for Pension Benefits and Post-employment Health Care	**$80,876,605,054**	**$1,036,089,962**	**$977,376,894**

See Notes to Combining Financial Statements, beginning on page 40.

(continued from page 36)

115 Health Care Trust	Total Pension and Health Care
$595,183,342	**$3,986,157,970**
2,016,190	285,984,516
12,173,150	13,714,336
38,943,225	302,867,705
44,840,466	286,294,653
97,973,031	**888,861,210**
4,117,147,799	24,391,900,070
2,911,258,188	17,766,727,911
	8,062,476,147
	9,619,253,716
2,240,589,009	16,694,636,586
1,495,996,430	13,442,805,902
10,764,991,426	**89,977,800,332**
	8,170,412,140
942,728	3,734,813
27,986,068	110,872,623
32,854,966	152,855,877
61,783,762	267,463,313
(38,171,032)	(140,353,296)
23,612,730	**127,110,017**
	2,062,788
11,481,760,529	**103,152,404,457**
214,798	2,704,895
119,532,084	120,372,871
109,027,945	702,901,475
	15,744,793
	8,167,622,811
228,774,827	**9,009,346,845**
$11,252,985,702	**$94,143,057,612**

Combining Statement of Changes in Fiduciary Net Position (for the year ended December 31, 2018)

	Pension		
	Traditional Pension Plan	Combined Plan	Member-Directed Plan
Additions			
Member Contributions	$1,354,235,298	$43,054,163	$58,482,168
Employer Contributions	1,895,462,837	60,249,275	58,482,191
Contract and Other Receipts	79,562,553	515,564	812,423
Other Income, net	2,112,353		
Interplan Activity	25,435,260		
Total Non-investment Income	**3,356,808,301**	**103,819,002**	**117,776,782**
Income/(Loss) from Investing Activities			
Net Decrease in the Fair Value of Investments	(5,188,264,525)	(72,509,243)	(72,625,894)
Bond Interest	902,547,770	6,628,338	1,758,699
Dividends	274,105,675	1,144,774	115,113
Real Estate Operating Income, net	401,569,347	2,010,706	77,187
International Income	2,526,763	16,202	622
Other Investment Income	1,644,955,880	9,005,042	345,688
External Asset Management Fees	(563,279,040)	(789,925)	(403,102)
Net Investment Loss	**(2,525,838,130)**	**(54,494,106)**	**(70,731,687)**
From Securities Lending Activity			
Securities Lending Income	215,997,139	1,384,982	53,165
Securities Lending Expenses	(178,570,808)	(1,145,003)	(43,953)
Net Securities Lending Income	37,426,331	239,979	9,212
Unrealized Gains	603,889	9,655	384
Net Income from Securities Lending	**38,030,220**	**249,634**	**9,596**
Investment Administrative Expenses	(36,406,001)	(378,130)	(377,283)
Net Loss from Investing Activity	**(2,524,213,911)**	**(54,622,602)**	**(71,099,374)**
TOTAL ADDITIONS	**832,594,390**	**49,196,400**	**46,677,408**
Deductions			
Benefits	6,101,603,746	4,489,811	3,143,722
Refunds of Contributions	388,067,394	16,808,080	48,565,546
Administrative Expenses	52,169,220	2,730,700	2,368,980
Interplan Activity		11,495,876	13,939,384
TOTAL DEDUCTIONS	**6,541,840,360**	**35,524,467**	**68,017,632**
Net Increase/(Decrease)	(5,709,245,970)	13,671,933	(21,340,224)
Net Positions Held in Trust for Pension Benefits and Post-employment Health Care			
Balance, Beginning of Year	86,585,851,024	1,022,418,029	998,717,118
Balance, End of Year	**$80,876,605,054**	**$1,036,089,962**	**$977,376,894**

See Notes to Combining Financial Statements, beginning on page 40.

(continued from page 38)

115 Health Care Trust	Total Pension and Health Care
	$1,455,771,629
$23,441,668	2,037,635,971
279,178	81,169,718
732,193	2,844,546
	25,435,260
24,453,039	**3,602,857,124**
(862,731,054)	(6,196,130,716)
108,077,693	1,019,012,500
88,148,545	363,514,107
	403,657,240
398,457	2,942,044
293,975	1,654,600,585
(28,772,749)	(593,244,816)
(694,585,133)	**(3,345,649,056)**
	217,435,286
	(179,759,764)
	37,675,522
	613,928
	38,289,450
(5,824,547)	(42,985,961)
(700,409,680)	**(3,350,345,567)**
(675,956,641)	**252,511,557**
870,284,919	6,979,522,198
	453,441,020
19,606,403	76,875,303
	25,435,260
889,891,322	**7,535,273,781**
(1,565,847,963)	(7,282,762,224)
12,818,833,665	101,425,819,836
$11,252,985,702	**$94,143,057,612**

1. Description of OPERS

a. **Organization**—The Ohio Public Employees Retirement System (OPERS or System) is a cost-sharing, multiple-employer public employee retirement system comprised of three separate pension plans: the Traditional Pension Plan, a defined benefit plan; the Combined Plan, a combination defined benefit/defined contribution plan; and the Member-Directed Plan, a defined contribution plan. OPERS is a qualified governmental plan under Section 401(a) of the Internal Revenue Code (IRC). OPERS is administered in accordance with Chapter 145 of the Ohio Revised Code (ORC). All state and local governmental employees in Ohio, except those covered by one of the other state or local retirement systems in Ohio, are members of OPERS. New public employees (those who establish membership in OPERS on or after January 1, 2003) have 180 days from the commencement of employment to select membership in one of the three pension plans. Contributions to OPERS are effective with the first day of the member's employment. Contributions made prior to the member's plan selection are maintained in the Traditional Pension Plan and later transferred to the plan elected by the member, as appropriate.

The OPERS health care plans are reported as other post-employment benefit plans (OPEB) based on the criteria established by the Governmental Accounting Standards Board (GASB). Periodically, OPERS modifies the health care program design to improve the ongoing solvency of the plans. Eligibility requirements for access to the OPERS health care options has changed over the history of the program for Traditional Pension Plan and Combined Plan members. Prior to January 1, 2015, 10 or more years of service were required to qualify for health care coverage. Beginning January 1, 2015, generally, members must be at least age 60 with 20 years of qualifying service credit to qualify for health care coverage or 30 years of qualifying service at any age. Beginning 2016, Traditional Pension Plan and Combined Plan retirees enrolled in Medicare A and B were eligible to participate in the OPERS Medicare Connector (Connector). The Connector, a vendor selected by OPERS, assists eligible retirees in the selection and purchase of Medicare supplemental coverage through the Medicare market. Retirees who purchase supplemental coverage through the Connector may receive a monthly allowance in their health reimbursement arrangement (HRA) account that can be used to reimburse eligible health care expenses. Upon termination or retirement, Member-Directed Plan participants can use vested retiree medical account (RMA) funds for reimbursement of qualified medical expenses. Members who elect the Member-Directed Plan after July 1, 2015 will vest in the RMA over 15 years at a rate of 10% each year starting with the sixth year of participation. Members who elected the Member-Directed Plan prior to July 1, 2015, vest in the RMA over a five-year period at a rate of 20% per year. Please see the Plan Statement beginning on page 217 for additional details. Health care coverage is neither guaranteed nor statutorily required.

OPERS maintains one health care trust, the 115 Health Care Trust (115 Trust), which was established in 2014 to initially provide a funding mechanism for the HRA, as the prior trust structure, the 401(h) Health Care Trust (401(h) Trust) and the Voluntary Employees' Beneficiary Association Trust (VEBA Trust), could not legally support the HRA. In March 2016, OPERS received two favorable rulings from the Internal Revenue Service (IRS) allowing OPERS to consolidate health care assets into the 115 Trust. The 401(h) Trust was a pre-funded trust that provided health care funding for eligible members of the Traditional Pension Plan and the Combined Plan through December 31, 2015, when plans funded through the 401(h) Trust were terminated. The VEBA Trust accumulated funding for RMAs for participants in the Member-Directed Plan through June 30, 2016. The 401(h) Trust and the VEBA Trust were closed as of June 30, 2016 and the net positions transferred to the 115 Trust on July 1, 2016. Beginning 2016, the 115 Trust, established under IRC Section 115, is the funding vehicle for all health care plans.

The accompanying financial statements comply with the provisions of GASB Statement No. 14, *The Financial Reporting Entity*, and with the provisions of GASB Statement No. 39, *Determining Whether Certain Organizations Are Component Units—an amendment of GASB Statement No. 14*. These statements require that financial statements of the reporting entity include all the organizations, activities, functions and component units for which the reporting entity is financially accountable. Financial accountability is defined as the appointment of a voting majority of the component unit's board of directors and either (1) the reporting entity's ability to impose its will over the component unit, or (2) the possibility that the component unit will provide a financial benefit to, or impose a financial burden on, the reporting entity. OPERS does not have financial accountability over any entities.

Individual audited financial statements, as of and for the year ended December 31, 2018, for each of the following plans and trusts as presented in the Combining Statements of Fiduciary Net Position and Changes in Fiduciary Net Position, were issued:

- Combined Plan
- Member-Directed Plan
- 115 Health Care Trust

OPERS is not part of the state of Ohio financial-reporting entity, nor is OPERS a component unit of the state of Ohio. Responsibility for the organization is vested in the OPERS Board of Trustees; there is no financial interdependency with the state of Ohio. The Board is the governing body of OPERS, with responsibility for administration and management. Of the Board, seven members are elected by the group they represent: the retirees (two representatives), employees of the state, employees of counties, employees of municipalities, non-teaching employees of state colleges and universities and miscellaneous employees. The remaining four members are appointed or designated by position. The Governor, General Assembly and the Treasurer of the state of Ohio each appoint a Board member. The Director of the Ohio Department of Administrative Services completes the Board.

The Board appoints the Executive Director, an actuary, investment consultants and other consultants necessary for the transaction of business. The Board typically meets monthly and receives no compensation, but is reimbursed for necessary expenses.

Plan membership—All state and local governmental employees, except those covered by another state retirement system in Ohio or the Cincinnati Retirement System, are required to become contributing members of OPERS when they begin public employment unless they are exempted or excluded as defined by the ORC. For actuarial purposes, employees who have earned sufficient service credit (five years) are entitled to a future retirement benefit from OPERS. Employer, employee and retiree data as of December 31, 2018 is found on the next page.

Plan Membership

As of December 31, 2018	Traditional Pension Plan	Combined Plan[1]	Member-Directed Plan	115 Health Care Trust[2] Traditional Pension and Combined Plans Retiree-Sponsored Programs	115 Health Care Trust[2] Member-Directed Plan Retiree-Sponsored Program	2018 Total
Employer Units						**3,693**
State Division						247
Local Division						3,210
Law Enforcement and Public Safety Divisions						236
Retirees and Inactive Members—Defined Benefit Pension						**843,484**
Retirees and Primary Beneficiaries currently receiving benefits	212,338	337	278			212,953
Dependents and Other Beneficiaries currently receiving benefits	7,585	229	2			7,816
Inactive Members eligible for, but not yet receiving benefits[3]	9,070	94				9,164
Inactive Members not yet age-eligible for benefits[3]	28,167	695				28,862
Inactive Members eligible for refund value of account only[3]	583,335	1,354				584,689
Retirees and Inactive Members—Defined Contribution Accounts						**5,385**
Retirees currently receiving benefits		4	5			9
Inactive Members			5,376			5,376
Retirees and Inactive Members—Health Care						**187,203**
Retirees and Primary Beneficiaries currently receiving benefits				146,410	6,660	153,070
Dependent and Other Beneficiaries currently receiving benefits				31,670		31,670
Inactive Members eligible for, but not yet receiving, benefits				2,463		2,463
Active Employees						**303,920**
State Division	98,847	2,815	3,848			105,510
Local Division	178,559	4,878	6,892			190,329
Law Enforcement Division	8,019					8,019
Public Safety Division	62					62

[1] Combined Plan members receiving a defined formula benefit may also be receiving a distribution of their defined contribution account, therefore may be counted more than once in this table.

[2] All health care coverage is funded through the 115 Health Care Trust. This table reflects the breakout of health care programs between those supporting members in the Traditional Pension Plan and Combined Plan, and a separate column for the Member-Directed Plan.

[3] Inactive members with at least five years of service are eligible for a retirement benefit at the age of 60. Inactive members with less than five years of service are eligible for a refund of account. Inactive members with five or more years of service are displayed based on their age eligibility for a retirement benefit as of the end of the year.

b. **Benefits**—All benefits of the System, and any benefit increases are established by the legislature pursuant to ORC Chapter 145. The Board, pursuant to ORC Chapter 145, has elected to maintain funds to provide health care coverage to eligible Traditional Pension Plan and Combined Plan retirees and survivors of members. Health care coverage does not vest and is not required under ORC Chapter 145. As a result, coverage may be reduced or eliminated at the discretion of the Board.

- ***Age-and-Service Defined Benefits***—Effective January 7, 2013, Senate Bill (SB) 343 modified components of the Traditional Pension Plan and Combined Plan. Members were impacted (to varying degrees) by the changes based on their transition group. Three transition groups (A, B and C) were designed to ease the transition for key components of the pension plan changes. Members who were eligible to retire under law in effect prior to SB 343, or will be eligible to retire no later than five years after January 7, 2013, comprise transition Group A. Members who have at least 20 years of service credit prior to January 7, 2013, or will be eligible to retire no later than 10 years after January 7, 2013, are included in transition Group B. Group C included those members who are not in either of the other groups and members who were hired on or after January 7, 2013. Please see the Plan Statement for additional details.

Benefits in the Traditional Pension Plan for State and Local members are calculated on the basis of age, final average salary (FAS), and service credit. State and Local members in transition Groups A and B are eligible for retirement benefits at age 60 with five years of service credit or at age 55 with 25 or more years of service credit. Group C for State and Local is eligible for retirement benefits at age 57 with 25 years of service or at age 62 with five years of service. For Groups A and B, the annual benefit is based on 2.2% of FAS multiplied by the actual years of service for the first 30 years of service credit and 2.5% for years of service in excess of 30 years. For Group C, the annual benefit applies a factor of 2.2% for the first 35 years and a factor of 2.5% for the years of service in excess of 35. FAS represents the average of the three highest years of earnings over a member's career for Groups A and B. Group C is based on the average of the five highest years of earnings over a member's career. Refer to the age-and-service tables located in the Plan Statement beginning on page 217 for additional information regarding the requirements for reduced and unreduced benefits. Members who retire before meeting the age and years of service credit requirement for unreduced benefits, receive a percentage reduction in the benefit amount. The base amount of a member's pension benefit is locked in upon receipt of the initial benefit payment for calculation of an annual cost-of-living adjustment.

Effective January 1, 2001, House Bill 416 divided the OPERS Law Enforcement Program into two separate divisions: Law Enforcement and Public Safety. Both groups of members, as defined in ORC Chapter 145, and updated in House Bill 520, are eligible for special retirement options under the Traditional Pension Plan and are not eligible to participate in the Member-Directed Plan or Combined Plan. Public Safety members may file an application for full retirement benefits at age 48 or older with 25 or more years of credited service or 52 or older with 15 or more years of credited service for Groups A and B. Public Safety Group C is eligible for benefits at age 52 or older with 25 years or at age 56 or older with 15 years. Those members classified as Law Enforcement officers are eligible for full retirement at age 52 or older with 15 or more years of credited service for Group A. Law Enforcement Group B is eligible at age 48 or older with 25 years or at age 52 or older with 15 years of service. Law Enforcement Group C is eligible at age 48 or older with 25 years of service or at age 56 with 15 years of service. Annual benefits under both divisions are calculated by multiplying 2.5% of FAS by the actual years of service for the first 25 years of service credit, and 2.1% of FAS for each year of service over 25 years. These options also permit early retirement under qualifying circumstances as early as age 48 with a reduced benefit.

Prior to 2000, payments to OPERS benefit recipients were limited under Section 415(b) of the IRC. OPERS entered into a Qualified Excess Benefit Arrangement (QEBA) with the IRS to allow OPERS benefit recipients to receive their full statutory benefit even when the benefit exceeds IRC 415(b) limitations. Monthly QEBA payments start when the total amount of benefits received by the recipients exceeds the IRC limit each year. The portion of the benefit in excess of the IRC 415(b) limit is paid out of the QEBA and taxed as employee payroll in accordance with IRS regulations.

Benefits in the Combined Plan consist of both an age-and-service formula benefit (defined benefit) and a defined contribution element. The defined benefit element is calculated on the basis of age, FAS, and years of service. Eligibility regarding age and years of service in the Combined Plan is the same as the Traditional Pension Plan. The benefit formula for the defined benefit component of the plan for State and Local members in transition Groups A and B applies a factor of 1.0% to the member's FAS for the first 30 years of service. A factor of 1.25% is applied to years of service in excess of 30. The benefit formula for transition Group C applies a factor of 1.0% to the member's FAS for the first 35 years of service and a factor of 1.25% is applied to years in excess of 35. Persons retiring before age 65 with less than 30 years of service credit receive a percentage reduction in benefit. The defined contribution portion of the benefit is based on accumulated member contributions plus or minus any investment gains or losses on those contributions.

- ***Defined Contribution Benefits***—Defined contribution plan benefits are established in the plan documents, which may be amended by the Board. Member-Directed Plan and Combined Plan members who have met the retirement eligibility requirements may apply for retirement benefits. The amount available for defined contribution benefits in the Combined Plan consists of the member's contributions plus or minus the investment gains or losses resulting from the member's investment selections. Combined Plan members wishing to receive benefits must meet the requirements for both the defined benefit and defined contribution plans. Member-Directed participants must have attained the age of 55, have money on deposit in the defined contribution plan and have terminated public service to apply for retirement benefits. The amount available for defined contribution benefits in the Member-Directed Plan consists of the members' contributions, vested employer contributions and investment gains or losses resulting from the members' investment selections. Employer contributions and associated investment earnings vest over a five-year period, at a rate of 20% each year. At retirement, members may select one of several distribution options for payment of the vested balance in their individual OPERS accounts. Options include the annuitization of their benefit (which includes joint and survivor options), partial lump-sum payments (subject to limitations), a rollover of the vested account balance to another financial institution, receipt of entire account balance, net of taxes withheld, or a combination of these options.

- ***Early Retirement Incentive Plan (ERIP)***—Employers under OPERS may establish an early retirement incentive plan by purchasing service credit for eligible employees. To be eligible, employees must be able to retire under existing plan provisions after the purchase of the additional credit. Electing employers must contribute all such additional costs as are actuarially determined to fund the benefit. Such a plan, if adopted by an employer, must be offered to a minimum of 5% of covered employees, and may provide for the purchase of up to five years of service credit, limited to a maximum of 20% of the member's total service credit. Members electing to participate in the employer's plan must retire within 90 days of receiving notice of the purchased service or the service is withdrawn and refunded to the employer.

  Employers offering an ERIP may choose to pay the full cost of the additional benefits at the time the plan is adopted, or elect an installment payment plan. The required contributions are recognized in full by OPERS in the year in which the payment plan becomes effective. In addition, interest is charged annually on the unpaid balance.

- ***Disability Benefits***—OPERS administers two disability plans for participants in either the Traditional Pension Plan or Combined Plan. Members in the plan as of July 29, 1992, could elect, by April 7, 1993, coverage under either the original plan or the revised plan. All members who entered the System after July 29, 1992 are automatically covered under the revised plan. Under the original plan, a member who becomes disabled before age 60 and has completed 60 contributing months is eligible for a disability benefit. Benefits are funded by the employee and employer contributions and terminate if the member is able to return to work. The revised plan differs in that a member who becomes disabled at any age with 60 contributing months will be eligible for disability benefits until a determined age. The benefit is funded by reserves accumulated from employer contributions. After the disability benefit ends, the member may apply for a service retirement benefit or a refund of contributions, which are not reduced by the amount of disability benefits received. Law Enforcement officers are immediately eligible for disability benefits if disabled by an on-duty illness or injury. Members participating in the Member-Directed Plan are not eligible for disability benefits.

- ***Survivor Benefits***—Dependents of deceased members who participated in either the Traditional Pension Plan or the Combined Plan may qualify for survivor benefits if the deceased employee had at least one and a half years of service credit with the plan, and at least one quarter year of credit within the two and one-half years prior to the date of death. ORC Chapter 145, updated by House Bill 520, specifies the dependents and the conditions under which they qualify for survivor benefits. Qualified survivors of Law Enforcement and Public Safety officers are eligible for survivor benefits immediately upon employment.
- ***Health Care Coverage***—The ORC permits, but does not require, OPERS to offer post-employment health care coverage. The ORC allows a portion of the employers' contributions to be used to fund health care coverage. The health care portion of the employer contribution rate for the Traditional Pension Plan and Combined Plan is comparable, as the same coverage options are provided to participants in both plans.

  Prior to January 1, 2015, the System provided comprehensive health care coverage to retirees with 10 or more years of qualifying service credit and offered coverage to their dependents on a premium deduction or direct bill basis. Beginning January 1, 2015, the service eligibility criteria for health care coverage increased from 10 years to 20 years with a minimum age of 60, or, generally, 30 years of qualifying service at any age. Beginning with January 2016 premiums, Medicare-enrolled retirees could select supplemental coverage through the Connector, and may be eligible for monthly allowances deposited to an HRA to be used for reimbursement of eligible health care expenses. Coverage for non-Medicare retirees includes hospitalization, medical expenses and prescription drugs. The System determines the amount, if any, of the associated health care costs that will be absorbed by the System and attempts to control costs by using managed care, case management and other programs. Additional details on health care coverage can be found in the Plan Statement beginning on page 217.

  Participants in the Member-Directed Plan are not eligible for health care coverage offered to benefit recipients in the Traditional Pension Plan and Combined Plan. A portion of employer contributions for these participants is allocated to an RMA. Upon separation or retirement, participants may be reimbursed for qualified medical expenses from these accounts.

  An additional RMA was also established several years ago when three health care coverage levels were available to retirees. Monthly allowance amounts in excess of the cost of the retiree's selected coverage were notionally credited to the retiree's RMA. Retirees and their dependents could seek reimbursement from the RMA balances for qualified medical expenses. In 2013, the number of health care options available to retirees was reduced from three to one, eliminating the majority of deposits to the RMA. Wellness incentive payments were the only remaining deposits made to this RMA. Wellness incentives are no longer awarded starting with the 2017 plan year. These RMA balances were transferred to the HRA for retirees with both types of accounts. In addition, OPERS initiated an automatic claims payment process for reimbursements for retiree health care costs paid through pension deduction. This process will reimburse members for eligible health care premiums paid to OPERS, currently through pension deduction, up to the member's available RMA balance.

- ***Other Benefits***—Once a benefit recipient retiring under the Traditional Pension Plan has received benefits for 12 months, current law provides for an annual cost-of-living adjustment. This cost-of-living adjustment is calculated on the member's base retirement benefit at the date of retirement and is not compounded. Members retiring under the Combined Plan receive a cost-of-living adjustment on the defined benefit portion of their retirement benefit. For those who retired prior to January 7, 2013, current law provides for a 3% cost-of-living adjustment. For those retiring subsequent to January 7, 2013, beginning in calendar year 2019, current law provides that the adjustment will be based on the average percentage increase in the Consumer Price Index, capped at 3%. A death benefit of $500-$2,500, determined by the number of years of service credit of the retiree, is paid to the beneficiary of a deceased retiree or disability benefit recipient under the Traditional Pension Plan and Combined Plan. Death benefits are not available to beneficiaries of Member-Directed Plan participants.
- ***Money Purchase Annuity***—Age-and-service retirees who become re-employed in an OPERS-covered position must contribute the regular contribution rates, which are applied towards a money purchase annuity. The money purchase annuity calculation is based on the accumulated contributions of the retiree for the period of re-employment, and an amount of the employer contributions determined by the Board. Upon termination of service, members over the age of 65 can elect to receive a lump-sum payout or a monthly annuity. Members under age 65 may leave the funds on deposit with OPERS to receive an annuity benefit at age 65, or may elect to receive a refund of their employee contributions made during the period of re-employment, plus interest.
- ***Refunds***—Members who have terminated service in OPERS-covered employment may file an application for refund of their account. The ORC requires a two-month waiting period after service termination before the refund may be paid. The acceptance of a refund payment cancels the individual's rights and benefits in OPERS.

  Refunds processed for Traditional Pension Plan members include the member's accumulated contributions, interest, and any qualifying employer funds, as determined by the Board. A Combined Plan member's refund may consist of member contributions for the purchase of service plus interest, qualifying employer funds, as determined by the Board, and the value of their account in the defined contribution plan consisting of member contributions adjusted by the gains or losses incurred based on their investment selections. Refunds paid to participants in the Member-Directed Plan include member contributions and vested employer contributions adjusted by the gains or losses incurred based on their investment selections.

c. Contributions—The OPERS funding policy provides for periodic member and employer contributions to all three plans (Traditional Pension, Combined and Member-Directed) at rates established by the Board, subject to limits set in statute. The rates established for member and employer contributions were approved based upon the recommendations of the System's actuary. All contribution rates were within the limits authorized by the ORC.

Member and employer contribution rates, as a percent of covered payroll, were the same for each covered group across all three plans for the year ended December 31, 2018. Within the Traditional Pension Plan and Combined Plan, member and employer contributions (employer contributions only for the Combined Plan) and an actuarially determined rate of return are adequate to accumulate sufficient assets to pay defined benefits when due. Member contributions within the Combined Plan are not used to fund the defined benefit retirement allowance. Employer contribution rates as a level percent of payroll dollars are determined using the entry age actuarial funding method. This formula determines the amount of contributions necessary to fund: (1) the current service cost, representing the estimated amount necessary to pay for defined benefits earned by the members during the current service year; and (2) the prior service cost for service earned prior to the current year and subsequent benefit increases. These contributions represent the amount necessary to fund accrued liabilities for retirement allowances and survivor benefits over a period of time. The annual employer contributions reported for the Traditional Pension Plan for 2018 were $1,895,462,837. Employer contributions for the Combined Plan for 2018 were $60,249,275. Employers satisfied 100% of the contribution requirements.

The following table displays the member and employer contribution rates as a percent of covered payroll for each division for 2018. With the assistance of the System's actuary and Board approval, a portion of each employer contribution to OPERS may be set aside for the funding of post-employment health care coverage. The portion of Traditional Pension Plan and Combined Plan employer contributions allocated to health care was zero for 2018. The employer contribution as a percent of covered payroll deposited for Member-Directed Plan health care accounts for 2018 was 4.0%.

Board of Trustees—Approved Contribution Rates—All Plans

	2018 Employee Rate	2018 Employer Rate
State Division	10.0%	14.0%
Local Division	10.0	14.0
Law Enforcement Division	13.0	18.1
Public Safety Division	12.0	18.1

The member and employer contribution rates for the State and Local divisions are currently set at the maximums authorized by the ORC of 10% and 14%, respectively. The Public Safety and Law Enforcement employer rates are also set at the maximum authorized rate of 18.1%. The member rate for Public Safety is determined by the Board and has no maximum rate established by the ORC. The member rate for Law Enforcement is also determined by the Board, but is limited by the ORC to not more than 2% greater than the Public Safety rate.

ORC Chapter 145 assigns authority to the Board to amend the funding policy. As of December 31, 2018, the Board adopted the contribution rates that were recommended by the actuary. The contribution rates were included in a funding policy adopted by the Board in October 2013, and are certified periodically by the Board as required by the ORC.

As of December 31, 2018, the date of the last pension actuarial study, the funding period for all defined benefits of the System was 27 years.

d. **Federal Subsidies**—OPERS participated in federal programs that subsidized or provided reimbursements to the 115 Trust. Medicare Part D is a voluntary federal program that reimburses 28% of the cost of prescription drugs for Medicare beneficiaries in the United States. During 2011, OPERS also implemented a prescription drug plan (PDP) in which the System received a direct subsidy from the Centers for Medicare & Medicaid Services based on the risk score of each eligible retiree. The implementation of the PDP reduced the number of claims available for submission through the Medicare Part D program. The PDP was terminated December 31, 2015 as OPERS transitioned the Medicare-enrolled retirees to the Connector and the program was no longer needed. OPERS no longer participates in the Medicare Part D program as of December 31, 2016. In 2018, OPERS received the final distribution of funds from the Medicare Part D program for calendar year 2016 of $378,007. Beginning 2017, health care-related receipts were netted against expenses included in the Benefits line item in the Combining Statement of Changes in Fiduciary Net Position.

e. **Commitments and Contingencies**—OPERS has committed to fund various private equity and closed-end real estate investments totaling approximately $8.0 billion as of December 31, 2018. The expected funding dates for these commitments extend through 2024. OPERS is a party in various lawsuits relating to plan benefits and investments. While the final outcome cannot be determined at this time, management is of the opinion that the liability, if any, for these legal actions will not have a material adverse effect on OPERS' financial position.

2. Summary of Significant Accounting Policies

The following are the significant accounting policies followed by OPERS for all pension and health care plans:

a. **Basis of Accounting**—The financial statements are prepared using the accrual basis of accounting under which deductions are recorded when the liability is incurred and revenues are recognized when earned. Pension benefit payments are due the first day of the month following the retirement of a member, and the first of each month thereafter. Health care payments are considered a liability and recognized in the Combining Statement of Fiduciary Net Position when a present obligation exists and a condition that requires that the event creating the liability has taken place. Therefore, OPEB plan liabilities are recognized when the benefits are currently due and payable in accordance with the benefit terms, as clarified in GASB Statement No. 74 (GASB 74), *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans.* GASB 74 also requires health care expenses be reported net of certain health care receipts. Beginning with the implementation of GASB 74 in 2017, the presentation of retiree-paid health care premiums, federal subsidy and rebates, rebates previously included in Contract and Other Receipts, has been revised and these health care receipts included in health care expenses in Benefits under Deductions in the Combining Statement of Changes in Fiduciary Net Position. Previously, these receipts were reflected in the Additions section of the statement. Health care liabilities contain estimates on incurred but not reported amounts for the current year.

OPERS notionally funds and tracks member balances in the HRA, Member-Directed health care accounts and wellness RMAs. As of December 31, 2018, the notional member balances in the HRAs were $389.8 million and the amount recognized as currently due for 2018 claims based on estimates was $38.9 million. As of December 31, 2018, the notional member balances in the Member-Directed health care accounts and wellness RMAs were $241.0 million and $1.5 million, respectively. The claim amounts currently due as of December 31, 2018 were estimated at $1.1 million and $0.5 million, respectively. As previously noted, the Member-Directed health care accounts were originally funded through the VEBA Trust, prior to the 115 Trust, and the VEBA Trust was historically reported separately in the combining financial statements. Although all health care activity now occurs through the 115 Trust, OPERS internally accounts for health care activity separately. Total net position reported for the 115 Trust as of December 31, 2018 was $11.3 billion, this includes a net position of $248.9 million in the Member-Directed health care plan.

Refunds, for any member who makes a written application to withdraw his/her contributions, are payable two months after termination of the member's OPERS-covered employment. Benefits and refunds are recognized when due and payable in accordance with the terms of the plan. Additions to the plans consist of contributions (member and employer), other contracts and receipts, interplan activities, net investment income, and other miscellaneous income. Contributions are recorded in the period the related salaries are earned and become measurable pursuant to formal commitments, statutory or contractual requirements. Accordingly, both member and employer contributions for the year ended December 31, 2018 include year-end accruals based upon estimates derived from subsequent payment activity and historical payment patterns. Member and employer contributions are due 30 days after the month in which salaries are earned based on pay period end date. Health care reimbursements are recognized when they become measurable and due to OPERS based on contractual requirements. Therefore, health care reimbursements contain estimates based on information received from health care vendors and other sources. Plan changes, or interplan activity, are recorded as an addition or deduction based on the nature of the transaction, when the transaction occurs. Investment purchases and sales are recorded as of their trade date.

The accounting and reporting policies of OPERS conform to accounting principles generally accepted in the United States (referred to as GAAP) as applicable to government organizations. The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, and to disclose contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

In March 2017, GASB Statement No. 85, *Omnibus 2017*, was issued. This statement addresses practice issues that have been identified during implementation and application of certain GASB statements. Topics include issues related to blending component units, goodwill, fair value measurement and application, and post-employment benefits (pensions and OPEB). The effective date for this standard is reporting periods beginning after June 15, 2017. This statement does not have an impact on the OPERS financial statements, notes or required supplementary information in this document, as OPERS is currently presenting the applicable information in accordance with the requirements of the statement.

In June 2017, GASB issued Statement No. 87, *Leases*. The primary objective of this statement is to increase the usefulness of financial statements by requiring recognition of certain lease assets and liabilities for leases that previously were classified as operating leases and recognized as inflows of resources or outflows of resources based on the payment provisions of the contract. Under this statement, a lessee is required to recognize a lease liability and an intangible right-to-use leased asset. A lessor is required to recognize a lease receivable and a deferred inflow of resources. The effective date of this standard is reporting periods beginning after December 15, 2019. OPERS is currently evaluating this statement with initial implementation planned for the 2020 annual report.

In March 2018, GASB issued Statement No. 88, *Certain Disclosures Related to Debt, including Direct Borrowings and Direct Placements*. The primary objective of this statement is to improve the information that is disclosed in notes to government financial statements related to debt, including direct borrowings and direct placements. OPERS has no debt obligations under the scope of this statement, therefore this statement does not apply.

In June 2018, GASB issued Statement No. 89, *Accounting for Interest Cost Incurred before the End of a Construction Period*. The objectives of this statement are to enhance the relevance and comparability of information about capital assets and the cost of borrowing for a reporting period and to simplify accounting for interest cost incurred before the end of a construction period. OPERS does not borrow for the purchase or construction of capital assets, therefore this statement does not apply.

In August 2018, GASB issued Statement No. 90, *Majority Equity Interests*. The primary objectives of this statement are to improve the consistency and comparability of reporting a government's majority equity interest in a legally separate organization and to improve the relevance of financial statement information for certain component units. All of OPERS equity interests meet the definition of an investment, therefore this statement does not apply.

b. **Investments**—OPERS is authorized by ORC Section 145.11 to invest under a prudent person standard and does so through an investment policy established by the Board. ORC 145.11 states:

> The Board and other fiduciaries shall discharge their duties with respect to the funds solely in the interest of the participants and beneficiaries; for the exclusive purpose of providing benefits to participants and their beneficiaries and defraying reasonable expenses of administering the public employees retirement system; with care, skill, prudence, and diligence under the circumstances then prevailing that a prudent person acting in a like capacity and familiar with these matters would use in the conduct of an enterprise of a like character and with like aims; and by diversifying the investments of the system so as to minimize the risk of large losses, unless under the circumstances it is clearly prudent not to do so.

Member-Directed Plan participants self-direct the investment of both member and employer contributions. Contributions must be invested with an investment manager approved by the Board. Similarly, participants in the Combined Plan self-direct the investment of member contributions. The investment assets for all other plans and the health care trust are invested under the direction of the OPERS Investment staff in conformance with policies approved by the Board.

Investments are generally reported at fair value. Fair value is the amount that a plan can reasonably expect to receive for an investment in a current sale between a willing buyer and a willing seller, that is, other than in a forced or liquidation sale. All investments, with the exception of real estate, private equity, and hedge funds, are valued based on closing market prices or broker quotes. Securities not having a quoted market price have been valued based on yields currently available on comparable securities of issuers with similar credit ratings. The fair value of real estate investments, private equity and hedge funds is based on a net asset value, which is established by the fund or by the fund's third-party administrator.

Net increase/(decrease) in the fair value of investments is determined by calculating the change in the fair value of investments between the end of the year and the beginning of the year, less purchases of investments at cost, plus sales of investments at fair value. Interest income is recorded on the accrual basis and dividends are recorded on the ex-dividend date. Commissions paid to brokers are considered a part of the investment asset cost and are, therefore, not reported as expenses of the System. Brokerage commissions for 2018 were $7,815,506. Investment administrative expenses consist of custodial banking fees and those expenses directly related to OPERS internal investment operations, and include a proportional amount of allocated overhead.

c. **Capital Assets**—Capital assets are recorded at cost and do not meet the definition of an investment under GASB Statement No. 72, *Fair Value Measurement and Application*. OPERS has adopted a capitalization threshold used to identify whether assets purchased by the System are classified as capital assets or operating expenses. Building enhancements, furniture and equipment with a cost equal to or greater than $5,000 and computer software purchases of $25,000 or more are recorded as capital assets and depreciated based on the useful life of the asset. OPERS implemented GASB Statement No. 51 (GASB 51), *Accounting and Financial Reporting for Intangible Assets*, in 2008 for internally developed software and capitalizes software projects in accordance with this standard.

Depreciation is computed using the straight-line method over the estimated useful lives of the related assets according to the following schedule:

Useful Lives of Capital Assets

	Years
Buildings and Building Improvements	50
Furniture and Equipment	3-10
Computer Software	3-10

The table below is a schedule of the capital asset account balances as of December 31, 2017 and 2018, with changes to those account balances during the year ended December 31, 2018:

Capital Asset Account Balances

	Land	Building and Building Improvements	Furniture and Equipment	Total Capital Assets
Cost				
Balances December 31, 2017	$3,734,813	$110,922,559	$152,711,154	$267,368,526
Additions		41,043	8,005,250	8,046,293
Deletions		(90,979)	(7,860,527)	(7,951,506)
Balances December 31, 2018	3,734,813	110,872,623	152,855,877	267,463,313
Accumulated Depreciation				
Balances December 31, 2017		36,453,382	99,113,838	135,567,220
Depreciation Expense		2,322,666	10,351,377	12,674,043
Deletions		(28,854)	(7,859,113)	(7,887,967)
Balances December 31, 2018		38,747,194	101,606,102	140,353,296
Net Capital Assets December 31, 2018	**$3,734,813**	**$72,125,429**	**$51,249,775**	**$127,110,017**

d. **Undistributed Deposits**—Cash receipts are recorded as undistributed deposits until they are allocated to employer receivables, member contributions, miscellaneous or investment income.

e. **Federal Income Tax Status**—OPERS is a qualified plan under Section 401(a) of the IRC and is exempt from federal income taxes under Section 501(a).

f. **Funds**—In accordance with the ORC and IRS regulations, various funds have been established to account for the reserves held for future and current payments. Statutory and IRS-mandated funds within each of the three pension plans are described starting below:

Traditional Pension Plan

- ***The Employees' Savings Fund***—represents member contributions held in trust pending their refund or transfer to a benefit disbursement fund. Upon a member's refund or retirement, such member's account is credited with an amount of interest (statutory interest) on the member's contributions based on a Board-approved rate, which currently ranges from 1% to 4%. Members eligible for a refund also receive additional funds from the Employers' Accumulation Fund, if qualified. The ORC Chapter 145 requires statutory interest to be compounded annually.
- ***The Employers' Accumulation Fund***—is used to accumulate employer contributions to be used in providing the reserves required for transfer to the Annuity and Pension Reserve Fund as members retire or become eligible for disability benefits, and to the Survivors' Benefit Fund for benefits due dependents of deceased members.

- ***The Employers' Accumulation Health Care Fund (IRC 115)***—is used to accumulate employer contributions to be used in providing the reserves required for transfer to the Annuity and Pension Reserve and Survivors' Benefit funds for health care coverage paid for non-Medicare eligible retirees and eligible dependents of deceased members and monthly deposits to an HRA for Medicare-enrolled retirees and eligible dependents of deceased members under the Connector program.
- ***The Annuity and Pension Reserve Fund***—is the fund from which retirement benefits that do not exceed the IRC 415(b) limitations, and health care coverage are paid. By law, OPERS is obligated to pay certain benefits that have commenced with retirees. In order to make these payments each year and hold sufficient assets in this fund to pay the vested benefits of all retirees and beneficiaries as of the actuarial valuation date, OPERS transfers funds from the active member employer fund (the Employers' Accumulation Fund) to the pension funds (the Annuity and Pension Reserve Fund and the Survivors' Benefit Fund). Thus, the active member funding was 39% as of December 31, 2018.
- ***The Survivors' Benefit Fund***—is the fund from which benefits due beneficiaries of deceased members of the System that do not exceed the IRC 415(b) limitations are paid. Refer to the description under the Annuity and Pension Reserve Fund for additional information.
- ***Qualified Excess Benefit Arrangement (QEBA) Fund***—is the fund from which annuity, disability and survivors' benefits are paid when the recipient exceeds the IRC 415(b) limits. This reserve is funded by employer contributions.
- ***The Income Fund***—is the fund credited with all investment earnings and miscellaneous income. Annually, the balance in this fund is transferred to other funds to aid in the funding of future benefit payments and administrative expenses.
- ***The Expense Fund***—provides for the payment of administrative expenses with the necessary monies allocated to it from the Income Fund.

Member-Directed Plan

- ***The Defined Contribution Fund***—represents member and employer contributions held in trust pending their refund or commencement of benefit payments. Members self-direct the investment of these funds. The member vests in employer contributions over a five-year period at a rate of 20% per year.
- ***The Annuity and Pension Reserve Fund***—is the fund from which purchased annuity benefits are paid. Upon retirement, Member-Directed participants may elect to liquidate their defined contribution accounts to purchase a defined benefit annuity. The value of the annuity is based on the value of the defined contribution account at the time of liquidation.
- ***The Income Fund***—is the fund credited with all investment earnings, account fees, and miscellaneous income. The balance in this fund is used to fund the gains or losses incurred by participants and to fund the administrative expenses of the Member-Directed Plan.
- ***The Expense Fund***—provides for the payment of administrative expenses with the necessary monies allocated to it from the Income Fund.
- ***The Employers' Accumulation Health Care Fund (IRC 115)***—is used to accumulate a portion of employer contributions into an RMA for members electing to participate in the Member-Directed Plan.

Combined Plan

- ***The Defined Contribution Fund***—represents member contributions held in trust pending their refund or commencement of benefit payments. Members self-direct the investment of these funds.
- ***The Employees' Savings Fund***—represents member deposits for the purchase of service credit held in trust pending their refund or transfer to the plan's Annuity and Pension Reserve Fund. Upon a member's refund or retirement, such member's accounts are credited with an amount of interest (statutory interest) on the member's deposits based on a Board-approved rate. The interest rate has been 1% since January 1, 2003.
- ***The Employers' Accumulation Fund***—is used to accumulate employer contributions to be used in providing the reserves required for transfer to the Annuity and Pension Reserve Fund as members retire. Disability and survivor benefits are funded by transfers to Traditional Pension Plan funds, which pay such benefits.
- ***The Employers' Accumulation Health Care Fund (IRC 115)***—is used to accumulate employer contributions to be used in providing the reserves required for transfer to the Annuity and Pension Reserve and Survivors' Benefit funds, for health care coverage paid for non-Medicare eligible retirees and eligible dependents of deceased members and monthly deposits to an HRA for Medicare-enrolled retirees and eligible dependents of deceased members under the Connector program.
- ***The Annuity and Pension Reserve Fund***—is the fund from which retirement benefits and health care coverage are paid.
- ***The Income Fund***—is the fund credited with all investment earnings, account fees and miscellaneous income. The balance in this fund is transferred to other funds, to the credit of member accounts and to aid in the funding of future benefit payments and administrative expenses.
- ***The Expense Fund***—provides for the payment of administrative expenses with the necessary monies allocated to it from the Income Fund.

The statutory funds defined by ORC Chapter 145 and the IRC-required funds are not mutually exclusive. The Combining Statement of Fiduciary Net Position and the Combining Statement of Changes in Fiduciary Net Position (pages 36-39) are presented based on IRC requirements. The following schedule provides the values of the statutory funds and how they are distributed among the various retirement plans and the health care trust administered by the System. The rows represent the statutory funds required by the ORC. In total, these funds will equal the fiduciary net position of the System. To support the fiduciary net position for each plan and trust included in the statements, the schedule has been expanded to include the value of the statutory funds as they relate to each plan and trust.

Statutory and IRC Fund Balances as of December 31, 2018 were as follows:

Statutory and IRC Fund Balances (as of December 31, 2018)

	Traditional Pension Plan	Combined Plan	Member-Directed Plan	115 Health Care Trust	Total
Employees' Savings Fund	$14,764,276,344	$3,342,013	$94,750		$14,767,713,107
Employers' Accumulation Fund	4,795,082,942	499,982,476	2,220,973	$11,252,985,702	16,550,272,093
Annuity and Pension Reserve Fund	59,423,998,546	28,176,089	16,944,706		59,469,119,341
Survivors' Benefit Fund	1,766,560,528				1,766,560,528
Defined Contribution Fund		504,589,384	958,116,465		1,462,705,849
Income Fund	122,296,958				122,296,958
Expense Fund	4,389,736				4,389,736
Total	**$80,876,605,054**	**$1,036,089,962**	**$977,376,894**	**$11,252,985,702**	**$94,143,057,612**

g. **Risk Management**—OPERS is exposed to various risks of loss related to theft of, damage to, and destruction of assets; injuries to employees; and court challenges to fiduciary decisions. To cover these risks, OPERS maintains commercial insurance and holds fidelity bonds on employees. There were no reductions in coverage nor have there been any settlements exceeding insurance coverage for the past three years. As required by state law, OPERS is registered and insured through the state of Ohio Bureau of Workers' Compensation for injuries to employees. OPERS is self-insured for employee health care coverage. The only outstanding liabilities at the end of 2018 were related to the employee health care coverage (see Note 7).

3. Cash and Investments

A summary of cash, cash equivalents and investments held as of December 31, 2018 was as follows:

Summary of Cash, Cash Equivalents and Investments (as of December 31, 2018)

	2018 Fair Value
Cash and Cash Equivalents	
Cash	$141,907,034
Cash Equivalents	
Commercial Paper	882,972,789
U.S. Treasury Obligations	436,590,953
Repurchase Agreements	1,050,000,000
Interest-Bearing Short-Term Certificates	200,000,000
Short-Term Investment Funds (STIF)	1,274,687,194
Subtotal Cash Equivalents	3,844,250,936
Total Cash and Cash Equivalents	**$3,986,157,970**

Investments	
Fixed Income	
U.S. Corporate Bonds	$5,012,814,641
Non-U.S. Notes and Bonds	7,702,336,457
U.S. Government and Agencies	8,066,479,687
U.S. Mortgage Backed	3,610,269,285
Subtotal Fixed Income	24,391,900,070
Domestic Equities	17,766,727,911
Real Estate	8,062,476,147
Private Equity	9,619,253,716
International Equities	16,694,636,586
Other Investments[1]	13,442,805,902
Total Investments Before Collateral on Loaned Securities	**89,977,800,332**
Collateral on Loaned Securities	
Reinvested Cash Collateral for Loaned Securities	8,170,412,140
Total Collateral on Loaned Securities	**8,170,412,140**
Total Investments Including Collateral on Loaned Securities	**$98,148,212,472**

Total Cash, Cash Equivalents and Investments	**$102,134,370,442**

[1] Includes hedge funds, derivatives, risk parity and global tactical asset allocation.

a. **Custodial Credit Risk, Deposits**—Custodial credit risk for deposits is risk that, in the event of the failure of a depository financial institution, OPERS will not be able to recover its deposits or will not be able to recover collateral securities that are in the possession of an outside party. Balances on deposit are insured by the Federal Deposit Insurance Corporation (FDIC) up to specified limits. Balances in excess of FDIC limits are uninsured. The total amount of cash and cash equivalent balances reported was $141,907,034 at December 31, 2018. OPERS has not experienced any losses in its accounts and believes it is not exposed to a significant credit risk on its cash. OPERS has no formal policy specific to custodial credit risk. These assets are under the custody of the Treasurer of the state of Ohio.

b. **Custodial Credit Risk, Investments**—Custodial credit risk for investments is the risk that, in the event of the failure of the custodian, OPERS will not be able to recover the value of its investment or collateral securities that are in the possession of the custodian. The Treasurer of the state of Ohio, as custodian, selects the custodian in the name of OPERS or its nominee; thus, OPERS investments are not exposed to custodial credit risk.

c. **Credit Risk**—Generally, credit risk is the risk that an issuer of an investment will not fulfill its obligation to the holder of the investment. This risk is measured by ratings assigned by a nationally recognized statistical rating organization.

   The OPERS Public Fixed Income Policy includes limiting non-investment grade securities to within 15 percentage points of the market value percentage of non-investment grade securities in the Fixed Income Aggregate Benchmark within the Defined Benefit portfolio, the Health Care portfolio, fixed income components of any target date funds and fixed income funds offered directly to OPERS members. Limitations on holdings of non-investment grade securities are included in portfolio guidelines.

d. **Interest Rate Risk**—Interest rate risk is the risk that changes in market interest rates will adversely affect the fair value of an investment. Generally, the longer the maturity of an investment, the greater the sensitivity of its fair value to changes in market interest rates. OPERS monitors the interest rate risk inherent in its portfolio by measuring the weighted-average duration of its portfolio. Duration is a measure of a debt investment's exposure to fair value changes arising from changing interest rates. It uses the present value of cash flows, weighted for those cash flows as a percentage of the investment's full price. The effective duration measures the sensitivity of the market price to parallel shifts in the yield curve. The OPERS Fixed Income Policy states the average effective duration of all defined benefit and health care assets must be within 20% of the average effective duration of the benchmark.

The following table presents the credit quality ratings and effective durations of OPERS fixed income assets, including short-term investments, as of December 31, 2018:

2018 Average Credit Quality and Exposure Levels of Guaranteed Investments

Fixed Income Security Type	Fair Value	Percent of All Fixed Income Assets	Weighted Average Duration to Maturity (years)	AAA	AA
Commercial Paper	$882,972,789	3.13%	0.02	$658,120,532	$197,854,619
Short-Term Investment Funds (STIF)	1,274,687,194	4.51	0.08	1,274,687,194	
Repurchase Agreements	1,050,000,000	3.72	0.00	800,000,000	200,000,000
Interest-Bearing Short-Term Certificates & Other	200,000,000	0.71	0.27	200,000,000	
Corporate Bonds	3,805,241,146	13.48	5.07	35,017,895	454,534,290
Municipal Bonds	49,804,196	0.17	16.07	16,800,000	30,000,000
Asset-Backed Securities	654,074,858	2.32	2.26	346,945,187	15,991,228
Mortgages	892,807,870	3.16	5.22	376,505,452	86,136,315
Agency Mortgages	2,616,575,165	9.27	5.67		2,616,575,165
Non-U.S. Corporate Bonds	2,190,444,745	7.76	3.87	141,189,098	287,764,720
Non-U.S. Mortgage & Asset-Backed Securities	987,395,416	3.50	3.12	761,812,444	102,209,482
Non-U.S. Government	4,524,496,296	16.02	5.71	50,000,000	139,893,456
Agency Bonds	614,115,821	2.17	2.03		614,115,821
Commingled Long-Term Global Funds	641,260,068	2.27	4.29	36,679,376	433,381,248
Total Non-Government Guaranteed	**20,383,875,564**	**72.19**		**4,697,757,178**	**5,178,456,344**
U.S. Treasury Notes	4,104,805,020	14.54	3.50		4,104,805,020
U.S. Treasury Bonds	906,214,210	3.21	17.88		906,214,210
U.S. Treasury Inflation Protected	2,404,665,259	8.52	7.23		2,404,665,259
U.S. Treasury Discount Notes	436,590,953	1.54	0.14		436,590,953
Total Fixed Income and Cash Equivalents	**$28,236,151,006**	**100.00%**	**4.63**	**$4,697,757,178**	**$13,030,731,786**

2018 Average Credit Quality and Exposure Levels of Guaranteed Investments (continued from page 56)

A	BBB	BB	B	CCC	CC	C	D	Not Rated
$26,997,638								
								$50,000,000
710,432,718	$1,245,508,092	$766,503,032	$397,131,604	$123,089,816	$628,850	$187,688	$222,000	71,985,161
	3,004,196							
30,974,167	158,384,281	21,590,036	8,546,023	5,968,164	31,238,226		17,544,885	16,892,661
32,848,015	261,376,559	52,959,538	16,003,819	5,607,029	473,578		13,552,708	47,344,857
296,792,237	605,287,664	312,606,399	316,383,359	104,317,960		18,081,198	31,957,570	76,064,540
	9,148,341	55,765,132	47,962,836	2,511,550	2,086,089			5,899,542
826,837,199	1,213,399,746	1,060,970,336	1,130,313,522	37,692,966			40,730,809	24,658,262
36,809,063			102,321,596					32,068,785
1,961,691,037	**3,496,108,879**	**2,270,394,473**	**2,018,662,759**	**279,187,485**	**34,426,743**	**18,268,886**	**104,007,972**	**324,913,808**
$1,961,691,037	**$3,496,108,879**	**$2,270,394,473**	**$2,018,662,759**	**$279,187,485**	**$34,426,743**	**$18,268,886**	**$104,007,972**	**$324,913,808**

e. **Concentration of Credit Risk**—Concentration of credit risk is the risk of loss that may be attributed to the magnitude of an investment in a single issuer. As of December 31, 2018, the portfolio has no single-issuer exposure that comprises 5% or more of the overall portfolio, excluding investments issued or explicitly guaranteed by the U.S. government and investments in mutual funds, external investment pools, and other pooled investments. Therefore, no concentration of credit risk exists.

f. **Foreign Currency Risk**—Foreign currency risk is the risk that changes in exchange rates will adversely impact the local currency value of an investment. The OPERS foreign currency exposures primarily reside within non-U.S. investment holdings. The OPERS implementation policy is to allow external managers to decide what action to take within approved portfolio guidelines for their respective portfolios' foreign currency exposures using forward-currency contracts. See chart on the next page for foreign currency detail.

Exposure to Foreign Currency Risk in U.S. Dollars (as of December 31, 2018)

Currency	Cash	Forwards	Fixed Income	International Equities	Real Estate	Private Equity
Argentine Peso	$132,830	$13,238,039	$55,013,012			
Australian Dollar	2,201,596			$501,149,707		
Brazilian Real	886,746	3,270,148	281,366,484	307,328,106		
British Pound Sterling	1,931,253			1,613,321,301		$502,224,622
Canadian Dollar	901,028			463,411,440		
Chilean Peso	54,849	28,340,729	41,340,635	14,226,733		
Chinese Yuan Renminbi	111,647			18,134,163		
Colombian Peso	35,925	3,978,456	192,994,377	3,167,059		
Czech Koruna	10,698		101,007,090	1,747,614		
Danish Krone	283,639	32,916		208,738,245		
Dominican Peso			15,936,958			
Egyptian Pound	1,309,431		48,620,115	3,842,507		
Euro Currency	5,589,760	(82,713,805)	90,100,765	2,626,899,186	$22,630,496	1,125,652,527
Georgian Lari			10,022,559			
Ghanaian Cedi	17		40,306,286			
Hong Kong Dollar	1,689,661	2,238,866		1,061,169,530		
Hungarian Forint	11,312	12,256,410	47,087,867	15,526,218		
Indian Rupee	3,694,112		40,528,920	374,037,728		
Indonesian Rupiah	1,133,381	(8,029,573)	273,053,508	132,681,786		
Israeli Shekel	13,298			48,995,223		
Japanese Yen	818,573	7,208,491		2,068,640,580		
Kazakhstani Tenge			8,882,135			
Kenyan Shilling			18,025,939			
Kuwaiti Dinar				3,536,330		
Malaysian Ringgit	265,475		48,651,030	59,722,242		
Mexican Peso	1,151,649	(16,740,889)	292,117,599	68,787,860		
New Zealand Dollar	135,079			32,019,734		
Nigerian Naira	5,364		21,399,010			
Norwegian Krone	1,573,343	89,616		119,072,684		
Peruvian Nuevo Sol	54,375		75,301,789	759,394		
Philippine Peso	116,982		14,747,130	25,266,324		
Polish Zloty	184,660	(1,038,968)	216,871,050	50,671,845		
Qatari Rial	4,614			17,224,359		
Romanian New Leu	52,811	1,033,268	21,108,766			
Russian Ruble		(6,364,370)	208,902,098			
Singapore Dollar	1,390,014			123,408,489		
South African Rand	2,924,582	(18,626,849)	260,153,010	193,087,182		
South Korean Won	408,212		1,876,609	555,849,964		
Swedish Krona	259,694	225,186		220,570,193		
Swiss Franc	331,443	(267,008)		684,140,632		
Taiwan Dollar	514,191			285,181,610		
Thailand Baht	40,755	(7,148,051)	126,636,244	141,520,146		
Turkish Lira	89,145		163,968,648	41,697,529		
UAE Dirham	11,663			20,415,733		
Uganda Shilling			4,807,321			
Uruguay Peso			57,205,894			
Zambian Kwacha			2,672,466			
Total	**$30,323,807**	**($69,017,388)**	**$2,780,705,314**	**$12,105,949,376**	**$22,630,496**	**$1,627,877,149**

g. **Securities Lending**—OPERS maintains a securities lending program. OPERS uses its discretion to determine the type and amount of securities lent under the program. Under this program, securities are loaned to brokers. In return, OPERS receives cash collateral and agrees to return the collateral for the same securities in the future. Cash collateral from securities loaned is, simultaneous to the loan, reinvested in repurchase agreements and short-term securities. Securities loaned are collateralized at a minimum of 102% of the fair value of loaned U.S. securities and 105% of the fair value of loaned international securities. Collateral is marked-to-market daily. OPERS does not have the ability to pledge or sell collateral securities absent a broker default. If the fair value of the collateral held falls below the required levels, additional collateral is provided.

As of December 31, 2018, the fair value of securities on loan was $7,973,139,149. Associated collateral totaling $8,167,622,811 was received. The fair market value of reinvested collateral was $8,170,412,140 as of December 31, 2018, which includes a net unrealized gain on securities lending income totaling $613,928.

Net securities lending income/(loss) is composed of four components: gross income, broker rebates, agent fees and unrealized gains/(losses) on collateral. Gross income is equal to earnings on cash collateral received in a securities lending transaction. A broker rebate is the cost of using that cash collateral. Agent fees represent the fees paid to the agent for administering the lending program. Unrealized gains/(losses) result from the change in fair value of the reinvested cash collateral. Net securities lending income is equal to gross income less broker rebates, agent fees, and unrealized losses on collateral. Securities lending income for 2018 was recorded on an accrual basis.

h. **Derivatives**—Derivatives are generally defined as contracts whose values depend on, or are derived from, the value of an underlying asset, reference rate or index. OPERS has classified the following as derivatives:

- ***Forward-Currency Contracts***—OPERS enters into various forward-currency contracts to manage exposure to changes in foreign currency exchange rates on its foreign portfolio holdings. The System may also enter into forward-currency exchange contracts to provide a quantity of foreign currency needed at a future time at the current exchange rates, if rates are expected to change dramatically. A forward-exchange contract is a commitment to purchase or sell a foreign currency at a future date at a negotiated forward rate. Risk associated with such contracts includes movement in the value of foreign currency relative to the U.S. dollar and the ability of the counterparty to perform. The contracts are valued at forward-exchange rates, and the changes in value of open contracts are recognized as net increase/decrease in the fair value of investments in the Combining Statement of Changes in Fiduciary Net Position. The forward-currency purchases are recognized in Investment Commitments Payable on the Combining Statement of Fiduciary Net Position and the forward-currency sales are recognized in Investment Sales Proceeds. The realized gains or losses on forward-currency contracts represent the difference between the value of the original contracts and the closing value of such contracts and are included as net increase/decrease in the fair value of investments in the Combining Statement of Changes in Fiduciary Net Position. The net realized and unrealized gain on forward-currency contracts for the year 2018 was $3,797,269.

  The fair values of forward-currency contracts and contracts hedged were as follows:

Fair Value of Forward-Currency and Hedged Contracts (as of December 31, 2018)

Forward-currency purchases	$80,485,975
Forward-currency sales	($149,503,362)
Unrealized loss	($57,393)

- ***Futures Contracts***—OPERS enters into various futures contracts to manage exposure to changes in equity, fixed income and currency markets and to take advantage of movements on an opportunistic basis. A stock index future is a futures contract that uses a stock index as its base, and which is settled by cash or delivery of the underlying stocks in the index. Financial futures represent an off balance sheet obligation, as there are no balance sheet assets or liabilities associated with those contracts; however, the realized and unrealized gains and losses on futures are recorded in the Combining Statement of Changes in Fiduciary Net Position. Futures contracts differ from forward-currency contracts by their standardization, exchange trading, margin requirements, and daily settlement (marking-to-market). Risk associated with stock index futures contracts includes adverse movements in the underlying stock index. The following table shows the futures positions held by OPERS as of December 31, 2018. The net realized and unrealized loss on futures contracts for the year 2018 was $292,938,291.

Futures Positions Held (as of December 31, 2018)

Futures Contracts	Number of Contracts	Contract Principal
U.S. Equity Index Futures purchased long	6,684	$789,519,510
U.S. Treasury Futures purchased long	9,723	$1,369,828,641
U.S. Treasury Futures purchased short	1,300	($276,006,250)
Non-U.S. Equity Index Futures purchased long	29,051	$1,874,130,397

- ***Total Return Swaps***—OPERS may manage market exposure through the use of total return swaps. A total return swap is an agreement in which one party commits to pay a fee in exchange for a return linked to the market performance of an underlying security, group of securities, index or other asset (reference obligation). Risks may arise if the value of the swap acquired decreases because of an unfavorable change in price of the reference obligation or the counterparty's ability to meet the terms of the contract. OPERS held total return swaps with a notional value of $1,217,118,932 as of December 31, 2018. The unrealized gain as of December 31, 2018 was $22,983,199. The net realized and unrealized loss in total return swaps for the year 2018 was $214,495,637.
- ***Credit Default Swaps***—OPERS may manage credit exposure through the use of credit default swaps or credit default swap indices. A credit default swap is a contract whereby the credit risk associated with an investment is transferred by entering into an agreement with another party, who, in exchange for periodic fees, agrees to make payments in the event of a default or other predetermined credit event. A credit default swap allows for exposure to credit risk while limiting exposure to other risks, such as interest rate and currency risk. OPERS held credit default swaps with a notional value of $135,000,000 as of December 31, 2018. The net realized and unrealized gain in credit default swaps for the year 2018 was $935,451.
- ***Options***—Options give buyers the right, but not the obligation, to buy or sell an asset at a predetermined strike price over a specified period. The option premium is usually a small percentage of the underlying asset value. When writing an option, OPERS receives a premium initially and bears the risk of an unfavorable change in the price of the underlying asset during the option life. When OPERS purchases an option, it pays a premium to a counterparty that bears the risk of an unfavorable change in the price of the underlying asset during the option life. OPERS did not invest in options during 2018.

i. **Fair Value Leveling**—Generally accepted accounting principles specify a hierarchy of valuation classifications based on whether the inputs to the valuation techniques used in each valuation classification are observable or unobservable. These classifications are summarized in the three broad levels listed below:

- Level 1—Unadjusted quoted prices for identical instruments in active markets.
- Level 2—Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and, model-derived valuations in which all significant inputs and significant value drivers are observable.
- Level 3—Valuations derived from valuation techniques in which significant inputs or significant value drivers are unobservable.

Inputs used to measure fair value might fall in different levels of the fair value hierarchy. In which case, OPERS defaults to the lowest level input that is significant to the fair value measurement in its entirety. These levels are not necessarily an indication of the risk or liquidity associated with the investments.

The following tables present fair value as of December 31, 2018:

Investments and Short-Term Holdings Measured At Fair Value (as of December 31, 2018)

		Fair Value Measurements Using		
	Fair Value	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level				
Fixed Income				
U.S. Corporate Bonds	$4,611,441,796	$102,321,596	$4,393,558,301	$115,561,899
Non-U.S. Notes and Bonds	7,702,336,457		6,913,395,642	788,940,815
U.S. Government and Agencies	8,029,800,311		8,029,800,311	
U.S. Mortgage Backed	3,509,383,034		3,443,080,182	66,302,852
Total Fixed Income	23,852,961,598	102,321,596	22,779,834,436	970,805,566
Equities				
Domestic Equities	17,055,058,073	17,029,109,880	16,453	25,931,740
International Equities	14,329,989,937	14,311,988,906	11,555,586	6,445,445
Total Equities	31,385,048,010	31,341,098,786	11,572,039	32,377,185
Total Investments by Fair Value Level	**$55,238,009,608**	**$31,443,420,382**	**$22,791,406,475**	**$1,003,182,751**
Investments Measured at the Net Asset Value (NAV)				
Real Estate	$8,062,476,147			
Private Equity	9,619,253,716			
Other Investments[1]	13,419,880,096			
Commingled Mutual Funds				
U.S. Corporate Bonds	32,068,785			
U.S. Mortgage Backed	100,886,251			
International Equities	2,017,724,580			
Defined Contribution Commingled Mutual Funds				
Domestic Equities	711,669,838			
U.S. Corporate Bonds	246,131,473			
U.S. Government and Agencies	36,679,376			
International Equities	346,922,069			
Total Investments Measured at the NAV	**$34,593,692,331**			
Investment Derivative Instruments				
Foreign Exchange Contracts	($57,393)		($57,393)	
Swaps (Total Return and Credit Default)	22,983,199		22,983,199	
Total Investment Derivative Instruments	**$22,925,806**		**$22,925,806**	
Investments Not Subject to Fair Value Leveling (at cost or amortized cost)				
Cash	$141,907,034			
Commercial Paper	882,972,789			
Interest-Bearing Short-Term Certificates	200,000,000			
Repurchase Agreements	1,050,000,000			
Short-Term Investment Funds (STIF)	1,274,687,194			
U.S. Treasury Obligations	436,590,953			
Stable Value Funds[2]	123,172,587			
Total Investments Not Subject to Fair Value Leveling	**$4,109,330,557**			
Total Cash and Investments Before Collateral on Loaned Securities	**$93,963,958,302**			

[1] Includes hedge funds, risk parity and global tactical asset allocation.
[2] Valued at contract value, which approximates fair value.

Other Investment Derivative Instruments (as of December 31, 2018)

	Fair Value	Fair Value Measurements Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investment Commitments Payable—Forward-Currency Purchases	$80,485,975		$80,485,975	
Investment Sales Proceeds—Forward-Currency Sales	($149,503,362)		($149,503,362)	

Reinvested Cash Collateral for Securities on Loan (as of December 31, 2018)

	Fair Value	Fair Value Measurements Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level				
Fixed Income				
U.S. Government and Agencies	$626,522,428		$626,522,428	
U.S. Corporate Bonds	1,597,406,471		1,597,406,471	
Non-U.S. Corporate Notes and Bonds	247,960,678		247,960,678	
Total Investments by Fair Value Level	**2,471,889,577**		**2,471,889,577**	
Investments Not Subject to Fair Value Leveling (at cost or amortized cost)				
Cash	161,705,845			
Certificates of Deposit	962,457,291			
Commercial Paper	810,758,928			
Commingled Funds	372,099,267			
Receivables/Payables	(4,162,748)			
Repurchase Agreements	1,804,994,818			
Short-Term Debt				
Short-Term Investment Funds	703,000,000			
U.S. Treasury Obligations Less than One Year	887,669,162			
Total Reinvested Cash Collateral for Loaned Securities	**$8,170,412,140**		**$2,471,889,577**	

Investments classified as Level 1 in the previous tables are comprised of U.S. corporate notes, common stock, international equity and exchange-traded funds.

Investments classified as Level 2 are primarily comprised of investments in U.S. corporate notes and bonds, international debt, U.S. mortgage-backed securities and U.S. government and agency securities, including Federal Home Loan Mortgage Corporation (Freddie Mac) securities, Federal National Mortgage Association (Fannie Mae) securities, Government National Mortgage Association (Ginnie Mae) securities, U.S. Treasury notes and bonds, U.S. Treasury floating rate notes, U.S. and commercial mortgage trusts, and derivatives, including foreign exchange contracts and swaps.

Investments classified as Level 3 are comprised of common stock, U.S. corporate notes and bonds, U.S. mortgage-backed securities, international equity and international debt.

Changes in the significant unobservable inputs in the table on page 62 may result in a materially higher or lower fair value measurement.

In certain instances, debt and equity securities are valued on the basis of prices from an orderly transaction between market participants provided by brokers/dealers or pricing services (Level 1 in the tables). In determining the value of a particular investment, pricing services may use information with respect to transactions in such investments, broker quotes, pricing matrices, market transactions in comparable investments and various relationships between investments. As part of its independent price verification process, OPERS selectively performs detailed reviews of valuations provided by brokers/dealers or pricing services.

Foreign exchange contracts are valued by interpolating a value using the spot foreign exchange rate and forward points (based on the spot rate and currency interest rate differentials), which are all inputs that are observable in active markets (Level 2 in the tables).

In the absence of observable market prices, OPERS values its investments using valuation methodologies applied on a consistent basis (Levels 2 or 3 in the tables). For some investments, little market activity may exist; management's determination of fair value is then based on the best information available in the circumstances, and may incorporate management's own assumptions and involves a significant degree of judgement, taking into consideration a combination of internal and external factors. Such investments are evaluated on a quarterly basis, taking into consideration any changes in key inputs and changes in economic and other relevant conditions, and valuation models are updated accordingly. The valuation process also includes a review by the OPERS internal valuation committee, comprised of senior members from various departments within OPERS, including investment management. The valuation committee provides independent oversight of the valuation policies and procedures.

The fair values in certain investments are based on the net asset value (NAV) per share (or its equivalent) provided by the investee or third party administrator, as applicable, and are considered to be alternative investments. Investments categorized according to NAV include hedge funds, real estate, and private equity limited partnership interests. These represent OPERS' collective ownership interests in limited partnership vehicles that invest in non-registered funds which are valued based on the net asset values of the underlying investments.

Unlike more traditional investments, alternative investments generally do not have readily obtainable market values and take the form of limited partnerships. OPERS values these investments based on the partnerships' audited financial statements, typically calendar year-end. If December 31 statements are available, those values are preferentially used for these statements. However, some partnerships have fiscal years ending on dates other than December 31. If December 31 valuations are not available, the value is progressed from the most recently available valuation on the financial statements, taking into account subsequent calls and distributions.

Hedge funds are most often established as private investment limited partnerships open to a limited number of accredited investors. Investments in hedge funds may be illiquid as investors in certain funds may be required to keep their investment in the fund for a year or longer, and withdrawals may be limited to intervals such as monthly, quarterly, annually or bi-annually. OPERS monitors liquidity provisions of each individual hedge fund investment and reports characteristics of the asset class quarterly.

Real estate investments typically do not trade on organized exchanges, but rather through privately negotiated transactions between a buyer and a seller, and transactions are predicated on the availability of capital, and a willing buyer and seller.

The nature of the private equity investments is that distributions are received through the liquidation of the underlying assets of the fund, rather than through redemptions, and these assets are not sold in the secondary market.

The expected liquidation period for alternative investments is as follows:

Private Equity	10 to 12 years
Closed-End Real Estate	10 to 12 years
Open-End Real Estate	Quarterly
Separately Managed Real Estate	3 to 10 years
Hedge Funds	Monthly, Quarterly, Annually, Bi-Annually

As of December 31, 2018, the alternative investments are not expected to be sold at an amount different from the NAV per share (or its equivalent) of the System’s ownership interest in partners’ capital.

The following table presents the unfunded commitments, redemption frequency (if currently eligible), and the redemption notice period for OPERS' alternative investments measured at NAV as of December 31, 2018:

Investments Measured at the Net Asset Value (NAV) (as of December 31, 2018)

	Net Asset Value	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Real Estate				
Closed-End Private Real Estate[1]	$1,049,153,806	$1,049,083,804	N/A	N/A
Open-End Private Real Estate[2]	2,012,833,805		Quarterly	90 Days
Separate Account Private Real Estate[3]	5,000,488,536	938,567,006	N/A	N/A
Private Equity[4]	9,619,253,716	5,940,964,242	N/A	N/A
Other Investments[5]				
Event-Driven[6]	1,794,669,684	N/A	Quarterly, Annual	45-90 Days
Long/Short Equity[7]	1,047,375,804	N/A	Monthly, Quarterly	5-65 Days
Multi-Strategy[8]	7,379,491,907	N/A	Monthly, Quarterly, Annual	3-90 Days
Relative Value[9]	1,472,932,679	N/A	Monthly, Quarterly	30-60 Days
Tactical Trading[10]	1,725,410,022	N/A	Monthly, Quarterly, Bi-Annual	2-65 Days
Commingled Mutual Funds[11]				
U.S. Corporate Bonds	32,068,785	N/A	Monthly	10 Days
U.S. Mortgage Bonds	100,886,251	N/A	Monthly	15 Days
International Equities	2,017,724,580	N/A	Daily, Monthly	1-7 Days
Defined Contribution Commingled Mutual Funds[12]				
Domestic Equities	711,669,838	N/A	Daily	Daily
U.S. Corporate Bonds	246,131,473	N/A	Daily	Daily
U.S. Government and Agencies	36,679,376	N/A	Daily	Daily
International Equities	346,922,069	N/A	Daily	Daily
Total Investments Measured at the NAV	**$34,593,692,331**			

[1] **Closed-End Private Real Estate**—Closed-end private real estate includes finite-life, pooled, private-market investment vehicles that are typically structured as limited partnerships, where the investors are limited partners (LPs) and the fund sponsor/manager is the general partner (GP). The LPs have limited control and limited liability. Real estate closed-end funds typically invest in value-add and opportunistic private market real estate assets. The valuations are based on manager-provided net asset values, located in quarterly capital account statements, that are cash flow adjusted to the end of the reporting period.

[2] **Open-End Private Real Estate**—Open-end private real estate holds infinite-life, pooled, private-market investment vehicles that typically invest in stabilized properties in major metropolitan areas. Open-end commingled funds provide liquidity to investors quarterly, subject to each fund's ability to honor investment and redemption requests. The valuations are based on manager-provided net asset values, located in quarterly capital account statements, that are cash flow adjusted to the end of the reporting period.

[3] **Separate Account Private Real Estate**—Separate account real estate includes separately managed investment accounts where OPERS is the sole investor. The account is governed by the investment management agreement between OPERS and the manager. The OPERS separate accounts may invest in stabilized, value-add and opportunistic private market real estate assets. The valuations are based on manager-provided net asset values, located in quarterly capital account statements, that are cash flow adjusted to the end of the reporting period.

[4] **Private Equity**—Private equity invests through closed-end, finite-life, commingled funds that are typically structured as limited partnerships, where the investors are limited partners (LPs) and the fund sponsor/manager is the general partner. The LPs have limited control and limited liability. Private equity closed-end funds typically invest in corporate

finance, venture capital and special situations (secondary fund-of-funds and distressed debt strategies). The valuations are based on manager-provided net asset values, located in quarterly capital account statements, that are cash flow adjusted to the end of the reporting period.

[5] **Other Investments**—Includes hedge funds, risk parity and global tactical asset allocation.

[6] **Event-Driven**—Event-driven managers maintain positions in companies currently or prospectively involved in various corporate transactions including, but not limited to, mergers, restructurings, financial distress, tender offers, shareholder buybacks, debt exchanges, security issuance or other capital structure adjustments. Security types can range from most senior in the capital structure to most junior or subordinated, and frequently involve additional derivative securities. Event-driven exposure includes a combination of sensitivities to equity markets, credit markets and company-specific developments. The valuations are based on manager-provided net asset values located in the monthly capital account statements, that are adjusted for estimated performance.

[7] **Long/Short Equity**—Equity hedge strategies maintain positions both long and short in primarily equity and equity derivative securities. A wide variety of investment processes can be employed to arrive at an investment decision, including both quantitative and fundamental techniques. Strategies can be broadly diversified or narrowly focused on specific sectors and can range broadly in terms of levels of net exposure, leverage employed, holding period, concentrations of market capitalizations and valuation ranges of typical portfolios. The valuations are based on manager-provided net asset values located in the monthly capital account statements, that are adjusted for estimated performance.

[8] **Multi-Strategy**—Multi-strategy managers combine several strategies within the same fund to provide diversification benefits to reduce return volatility and decrease asset-class and single-strategy risks. These funds typically add incremental returns through active allocation adjustments based on market opportunities. Risk is managed through a combination of quantitative and qualitative constraints including, but not limited to, active risk, liquidity risk, currency risk, manager risk, derivatives risk, and leverage risk. The valuations are based on manager-provided net asset values located in the monthly capital account statements, that are adjusted for estimated performance.

[9] **Relative Value—**Relative value managers maintain positions in which the investment thesis is predicated on the realization of a valuation discrepancy in the relationship between multiple securities. Managers employ a variety of fundamental and quantitative techniques to establish investment insights, and security types range broadly across equity, fixed income, derivative or other security types. Fixed Income strategies are typically quantitatively driven to measure the existing relationship between instruments and, in some cases, identify attractive positions in which the risk-adjusted spread between these instruments represents an attractive opportunity. The valuations are based on manager-provided net asset values located in the monthly capital account statements, that are adjusted for estimated performance.

[10] **Tactical Trading**—Tactical managers execute a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the impact these have on equity, fixed income, hard currency, and commodity markets. Managers employ a variety of techniques, both discretionary and systematic analyses, combinations of top down and bottom up disciplines, quantitative and fundamental approaches, and long- and short-term holding periods. The valuations are based on manager-provided net asset values located in the monthly capital account statements, that are adjusted for estimated performance.

[11] **Commingled Mutual Funds**—The commingled mutual funds seek to outperform the Bloomberg Barclays U.S. Corporate High Yield Index, Bloomberg Barclays Capital U.S. Aggregate Bond Index, MSCI All Country World Free x U.S. Index, and MSCI Emerging Markets Small Cap Net Index. The valuations are based on manager-provided net asset values located in the monthly capital account statements.

[12] **Defined Contribution Commingled Mutual Funds**—The defined contribution funds, other than the Stable Value Fund, not included in this activity, are index-managed, meaning they seek to mirror investment results of broadly based and publicly quoted market indices. They are not intended to outperform such indices. The valuations are based on manager-provided net asset values located in the monthly capital account statements.

4. Vacation and Sick Leave

As of December 31, 2018, $8,428,315 was accrued for unused vacation and sick leave for OPERS employees. Employees who resign or retire are entitled to full compensation for all earned but unused vacation leave for balances up to three times their annual accrual rate at the time of separation. Unused sick leave is forfeited upon termination. However, employees who retire with more than 10 years of service with OPERS are entitled to receive payment for 50% of their unused sick leave up to a maximum of 2,000 hours, or payment of 1,000 hours.

5. Deferred Compensation Plan

OPERS does not sponsor a deferred compensation program. OPERS employees are eligible to participate in the deferred compensation plan sponsored by the state of Ohio. The state-sponsored plan was created in accordance with IRC Section 457. The plan is available to all OPERS employees and permits them to defer a portion of their salary until future years. Deferred compensation assets are not available to employees until termination, retirement, death, or unforeseeable emergency.

IRC Section 457 requires that the amount of compensation assets deferred under a plan, all property and rights, and all income attributable to those amounts, property or rights, be held in trust for the benefit of the participants. This insulates IRC Section 457 benefits from the claims of an employer's general creditors. Accordingly, OPERS does not include the deferred compensation assets or liabilities of the Ohio Deferred Compensation Plan in its financial statements.

6. Schedule of Required Contributions

All employees of OPERS are eligible for membership in the benefit plans of the System. The employer contributions paid on behalf of these employees are funded by revenues in the Income Fund, arising from investment activity and other income. The annual required pension and health care contributions for employees for the year ended December 31, 2018 are as follows:

Annual Required Pension and Health Care Contributions

	Pension		Health Care	
Year Ended	Annual Required Contributions	Percent Contributed	Annual Required Contributions	Percent Contributed
2018	$6,375,042	100%	$507,842	100%

Under GASB 51, internal payroll related to the implementation of capital projects is capitalized as part of the fixed asset cost. OPERS implemented GASB 51 at the end of 2008, and began capitalizing internal labor costs effective January 1, 2009. The capitalized cost includes salary and wages as well as the corresponding employer paid Medicare and retirement contribution expenses. The portion of the 2018 annual required contribution included in fixed assets was $250,048 for pension and $20,732 for health care.

7. Self-insured Employee Health Care

Under a professionally administered plan, OPERS self-insures for general health, hospitalization, and prescription drug employee benefits. OPERS maintained specific stop-loss coverage per employee for medical benefits in the amount of $250,000 for 2018. Employees share in the cost of their coverage by payroll deductions, which are netted against the claims cost. Employee deductions and vendor rebates totaled $4,679,037 in 2018, including accrued estimated vendor rebates of $625,000 to be received in 2019 related to 2018 claims. The summary of changes in incurred but not reported claims for the year ended December 31, 2018 follows:

Employee Health Insurance

	2018
Balance January 1	$0
Claims Incurred	7,756,316
Claims Paid	(7,294,605)
Balance December 31	**$461,711**

The liability for self-insured employee health care is included in Accounts Payable and Other Liabilities on the Combining Statement of Fiduciary Net Position.

8. Net Pension Liability

The components of the net pension liability of the defined benefit portion of the pension plans as of December 31, 2018 are as follows:

Net Pension Liability/(Asset) ($ in millions)

As of December 31, 2018	All Plans	Traditional Pension Plan	Combined Plan[1]	Member-Directed Plan[1]
Total Pension Liability	$108,701	$108,264	$420	$17
Plan Fiduciary Net Position	81,427	80,876	532	19
Employers' Net Pension Liability/(Asset)	$27,274	$27,388	($112)	($2)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability/(Asset)	74.91%	74.70%	126.64%	113.42%

[1] The Combined Plan and Member-Directed Plan information in the Net Pension Liability includes only the defined benefit portion of these plans to comply with GASB-reporting standards and does not include the defined contribution portion. The Combining Statements of Fiduciary Net Position and Changes in Fiduciary Net Position present the combined defined benefit and defined contribution portions of the Combined Plan and Member-Directed Plan.

Actuarial valuations of an ongoing plan involve estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and cost trends. Actuarially determined amounts are subject to continual review or modification as actual results are compared with past expectations and new estimates are made about the future.

Projections of benefits for financial-reporting purposes are based on the substantive plan (the plan as understood by the employers and plan members) and include the types of benefits provided at the time of each valuation. The total pension liability was determined by an actuarial valuation as of December 31, 2018, using the following key actuarial assumptions and methods applied to all prior periods included in the measurement in accordance with the requirements of GASB 67:

Key Methods and Assumptions Used in Valuation of Total Pension Liability

Actuarial Information	Traditional Pension Plan	Combined Plan	Member-Directed Plan
Measurement and Valuation Date	December 31, 2018	December 31, 2018	December 31, 2018
Experience Study	5-Year Period Ended December 31, 2015	5-Year Period Ended December 31, 2015	5-Year Period Ended December 31, 2015
Actuarial Cost Method	Individual entry age	Individual entry age	Individual entry age
Actuarial Assumptions			
Investment Rate of Return	7.20%	7.20%	7.20%
Wage Inflation	3.25%	3.25%	3.25%
Projected Salary Increases	3.25%-10.75% (includes wage inflation at 3.25%)	3.25%-8.25% (includes wage inflation at 3.25%)	3.25%-8.25% (includes wage inflation at 3.25%)
Cost-of-living Adjustments	Pre-1/7/2013 Retirees: 3.00% Simple Post-1/7/2013 Retirees: 3.00% Simple through 2018, then 2.15% Simple	Pre-1/7/2013 Retirees: 3.00% Simple Post-1/7/2013 Retirees: 3.00% Simple through 2018, then 2.15% Simple	Pre-1/7/2013 Retirees: 3.00% Simple Post-1/7/2013 Retirees: 3.00% Simple through 2018, then 2.15% Simple

Pre-retirement mortality rates are based on the RP-2014 Employees mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates are based on the RP-2014 Healthy Annuitant mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates for disabled retirees are based on the RP-2014 Disabled mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to all of the above described tables.

The discount rate used to measure the total pension liability was 7.2% for the Traditional Pension Plan, Combined Plan and Member-Directed Plan. The projection of cash flows used to determine the discount rate assumed that contributions from plan members and those of the contributing employers are made at the contractually required rates, as actuarially determined. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments for the Traditional Pension Plan, Combined Plan and Member-Directed Plan was applied to all periods of projected benefit payments to determine the total pension liability.

The allocation of investment assets within the Defined Benefit portfolio is approved by the Board as outlined in the annual investment plan. Plan assets are managed on a total return basis with a long-term objective of achieving and maintaining a fully funded status for the benefits provided through the defined benefit pension plans. The table below displays the Board-approved asset allocation policy for 2018 and the long-term expected real rates of return.

Asset Class	Target Allocation for 2018	Weighted Average Long-Term Expected Real Rate of Return (Arithmetic)
Fixed Income	23.00%	2.79%
Domestic Equities	19.00	6.21
Real Estate	10.00	4.90
Private Equity	10.00	10.81
International Equities	20.00	7.83
Other Investments	18.00	5.50
TOTAL	**100.00%**	**5.95%**

The long-term expected rate of return on defined benefit investment assets was determined using a building-block method in which best-estimate ranges of expected future real rates of return are developed for each major asset class. These ranges are combined to produce the long-term expected real rate of return by weighting the expected future real rates of return by the target asset allocation percentage, adjusted for inflation.

During 2018, OPERS managed investments in three investment portfolios: the Defined Benefit portfolio, the Health Care portfolio and the Defined Contribution portfolio. The Defined Benefit portfolio contains the investment assets of the Traditional Pension Plan, the defined benefit component of the Combined Plan and the annuitized accounts of the Member-Directed Plan. Within the Defined Benefit portfolio, contributions into the plans are all recorded at the same time, and benefit payments all occur on the first of the month. Accordingly, the money-weighted rate of return is considered to be the same for all plans within the portfolio. The annual money-weighted rate of return expressing investment performance, net of investment expenses and adjusted for the changing amounts actually invested, for the Defined Benefit portfolio was a loss of 2.94% for 2018.

The following table presents the net pension liability or asset calculated using the discount rate of 7.2%, and the expected net pension liability or asset if it were calculated using a discount rate that is 1.0% lower or 1.0% higher than the current rate.

Sensitivity of Net Pension Liability/(Asset) to Changes in the Discount Rate ($ in millions)

Employers' Net Pension Liability/(Asset) As of December 31, 2018	1% Decrease 6.2%	Current Discount Rate 7.2%	1% Increase 8.2%
All Plans	$40,422	$27,274	$16,355
Traditional Pension Plan	$40,460	$27,388	$16,525
Combined Plan	($37)	($112)	($166)
Member-Directed Plan	($1)	($2)	($4)

The funding status of the three pension plans and their Schedules of Funding Progress may be found in the Actuarial Section of this document on pages 153-154. The Member-Directed Plan is a defined contribution pension plan allowing members at retirement to have the option to convert their defined contribution account to a defined benefit annuity. The defined contribution annuitized balances under this plan were included in this annual report from a GASB 67 perspective.

9. Net OPEB Liability—Health Care

The components of the net OPEB liability of the defined benefit health care plans as of December 31, 2018 were as follows:

Net OPEB Liability ($ in millions)

As of December 31, 2018	
Total OPEB Liability	$24,291
Plan Fiduciary Net Position	11,253
Employers' Net OPEB Liability	$13,038
Plan Fiduciary Net Position as a Percentage of Total OPEB Liability	46.33%

The total OPEB liability was determined by an actuarial valuation as of December 31, 2017, rolled forward to the measurement date of December 31, 2018, by incorporating the expected value of health care cost accruals, the actual health care payments, and interest accruals during the year for the defined benefit health care plans. In accordance with GASB Statement No. 75 (GASB 75), *Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*, the Member-Directed Plan health care is a defined benefit health care plan, although the pension plan is defined contribution. Interest of 4% is credited to member accounts as long as the Health Care portfolio earns a positive return.

Actuarial valuations of an ongoing plan involve estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and cost trends. Actuarially determined amounts are subject to continual review or modification as actual results are compared with past expectations and new estimates are made about the future.

Projections of health care costs for financial reporting purposes are based on the substantive plan (the plan as understood by the employers and plan members) and include the types of coverage provided at the time of each valuation and the historical pattern of sharing of costs between the System and plan members. The total OPEB liability was determined by an actuarial valuation as of December 31, 2017, rolled forward to the measurement date of December 31, 2018.

The actuarial valuation used the following key actuarial assumptions applied to all prior periods included in the measurement in accordance with the requirements of GASB 74:

Key Methods and Assumptions Used in Valuation of Total OPEB Liability	
Actuarial Information	
Actuarial Valuation Date	December 31, 2017
Rolled-Forward Measurement Date	December 31, 2018
Experience Study	5-Year Period Ended December 31, 2015
Actuarial Cost Method	Individual entry age normal
Actuarial Assumptions	
Single Discount Rate	3.96%
Investment Rate of Return	6.00%
Municipal Bond Rate	3.71%
Wage Inflation	3.25%
Projected Salary Increases	3.25%-10.75% (includes wage inflation at 3.25%)
Health Care Cost Trend Rate	10.0% initial, 3.25% ultimate in 2029

Pre-retirement mortality rates are based on the RP-2014 Employees mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates are based on the RP-2014 Healthy Annuitant mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates for disabled retirees are based on the RP-2014 Disabled mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to all of the above described tables.

A single discount rate of 3.96% was used to measure the OPEB liability on the measurement date of December 31, 2018. Projected benefit payments are required to be discounted to their actuarial present value using a single discount rate that reflects (1) a long-term expected rate of return on OPEB plan investments (to the extent that the health care fiduciary net position is projected to be sufficient to pay benefits), and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate are not met). This single discount rate was based on an expected rate of return on the health care investment portfolio of 6.00% and a municipal bond rate of 3.71%. The projection of cash flows used to determine this single discount rate assumed that employer contributions will be made at rates equal to the actuarially determined contribution rate. Based on these assumptions, the health care fiduciary net position and future contributions were sufficient to finance health care costs through the year 2031. As a result, the long-term expected rate of return on health care investments was applied to projected costs through the year 2031, and the municipal bond rate was applied to all health care costs after that date.

The allocation of investment assets within the Health Care portfolio is approved by the Board as outlined in the annual investment plan. Assets are managed on a total return basis with a long-term objective of continuing to offer a sustainable health care program for current and future retirees. The System's primary goal is to achieve and maintain a fully funded status for benefits provided through the defined pension plans. Health care is a discretionary benefit. The table below displays the Board-approved asset allocation policy for 2018 and the long-term expected real rates of return.

Asset Class	Target Allocation for 2018	Weighted Average Long-Term Expected Real Rate of Return (Arithmetic)
Fixed Income	34.00%	2.42%
Domestic Equities	21.00	6.21
REITs	6.00	5.98
International Equities	22.00	7.83
Other Investments	17.00	5.57
TOTAL	**100.00%**	**5.16%**

The long-term expected rate of return on the health care investment assets was determined using a building-block method in which best-estimate ranges of expected future real rates of return are developed for each major asset class. These ranges are combined to produce the long-term expected real rate of return by weighting the expected future real rates of return by the target asset allocation percentage, adjusted for inflation.

During 2018, OPERS managed investments in three investment portfolios: the Defined Benefit portfolio, the Health Care portfolio and the Defined Contribution portfolio. The Health Care portfolio includes the assets for health care expenses for the Traditional Pension Plan, Combined Plan and Member-Directed Plan eligible members. Within the Health Care portfolio, contributions into the plans are assumed to be received continuously throughout the year based on the actual payroll payable at the time contributions are made, and health care-related payments are assumed to occur mid-year. Accordingly, the money-weighted rate of return is considered to be the same for all plans within the portfolio. The annual money-weighted rate of return expressing investment performance, net of investment expenses and adjusted for the changing amounts actually invested, for the Health Care portfolio was a loss of 5.60% for 2018.

The following table presents the OPEB liability calculated using the single discount rate of 3.96%, and the expected net OPEB liability if it were calculated using a discount rate that is 1.0% lower or 1.0% higher than the current rate.

Sensitivity of Net OPEB Liability to Changes in the Discount Rate ($ in millions)

As of December 31, 2018	1% Decrease 2.96%	Single Discount Rate 3.96%	1% Increase 4.96%
Employers' Net OPEB Liability	$16,680	$13,038	$10,141

Changes in the health care cost trend rate may also have a significant impact on the net OPEB liability. The following table presents the net OPEB liability calculated using the assumed trend rates, and the expected net OPEB liability if it were calculated using a health care cost trend rate that is 1.0% lower or 1.0% higher than the current rate.

Sensitivity of Net OPEB Liability to Changes in the Health Care Cost Trend Rate ($ in millions)

As of December 31, 2018	1% Decrease	Current Health Care Cost Trend Rate Assumption	1% Increase
Employers' Net OPEB Liability	$12,532	$13,038	$13,620

Retiree health care valuations use a health care cost-trend assumption that changes over several years built into the assumption. The near-term rates reflect increases in the current cost of health care; the trend starting in 2019 is 10.00%. If this trend continues for future years, the projection indicates that years from now virtually all expenditures will be for health care. A more reasonable alternative is that in the not-too-distant future, the health plan cost trend will decrease to a level at, or near, wage inflation. On this basis, the actuaries project premium rate increases will continue to exceed wage inflation for approximately the next decade, but by less each year, until leveling off at an ultimate rate, assumed to be 3.25% in the most recent valuation.

The funding status of health care and the Schedule of Funding Progress are found in the Actuarial Section of this document on page 155.

Defined Benefit Pension Plans

The Schedules of Changes in Net Pension Liability and Related Ratios display the components of the total pension liability and plan fiduciary net position for each pension plan with a defined benefit component, calculated in conformity with the requirements of GASB 67. Covered Payroll represents the collective total of the OPERS eligible wages of all OPERS employers within each plan.

Schedule of Changes in Net Pension Liability and Related Ratios ($ in millions) — All Plans[1]

	2018	2017	2016	2015	2014
Net Change in Total Pension Liability					
Service Cost	$1,976.7	$1,823.3	$1,763.4	$1,710.7	$1,685.3
Interest on Total Pension Liability	7,475.5	7,347.3	7,131.5	6,978.9	6,778.9
Changes of Benefit Terms	-	-	-	-	-
Difference Between Expected and Actual Experience	(339.8)	(456.1)	37.5	(334.0)	(321.4)
Changes in Assumptions	3,433.9	-	5,344.6	-	-
Benefit Payments, Including Refunds of Employee Contributions	(6,498.4)	(6,227.6)	(5,942.8)	(5,808.6)	(5,502.2)
Net Change in Total Pension Liability	**6,047.9**	**2,486.9**	**8,334.2**	**2,547.0**	**2,640.6**
Total Pension Liability—Beginning	102,653.3	100,166.4	91,832.2	89,285.2	86,644.6
Total Pension Liability—Ending	**$108,701.2**	**$102,653.3**	**$100,166.4**	**$91,832.2**	**$89,285.2**
Net Change in Plan Fiduciary Net Position					
Employer Contributions	$1,958.6	$1,779.6	$1,606.0	$1,564.7	$1,520.3
Member Contributions	1,354.2	1,324.5	1,294.8	1,246.7	1,228.1
Net Investment Income/(Loss)	(2,541.1)	12,657.6	5,976.9	276.3	5,074.7
Benefit Payments, Including Refunds of Employee Contributions	(6,498.4)	(6,227.6)	(5,942.8)	(5,808.6)	(5,502.2)
Non-Investment Administrative Expenses	(51.8)	(52.2)	(51.9)	(49.1)	(49.8)
Other[2]	100.9	108.8	71.1	66.9	125.5
Net Change in Plan Fiduciary Net Position	**(5,677.6)**	**9,590.7**	**2,954.1**	**(2,703.1)**	**2,396.6**
Plan Fiduciary Net Position—Beginning	87,104.8	77,514.2	74,560.1	77,263.2	74,866.6
Plan Fiduciary Net Position—Ending	**$81,427.2**	**$87,104.9**	**$77,514.2**	**$74,560.1**	**$77,263.2**
Net Pension Liability/(Asset)	**$27,274.0**	**$15,548.4**	**$22,652.2**	**$17,272.1**	**$12,022.0**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability/(Asset)	74.91%	84.85%	77.39%	81.19%	86.54%
Covered Payroll	$14,391.1	$14,058.0	$13,717.6	$13,177.0	$12,932.5
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	189.52%	110.60%	165.13%	131.08%	92.96%

[1] Includes Traditional Pension Plan and defined benefit portions of Combined Plan and Member-Directed Plan. Does not tie exactly to the combined total of the following three schedules for the Traditional Pension Plan, Combined Plan and Member-Directed Plan due to rounding.
[2] Other includes Contract and Other Receipts, Other Income and Interplan Activity.

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors' Report, beginning on page 20.

Schedule of Changes in Net Pension Liability and Related Ratios ($ in millions) — Traditional Pension Plan[1]

	2018	2017	2016	2015	2014
Net Change in Total Pension Liability					
Service Cost	$1,948.6	$1,796.9	$1,738.6	$1,687.0	$1,659.6
Interest on Total Pension Liability	7,446.3	7,320.5	7,107.3	6,956.7	6,759.0
Changes of Benefit Terms	-	-	-	-	-
Difference Between Expected and Actual Experience	(331.5)	(441.6)	45.5	(322.3)	(309.7)
Changes in Assumptions	3,417.0	-	5,328.8	-	-
Benefit Payments, Including Refunds of Employee Contributions	(6,489.7)	(6,219.8)	(5,936.9)	(5,804.1)	(5,498.8)
Net Change in Total Pension Liability	**5,990.7**	**2,456.0**	**8,283.3**	**2,517.3**	**2,610.1**
Total Pension Liability—Beginning	102,273.9	99,817.9	91,534.6	89,017.3	86,407.2
Total Pension Liability—Ending	**$108,264.6**	**$102,273.9**	**$99,817.9**	**$91,534.6**	**$89,017.3**
Net Change in Plan Fiduciary Net Position					
Employer Contributions	$1,895.5	$1,722.9	$1,556.5	$1,498.7	$1,476.1
Member Contributions	1,354.2	1,324.5	1,294.8	1,246.7	1,228.1
Net Investment Income/(Loss)	(2,524.6)	12,586.4	5,947.2	274.9	5,056.3
Benefit Payments, Including Refunds of Employee Contributions	(6,489.7)	(6,219.8)	(5,936.9)	(5,804.1)	(5,498.8)
Non-Investment Administrative Expenses	(51.8)	(52.2)	(51.9)	(49.1)	(49.8)
Other[2]	107.1	114.4	86.6	90.0	125.8
Net Change in Plan Fiduciary Net Position	**(5,709.3)**	**9,476.2**	**2,896.3**	**(2,742.9)**	**2,337.7**
Plan Fiduciary Net Position—Beginning	86,585.8	77,109.6	74,213.3	76,956.2	74,618.5
Plan Fiduciary Net Position—Ending	**$80,876.5**	**$86,585.8**	**$77,109.6**	**$74,213.3**	**$76,956.2**
Net Pension Liability/(Asset)	**$27,388.1**	**$15,688.1**	**$22,708.3**	**$17,321.3**	**$12,061.1**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability/(Asset)	74.70%	84.66%	77.25%	81.08%	86.45%
Covered Payroll	$13,375.7	$13,085.0	$12,794.0	$12,321.2	$12,139.7
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	204.76%	119.89%	177.49%	140.58%	99.35%

[1] Includes money purchase annuities for re-employed retirees and additional annuities.
[2] Other includes Contract and Other Receipts, Other Income and Interplan Activity.

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors' Report, beginning on page 20.

Schedule of Changes in Net Pension Liability and Related Ratios ($ in millions) — Combined Plan[1]

	2018	2017	2016	2015	2014
Net Change in Total Pension Liability					
Service Cost	$28.1	$26.4	$24.8	$23.7	$25.7
Interest on Total Pension Liability	28.3	26.0	23.5	21.6	19.4
Changes of Benefit Terms	-	-	-	-	-
Difference Between Expected and Actual Experience	(12.3)	(17.9)	(10.2)	(13.3)	(13.2)
Changes in Assumptions	16.5	-	15.2	-	-
Benefit Payments, Including Refunds of Employee Contributions	(6.1)	(5.6)	(5.0)	(3.7)	(2.8)
Net Change in Total Pension Liability	**54.5**	**28.9**	**48.3**	**28.3**	**29.1**
Total Pension Liability—Beginning	365.1	336.2	287.9	259.6	230.5
Total Pension Liability—Ending	**$419.6**	**$365.1**	**$336.2**	**$287.9**	**$259.6**
Net Change in Plan Fiduciary Net Position					
Employer Contributions	$60.2	$53.6	$47.1	$44.0	$44.2
Member Contributions	-	-	-	-	-
Net Investment Income/(Loss)	(15.9)	68.6	28.8	1.3	17.9
Benefit Payments, Including Refunds of Employee Contributions	(6.1)	(5.6)	(5.0)	(3.7)	(2.8)
Non-Investment Administrative Expenses	-	-	-	-	-
Other[2]	(8.0)	(7.3)	(15.6)	(3.1)	(2.2)
Net Change in Plan Fiduciary Net Position	**30.2**	**109.3**	**55.3**	**38.5**	**57.1**
Plan Fiduciary Net Position—Beginning	501.2	391.9	336.6	298.1	241.0
Plan Fiduciary Net Position—Ending	**$531.4**	**$501.2**	**$391.9**	**$336.6**	**$298.1**
Net Pension Liability/(Asset)	**($111.8)**	**($136.1)**	**($55.7)**	**($48.7)**	**($38.5)**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability/(Asset)	126.64%	137.28%	116.55%	116.90%	114.83%
Covered Payroll	$430.5	$412.7	$392.3	$366.9	$346.0
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	(25.97%)	(32.99%)	(14.19%)	(13.26%)	(11.13%)

[1] Includes annuitized defined contribution accounts. The Combined Plan information in the Net Pension Liability includes only the defined benefit portion of this plan to comply with GASB-reporting standards and does not include the defined contribution portion. The Combining Statements of Fiduciary Net Position and Changes in Fiduciary Net Position present the combined defined benefit and defined contribution portions of the Combined Plan.

[2] Other includes Contract and Other Receipts, Other Income and Interplan Activity.

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors' Report, beginning on page 20.

Schedule of Changes in Net Pension Liability and Related Ratios ($ in millions) — Member-Directed Plan[1]

	2018	2017	2016	2015	2014
Net Change in Total Pension Liability					
Service Cost	-	-	-	-	-
Interest on Total Pension Liability	$0.9	$0.8	$0.7	$0.6	$0.5
Changes of Benefit Terms	-	-	-	-	-
Difference Between Expected and Actual Experience	4.0	3.4	2.2	1.6	1.5
Changes in Assumptions	0.4	-	0.6	-	-
Benefit Payments, Including Refunds of Employee Contributions	(2.6)	(2.2)	(0.9)	(0.8))	(0.6)
Net Change in Total Pension Liability	**2.7**	**2.0**	**2.6**	**1.4**	**1.4**
Total Pension Liability—Beginning	14.3	12.3	9.7	8.3	6.9
Total Pension Liability—Ending	**$17.0**	**$14.3**	**$12.3**	**$9.7**	**$8.3**
Net Change in Plan Fiduciary Net Position					
Employer Contributions	$2.9	$3.1	$2.4	$22.0	-
Member Contributions	-	-	-	-	-
Net Investment Income	(0.6)	2.5	0.9	0.1	$0.5
Benefit Payments, Including Refunds of Employee Contributions	(2.6)	(2.2)	(0.9)	(0.8)	(0.6)
Non-Investment Administrative Expenses	-	-	-	-	-
Other[2]	1.8	1.7	0.1	(20.0)	1.9
Net Change in Plan Fiduciary Net Position	**1.5**	**5.1**	**2.5**	**1.3**	**1.8**
Plan Fiduciary Net Position—Beginning	17.8	12.7	10.2	8.9	7.1
Plan Fiduciary Net Position—Ending	**$19.3**	**$17.8**	**$12.7**	**$10.2**	**$8.9**
Net Pension Liability/(Asset)	**($2.3)**	**($3.5)**	**($0.4)**	**($0.5)**	**($0.6)**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability/(Asset)	113.42%	124.46%	103.40%	103.91%	107.10%
Covered Payroll	$584.8	$560.3	$531.3	$488.9	$446.8
Net Pension Liability/(Asset) as a Percentage of Covered Payroll	(0.39%)	(0.62%)	(0.08%)	(0.08%)	(0.13%)

[1] Includes annuitized defined contribution accounts. The Member-Directed Plan information in the Net Pension Liability includes only the defined benefit annuities purchased in this plan to comply with GASB-reporting standards and does not include the defined contribution portion. The Combining Statements of Fiduciary Net Position and Changes in Fiduciary Net Position present the combined defined benefit and defined contribution portions of the Member-Directed Plan.

[2] Other includes Contract and Other Receipts, Other Income and Interplan Activity.

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors' Report, beginning on page 20.

Within the Traditional Pension Plan, OPERS classifies employees into four divisions: State, Local, Law Enforcement and Public Safety. The Public Safety and Law Enforcement divisions have different contribution rates, benefit formulas, and retirement eligibility requirements than those of the State and Local members. The member and employer contribution rates are actuarially determined within the constraints of statutory limits for each division. Both the member and employer contribution rates for Public Safety and Law Enforcement members are higher than those of the State and Local members to recognize the higher cost of these benefits. Accordingly, both member and employer contributions are used to calculate the proportionate shares of employers.

Schedule of Member and Employer Contributions — Traditional Pension Plan[1]

Year Ended December 31	Actuarially Determined Contributions[2]	Contributions Paid	Contribution Deficiency/ (Excess)	Covered Payroll[3]	Contributions as a Percent of Covered Payroll
2018	$3,249,698,135	$3,249,698,135	-	$13,375,730,324	24.3%
2017	3,047,313,879	3,047,313,879	-	13,085,037,696	23.3
2016	2,851,382,826	2,851,382,826	-	12,793,976,661	22.3
2015	2,745,411,751	2,745,411,751	-	12,321,236,358	22.3
2014	2,704,218,157	2,704,218,157	-	12,139,692,990	22.3
2013	2,778,566,900	2,778,566,900	-	11,999,928,351	23.2
2012	2,407,224,107	2,407,224,107	-	11,883,831,019	20.3
2011	2,454,599,959	2,454,599,959	-	12,103,258,896	20.3
2010	2,315,100,186	2,315,100,186	-	12,165,415,760	19.0
2009	2,256,548,622	2,256,548,622	-	12,289,885,494	18.4

[1] The actuarially determined contribution to fund the cost of pensions includes member and employer contributions. The contributions reported in this schedule are consistent with the presentation of the employers' proportionate shares.
[2] The Board has approved all contribution rates as recommended by the actuary.
[3] Covered Payroll was calculated based on actual information obtained from OPERS-contributing employers during the fiscal year.

The Combined Plan defined benefit pension is funded only from the employer contributions, with the member contributions deposited to a defined contribution account. Both member and employer contributions for the Member-Directed Plan are deposited into the participants' defined contribution accounts. However, the Member-Directed Plan defined benefit annuities of eligible Member-Directed Plan retirees are funded with accumulated member contributions, vested employer contributions and gains or losses resulting from the member-selected investment options. As a result, the Member-Directed Plan table on page 82 shows all employer contributions to the plan since there are no separate actuarially determined contributions calculated for annuities and employer contributions are used to determine the employer proportionate share of this activity. The tables on the next page display the actuarially determined contributions for employers of the defined benefit pension plans based on the actuarially determined rate, and the amount of these contributions paid by the employers each year.

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors' Report, beginning on page 20.

Schedule of Employer Contributions[1] — All Plans

Year Ended December 31	Actuarially Determined Contributions	Contributions Paid	Contribution Deficiency/ (Excess)	Covered Payroll [2]	Contributions as a Percent of Covered Payroll
2018	$2,014,194,303	$2,014,194,303	-	$14,391,093,639	14.0%
2017	1,832,523,797	1,832,523,797	-	14,058,005,653	13.0
2016	1,656,729,065	1,656,729,065	-	13,717,592,219	12.1
2015	1,611,150,408	1,611,150,408	-	13,177,006,156	12.2
2014	1,568,121,657	1,568,121,657	-	12,932,540,544	12.1
2013	1,655,726,521	1,655,726,521	-	12,331,162,054	13.4
2012	1,267,795,786	1,267,795,786	-	12,193,467,217	10.4
2011	1,290,029,652	1,290,029,652	-	12,399,464,698	10.4
2010	1,153,671,398	1,153,671,398	-	12,449,782,144	9.3
2009	1,069,336,423	1,069,336,423	-	12,548,337,499	8.5

Schedule of Employer Contributions[1] — Traditional Pension Plan

Year Ended December 31	Actuarially Determined Contributions	Contributions Paid	Contribution Deficiency/ (Excess)	Covered Payroll [2]	Contributions as a Percent of Covered Payroll
2018	$1,895,462,837	$1,895,462,837	-	$13,375,730,324	14.2 %
2017	1,722,856,378	1,722,856,378	-	13,085,037,696	13.2
2016	1,556,529,162	1,556,529,162	-	12,793,976,661	12.2
2015	1,498,679,737	1,498,679,737	-	12,321,236,358	12.2
2014	1,476,074,083	1,476,074,083	-	12,139,692,990	12.2
2013	1,571,758,150	1,571,758,150	-	11,999,928,351	13.1
2012	1,208,150,727	1,208,150,727	-	11,883,831,019	10.2
2011	1,233,002,841	1,233,002,841	-	12,103,258,896	10.2
2010	1,097,711,440	1,097,711,440	-	12,165,415,760	9.0
2009	1,019,582,360	1,019,582,360	-	12,289,885,494	8.3

[1] The Board has approved all contribution rates recommended by the actuary. Actuarially determined contributions exclude funds deposited for purchase of service, employer-paid retirement incentive programs, interest and penalties. These deposits are included in Contract and Other Receipts in the Combining Statement of Changes in Fiduciary Net Position.

[2] Covered Payroll was calculated based on actual information obtained from OPERS-contributing employers during the fiscal year.

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors' Report, beginning on page 20.

Schedule of Employer Contributions[1] — Combined Plan

Year Ended December 31	Actuarially Determined Contributions	Contributions Paid	Contribution Deficiency/ (Excess)	Covered Payroll[2]	Contributions as a Percent of Covered Payroll
2018	$60,249,275	$60,249,275	-	$430,541,632	14.0%
2017	53,636,897	53,636,897	-	412,658,782	13.0
2016	47,079,023	47,079,023	-	392,326,896	12.0
2015	44,022,120	44,022,120	-	366,851,607	12.0
2014	44,196,044	44,196,044	-	346,043,977	12.8
2013	45,427,520	45,427,520	-	331,233,703	13.7
2012	23,998,486	23,998,486	-	309,636,198	7.8
2011	23,280,520	23,280,520	-	296,205,802	7.9
2010	26,432,761	26,432,761	-	284,366,384	9.3
2009	23,397,299	23,397,299	-	258,452,005	9.1

Schedule of Employer Contributions[1] — Member-Directed Plan

Year Ended December 31	Actuarially Determined Contributions	Contributions Paid	Contribution Deficiency/ (Excess)	Covered Payroll[2, 3]	Contributions as a Percent of Covered Payroll
2018	$58,482,191	$58,482,191	-	$584,821,683	10.0%
2017	56,030,522	56,030,522	-	560,309,175	10.0
2016	53,120,880	53,120,880	-	531,288,662	10.0
2015	68,448,551	68,448,551	-	488,918,191	14.0
2014	47,851,530	47,851,530	-	446,803,577	10.7
2013	38,540,851	38,540,851	-		
2012	35,646,573	35,646,573	-		
2011	33,746,291	33,746,291	-		
2010	29,527,197	29,527,197	-		
2009	26,356,764	26,356,764	-		

[1] The Board has approved all contribution rates recommended by the actuary. Actuarially determined contributions exclude funds deposited for purchase of service, employer-paid retirement incentive programs, interest and penalties. These deposits are included in Contract and Other Receipts in the Combining Statement of Changes in Fiduciary Net Position.
[2] Covered Payroll was calculated based on actual information obtained from OPERS-contributing employers during the fiscal year.
[3] Covered Payroll calculated in conjunction with GASB 67 implementation in 2014. Information not available prior to 2014 implementation.

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors' Report, beginning on page 20.

During 2018, OPERS managed its investments in three investment portfolios: the Defined Benefit portfolio, the Health Care portfolio and the Defined Contribution portfolio. The Defined Benefit portfolio contains the investment assets of the Traditional Pension Plan, the defined benefit component of the Combined Plan, and the annuitized accounts of the Member-Directed Plan. Within the Defined Benefit portfolio, with the exception of Member-Directed annuitized accounts, contributions into the plans are all recorded at the same time, and benefit payments all occur on the first of the month. Accordingly, the money-weighted rate of return is considered the same for all plans within the portfolio.

Schedule of Investment Returns Defined Benefit Portfolio

Year	Annual Money-Weighted Rate of Return Net of Investment Expenses
2018	(2.9%)
2017	16.8
2016	8.3
2015	0.4
2014	6.9

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors’ Report, beginning on page 20.

Post-employment Health Care Coverage or OPEB

The Schedule of Changes in Net OPEB Liability and Related Ratios displays the components of the total OPEB liability and plan fiduciary net position for the defined benefit health care plans, calculated in conformity with the requirements of GASB 74. Covered Payroll represents the collective total of the OPERS eligible wages of all OPERS employers within each pension plan.

Schedule of Changes in Net OPEB Liability and Related Ratios ($ in millions) — Health Care	2018	2017
Net Change in Total OPEB Liability		
Service Cost	$617.4	$546.9
Interest on Total OPEB Liability	906.7	921.2
Changes of Health Care Terms	-	-
Difference Between Expected and Actual Experience	(52.8)	12.5
Changes in Assumptions	11.5	1,168.7
Health Care Payments, Including Refunds of Employee Contributions	(870.3)	(952.0)
Net Change in Total OPEB Liability	**612.5**	**1,697.3**
Total OPEB Liability—Beginning	23,678.1	21,980.8
Total OPEB Liability—Ending	**$24,290.6**	**$23,678.1**
Net Change in Plan Fiduciary Net Position		
Employer Contributions	$23.4	$157.4
Contributions—Non-employer Contributing Entities	-	-
Employee Contributions	-	-
Net Investment Income/(Loss)	(700.4)	1,756.8
Health Care Payments, Including Refunds of Employee Contributions	(870.3)	(952.0)
Non-Investment Administrative Expenses	(19.6)	(24.9)
Other[1]	1.0	1.0
Net Change in Plan Fiduciary Net Position	**(1,565.9)**	**938.3**
Plan Fiduciary Net Position—Beginning	12,818.8	11,880.5
Plan Fiduciary Net Position—Ending	**$11,252.9**	**$12,818.8**
Net OPEB Liability	**$13,037.7**	**$10,859.3**
Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability	46.33%	54.14%
Covered Payroll	$14,391.1	$14,058.0
Net OPEB Liability as a Percentage of Covered Payroll	90.60%	77.25%

[1] Other includes Contract and Other Receipts and Other Income.

With the assistance of the System's actuary, the Board may approve a portion of each employer contribution to OPERS to be set aside for the funding of post-employment health care coverage. The portion of Traditional Pension Plan and Combined Plan employer contributions allocated to defined benefit health care was zero in 2018. The employer contribution as a percent of covered payroll deposited for the Member-Directed Plan participants' health care accounts for 2018 was 4.0%. In accordance with GASB 75, the Member-Directed Plan health care is a defined benefit health care plan, although the pension plan is defined contribution. Interest of 4% is credited to member accounts as long as the Health Care portfolio earns a positive return.

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors' Report, beginning on page 20.

The table below displays the actuarially determined contributions for employers allocated to health care based on the actuarially determined rate, and the amount of these contributions paid by the employers each year based on the allocations determined by the Board. Due to the discretionary nature of health care funding and the potential for frequent changes in allocations, including no funding to health care for some plans, the calculation of proportionate shares of employers is based on total employer contributions, as disclosed in the Schedules of Employer Contributions within the Defined Benefit Pension Plans section of the Required Supplementary Information.

Schedule of Employer Contributions — Health Care

Year Ended December 31	Actuarially Determined Contributions	Contributions Paid	Contribution Deficiency/(Excess)	Covered Payroll[1]	Contributions as a Percent of Covered Payroll
2018	$850,929,552	$23,441,668	$827,487,884	$14,391,093,640	0.2%
2017	739,451,097	157,417,888	582,033,209	14,058,005,653	1.1
2016[a]	762,698,127	284,903,259	477,794,868	13,717,592,219	2.1
2015	731,847,564	253,673,333	478,174,231	13,177,006,156	1.9
2014	684,421,764	247,083,670	437,338,094	12,932,540,544	2.0
2013	1,555,931,467	120,056,440	1,435,875,027	12,331,162,054	1.1
2012	1,422,859,434	494,048,415	928,811,019	12,193,467,217	4.2
2011	1,831,329,260	503,458,216	1,327,871,044	12,399,464,698	4.2
2010	1,650,917,533	628,685,237	1,022,232,296	12,449,782,144	5.2
2009	1,698,928,499	740,817,891	958,110,608	12,548,337,499	6.0

[a] In 2016, IRS guidance allowed OPERS to consolidate all health care funding into the 115 Trust. Based on criteria in GASB 74, all OPERS health care plans are reported as defined benefit OPEB. Therefore, beginning in 2016, the total employer contributions presented includes the contributions for all health care plans.

[1] Covered Payroll was calculated based on actual information obtained from OPERS-contributing employers during the fiscal year, which differs from the Covered Payroll in the funding valuation. Covered Payroll used in the funding valuation is based on the annualized pay rate of all pension plan active members as of the valuation date.

During 2018, OPERS managed investments in three investment portfolios: the Defined Benefit portfolio, the Health Care portfolio and the Defined Contribution portfolio. The Health Care portfolio includes the assets for health care expenses for the Traditional Pension Plan, Combined Plan and Member-Directed Plan eligible members. Within the Health Care portfolio, contributions into the plan are assumed to be received continuously through the year based on the actual payroll payable at the time contributions are made, and health care-related payments are assumed to occur mid-year. Accordingly, the money-weighted rate of return is considered to be the same for all plans within the portfolio.

Schedule of Investment Returns — Health Care Portfolio

Year	Annual Money-Weighted Rate of Return Net of Investment Expenses
2018	(5.6%)
2017	15.3%

See Notes to Required Supplementary Information, beginning on page 86.

See accompanying Independent Auditors’ Report, beginning on page 20.

Defined Benefit Pension Plans

Actuarial Assumptions and Methods Used in Determining Contribution Rates

Actuarially determined contributions are constrained by contribution limits established by statute. The actuarial assumptions and methods used to determine contribution rates are calculated using the valuation date of December 31, 2016 and are described below.

- ***Valuation Method***—Individual entry age actuarial cost method of valuation is used in determining benefit liabilities and normal cost. Differences between assumed and actual experience (the actuarial gains and losses) become part of the total pension liability.
- ***Asset Valuation Method***—For actuarial purposes, assets are valued utilizing a method that recognizes assumed total investment returns each year. Differences between actual and assumed investment returns are phased in over a closed four-year period. This funding value is not permitted to deviate from fair value by a corridor of plus or minus 12.00%.
- ***Amortization Method***—Level percent of payroll, closed amortization period, for the Traditional Pension and Combined plans; 19 years from December 31, 2018 for the Traditional Pension Plan. Level dollar, closed amortization period for the Member-Directed Plan.
- ***Investment Return***—An investment rate of return of 7.50% for December 31, 2016 compounded annually was assumed for all members, retirees, and beneficiaries (7.20% for the year ended December 31, 2018).
- ***Wage Inflation***—The active member payroll was assumed to increase 3.25% annually, which is the portion of the individual pay increase assumption attributable to inflation and overall productivity.
- ***Salary Scale***—Wage inflation plus additional projected salary increases ranged up to 7.50% per year depending on age, attributable to seniority and merit, or 3.25% to 10.75%, including inflation.
- ***Cost-of-living Adjustments***—Pre-January 7, 2013 retirees: 3.0% simple; post-January 7, 2013 retirees: 3.0% simple through 2018, then 2.15% simple.
- ***Multiple Decrement Tables-Mortality***—Pre-retirement mortality rates are based on the RP-2014 Employees mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates are based on the RP-2014 Healthy Annuitant mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates for disabled retirees are based on the RP-2014 Disabled mortality table for males and females, adjusted for mortality improvement back to the observation base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to all of the above described tables.

Post-employment Health Care Coverage or OPEB

Actuarial Assumptions and Methods Used in Determining Contribution Rates

The Actuarial Determined Employer Contribution for the year ended December 31, 2018 was based on the December 31, 2016 health care actuarial valuation. The actuarial assumptions and methods used to determine contribution rates are described below.

- ***Valuation Method***—Individual entry age actuarial cost method of valuation is used in determining health care liabilities and normal cost. Differences between assumed and actual experience (the actuarial gains and losses) become part of the total OPEB liability.
- ***Asset Valuation Method***—For actuarial purposes, assets are valued utilizing a method that recognizes assumed total investment returns each year. Differences between actual and assumed investment returns are phased in over a closed four-year period. This funding value is not permitted to deviate from fair value by a corridor of plus or minus 12.00%.
- ***Investment Return***—An investment rate of return of 5.00% for December 31, 2016, compounded annually (net of OPEB plan investment expenses, including inflation, and 6.00% for the year ended December 31, 2018).
- ***Salary Scale***—Wage inflation plus additional projected salary increases ranged up to 7.50% per year depending on age, attributable to seniority and merit, or 3.25% to 10.75%, including inflation.
- ***Amortization Method***—Level percent of payroll, open amortization period, 30 years amortization period.
- ***Wage Inflation***—The active member payroll was assumed to increase 3.25% annually, which is the portion of the individual pay increase assumption attributable to inflation and overall productivity.
- ***Multiple Decrement Tables-Mortality***—Pre-retirement mortality rates are based on the RP-2014 Employees mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates are based on the RP-2014 Healthy Annuitant mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates for disabled retirees are based on the RP-2014 Disabled mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Mortality rates for a particular calendar year are determined by applying the MP-2015 mortality improvement scale to all of the above described tables.

Factors Significantly Affecting Trends in Reported Amounts

There were no recent significant changes of pension benefit terms, health care plans, investment policies, the size or composition of the population covered by the benefit terms and health care plans impacting the actuarial valuation studies for pension and health care for the measurement date of December 31, 2018.

Administrative Expenses (for the year ended December 31, 2018)

Personnel Expenses	
Wages and Salaries	$51,134,731
Retirement Contributions—OPERS	6,632,837
Retirement Contributions—Medicare	717,777
Employee Insurance	8,969,888
Other Personnel Expense	138,734
Purchased Services and Supplies	
Professional Expenses	
Audit Services	845,198
Actuarial Services	621,815
Consulting Services	628,259
Investment and Financial Services	15,189,741
Legal and Investigation Services	1,168,690
Medical Examinations	855,832
Retirement Study Council	328,697
Custodial and Banking Fees	4,006,326
Information Technology	7,872,800
Communications	1,944,574
Office Supplies, Equipment and Other Miscellaneous	596,870
Education—Member and Staff	1,094,779
Facility Expenses	4,439,673
Subtotal Operating Expenses	**107,187,221**
Depreciation Expense	
Building	2,322,666
Furniture and Equipment	10,351,377
Subtotal Depreciation	**12,674,043**
Total Administrative Expenses	**119,861,264**
Investment Expenses	(42,985,961)
Net Administrative Expenses	**$76,875,303**

Schedule of Investment Expenses[1] (for the year ended December 31, 2018)

Investment Staff Expense	$20,170,083
Investment Services	19,887,519
Investment Legal Services	834,804
Allocation of Administrative Expenses (See Note 2b to Financial Statements)	2,093,555
Total Investment Expenses	**$42,985,961**

[1] Excludes fees and commissions, please see Schedules of Brokerage Commissions Paid beginning on page 102.

Responsible actions: Diligent funding, asset allocation, diversification

The importance of solid investment returns cannot be overstated. Why? Because investment returns generate nearly two-thirds of all pension payments.

Throughout a member's active career, each member's contribution is combined with employer contributions and invested responsibly. This pool of investment funding is diligently and carefully invested using the time-honored paths of asset allocation and diversification. As a long-term investor, OPERS works to create sustainable returns—our highs will never be as high as some investors because all investments are carefully vetted to determine risk. When risk is deemed excessive—the investment is no longer considered to be acceptable.

When investing for the future, the investment experts do not speculate on high-risk investments, we invest responsibly. Each action, each step is taken with the goal of creating a solid financial foundation.

OPERS

OPERS Ohio Public Employees Retirement System

277 East Town Street Columbus, Ohio 43215-4642 1-800-222-7377 www.opers.org

Dear Members,

It is a privilege to present the Investment Section of the *2018 Comprehensive Annual Financial Report*. In this letter, I'll review the investment performance for 2018 and identify some key initiatives and areas of focus for the Investment Division for 2019.

Year in review

The year 2018 was a difficult one. In a research study, Deutsche Bank reported that, of the 71 asset classes it follows, 90% produced negative returns for the year, which is the highest loss percentage since 1905. Deutsche's study is especially interesting in light of the fact the Russell 3000 Index attained its all-time high as late as the end of third quarter 2018—entering into a bear market by falling a little more than 20% in the fourth quarter and ending the year down over 5%. Non-U.S. equities, which had lagged all year, performed demonstratively worse returning between negative 12%-15%, depending on the region of the world. In general, bond markets offered no sanctuary except for U.S. Treasury bonds that yielded a .80% return—only entering positive territory in the last two weeks of December as investors sought a safe haven from plunging equities and credit markets.

Tracking slightly ahead of benchmarks, and as could be expected, the OPERS Defined Benefit portfolio returned a loss of 2.99% and the Health Care Trust portfolio returned a loss of 5.8% for the year. The better performance of the Defined Benefit portfolio can be attributed to its 20% allocation to private equity and private real estate, which posted positive returns of 15.5% and 4.0%, respectively. Simply put, 2018 was quite different than 2017 when the Defined Benefit portfolio returned 16.8%.

There were some major achievements in 2018, highlighted here:

- **Internal High Yield**—The year 2018 marked the first full calendar year of performance for our Internal High Yield portfolio, launched in late 2017. The portfolio generated excess returns above its benchmark. Further, the System avoided paying fees to external managers on these internally managed assets. We expect to direct more assets from external managers to our internal team in the coming years.
- **U.S. Equity Analysis**—As part of an effort to optimize our U.S. equity allocation, Project Restock was initiated to identify the key risk factors in this large allocation. Project Restock reviewed size, style, quality and momentum trends across internally and externally managed portfolios to identify and mitigate any unintended tilts. As a result of Project Restock, we launched two U.S. Equity Multi-Factor portfolios, totaling roughly $400 million.

These portfolios will be managed by our Quantitative Equity team. Our goal for these portfolios is to diversify our internally managed U.S. Equity portfolios, which represents 77% of this asset class, so that we can generate above-market returns, manage risk, and reduce fees.

- **Investment Business Process Review**—The Investment Division continually strives to ensure our use of information technology systems is effective and cost-efficient. In keeping with this approach, OPERS conducted a business process review to assess investment-related system utilization. Following this review, we recognized a need to evaluate fixed income analytical systems currently available in the marketplace. As a result, after an extensive process, a leading provider was selected to provide portfolio analytics for fixed income and cash assets. This implementation, expected be completed in the second quarter of 2019, will help realize additional system consolidation in the near-term—resulting in operational efficiencies and cost-savings over the long-term.

A look ahead

What's ahead? As a long-term investor, OPERS must be always be aware of and analyze long-term trends with the potential to impact future investment returns. Two main global trends that could affect OPERS investments in the future include China, as an emerging market, and the U.S. national debt.

The rise of China will be a key driver of the global economic cycle as U.S. and China economies evolve. In this world, the U.S. Federal Reserve policies may be counter-balanced by China's monetary policies, altering the length and depth of economic cycles compared to recent history. This change in cycle length, in turn, could make it increasingly difficult to determine where we are in the business cycle and, therefore, how to best allocate OPERS assets.

Equally concerning, the growing U.S. national debt may have very long-term consequences. Traditionally, the U.S. has historically paid down its debt during a recovery, which the market is currently experiencing since 2009. This has not been the case as nearly two trillion dollars in new debt has been added in the past two years; with no signs of reversing that trend. Therefore, the impact of servicing this higher debt on domestic growth and the U.S. ability to employ fiscal stimulus during recessions could be significantly impacted.

Positioning OPERS assets

OPERS invests in global markets. We work to position the System to maximize opportunities and minimize unwarranted risk. Here are a few initiatives for 2019 within the Investment Division to do just that:

- **Asset/Liability Study**—Throughout 2019, the OPERS investment consultants, actuary, staff and the Board will review the existing asset allocation mixes of the Defined Benefit and Health Care portfolios. This study could result in changes to our asset class allocations based on an analysis of expected liabilities, asset class returns, fees, liquidity, structure and implementation costs. The study for the Defined Benefit portfolio is expected to be completed by the end of May 2019, and the study for the Health Care portfolio is expected to be completed shortly thereafter.

- **External Manager Search (Defined Contribution Portfolio)**—As part of our ongoing due diligence, staff will be reviewing externally managed defined contribution platforms to determine market offerings for the investment and operational management of the plan.
- **Implement Fixed Income Analytics System**—As mentioned earlier, a leading provider was selected to implement a fixed income analytics system. The implementation is expected to be completed by June 2019.
- **Focus on Reducing Fees**—Costs really do matter. We are continuously investigating ways to reduce the overall fee structure for the Investment Division. Possible ways of doing so in 2019 are to seek fee reductions from external managers, bring assets in-house, and move assets from active to passive management, when appropriate. All avenues will be explored in 2019.

Ever forward—responsible decisions

Although marketplace volatility resulted in disappointing returns for 2018, it's important to note OPERS managed against that volatility to perform slightly better than our benchmarks. We look forward to 2019. As with any year, 2019 will bring opportunities and challenges—and we are prepared to find and address both.

As we evolve to meet our responsibilities of current and future commitments, we have the privilege to work with a dedicated and diligent Board of Trustees. At Board direction, we will continue to adhere to our stated policies—policies designed to help the System remain strong. Working with the Board, I know that all members of management and the investment staff are equally committed to make responsible decisions that will distill the best possible outcomes for the System—in 2019 and every year in our future.

Paul Greff
Chief Investment Officer
April 25, 2019

Board Investment and Fiduciary Duties

(A) The members of the public employees retirement board shall be the trustees of the funds created by section 145.23 of the Revised Code. The board shall have full power to invest the funds. The board and other fiduciaries shall discharge their duties with respect to the funds solely in the interest of the participants and beneficiaries; for the exclusive purpose of providing benefits to participants and their beneficiaries and defraying reasonable expenses of administering the public employees retirement system; with care, skill, prudence, and diligence under the circumstances then prevailing that a prudent person acting in a like capacity and familiar with these matters would use in the conduct of an enterprise of a like character and with like aims; and by diversifying the investments of the system so as to minimize the risk of large losses, unless under the circumstances it is clearly prudent not to do so.

(B) In exercising its fiduciary responsibility with respect to the investment of the funds, it shall be the intent of the board to give consideration to investments that enhance the general welfare of the state and its citizens where the investments offer quality, return, and safety comparable to other investments currently available to the board. In fulfilling this intent, equal consideration shall also be given to investments otherwise qualifying under this section that involve minority owned and controlled firms and firms owned and controlled by women either alone or in joint venture with other firms.

OPERS

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NEPC, LLC

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April 24, 2019

Board of Trustees
Ohio Public Employees Retirement System
277 East Town Street
Columbus, OH 43215-4642

As an independent investment advisor to the Ohio Public Employees Retirement System ('OPERS') and the Board of Trustees (the 'Board'), NEPC, LLC is providing an opinion on the reporting of OPERS investment results, investment policies, internal compliance procedures and the Board's oversight of the Retirement System's investments.

Investment Results

To the best of NEPC's knowledge and belief, OPERS investment results, as presented in this Comprehensive Annual Financial Report (CAFR), accurately represent the performance of the Retirement System's Defined Benefit, Health Care and Defined Contribution assets. All measurements shown have been calculated using standard performance evaluation methods and are presented in a manner that is consistent with investment industry standards.

Investment Policies

OPERS investment policies can be accessed online at https://www.opers.org/investments/inv-plans.shtml and are organized as follows: Part I: Investment Objectives and Asset Allocation Policies; Part II: Asset Class and Sub-Asset Class Policies; Part III: Investment-Wide Policies; and Part IV: Corporate Governance and Proxy Voting Policies.

In NEPC's opinion, OPERS assets are managed under a set of transparent investment policies and guidelines. These policies and guidelines adequately highlight the strategic performance objectives of the Ohio Public Employees Retirement System and emphasize the dual importance of maintaining robust risk controls and program diversification.

Internal Compliance

The constant testing of Fund portfolios and the continuous review of the compliance function itself is considered to be best practice within the investment industry. While serving as OPERS generalist investment consultant, NEPC has witnessed Staff's consistent and ongoing efforts to improve the effectiveness of their internal compliance procedures. NEPC also believes that the Investment Division's support of the CFA® Institute's Code of

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Ethics and Standards of Professional Conduct, as well as the guidelines and procedures that are set forth in the OPERS Code of Ethics and OPERS Personal Trading Policies, are consistent with industry best practice for investment professionals.

Prudent Oversight

The daily management of the OPERS assets has been clearly delegated to the Retirement System's investment Staff. In NEPC's opinion, this clear delegation of accountability helps the Board maintain effective oversight of the OPERS Defined Benefit, Health Care and Defined Contribution Funds through quarterly performance reviews, regular oversight of Staff's activities and monthly meetings with Staff, the investment consultants and other independent service providers.

Craig Svendsen, CFA
Partner

NEPC, LLC

Introduction

The total OPERS investment portfolio, as reflected in the Combining Statement of Fiduciary Net Position, pages 36-37, is comprised of Defined Benefit, Health Care, and Defined Contribution portfolio assets. The Defined Benefit portfolio assets originate from Traditional Pension Plan member and employer contributions, employer contributions to the Combined Plan, and funds from defined contribution accounts for annuities. The investment of these assets is the responsibility of the Investment staff, adhering to the policies approved by the OPERS Board of Trustees (Board).

In 2005, the Health Care portfolio assets were segregated from the pension portfolio and invested with a more conservative, and shorter term, asset-allocation strategy. The Health Care portfolio is comprised of assets set aside to provide post-employment health care for the retirees of the Traditional Pension Plan, Combined Plan and Member-Directed Plan. The investment of these assets is the responsibility of the Investment staff, adhering to the policies approved by the Board. Prior to 2017, heath care assets were included in two trusts established under Internal Revenue Code Sections 115 and 401(h). Accordingly, historical information was reported in this section as the 115 Health Care Trust and 401(h) Health Care Trust portfolios. The 401(h) Health Care Trust portfolio was transferred to the 115 Health Care Trust portfolio on July 1, 2016 and one portfolio remains for health care. Historical information in this section reflects the different health care portfolios in place for the time periods reported.

Defined Contribution portfolio assets originate from member contributions to the Combined Plan and both member and employer contributions to the Member-Directed Plan. The investment of Defined Contribution portfolio assets is self-directed by members of the Combined and Member-Directed plans, but is limited to investment options approved by the Board and the self-directed brokerage account window.

Investment summary

The Total Investment Summary (starting on page 97) relates to System-wide investments and includes the assets of all three portfolios as of December 31, 2018. The balance of information in this Investment Section is organized as follows: Defined Benefit portfolio investments (pages 107-111) relating exclusively to defined benefit assets; Health Care portfolio investments (pages 113-117) relating exclusively to health care assets; and Defined Contribution portfolio investments (pages 119-121) relating exclusively to defined contribution assets. The Investment Objectives and Policies and Asset Class Policies (pages 123-132) provide information on the System investment policies and performance objectives.

All returns presented throughout the Investment Section are net of external manager fees, overdraft charges, debit interest, registration expenses, stamp duties, and taxes spent on foreign securities. In addition, securities lending money market returns are net of custodial fees, transfer agent expenses, and professional fees.

A complete list of assets held as of December 31, 2018 is available upon request.

The table below reflects the total investment portfolio, which includes three component portfolios, as of December 31, 2018: the Defined Benefit portfolio, the Health Care portfolio and the Defined Contribution portfolio.

Investments are reported at fair value. Short-term investments are reported at cost, which approximates fair value. Securities traded on a national or international exchange are valued at the last-reported sales price at current exchange rates. Performance results and fair values for the real estate and private equity asset classes are typically reported on a quarter lag basis, adjusted for cash flow activity during the fourth quarter. If any significant market gains or losses occur in the fourth quarter, these asset classes are adjusted for financial reporting purposes to reflect the estimated fair value at year end. The investment results reported for these asset classes in the Investment Section reflect this practice. The table below displays the fair values of investment assets consistent with the presentation in the financial statements on pages 36-37.

Summary of Cash, Cash Equivalents and Investments (as of December 31, 2018)

	Fair Value	Percent of Total Fair Value
Cash and Cash Equivalents		
Cash	$141,907,034	0.15%
Cash Equivalents		
Commercial Paper	882,972,789	0.94
U.S. Treasury Obligations	436,590,953	0.46
Repurchase Agreements	1,050,000,000	1.12
Interest-Bearing Short-Term Certificates	200,000,000	0.21
Short-Term Investment Funds (STIF)	1,274,687,194	1.36
Total Cash and Cash Equivalents	**3,986,157,970**	**4.24**
Investments		
Fixed Income		
U.S. Corporate Bonds	5,012,814,641	5.33
Non-U.S. Notes and Bonds	7,702,336,457	8.20
U.S. Government and Agencies	8,066,479,687	8.58
U.S. Mortgage Backed	3,610,269,285	3.84
Subtotal Fixed Income	24,391,900,070	25.95
Domestic Equities	17,766,727,911	18.91
Real Estate	8,062,476,147	8.58
Private Equity	9,619,253,716	10.24
International Equities	16,694,636,586	17.77
Other Investments[1]	13,442,805,902	14.31
Total Long-Term Investments	**89,977,800,332**	**95.76**
Total Cash, Cash Equivalents and Investments	**$93,963,958,302**	**100.00%**

[1] Includes hedge funds, derivatives, risk parity and global tactical asset allocation.

Total Investment Summary

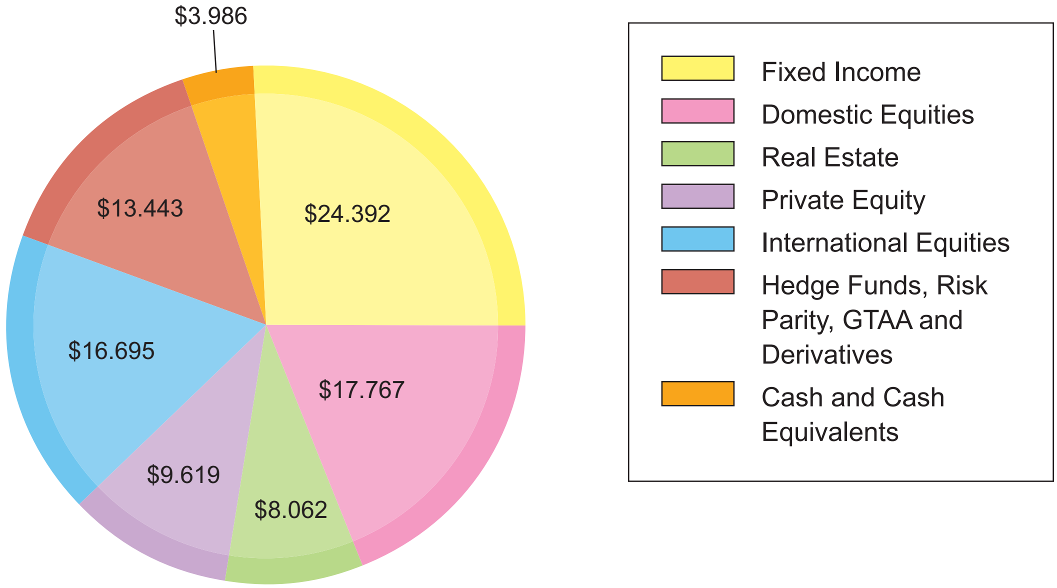
The table below reflects the breakdown of the total investment portfolio into the three component portfolios—the Defined Benefit, the Health Care and the Defined Contribution portfolios.

Total Summary of Cash, Cash Equivalents and Investments by Portfolio[1] (as of December 31, 2018)

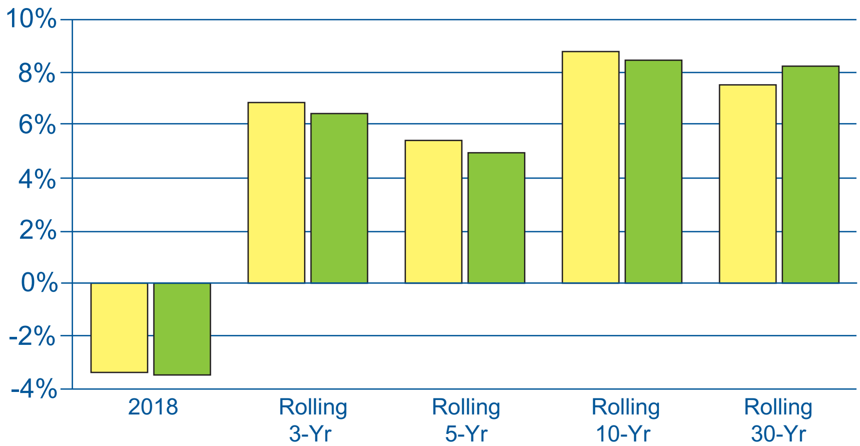
	Defined Benefit	Health Care	Defined Contribution	Total
Fixed Income	$19,885,743,004	$4,117,147,799	$389,009,267	$24,391,900,070
Domestic Equities	14,143,799,885	2,911,258,188	711,669,838	17,766,727,911
Real Estate	8,062,476,147			8,062,476,147
Private Equity	9,619,253,716			9,619,253,716
International Equities	14,107,125,509	2,240,589,009	346,922,068	16,694,636,586
Other Investments[2]	11,946,809,472	1,495,996,430		13,442,805,902
Cash and Cash Equivalents	3,390,974,628	595,183,342		3,986,157,970
Total	**$81,156,182,361**	**$11,360,174,768**	**$1,447,601,173**	**$93,963,958,302**

[1] Assets summarized on performance basis.
[2] Includes hedge funds, derivatives, risk parity and global tactical asset allocation.

Total Investment Summary (as of December 31, 2018, $ in billions)



Total Investment Returns—Annual Rates of Return[1]



	2018	Rolling 3-Yr	Rolling 5-Yr	Rolling 10-Yr	Rolling 30-Yr
Total Investment Returns	(3.38%)	6.85%	5.41%	8.80%	7.51%
Policy Benchmark Returns	(3.47%)	6.44%	4.96%	8.48%	8.26%[a]

[a] The benchmark returns for 1996 and prior years were estimated.

[1] Annual Rates of Return—The returns are the result of the returns generated by Defined Benefit, Health Care and Defined Contribution portfolio investments, based on a combination of time-weighted calculations and market value-weighted calculations. The policy benchmark is derived by a market value-weighted calculation of the Defined Benefit, Health Care, and Defined Contribution investment policy benchmarks while all other returns throughout the remainder of this section are derived from a time-weighted calculation. All returns presented throughout the Investment Section are net of external manager fees, overdraft charges, debit interest, registration expenses, stamp duties, and taxes spent on foreign securities. In addition, the securities lending money market returns are net of custodial fees, transfer agent expenses, and professional fees.

Historical Investment Returns

Year	Total Portfolio Return	Total Defined Benefit Return[1]	Total 401(h) Health Care Trust Return[1]	Total 115 Health Care Trust Return (Health Care Portfolio)	Total Defined Contribution Return[2]
2018	(3.38%)	(2.99%)		(5.76%)	(6.65%)
2017	16.62	16.82		15.25	17.39
2016	8.23	8.31[a]	4.73%[a]	5.11[a]	9.51
2015	(0.03)	0.33	(2.18)	(3.23)	(1.71)
2014	6.70	6.96	5.28	(0.03)[b]	4.83
2013	14.00	14.38	11.36		20.45
2012	14.40	14.54	13.72		13.37
2011	0.20	0.36	(0.38)		(2.59)
2010	13.90	13.98	13.93		13.74
2009	20.06	19.09	24.80		26.44
2008	(26.92)	(27.15)	(25.77)		(28.00)
2007	8.52	8.89	6.87		5.80
2006	14.66	15.05	12.78		12.96
2005	9.03	9.25	8.00		6.88
2004	12.49	12.50			9.73
2003	25.39	25.39			
2002	(10.73)	(10.73)			
2001	(4.58)	(4.58)			
2000	(0.71)	(0.71)			
1999	12.10	12.10			
1998	14.45	14.45			
1997	13.37	13.37			
1996	7.85	7.85			
1995	20.47	20.47			
1994	(0.02)	(0.02)			
1993	9.72	9.72			
1992	5.66	5.66			
1991	15.68	15.68			
1990	6.30	6.30			
1989	18.38	18.38			

[a] Returns are six-month cumulative returns as of June 30, 2016 in the 401(h) Health Care Trust. The 401(h) Health Care Trust and the Voluntary Employees' Beneficiary Association (VEBA) Trust were closed as of June 30, 2016. Prior to July 1, 2016, the VEBA Trust assets were included in the Defined Benefit portfolio. On July 1, 2016, the 401(h) Health Care Trust and VEBA Trust assets were transferred to the 115 Health Care Trust portfolio. The combined return on the total health care assets for the year ended December 31, 2016 was 7.55%. The number disclosed in the 115 Health Care Trust column, 5.11%, represents the return for the 115 Health Care Trust portfolio assets.

[b] The 115 Health Care Trust was established September 2014. Returns are two-month cumulative returns in 2014 since funding of the 115 Health Care Trust portfolio began November 2014.

[1] Prior to 2005, the 401(h) Health Care Trust assets were included in the Defined Benefit portfolio. In 2005, the 401(h) Health Care Trust assets were segregated from the Defined Benefit portfolio into a separate portfolio with portfolio-specific asset allocation and investment policies. Accordingly, Defined Benefit returns for 2004 and prior represent a composite of the Defined Benefit and 401(h) Health Care Trust assets.

[2] Defined Contribution plans commenced January 1, 2003, with a separate portfolio established in 2004.

Largest Equity Holdings (by fair value)[1] (as of December 31, 2018)

Description	Shares	Fair Value
Microsoft Corp.	5,376,931	$546,134,882
Apple Inc.	3,268,595	515,588,175
Amazon.com Inc.	276,750	415,670,198
Berkshire Hathaway Inc.	1,304,379	266,328,104
Johnson & Johnson Co.	1,985,752	256,261,296
JPMorgan Chase & Co.	2,311,515	225,650,094
Alphabet Inc. Class A	206,364	215,642,125
Alphabet Inc. Class C	204,731	212,021,471
Facebook Inc.	1,600,756	209,843,104
Samsung Electronics Co. Ltd	5,794,093	200,960,216
Total	**22,329,866**	**$3,064,099,665**

Largest Bond Holdings (by fair value)[1] (as of December 31, 2018)

Description	Coupon	Maturity	Rating	Par Value	Fair Value
U.S. Treasury Bond	2.500%	2/15/2045	AAA	$281,498,000	$254,989,373
Ginnie Mae Pool	3.000	1/20/2049	AAA	200,000,000	196,781,700
U.S. Treasury Note	1.500	5/31/2020	AAA	193,375,000	190,533,928
Fannie Mae Pool	3.500	2/1/2048	AAA	176,663,324	176,669,115
U.S. Treasury Note	1.625	7/31/2020	AAA	146,682,000	144,607,079
U.S. Treasury Note	1.375	5/31/2021	AAA	145,573,000	141,850,410
U.S. Treasury Note	3.125	11/15/2028	AAA	128,305,000	133,097,602
U.S. Treasury Bond	3.625	2/15/2044	AAA	119,035,000	131,869,781
U.S. Treasury Note	1.375	10/31/2020	AAA	132,628,000	129,945,113
U.S. Treasury Note	1.125	7/31/2021	AAA	129,108,000	124,765,558
Total				**$1,652,867,324**	**$1,625,109,659**

[1] A complete list of assets held as of December 31, 2018 is available upon request.

U.S. Equity Commissions (for the year ended December 31, 2018)

Brokerage Firm	U.S. Equity Commissions Paid	Shares Traded	Average Commission Per Share
UBS Securities LLC	$548,559	53,653,054	$0.010
J.P. Morgan Securities LLC	235,439	23,915,193	0.010
Merrill Lynch & Co. Inc.	203,135	14,917,544	0.014
Credit Suisse Securities (USA) LLC	178,949	11,325,587	0.016
Weeden & Co.	132,657	16,708,676	0.008
Investment Technology Group Inc.	109,107	17,842,390	0.006
Morgan Stanley & Co.	107,699	6,983,708	0.015
RBC Capital Markets Corp.	95,606	6,460,981	0.015
Barclays Capital Inc.	86,242	8,250,400	0.010
Citigroup Global Markets Inc.	82,587	6,861,261	0.012
Liquidnet Inc.	69,209	3,514,702	0.020
Goldman Sachs & Co.	60,972	3,765,387	0.016
Sanford C. Bernstein & Co.	58,919	6,284,579	0.009
HSBC Securities Inc.	43,621	4,098,299	0.011
KeyBanc Capital Markets Inc.	37,751	1,897,582	0.020
ISI Group Inc.	26,130	1,326,476	0.020
Wells Fargo Securities LLC	24,651	1,732,381	0.014
Pershing LLC	22,503	2,149,114	0.010
Other Commissions less than $20,000	183,984	16,133,564	0.011
Total U.S. Equity Commissions	**$2,307,720**	**207,820,878**	**$0.011**

Non-U.S. Equity Commissions (for the year ended December 31, 2018)

Brokerage Firm	Non-U.S. Equity Commissions Paid	Shares Traded	Average Commission Per Share
UBS Securities LLC	$356,867	451,206,764	$0.001
Morgan Stanley & Co.	286,030	135,559,743	0.002
Merrill Lynch & Co. Inc.	285,028	136,478,832	0.002
Instinet LLC	284,549	163,203,146	0.002
Citigroup Global Markets Inc.	279,170	83,172,914	0.003
Goldman Sachs & Co.	270,982	207,096,856	0.001
Credit Suisse Securities LLC	237,303	92,775,107	0.003
J.P. Morgan Securities LLC	235,705	97,630,777	0.002
Deutsche Bank Securities Inc.	218,555	128,009,956	0.002
HSBC Securities Inc.	201,539	46,566,949	0.004
Investment Technology Group Inc.	188,747	74,529,221	0.003
Macquarie Bank Ltd.	162,900	114,772,122	0.001
S.G. Securities	161,787	108,098,830	0.001
Sanford C. Bernstein & Co.	121,108	33,783,452	0.004
Credit Lyonnais Bank	100,336	55,866,674	0.002
Banque BNP Paribas	68,510	34,439,509	0.002
Daiwa Capital Markets Inc.	66,147	4,597,155	0.014
Bank of New York Mellon Corp.	53,865	11,192,813	0.005
Jefferies & Co.	49,676	6,828,147	0.007
SMBC Nikko Securities Inc.	46,345	2,740,308	0.017
Exane	44,793	7,929,678	0.006
RBC Capital Markets Corp.	42,864	2,250,013	0.019
Pershing Securities Ltd.	39,650	5,020,612	0.008
Societe Generale Securities Services	39,237	6,113,718	0.006
CLSA Global Markets Pte Ltd.	31,698	10,377,085	0.003
Banco BTG Pactual SA	26,665	2,348,087	0.011
Woori Investment & Securities	25,469	288,768	0.088
Mizuho Securities	24,128	1,264,712	0.019
Barclays Capital Inc.	22,828	3,007,214	0.008
Mitsubishi UFJ Securities Holdings Co., Ltd.	22,727	730,000	0.031
ICICI Brokerage Services Ltd.	21,945	8,632,197	0.003
Hyundai Securities	21,493	171,245	0.126
Maybank Kim Eng Securities Pte. Ltd.	20,976	2,325,397	0.009
Banco Bradesco SA	20,905	4,904,222	0.004
Other Commissions less than $20,000	443,810	135,234,776	0.003
Total Non-U.S. Equity Commissions	**$4,524,337**	**2,179,146,999**	**$0.002**

Futures Commissions (for the year ended December 31, 2018)

Brokerage Firm	Futures Commissions Paid	Contracts Traded	Average Commission Per Contract
Goldman Sachs & Co.	$660,242	306,032	$2.16
Credit Suisse Securities LLC	323,207	182,645	1.77
Total Futures Commissions	**$983,449**	**488,677**	**$2.01**
Total U.S. Equity, Non-U.S. Equity and Futures Commissions	**$7,815,506**	**N/A**	**N/A**

Brokerage commissions do not include commissions paid by external investment managers using commingled fund structures. OPERS maintains a commission recapture program with several of its non-U.S. Equity managers. Capital Institutional Services Inc. and Frank Russell Securities Inc. perform record-keeping services for the commission recapture program.

The total commissions schedule includes $622,294 in commissions paid that were part of a commission sharing agreement (CSA). CSA funds are held by the participating brokers and may be used to purchase qualifying investment research services. During 2018, $240,000 of investment research services were purchased using CSA funds.

Schedule of Fees to External Asset Managers by Portfolio (for the year ended December 31, 2018)

	Defined Benefit	Health Care	Defined Contribution	Total
Fixed Income	$23,080,239	$2,993,832	$215,542	$26,289,613
Domestic Equities	13,576,213	2,204,041	211,924	15,992,178
International Equities	46,647,648	7,733,856	154,150	54,535,654
Private Equity[1]	240,560,435			240,560,435
Other Investments[1]	152,039,295	15,841,020		167,880,315
Real Estate[1]	87,986,621			87,986,621
Total Fees	**$563,890,451**	**$28,772,749**	**$581,616**	**$593,244,816**

[1] All investment manager fees reported to OPERS, whether directly invoiced or subtracted from the fund on a net basis, are reported as External Asset Management Fees in the Combining Statement of Changes in Fiduciary Net Position. OPERS makes a good faith attempt to account for fees that are not readily separable. Net Management Fees are net of management fee offsets. Performance Fees represent the investment managers' share of the net profits realized by the fund during the period. Other Investments includes hedge funds, derivatives, risk parity and global tactical asset allocation.

Schedule of Fees to External Asset Managers by Category (for the year ended December 31, 2018)

	Net Management Fees	Fund Expenses	Subtotal	Performance Fees	Total
Fixed Income	$26,289,613		$26,289,613		$26,289,613
Domestic Equities	15,992,178		15,992,178		15,992,178
International Equities	54,535,654		54,535,654		54,535,654
Private Equity[1]	94,104,191	$30,691,617	124,795,808	$115,764,627	240,560,435
Other Investments[1]	116,101,301	25,431,978	141,533,279	26,347,036	167,880,315
Real Estate[1]	47,222,702	8,420,496	55,643,198	32,343,423	87,986,621
Total Fees	**$354,245,639**	**$64,544,091**	**$418,789,730**	**$174,455,086**	**$593,244,816**

[1] All investment manager fees reported to OPERS, whether directly invoiced or subtracted from the fund on a net basis, are reported as External Asset Management Fees in the Combining Statement of Changes in Fiduciary Net Position. OPERS makes a good faith attempt to account for fees that are not readily separable. Net Management Fees are net of management fee offsets. Performance Fees represent the investment managers' share of the net profits realized by the fund during the period. Other Investments includes hedge funds, derivatives, risk parity and global tactical asset allocation.

Schedule of External Asset Managers (for the year ended December 31, 2018)

U.S. Equity Managers		
Affinity Investment Advisors	First Fiduciary Investment Counsel Inc.	Opus Capital Management
Atlanta Capital Management Company LLC	Geneva Capital Management Ltd.	Penn Capital Management
Bowling Portfolio Management LLC	Hahn Capital Management LLC	Quantitative Management Associates LLC
CT Mason Inc. (aka Grace Capital)	Matarin Capital	Redwood Investments LLC
Dean Investment Associates	New South Capital Management	Wasatch Advisors
Decatur Capital Management	Nicholas Investment Partners	Winslow Asset Management
Disciplined Growth Investors	Oberweis Asset Management Inc.	

Non-U.S. Equity Managers		
Acadian	Fisher Investments	Strategic Global Advisors
AQR Capital Management LLC	J.P. Morgan	T. Rowe Price International Ltd.
Arrowstreet	J O Hambro Capital Management Ltd.	Vontobel Asset Management
Baillie Gifford	Lazard	Walter Scott & Partners
BlackRock Financial Management Inc.	LSV	Wasatch Advisors Inc.
Copper Rock Capital Partners LLC	Oldfield Partners LLP	
Dimensional Fund Advisors	Schroder Investment Management NA Inc.	

Bond Managers		
Aberdeen Asset Management	Fort Washington Investment Advisors Inc.	Nomura Group
AFL-CIO Housing Investment Trust	Franklin Templeton Institutional LLC	Post Advisory Group
Ashmore Investment Management Ltd.	Lazard	Stone Harbor
Capital Guardian	Loomis, Sayles & Company LP	
CIFC	Neuberger Berman	

Hedge Fund Managers		
AQR Capital Management	Egerton Capital	Och Ziff Capital Management
Aristeia Capital LLC	First Quadrant	Panagora Asset Management
Arrowgrass Partnership	Graham Capital	Prisma Capital Partners LP
Ascend Partners	Highline Capital Partners	Putnam Investments
Beach Point Capital Management	Jana Partners	Schroders
BlackRock Financial Management, Inc.	K2 Advisors	Scopia Capital
Bridgewater Associates	Kepos Capital	Taconic Investment Partners
Brigade Capital Management LP	KLS Diversified Asset Management	Third Point Partners
Canyon Capital Advisors LLC	Kynikos Associates	Visium Asset Management
Capital Fund Management S.A.	Lakewood Capital Partners	Wellington Management
CQS Management	Lynx Asset Management AB	Winton Capital
Davidson Kempner Institutional Partners LP	Oceanwood Capital Management LLP	York Capital Management

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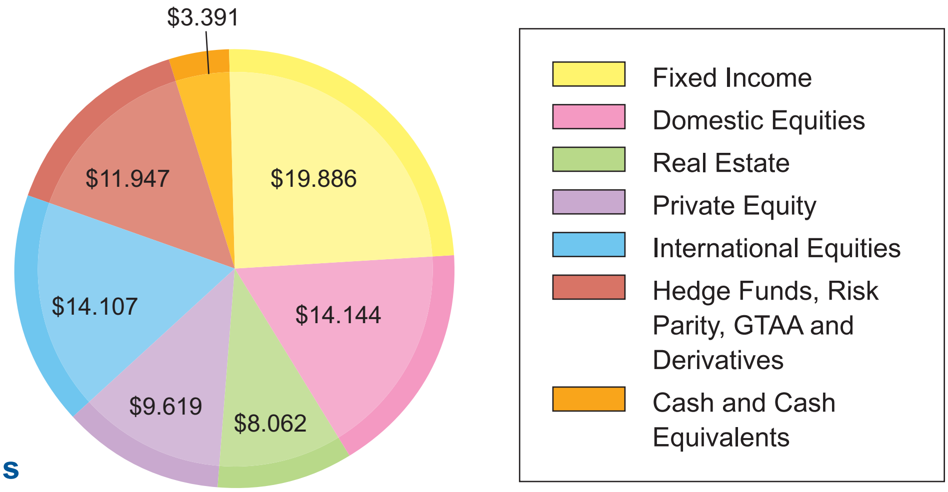
As noted previously, the Investment Division manages the total investment portfolio by dividing it into three sub-portfolios. These portfolios are: the Defined Benefit portfolio, the Health Care portfolio, and the Defined Contribution portfolio. All information prior to this point has been reported on the OPERS total investment portfolio; however, all the following information will be presented at the specific portfolio level.

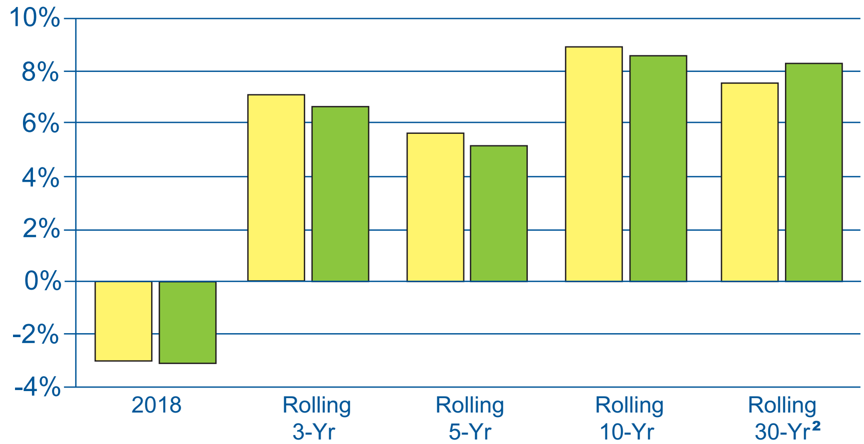
Defined Benefit Portfolio Asset Allocation (as of December 31, 2018, $ in billions)



Investment Returns

The Defined Benefit portfolio reported an investment loss of 2.99% in 2018. The overall portfolio return is compared to a composite benchmark return that could be achieved by a portfolio that is passively invested in the broad market, with percentage weights allocated to each asset class as specified in the *OPERS Statement of Investment Objectives and Policies*. The return of the policy benchmark for 2018 was a loss of 3.07%.

Investment Returns—Annual Rates of Return[1] — Defined Benefit Portfolio



	2018	Rolling 3-Yr	Rolling 5-Yr	Rolling 10-Yr	Rolling 30-Yr[2]
Defined Benefit Portfolio Returns	(2.99%)	7.07%	5.67%	8.92%	7.57%
Policy Benchmark Returns	(3.07%)	6.65%	5.17%	8.60%	8.30%[a]

[a] The benchmark returns for 1996 and prior years were estimated.

[1] Annual Rates of Return—The Defined Benefit portfolio return is based on a time-weighted calculation. The policy benchmark is derived by a market value-weighted calculation of the Defined Benefit investment policy benchmarks. All returns are net of external manager fees, overdraft charges, debit interest, registration expenses, stamp duties, and taxes spent on foreign securities.

[2] The 401(h) Health Care Trust portfolio was segregated from the Defined Benefit portfolio in 2005; thus, the 30-year rolling return information reflects both the Defined Benefit and 401(h) Health Care Trust portfolios.

Investment returns for the Defined Benefit portfolio underlying asset class composites and their respective benchmarks are shown below:

Schedule of Investment Results (for the year ended December 31, 2018) **Defined Benefit Portfolio**

	2018	Rolling 3-Year	Rolling 5-Year
Total Defined Benefit Portfolio	**(2.99%)**	**7.07%**	**5.67%**
Total Defined Benefit Portfolio Benchmark[1]	**(3.07)**	**6.65**	**5.17**
U.S. Equity Composite	(5.07)	8.83	7.59
U.S. Equity Composite Benchmark	(5.24)	8.97	7.91
Non-U.S. Equity Composite	(14.45)	5.78	2.12
Non-U.S. Equity Composite Benchmark	(14.74)	5.16	1.07
Core Fixed Composite	(0.06)	2.10	2.73
Core Fixed Composite Benchmark	0.01	2.06	2.52
TIPS Composite	(1.26)	2.07	1.68
TIPS Composite Benchmark	(1.26)	2.11	1.69
High Yield Composite	(2.28)	6.05	3.41
High Yield Composite Benchmark	(2.08)	7.23	3.83
Emerging Markets Debt Composite	(5.99)	5.54	1.33
Emerging Markets Debt Composite Benchmark	(5.33)	5.40	1.65
Securitized Debt Composite	3.21	3.25	6.39
Securitized Debt Composite Benchmark	2.79	4.80	4.54
Floating Rate Debt Composite	13.84	6.46	5.21
Floating Rate Debt Composite Benchmark	1.14	5.03	3.33
Private Equity Composite	15.49	13.81	13.02
Private Equity Composite Benchmark	15.00	12.83	11.94
Real Estate Composite	4.04	8.18	11.88
Real Estate Composite Benchmark	8.56	8.68	10.56
Hedge Funds Composite	(1.51)	2.98	2.32
Hedge Funds Composite Benchmark	(3.07)	3.48	2.24
Opportunistic Composite	0.57	1.32	1.50
Opportunistic Composite Benchmark	0.86	1.40	2.03
Commodities Composite	(13.59)	0.96	(13.95)
Commodities Composite Benchmark	(13.82)	0.50	(14.52)
Cash Composite	2.16	1.35	0.94
Cash Composite Benchmark	1.87	1.02	0.63
Additional Annuity Composite	2.37	2.05	1.84
Additional Annuity Composite Benchmark	1.87	1.02	0.63
Risk Parity Composite	(9.93)	7.23	3.92
Risk Parity Composite Benchmark	(10.08)	2.37	3.59
GTAA Composite	(10.13)	3.88	3.39
GTAA Composite Benchmark	(4.77)	5.07	3.60
U.S. Treasury Composite	0.84	1.39	N/A
U.S. Treasury Composite Benchmark	0.86	1.40	N/A

[1] **Defined Benefit Portfolio Benchmark**—The returns for this benchmark are derived from the asset class composite benchmark returns summarized in the table above, the historical asset class target allocations listed on the next page, and the asset class composite benchmark indices listed in the table on page 110.

Historical Asset Class Target Allocations — Defined Benefit Portfolio

Asset Class	2018	2017	2016	2015	2014
U.S. Equity	20.9%	22.0%	22.4%	22.3%	21.4%
Opportunistic	0.1	0.1	0.1	0.1	0.1
Core Bonds	10.9	8.9	9.8	9.5	10.3
Floating Rate Debt	0.1	0.1	0.2	0.5	0.7
Global High Yield	N/A	N/A	1.0	1.0	1.0
Securitized Debt	1.0	1.0	1.0	1.0	1.0
Non-U.S. Equity	20.0	18.9	18.5	18.6	19.5
Private Real Estate	10.0	10.0	10.0	10.0	10.0
Private Equity	10.0	10.0	10.0	10.0	10.0
High Yield	2.0	3.0	3.0	3.0	3.0
Emerging Markets Debt	6.0	7.0	6.0	6.0	6.0
Hedge Funds	8.0	8.0	8.0	8.0	8.0
Commodities	1.0	1.0	1.0	1.0	1.0
Risk Parity	5.0	5.0	5.0	5.0	5.0
GTAA	2.0	2.0	2.0	2.0	2.0
TIPS	2.0	2.0	1.0	1.0	1.0
U.S. Treasury	1.0	1.0	1.0	1.0	N/A
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

To arrive at customized benchmark performance, the asset allocation targets are multiplied by the performance of the corresponding asset class reference indices. The asset class reference indices are specified by the Investment Policy, and are displayed below:

Historical Asset Class Composite Benchmark Indices — Defined Benefit Portfolio

Asset Class Composite Benchmarks	As of December 31				
	2018	2017	2016	2015	2014
U.S. Equity	Russell 3000 Stock Index[1]	Russell 3000 Stock Index	Russell 3000 Stock Index	Russell 3000 Stock Index	Russell 3000 Stock Index
Opportunistic	Custom Opportunistic Benchmark[2]	Custom Opportunistic Benchmark	Custom Opportunistic Benchmark	Custom Opportunistic Benchmark	Custom Opportunistic Benchmark
Core Bonds	Bloomberg Barclays U.S. Aggregate Bond Index[3]	Bloomberg Barclays U.S. Aggregate Bond Index	Bloomberg Barclays U.S. Aggregate Bond Index	Custom Core Fixed	Custom Core Fixed
Floating Rate Debt	Credit Suisse Leveraged Loan Index[4]	Credit Suisse Leveraged Loan Index	Credit Suisse Leveraged Loan Index	Credit Suisse Leveraged Loan Index	Credit Suisse Leveraged Loan Index
Global High Yield	N/A	N/A	Bloomberg Barclays Global High Yield Index	Barclays Global High Yield	Barclays Global High Yield
Securitized Debt	Custom Securitized Debt Benchmark[5]	Non-Agency CMBS Component of Bloomberg Barclays U.S. Aggregate Bond Index + 2%	Bloomberg Barclays CMBS Index + 2%	Barclays CMBS Index + 2%	Barclays CMBS Index + 2%
Non-U.S. Equity	Custom Non-U.S. Equity Benchmark (net)[6]	Custom Non-U.S. Equity Benchmark (net)	Custom Non-U.S. Equity Benchmark (net)	Custom Non-U.S. Equity Benchmark (net)	Custom Non-U.S. Equity Benchmark (net)
Private Real Estate	Custom Private Real Estate[7]	Custom Private Real Estate	Custom Private Real Estate	Custom Private Real Estate	Custom Private Real Estate
Private Equity	SSPEI Index[8]	SSPEI Index	SSPEI Index	SSPEI Index	Custom Private Equity
Cash Equivalents	BofAML U.S. 3-month Treasury Bill Index[9]	BofAML U.S. 3-month Treasury Bill Index	BofAML U.S. 3-month Treasury Bill Index	BofAML U.S. 3-month Treasury Bill Index	BofAML U.S. 3-month Treasury Bill Index
High Yield	Bloomberg Barclays U.S. Corporate High Yield[10]	Bloomberg Barclays U.S. Corporate High Yield	Bloomberg Barclays U.S. Corporate High Yield	Barclays Capital U.S. Corporate High Yield	Barclays Capital U.S. Corporate High Yield
Emerging Markets Debt	Custom Emerging Markets Debt Benchmark[11]	Custom Emerging Markets Debt Benchmark	Custom Emerging Markets Debt Benchmark	Custom Emerging Markets Debt Benchmark	Custom Emerging Markets Debt Benchmark
Hedge Funds	Custom Hedge Funds Benchmark[12]	Custom Hedge Funds Benchmark	Custom Hedge Funds Benchmark	Custom Hedge Funds Benchmark	Custom Hedge Funds Benchmark
Commodities	S&P Goldman Sachs Commodity Index[13]	S&P Goldman Sachs Commodity Index	S&P Goldman Sachs Commodity Index	S&P Goldman Sachs Commodity Index	S&P Goldman Sachs Commodity Index
Risk Parity	HFR Risk Parity Vol 15 Institutional Index[14]	Custom Risk Parity Benchmark	Custom Risk Parity Benchmark	Custom Risk Parity Benchmark	Custom Risk Parity Benchmark
GTAA	Custom GTAA Benchmark[15]	Custom GTAA Benchmark	Custom GTAA Benchmark	Custom GTAA Benchmark	Custom GTAA Benchmark
TIPS	Bloomberg Barclays U.S. TIPS Index[16]	Bloomberg Barclays U.S. TIPS Index	Bloomberg Barclays U.S. TIPS Index	Barclays U.S. TIPS Index	Barclays U.S. TIPS Index
U.S. Treasury	Bloomberg Barclays U.S. Treasury Index[17]	Bloomberg Barclays U.S. Treasury Index	Bloomberg Barclays U.S. Treasury Index	Barclays U.S. Treasury Index	N/A

Footnotes found on next page.

Footnotes for Schedule of Investment Results—Defined Benefit Portfolio

The footnotes below provide definitions for the asset class composite benchmark indices as of December 31, 2018:

[1] **Russell 3000 Stock Index**—A capitalization-weighted stock index consisting of the 3,000 largest publicly traded U.S. stocks by capitalization. This index is a broad measure of the performance of the aggregate domestic equity market.

[2] **Custom Opportunistic Benchmark**—Market value weight of the underlying portfolio benchmarks.

[3] **Bloomberg Barclays U.S. Aggregate Bond Index**—A market capitalization-weighted index covering the universe of most U.S. traded investment grade bonds, excluding municipal bonds and TIPS.

[4] **Credit Suisse Leveraged Loan Index**—Is designed to mirror the investible universe of the U.S.-denominated leveraged loan market.

[5] **Custom Securitized Debt Benchmark**—As of December 31, 2018, blend was 50% Bloomberg Barclays non-agency investment grade CMBS: BBB total return index unhedged USD, 50% Bloomberg Barclays non-agency CMBS agg eligible total return index value unhedged USD.

[6] **Custom Non-U.S. Equity Benchmark (net)**—As of December 31, 2018, blend was 55% MSCI World x U.S. Standard (net), 31% MSCI Emerging Markets Standard (net), 10% MSCI World x U.S. Small Cap (net), and 4% MSCI Emerging Markets Small Cap (net).

[7] **Custom Private Real Estate**—NCREIF Fund Index Open-End Diversified Core Equity (NFI-ODCE) net of fees plus an annual premium of 85 bps is a capitalization-weighted index consisting of 24 open-end commingled funds pursuing a core investment strategy.

[8] **State Street Private Equity Index (SSPEI)**—Evaluates the performance of actively managed private equity portfolios. SSPEI includes venture capital, buyout, and distressed debt funds within the U.S.

[9] **Bank of America Merrill Lynch (BofAML) U.S. 3-Month Treasury Bill Index**—The three-month Treasury Bill return as measured by Bank of America Merrill Lynch.

[10] **Bloomberg Barclays U.S. Corporate High Yield**—Covers the universe of fixed rate, non-investment grade debt.

[11] **Custom Emerging Markets Debt Benchmark**—As of December 31, 2018, blend was 50% JPMorgan EMBI Global Index, and 50% JPMorgan GBI-Emerging Markets Global Diversified USD Index.

[12] **Custom Hedge Funds Benchmark**—As of December 31, 2018, blend was 30% HFRI Event-Driven (Total) Index, 20% HFRI Equity Hedge (Total) Index, 25% HFRI Macro (Total) Index, 25% HFRI Relative Value (Total) Index.

[13] **Standard & Poor’s Goldman Sachs Commodity Index**—Tracks general price movements and inflation in the world economy. The index is calculated primarily on a world-production weighted basis and is comprised of the principal physical commodities that are the subject of active, liquid futures markets.

[14] **HFR Risk Parity Vol 15 Institutional Index**—This index includes funds with a volatility target of 15% or greater and are classified as Volatility Target: 15%. Funds must have assets under management of USD $500 million or greater in order to be considered for inclusion in an HFR Risk Parity Institutional Index.

[15] **Custom Global Tactical Asset Allocation (GTAA) Benchmark**—Market value weight of the underlying portfolio benchmarks.

[16] **Bloomberg Barclays U.S. TIPS Index**—This index consists of inflation-protected securities issued by the U.S. Treasury.

[17] **Bloomberg Barclays U.S. Treasury Index**—Is designed to measure U.S. dollar-denominated, fixed-rate, nominal debt issued by the U.S. Treasury. Treasury bills are excluded, but are part of a separate Short Treasury bond index. Separate Trading of Registered Interest and Principal of Securities (STRIPS) are excluded from the index. The U.S. Treasury index is a component of the U.S. Aggregate, U.S. Universal, Global Aggregate and Global Treasury indices.

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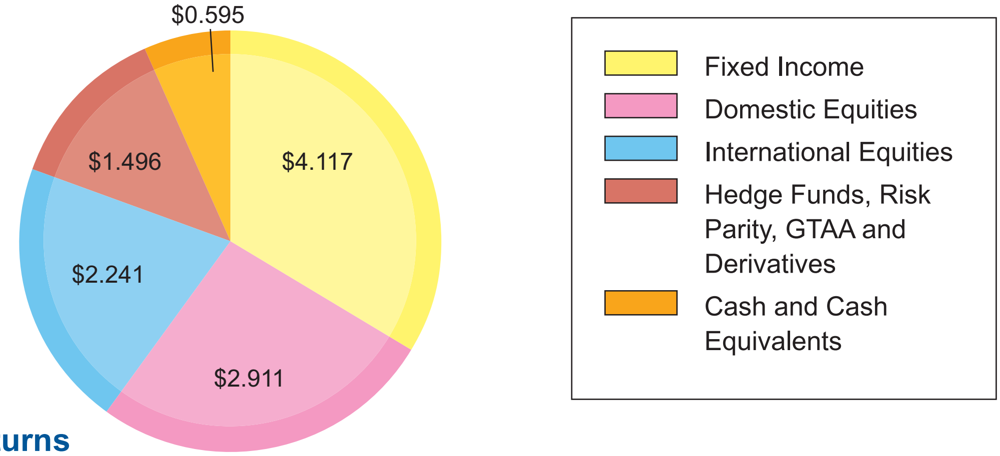
Health Care Portfolio Asset Allocation (as of December 31, 2018, $ in billions)

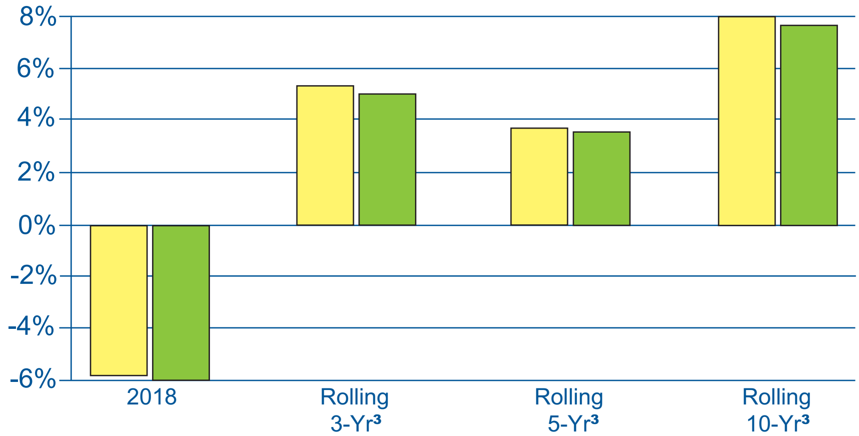


Investment Returns

The Health Care portfolio reported an investment loss of 5.76% in 2018. The overall returns are compared to a composite benchmark return that could be achieved by a portfolio that is passively invested in the broad market, with percentage weights allocated to each asset class as specified in the *OPERS Statement of Investment Objectives and Policies*. The return of the policy benchmark for 2018 was a loss of 5.96%.

Prior to 2017, health care assets were included in two trusts established under Internal Revenue Code Sections 115 and 401(h). Accordingly, historical information was reported in this section under 115 Health Care Trust and 401(h) Health Care Trust portfolios. The 401(h) Health Care Trust portfolio was transferred to the 115 Health Care Trust portfolio on July 1, 2016 and one Health Care portfolio remains. Historical information in this section reflects the different health care portfolios in place for the time periods reported.

Investment Returns—Annual Rates of Return[1] — Health Care Portfolio



	2018	Rolling 3-Yr[3]	Rolling 5-Yr[3]	Rolling 10-Yr[3]
Health Care Portfolio Returns[2]	(5.76%)	5.31%	3.75%	7.99%
Policy Benchmark Returns[2]	(5.96%)	5.02%	3.59%	7.63%

[1] Annual Rates of Return—The Health Care portfolio return is based on a time-weighted calculation and market value-weighted calculation. The policy benchmark is derived by a market value-weighted calculation of the Health Care portfolio investment policy benchmarks. All returns are net of external manager fees, overdraft charges, debit interest, registration expenses, stamp duties, and taxes spent on foreign securities.

[2] The Health Care portfolio (previously known as the 401(h) Health Care Trust portfolio) was segregated from the Defined Benefit portfolio in 2005; thus, the 30-year rolling return information does not exist.

[3] The 115 Health Care Trust portfolio was established in September 2014, and the 401(h) Health Care Trust portfolio was closed on June 30, 2016 with the assets transferring to the 115 Health Care Trust portfolio on July 1, 2016. Beginning in 2017, one health care trust exists, referred to as the Health Care portfolio. The rolling 3-year returns, the rolling 5-year returns, and the rolling 10-year returns are the combined returns of the former 115 Health Care Trust portfolio and the 401(h) Health Care Trust portfolio for all years prior to 2017.

Investment returns for the Health Care portfolio underlying asset class composites and their respective benchmarks are shown below:

Schedule of Investment Results (for the period ended December 31, 2018) **Health Care Portfolio**

	2018	Rolling 3-Year[1]	Rolling 5-Year[1]
Total Health Care Portfolio	**(5.76%)**	**5.31%**	**3.75%**
Total Health Care Portfolio Benchmark[2]	**(5.96)**	**5.02**	**3.59**
U.S. Equity Composite	(5.07)	8.83	7.59
U.S. Equity Composite Benchmark	(5.24)	8.97	7.91
Non-U.S. Equity Composite	(14.45)	5.78	2.13
Non-U.S. Equity Composite Benchmark	(14.74)	5.16	1.07
Core Fixed Composite	(0.06)	2.10	2.73
Core Fixed Composite Benchmark	0.01	2.06	2.55
TIPS Composite	(1.26)	2.07	1.68
TIPS Composite Benchmark	(1.26)	2.11	1.69
High Yield Composite	(2.28)	6.05	3.41
High Yield Composite Benchmark	(2.08)	7.23	3.83
Emerging Markets Debt Composite	(5.99)	5.54	1.33
Emerging Markets Debt Composite Benchmark	(5.33)	5.40	1.65
Securitized Debt Composite	3.21	3.25	6.39
Securitized Debt Composite Benchmark	2.79	4.80	4.54
Floating Rate Debt Composite	13.84	6.46	5.21
Floating Rate Debt Composite Benchmark	1.14	5.03	3.33
REITs Composite	(4.10)	2.03	7.89
REITs Composite Benchmark	(4.22)	1.96	7.86
Hedge Funds Composite	(1.51)	2.98	2.32
Hedge Funds Composite Benchmark	(3.07)	3.48	2.24
Opportunistic Composite	0.57	1.32	N/A
Opportunistic Composite Benchmark	0.86	1.40	N/A
Commodities Composite	(13.59)	0.96	(13.95)
Commodities Composite Benchmark	(13.82)	0.50	(14.52)
Cash Composite[3]	2.16	1.36	0.94
Cash Composite Benchmark[3]	1.87	1.02	0.63
Risk Parity Composite	(9.93)	7.23	3.92
Risk Parity Composite Benchmark	(10.08)	2.37	3.59
GTAA Composite	(10.13)	3.88	3.39
GTAA Composite Benchmark	(4.77)	5.07	3.60
U.S. Treasury Composite	0.84	1.39	N/A
U.S. Treasury Composite Benchmark	0.86	1.40	N/A

Footnotes found on next page.

[1] The 115 Health Care Trust portfolio was established in September 2014, and the 401(h) Health Care Trust portfolio was closed on June 30, 2016 with the assets transferring to the 115 Health Care Trust portfolio on July 1, 2016. Beginning in 2017, one health care trust exists, referred to as the Health Care portfolio. The Rolling 3-Year returns and the Rolling 5-Year returns are the combined returns of the former 115 Health Care Trust portfolio and the 401(h) Health Care Trust portfolio for all years prior to 2017.

[2] **Health Care Portfolio Benchmark**—The returns for this benchmark are derived from the asset class composite benchmark returns summarized in the table on the previous page, the historical asset class target allocations listed in the table below, and the asset class composite benchmark indices listed in the table on page 116.

[3] Cash Composites have a zero allocation but can hold residual cash balances of the Health Care portfolio. This can result in residual performance that does not affect the overall Health Care portfolio.

Historical Asset Class Target Allocations — Health Care Portfolio

Asset Class	2018	2017[a]	2016[b]		2015[c]		2014[d]	
	115	115	401(h)	115	401(h)	115	401(h)	115
U.S. Equity	22.9%	24.1%	24.7%	24.5%	24.4%	9.8%	23.4%	23.4%
Commodities	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0
Opportunistic	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Core Bonds	17.9	15.9	16.6	16.8	16.5	7.0	17.3	17.3
Floating Rate Debt	0.1	0.1	0.4	0.2	0.5	N/A	0.7	0.7
Global High Yield	N/A	N/A	1.5	1.5	1.5	N/A	1.5	1.5
Securitized Debt	1.0	1.0	1.0	1.0	1.0	N/A	1.0	1.0
TIPS	6.0	6.0	5.0	5.0	5.0	2.0	5.0	5.0
High Yield	2.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
Non-U.S. Equity	22.0	20.8	20.2	20.4	20.5	8.1	21.5	21.5
Emerging Markets Debt	6.0	7.0	6.0	6.0	6.0	2.0	6.0	6.0
REITs	6.0	6.0	6.0	6.0	6.0	3.0	6.0	6.0
Hedge Funds	6.0	6.0	6.0	6.0	6.0	3.0	6.0	6.0
Risk Parity	5.0	5.0	5.0	5.0	5.0	3.0	5.0	5.0
GTAA	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0
U.S. Treasury	1.0	1.0	1.0	1.0	1.0	N/A	N/A	N/A
Short-Term Liquidity	N/A	N/A	N/A	N/A	N/A	59.0	N/A	N/A
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

[a] Beginning 2017, one health care trust remained, the 115 Health Care Trust.
[b] With the transfer of the 401(h) Health Care Trust (401(h)) assets to the 115 Health Care Trust on July 1, 2016, the Board approved changing the target allocation for the 115 Health Care Trust to be the same as the target allocation for the 401(h) prior to June 30, 2016.
[c] The 115 Health Care Trust target allocation for 2015 reflects a change approved by the Board effective October 1, 2015. For the first nine months of 2015, the target allocation was the same as the 401(h) .
[d] The 115 Health Care Trust was established in 2014. The 115 Health Care Trust portion of this column represents average target allocations that reflect adjustments during implementation of the 115 Health Care Trust. Information prior to 2014 does not exist for the 115 Health Care Trust. Health care assets were contained in the 401(h) until it closed on June 30, 2016 and the assets transferred to the 115 Health Care Trust.

To arrive at customized benchmark performance, the asset allocation targets are multiplied by the performance of the corresponding asset class reference indices. The asset class reference indices are specified by the Investment Policy, and are displayed below:

Historical Asset Class Composite Benchmark Indices — Health Care Portfolio[17]

Asset Class Composite Benchmarks	As of December 31				
	2018	2017	2016	2015	2014
U.S. Equity	Russell 3000 Stock Index[1]	Russell 3000 Stock Index	Russell 3000 Stock Index	Russell 3000 Stock Index	Russell 3000 Stock Index
Commodities	S&P Goldman Sachs Commodity Index[2]	S&P Goldman Sachs Commodity Index	S&P Goldman Sachs Commodity Index	S&P Goldman Sachs Commodity Index	S&P Goldman Sachs Commodity Index
Opportunistic	Custom Opportunistic Benchmark[3]	Custom Opportunistic Benchmark	Custom Opportunistic Benchmark	Custom Opportunistic Benchmark	Custom Opportunistic Benchmark
Core Bonds	Bloomberg Barclays U.S. Aggregate Bond Index[4]	Bloomberg Barclays U.S. Aggregate Bond Index	Bloomberg Barclays U.S. Aggregate Bond Index	Custom Core Fixed	Custom Core Fixed
Floating Rate Debt	Credit Suisse Leveraged Loan Index[5]	Credit Suisse Leveraged Loan Index	Credit Suisse Leveraged Loan Index	Credit Suisse Leveraged Loan Index	Credit Suisse Leveraged Loan Index
Global High Yield	N/A	N/A	Bloomberg Barclays Global High Yield	Barclays Global High Yield	Barclays Global High Yield
Securitized Debt	Custom Securitized Debt Benchmark[6]	Non-Agency CMBS Component of Bloom-berg Barclays U.S. Aggregate Bond, Index + 2%	Bloomberg Barclays CMBS Index + 2%	Barclays CMBS Index + 2%	Barclays CMBS Index + 2%
TIPS	Bloomberg Barclays U.S. TIPS Index[7]	Bloomberg Barclays U.S. TIPS Index	Bloomberg Barclays U.S. TIPS Index	Barclays U.S. TIPS Index	Barclays U.S. TIPS Index
High Yield	Bloomberg Barclays U.S. Corporate High Yield[8]	Bloomberg Barclays U.S. Corporate High Yield	Bloomberg Barclays Capital U.S. Corporate High Yield	Barclays Capital U.S. Corporate High Yield	Barclays Capital U.S. Corporate High Yield
Non-U.S. Equity	Custom Non-U.S. Equity Benchmark (net)[9]	Custom Non-U.S. Equity Benchmark (net)	Custom Non-U.S. Equity Benchmark (net)	Custom Non-U.S. Equity Benchmark (net)	Custom Non-U.S. Equity Benchmark (net)
Emerging Markets Debt	Custom Emerging Markets Debt Benchmark[10]	Custom Emerging Markets Debt Benchmark	Custom Emerging Markets Debt Benchmark	Custom Emerging Markets Debt Benchmark	Custom Emerging Markets Debt Benchmark
REITs	DJ U.S. Select RESI[11]	DJ U.S. Select RESI	DJ U.S. Select RESI	DJ U.S. Select RESI	DJ U.S. Select RESI
Cash Equivalents	BofAML U.S. 3-Month Treasury Bill Index[12]	BofAML U.S. 3-Month Treasury Bill Index	BofAML U.S. 3-Month Treasury Bill Index	BofAML U.S. 3-Month Treasury Bill Index	BofAML U.S. 3-Month Treasury Bill Index
Private Equity	N/A	N/A	N/A	N/A	Custom Private Equity
Hedge Funds	Custom Hedge Funds Benchmark[13]	Custom Hedge Funds Benchmark	Custom Hedge Funds Benchmark	Custom Hedge Funds Benchmark	Custom Hedge Funds Benchmark
Risk Parity	HFR Risk Parity Vol 15 Institutional Index[14]	Custom Risk Parity Benchmark	Custom Risk Parity Benchmark	Custom Risk Parity Benchmark	Custom Risk Parity Benchmark
GTAA	Custom GTAA Benchmark[15]	Custom GTAA Benchmark	Custom GTAA Benchmark	Custom GTAA Benchmark	Custom GTAA Benchmark
U.S. Treasury	Bloomberg Barclays U.S. Treasury Index[16]	Bloomberg Barclays U.S. Treasury Index	Bloomberg Barclays U.S. Treasury Index	Barclays U.S. Treasury Index	N/A
Short-Term Liquidity	N/A	N/A	N/A	90-day U.S. Treasury Bill Index	N/A

Footnotes found on next page.

Footnotes for Schedule of Investment Results—Health Care Portfolio

The footnotes below provide definitions for the asset class composite benchmark indices as of December 31, 2018:

[1] **Russell 3000 Stock Index**—A capitalization-weighted stock index consisting of the 3,000 largest publicly traded U.S. stocks by capitalization. This index is a broad measure of the performance of the aggregate domestic equity market.

[2] **Standard & Poor's Goldman Sachs Commodity Index**—Tracks general price movements and inflation in the world economy. The index is calculated primarily on a world-production weighted basis and is comprised of the principal physical commodities that are the subject of active, liquid futures markets.

[3] **Custom Opportunistic Benchmark**—Market value weight of the underlying portfolio benchmarks.

[4] **Bloomberg Barclays U.S. Aggregate Bond Index**—A market capitalization-weighted index covering the universe of most U.S. traded investment grade bonds, excluding municipal bonds and TIPS.

[5] **Credit Suisse Leveraged Loan Index**—This index is designed to mirror the investible universe of the U.S.-denominated leveraged loan market.

[6] **Custom Securitized Debt**—As of December 31, 2018, blend was 50% Bloomberg Barclays non-agency investment grade CMBS: BBB total return index unhedged USD, 50% Bloomberg Barclays non-agency CMBS agg eligible total return index value unhedged USD.

[7] **Bloomberg Barclays U.S. TIPS Index**—This index consists of Inflation-Protection securities issued by the U.S. Treasury.

[8] **Bloomberg Barclays U.S. Corporate High Yield**—Covers the universe of fixed rate, non-investment grade debt.

[9] **Custom Non-U.S. Equity Benchmark (net)**—As of December 31, 2018, blend was 55% MSCI World x U.S. Standard (net), 31% MSCI Emerging Markets Standard (net), 10% MSCI World x U.S. Small Cap (net), and 4% MSCI Emerging Markets Small Cap (net).

[10] **Custom Emerging Markets Debt Benchmark**—As of December 31, 2018, blend was 50% JPMorgan EMBI Global Index, and 50% JPMorgan GBI-Emerging Markets Global Diversified USD Index.

[11] **DJ U.S. Select RESI**—The Dow Jones U.S. Select RESI represents equity REITs and REOCs traded in the U.S.

[12] **Bank of America Merrill Lynch (BofAML) U.S. 3-Month Treasury Bill Index**—The three-month Treasury Bill return as measured by Bank of America Merrill Lynch.

[13] **Custom Hedge Funds Benchmark**—As of December 31, 2018, blend was 30% HFRI Event-Driven (Total) Index, 20% HFRI Equity Hedge (Total) Index, 25% HFRI Macro (Total) Index, 25% HFRI Relative Value (Total) Index.

[14] **HFR Risk Parity Vol 15 Institutional Index**—This index includes funds with a volatility target of 15% or greater and are classified as Volatility Target: 15%. Funds must have assets under management of USD $500 million or greater in order to be considered for inclusion in an HFR Risk Parity Institutional Index.

[15] **Custom Global Tactical Asset Allocation (GTAA) Benchmark**—Market value weight of the underlying portfolio benchmarks.

[16] **Bloomberg Barclays U.S. Treasury Index**—Is designed to measure U.S. dollar-denominated, fixed-rate, nominal debt issued by the U.S. Treasury. Treasury bills are excluded, but are part of a separate Short Treasury index. Separate Trading of Registered Interest and Principal of Securities (STRIPS) are excluded from the index. The U.S. Treasury Index is a component of the U.S. Aggregate, U.S. Universal, Global Aggregate and Global Treasury indices.

[17] The 115 Health Care Trust portfolio was established in September 2014, and the 401(h) Health Care Trust portfolio was closed on June 30, 2016 with the assets transferring to the 115 Health Care Trust on July 1, 2016. This table represents benchmark indices for both portfolios over the years disclosed. Beginning 2017, as there is only one health care trust, this section was renamed to Health Care Portfolio.

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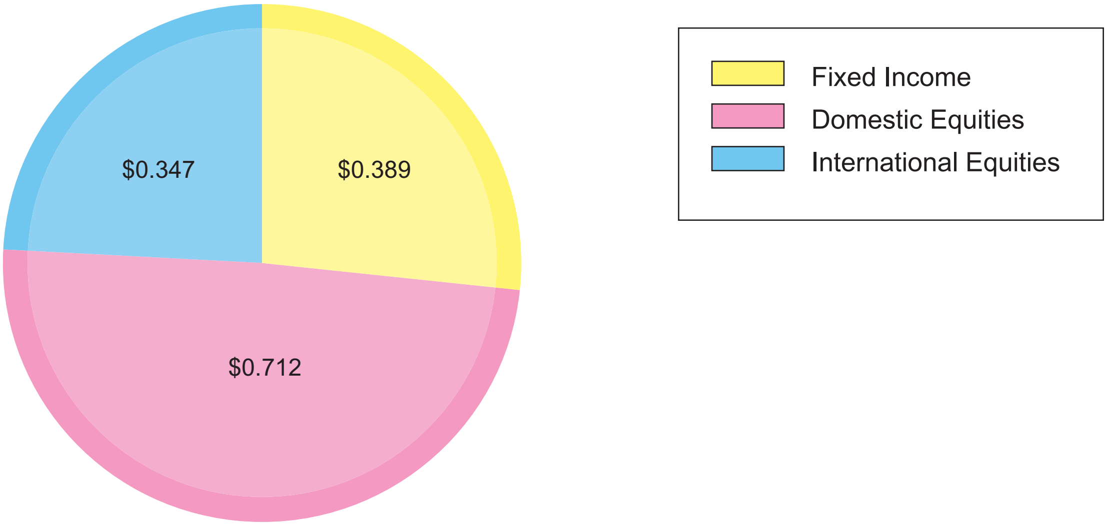
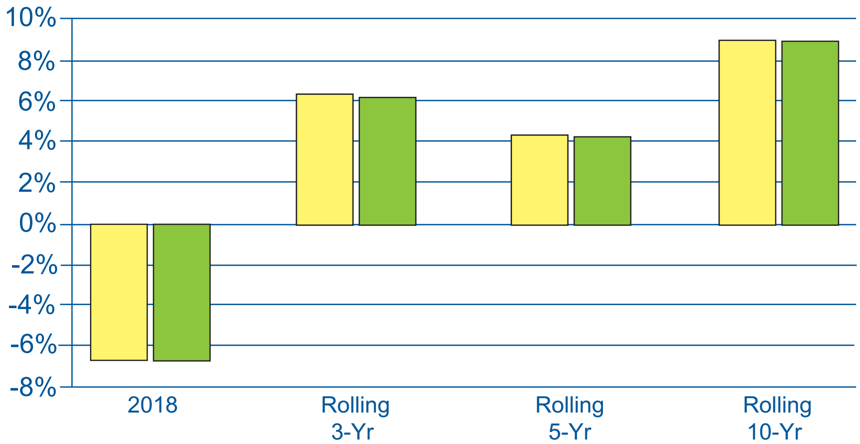
Defined Contribution Portfolio Asset Allocation (as of December 31, 2018, $ in billions)



Investment Returns

The Defined Contribution portfolio reported an investment loss of 6.65% in 2018. The portfolio composite is derived from the individual investment option returns and their actual year-end market values. Members may not invest in this portfolio composite, but choose to invest in the individual investment options provided. The returns for the investment options, and their respective indices, are shown on the following page.

Investment Returns—Annual Rates of Return[1] — Defined Contribution Portfolio



	2018	Rolling 3-Yr	Rolling 5-Yr	Rolling 10-Yr
Defined Contribution Portfolio Returns	(6.65%)	6.27%	4.34%	8.99%
Policy Benchmark Returns	(6.64%)	6.14%	4.32%	8.97%

[1] Annual Rates of Return—The Defined Contribution portfolio return is the result of the returns generated by defined contribution investments based on a combination of time-weighted and market value-weighted calculations. The defined contribution plans began in 2003; thus, 30-year return information does not exist.

Investment returns for the Defined Contribution portfolio underlying asset class composites and their respective benchmarks are shown below:

Schedule of Investment Results (for the year ended December 31, 2018)	Defined Contribution Portfolio		
	2018	Rolling 3-Year	Rolling 5-Year
Target Payout Fund	(3.02%)	3.40%	2.56%
Target Payout Fund Index[1]	(2.83)	3.28	2.54
Target 2020 Fund	(3.92)	4.50	3.16
Target 2020 Fund Index[2]	(3.79)	4.22	3.07
Target 2025 Fund	(5.81)	5.23	3.40
Target 2025 Fund Index[3]	(5.75)	5.04	3.37
Target 2030 Fund	(7.81)	5.92	3.62
Target 2030 Fund Index[4]	(7.45)	5.76	3.60
Target 2035 Fund	(8.75)	6.00	3.58
Target 2035 Fund Index[5]	(8.49)	5.97	3.64
Target 2040 Fund	(9.20)	6.06	3.57
Target 2040 Fund Index[6]	(9.00)	5.94	3.60
Target 2045 Fund	(9.28)	6.31	3.71
Target 2045 Fund Index[7]	(9.07)	6.16	3.71
Target 2050 Fund	(9.43)	6.40	3.73
Target 2050 Fund Index[8]	(9.43)	6.26	3.71
Target 2055 Fund	(9.90)	6.25	3.64
Target 2055 Fund Index[9]	(9.69)	6.17	3.66
Target 2060 Fund	(9.77)	N/A	N/A
Target 2060 Fund Index[10]	(9.69)	N/A	N/A
Stable Value Index Portfolio	2.37	2.05	1.84
Stable Value Index Benchmark[11]	1.02	1.51	1.62
Bond Index Portfolio	(0.02)	2.04	2.53
Bloomberg Barclays U.S. Aggregate Bond Index Benchmark[12]	0.01	2.06	2.52
U.S. Stock Index Portfolio	(5.23)	8.96	7.90
Russell 3000 Stock Index Benchmark[13]	(5.24)	8.97	7.91
Large Cap Index Portfolio	(4.85)	9.02	8.14
Russell 1000 Stock Index Benchmark[14]	(4.78)	9.09	8.21
Small Cap Index Portfolio	(11.02)	7.31	4.37
Russell 2000 Index Benchmark[15]	(11.01)	7.36	4.41
Non-U.S. Stock Index Portfolio	(13.95)	4.94	0.87
MSCI ACWI x U.S. Index Benchmark[16]	(14.20)	4.48	0.67

Footnotes found on next page.

Footnotes for Schedule of Investment Results—Defined Contribution Portfolio

The footnotes below provide definitions for the asset class composite benchmark indices as of December 31, 2018:

[1] **Target Payout Fund Index**—Blend was 25% Bloomberg Barclays Government 1-3 Year Index, 32% Bloomberg Barclays U.S. Aggregate, 10% Russell 1000, 5% Russell 2000, 15% MSCI ACWI Net Dividend Return x U.S., 13% Bloomberg Barclays U.S. TIPS.

[2] **Target 2020 Fund Index**—Blend was 17% Bloomberg Barclays Government 1-3 Year Index, 35% Bloomberg Barclays U.S. Aggregate, 11% Russell 1000, 7% Russell 2000, 18% MSCI ACWI Net Dividend Return x U.S., 12% Bloomberg Barclays U.S. TIPS.

[3] **Target 2025 Fund Index**—Blend was 3% Bloomberg Barclays Government 1-3 Year Index, 37% Bloomberg Barclays U.S. Aggregate, 15% Russell 1000, 12% Russell 2000, 26% MSCI ACWI Net Dividend Return x U.S., 7% Bloomberg Barclays U.S. TIPS.

[4] **Target 2030 Fund Index**—Blend was 28% Bloomberg Barclays U.S. Aggregate, 19% Russell 1000, 16% Russell 2000, 34% MSCI ACWI Net Dividend Return x U.S., 2% Bloomberg Barclays U.S. Government/Credit, 1% Bloomberg Barclays U.S. TIPS.

[5] **Target 2035 Fund Index**—Blend was 15% Bloomberg Barclays U.S. Aggregate, 21% Russell 1000, 18% Russell 2000, 40% MSCI ACWI Net Dividend Return x U.S., 6% Bloomberg Barclays U.S. Government/Credit.

[6] **Target 2040 Fund Index**—Blend was 9% Bloomberg Barclays U.S. Aggregate, 22% Russell 1000, 19% Russell 2000, 42% MSCI ACWI Net Dividend Return x U.S., 8% Bloomberg Barclays U.S. Government/Credit.

[7] **Target 2045 Fund Index**—Blend was 8% Bloomberg Barclays U.S. Aggregate, 24% Russell 1000, 19% Russell 2000, 42% MSCI ACWI Net Dividend Return x U.S., 7% Bloomberg Barclays U.S. Government/Credit.

[8] **Target 2050 Fund Index**—Blend was 6% Bloomberg Barclays U.S. Aggregate, 24% Russell 1000, 20% Russell 2000, 44% MSCI ACWI Net Dividend Return x U.S., 6% Bloomberg Barclays U.S. Government/Credit.

[9] **Target 2055 Fund Index**—Blend was 5% Bloomberg Barclays U.S. Aggregate, 25% Russell 1000, 20% Russell 2000, 45% MSCI ACWI Net Dividend Return x U.S., 5% Bloomberg Barclays U.S. Government/Credit.

[10] **Target 2060 Fund Index**—Blend was 5% Bloomberg Barclays U.S. Aggregate, 25% Russell 1000, 20% Russell 2000, 45% MSCI ACWI Net Dividend Return x U.S., 5% Bloomberg Barclays U.S. Government/Credit. The fund was launched in December 2015; thus, the 3-year and 5-year rolling returns information does not exist.

[11] **Stable Value Index Benchmark**—Blend was 15% Bloomberg Barclays Aggregate Index, 45% Bloomberg Barclays 1-5 Year Government/Corporate Bond, 35% Bloomberg Barclays Intermediate Government/Credit, 5% Bank of America Merrill Lynch 3-Month U.S. Treasury Bill.

[12] **Bloomberg Barclays U.S. Aggregate Bond Index Benchmark**—A market value-weighted index consisting of Bloomberg Barclays Corporate, Government and Mortgage-Backed Indices. This index is the broadest available measure of the aggregate U.S. fixed income market.

[13] **Russell 3000 Stock Index Benchmark**—A capitalization-weighted stock index consisting of the 3,000 largest publicly traded U.S. stocks by capitalization. This index is a broad measure of the performance of the aggregate domestic equity market.

[14] **Russell 1000 Stock Index Benchmark**—A capitalization-weighted stock index consisting of the 1,000 largest companies in the Russell 3000 Index, which represents approximately 92% of the total market capitalization of the Russell 3000 Index.

[15] **Russell 2000 Stock Index Benchmark**—A capitalization-weighted stock index consisting of the 2,000 smallest companies in the Russell 3000 Index, which represents approximately 8% of the total market capitalization of the Russell 3000 Index.

[16] **MSCI All Country World Net Dividend Return x U.S. Index (MSCI ACWI Net Dividend Return x U.S. Benchmark)**—A capitalization-weighted index of stocks representing 45 developed and emerging country markets, excluding the U.S. market.

The largest direct investments in the state of Ohio, measured at the fair value of OPERS' investment in the securities of firms headquartered in Ohio, totaled approximately $0.3 billion at the end of the year.

The largest indirect investments, measured at the fair value of OPERS' investment in the securities of companies with the largest employment presence in the state, totaled approximately $1.0 billion. Employment presence is measured by the number of persons employed at a business located in Ohio, as defined by the Office of Strategic Research, Ohio Department of Development. Firms with the largest employment presence in Ohio employed over 206,000 people in Ohio.

Top Ohio Holdings (as of December 31, 2018)

Direct		Indirect		
Largest Firms Headquartered In Ohio	Fair Value	Firms with Largest Employment Presence	Ohio Employment Estimated Headcount	Fair Value
Procter & Gamble Co.	$156,213,628	Wal-Mart Stores Inc.	50,200	$89,709,505
Welltower Inc.	38,195,282	Kroger Co.	45,150	10,488,610
Progressive Corp.	28,620,673	JPMorgan Chase & Co.	21,000	225,650,094
Marathon Petroleum Corp.	27,117,278	Honda Motor Co. Ltd.	15,000	15,135,398
American Electric Power Co. Inc.	24,620,103	General Electric Co.	14,100	41,235,554
Sherwin Williams Co.	21,161,459	United Parcel Service Inc.	13,700	45,744,496
Kroger Co.	10,488,610	Home Depot Inc.	12,200	141,516,107
Parker-Hannifin Corp.	9,423,262	Berkshire Hathaway Inc.	11,900	266,328,104
Worldpay, Inc.	9,060,012	Lowe's Companies Inc.	11,800	53,308,622
FirstEnergy Corp.	7,526,672	Procter & Gamble Co.	11,000	156,213,628
Total	**$332,426,979**	**Total**	**206,050**	**$1,045,330,118**

The investment and fiduciary responsibilities of the Board are governed by ORC 145.11, the requirements of the *OPERS Code of Ethics and Personal Trading Policy* and applicable state statutes. The Board discharges its duties solely in the interest of participants and beneficiaries, for the exclusive purpose of providing benefits and defraying reasonable administrative expenses. Prudent Person standards apply.

The Board reviews all policies and approves changes or additions as appropriate. The Investment staff fulfills the mandates and obligations described in the policies and recommends changes to the Board, as appropriate. The following policies reflect those in place for the 2018 fiscal year.

The OPERS Board manages the assets in a fashion that reflects OPERS' unique liabilities, funding resources and portfolio size, by incorporating accepted investment theory and reliable, empirical evidence. The Board ensures adequate risk control of the portfolios through diversification, adhering to portfolio guidelines, providing risk budgeting, adherence to compliance, and ongoing monitoring.

The purpose of the OPERS policies is to provide a broad strategic framework for managing portfolios. Approved Board asset class policies are summarized beginning on page 129 and are posted on the OPERS website, OPERS.org, where they can be viewed in their entirety.

Note: Policies adapted to meet plain-language standards of the OPERS Comprehensive Annual Financial Report *and provide an overview. Complete policy information, with exact verbiage approved by the Board, is available on OPERS.org.*

Rebalancing

Markets are dynamic and portfolios must be reviewed regularly to ensure holdings remain within their strategic asset allocations. To ensure conformance with the asset allocation policies, the portfolios are reviewed daily for compliance within the target asset allocation percentages, specified by portfolio, reasonable costs, and best interest of OPERS.

The Board establishes and reviews asset allocation targets, ranges and investment policies against capital market expectations, the investment landscape, and an annual actuarial assessment by the actuarial consultant of each portfolio. A comprehensive strategic asset allocation review is completed approximately every three-to-five years or if market conditions change substantially. This review helps to assess the continuing appropriateness of the asset allocation policy. Additionally, the review may also include a study of portfolio design and comparisons with peers. An actuarial experience study was completed in 2016 that resulted in a reduction to the long-term actuarial assumed rate of return from 8.0% to 7.5%. Since the reduction related to decreased long-term return expectations, there were no material portfolio changes required.

In addition to the experience studies, conditions are monitored and assumptions are reviewed annually to ensure that the assumptions remain reasonable until the next scheduled experience study. If conditions change materially, it may become necessary to review and update assumptions in advance of the next scheduled experience study. In 2018, the Board adopted changes to further reduce the long-term pension investment return assumption from 7.5% to 7.2% and the long-term health care investment return assumption from 6.5% to 6.0%. The next strategic asset allocation review is scheduled to be completed in 2019.

Defined Benefit Investment Policies

Investment Objective

The primary objective of the Defined Benefit portfolio is to secure statutory benefits provided by OPERS and to keep OPERS costs reasonable for employees and employers.

Asset Allocation and Performance Objectives

The Board asset allocation policy establishes a framework that has a high likelihood of realizing the OPERS long-term investment objectives. The Defined Benefit portfolio performance objectives are to exceed the OPERS performance benchmark, net of investment expenses over five-year periods, and exceed the actuarial interest rate, currently 7.2%, over a reasonably longer time horizon.

The Board sets target allocations to various asset classes designed to meet the OPERS long-term investment objectives. Allocations for the Public Equity and Fixed Income asset classes are 41% and 23%, respectively, with the remaining 29%, 5% and 2% allocated to Alternatives (Private Equity, Real Estate, Commodities, Hedge Funds, and Opportunistic), Risk Parity and Global Tactical Asset Allocation (GTAA), respectively. The Board also establishes a band of minimum and maximum allowable allocations, or ranges, surrounding each asset class target. The purpose of ranges is to appropriately and cost-effectively balance the Board's investment policy with the investment strategies pursued over shorter time-periods. The following table lists the Defined Benefit portfolio target allocations, ranges and performance benchmarks for each asset class:

Defined Benefit Asset Allocation

Asset Class	Target Allocation	Range	Benchmark Index
Public Equity	**40.9%**	**31 to 47%**	
U.S. Equity	Custom Allocation[1]	+/- 5%	Russell 3000 Stock Index
Non-U.S. Equity	Custom Allocation[1]	+/- 5%	Custom benchmark of the following indices: 55% MSCI World Index x U.S. Standard (net) 10% MSCI World Index x U.S. Small Cap (net) 31% MSCI Emerging Markets Standard (net) 4% MSCI Emerging Markets Small Cap (net)
Fixed Income	**23.0%**	**16 to 30%**	
Core Fixed	10.9	7 to 13	Bloomberg Barclays U.S. Aggregate Bond Index
Emerging Markets Debt	6.0	4 to 8	Custom benchmark of the following indices: 50% J.P. Morgan Emerging Markets Bond Index (EMBI) Global 50% J.P. Morgan Government Bond Index (GBI)—Emerging Markets Global Diversified
Floating Rate Debt	0.1	0 to 2	Credit Suisse Leveraged Loan Index
Securitized Debt	1.0	0 to 2	Custom benchmark of the following indices: 50% Bloomberg Barclays Non-Agency Investment Grade CMBS: BBB Total Return Index Unhedged USD 50% Bloomberg Barclays Non-Agency CMBS Agg Eligible Total Return Index Value Unhedged USD
TIPS	2.0	1 to 3	Bloomberg Barclays U.S. TIPS Index
High Yield	2.0	0 to 3	Bloomberg Barclays U.S. High Yield Index
U.S. Treasury	1.0	0 to 2	Bloomberg Barclays U.S. Treasury Index
Alternatives	**29.1%**	**22 to 40%**	
Private Equity	10.0	5 to 15	State Street Private Equity Index (SSPEI)
Real Estate	10.0	5 to 15	Net NFI-ODCE plus 85 basis points
Hedge Funds	8.0	4 to 12	Custom benchmark using the HFRI single-strategy indices weighted by the target allocations listed in the *Annual Investment Plan*
Opportunistic	0.1	0 to 4	Market value weight of underlying portfolio benchmarks
Commodities	1.0	0 to 2	S&P GSCI Total Return Index
Risk Parity	**5.0%**	**2 to 8%**	HFR Risk Parity Vol 15 Institutional Index
GTAA	**2.0%**	**0 to 4%**	Market value weight of underlying portfolio benchmarks
Operating Cash	**0.0%**	**0 to 3%**	N/A
Total	**100.0%**		

[1] The custom allocation is set to the fixed U.S. Equity and Non-U.S. Equity target weights.

Health Care Investment Policies

Investment Objective

The primary objective of the Health Care portfolio is to provide funding for discretionary health care for eligible members. The assets of the Health Care portfolio are invested with the objectives of: a) preservation of capital, and b) earning a reasonable return.

Asset Allocation and Performance Objectives

The approved asset allocation policy establishes a framework that has a high likelihood of realizing the long-term investment objective. The Health Care portfolio performance objective is to exceed the performance benchmark net of investment expenses. The table below sets forth targets, ranges and performance benchmarks for each asset class:

Health Care Asset Allocation

Asset Class	Target Allocation	Range	Benchmark Index
Public Equity	**44.9%**	**34 to 52%**	
U.S. Equity	Custom Allocation[1]	+/- 5%	Russell 3000 Stock Index
Non-U.S. Equity	Custom Allocation[1]	+/- 5%	Custom benchmark of the following indices: 55% MSCI World Index x U.S. Standard (net) 10% MSCI World Index x U.S. Small Cap (net) 31% MSCI Emerging Markets Standard (net) 4% MSCI Emerging Markets Small Cap (net)
Fixed Income	**34.0%**	**24 to 44%**	
Core Fixed	17.9	12 to 22	Bloomberg Barclays U.S. Aggregate Bond Index
Emerging Markets Debt	6.0	4 to 8	Custom benchmark of the following indices: 50% J.P. Morgan Emerging Markets Bond Index (EMBI) Global 50% J.P. Morgan Government Bond Index (GBI)—Emerging Markets Global Diversified
Floating Rate Debt	0.1	0 to 2	Credit Suisse Leveraged Loan Index
Securitized Debt	1.0	0 to 2	Custom benchmark of the following indices: 50% Bloomberg Barclays Non-Agency Investment Grade CMBS: BBB Total Return Index Unhedged USD 50% Bloomberg Barclays Non-Agency CMBS Agg Eligible Total Return Index Value Unhedged USD
TIPS	6.0	3 to 9	Bloomberg Barclays U.S. TIPS Index
High Yield	2.0	0 to 3	Bloomberg Barclays U.S. High Yield Index
U.S. Treasury	1.0	0 to 2	Bloomberg Barclays U.S. Treasury Index
Alternatives	**14.1%**	**11 to 21%**	
REITs	6.0	3 to 9	Dow Jones U.S. Select RESI Total Return
Hedge Funds	6.0	3 to 9	Custom benchmark using the HFRI single-strategy indices weighted by the target allocations listed in the *Annual Investment Plan*
Opportunistic	0.1	0 to 4	Market value weight of underlying portfolio benchmarks
Commodities	2.0	0 to 4	S&P GSCI Total Return Index
Risk Parity	**5.0%**	**2 to 8%**	HFR Risk Parity Vol 15 Institutional Index
GTAA	**2.0%**	**0 to 4%**	Market value weight of underlying portfolio benchmarks
Operating Cash	**0.0%**	**0 to 3%**	N/A
Total	**100.0%**		

[1] The custom allocation is set to the fixed U.S. Equity and Non-U.S. Equity target weights.

Defined Contribution Investment Policies

Investment Objective

The Defined Contribution portfolio investment options are intended to be primary retirement savings vehicles for members. The long-term objectives of the Defined Contribution portfolios are to support defined contribution plan members in having independent control over their OPERS retirement assets, while providing a suitable framework to invest their assets over the long-term.

Asset Allocation

The asset allocation and diversification objective is based on three components: target date funds, OPERS funds and the self-directed brokerage account that offers members in the defined contribution plans (the Member-Directed Plan and the Combined Plan) diversified investment options. The default investment option for defined contribution plan members who fail to make a selection is the target date fund that most closely corresponds to the member's current age, assuming a payout at age 65.

- **Target Date Funds**

  Target Date Funds is a passive program that links a defined contribution member's investment portfolio to a particular time horizon, typically an expected retirement date. A target date fund with a corresponding target date in the distant future will have an allocation tilted more toward equities and other higher risk/higher reward asset classes to enhance the opportunity to accumulate capital. As target date funds move toward their target payout dates, allocations to such assets are reduced to better preserve accumulated capital while simultaneously increasing allocation to fixed income and cash. These transitions, called glide paths, are accomplished by assigning each target date fund an asset class investment allocation and an asset class range surrounding such targets. The asset class ranges for each OPERS target date fund, for the period December 1, 2018 through November 30, 2019, are on the next page.

Defined Contribution Asset Allocation

	OPERS Target Date Funds									
	Payout		2020		2025		2030		2035	
OPERS Investment Fund	Target	Range	Target	Range	Target	Range	Target	Range	Target	Range
Large Cap Index Fund	10.0%	+/-2.0%	11.0%	+/-2.0%	15.0%	+/-3.0%	19.0%	+/-3.0%	21.0%	+/-3.0%
Small Cap Index Fund	5.0	+/-2.0	7.0	+/-2.0	12.0	+/-2.0	16.0	+/-3.0	18.0	+/-3.0
Non-U.S. Stock Index Fund	15.0	+/-3.0	18.0	+/-3.0	26.0	+/-4.0	34.0	+/-4.0	40.0	+/-5.0
Bond Index Fund	32.0	+/-4.0	35.0	+/-5.0	37.0	+/-5.0	28.0	+/-4.0	15.0	+/-3.0
Short-Term Bond Fund	25.0	+/-4.0	17.0	+/-3.0	3.0	+/-1.0	0.0	+/-0.0	0.0	+/-0.0
Long-Duration Bond Fund	0.0	+/-0.0	0.0	+/-0.0	0.0	+/-0.0	2.0	+/-1.0	6.0	+/-2.0
TIPS Fund	13.0	+/-2.0	12.0	+/-2.0	7.0	+/-2.0	1.0	+/-1.0	0.0	+/-0.0

Defined Contribution Asset Allocation (continued)

	OPERS Target Date Funds									
	2040		2045		2050		2055		2060	
OPERS Investment Fund	Target	Range	Target	Range	Target	Range	Target	Range	Target	Range
Large Cap Index Fund	22.0%	+/-3.0%	24.0%	+/-3.0%	24.0%	+/-3.0%	25.0%	+/-4.0%	25.0%	+/-4.0%
Small Cap Index Fund	19.0	+/-3.0	19.0	+/-3.0	20.0	+/-3.0	20.0	+/-3.0	20.0	+/-3.0
Non-U.S. Stock Index Fund	42.0	+/-5.0	42.0	+/-5.0	44.0	+/-5.0	45.0	+/-5.0	45.0	+/-5.0
Bond Index Fund	9.0	+/-2.0	8.0	+/-2.0	6.0	+/-2.0	5.0	+/-2.0	5.0	+/-2.0
Short-Term Bond Fund	0.0	+/-0.0	0.0	+/-0.0	0.0	+/-0.0	0.0	+/-0.0	0.0	+/-0.0
Long-Duration Bond Fund	8.0	+/-2.0	7.0	+/-2.0	6.0	+/-2.0	5.0	+/-2.0	5.0	+/-2.0
TIPS Fund	0.0	+/-0.0	0.0	+/-0.0	0.0	+/-0.0	0.0	+/-0.0	0.0	+/-0.0

- **OPERS Funds**

OPERS offers members in the defined contribution plans low cost, primarily passive, asset class specific investment funds. Those funds, and their respective indices, are as follows:

OPERS Fund	Market Index
Stable Value	Custom Index[1]
Bond Index	Bloomberg Barclays U.S. Aggregate
Stock Index	Russell 3000
Large Cap	Russell 1000
Small Cap	Russell 2000
Non-U.S. Stock Index	MSCI ACWI Net Dividend Return ex U.S.

[1] The Stable Value Fund (SVF) is managed actively. Its primary objective is to preserve the value of principal. Its secondary objective is to exceed the long-term return of a custom index comprised of 45% of the Bloomberg Barclays 1-5 Year Government/Corporate Bond Index, 35% of the Bloomberg Barclays Intermediate Government/Corporate Bond Index, 15% of the Bloomberg Barclays Aggregate Bond Index and 5% of the Bank of America Merrill Lynch 3-Month U.S. Treasury Bill Index. A typical stable value fund return fluctuates less than one percent a year; therefore, neither the short-term returns nor volatility of the SVF is consistent with market value instruments such as those in the custom index.

- **Self-Directed Brokerage Account**

The self-directed brokerage account option provides defined contribution members more flexibility in choosing their own retirement savings investments by allowing them to invest in a variety of active and passive mutual funds. The program parameters are the following:

- Only designated mutual funds can be purchased through the window.
- Maximum of 50% of a member's portfolio is allowed to be invested through the brokerage window. (The plan will not rebalance the brokerage investments should they grow to exceed 50% of participant's assets.)
- Account minimum of $5,000 is required before a participant can use the window.
- The annual cost of the window is borne by the participant using the window.

Rebalancing

The ranges specified for the target date funds are a function of the expected volatility of each asset class and the proportion of the total fund allocated to the asset class. The staff ensures target date funds conform to the asset allocation policy through quarterly review and rebalancing.

Performance Objectives and Risk Management

The performance objective for the target date funds is to meet the return of the respective performance benchmarks primarily through the use of passive index funds. The performance benchmarks are a custom index comprised of market indices for the component funds weighted in accordance with the target date fund target allocations as specified in the Defined Contribution Fund policy. The performance objective for the OPERS funds is to meet the return of respective performance benchmarks, gross of investment manager fees. There is no plan-level performance objective for the self-directed brokerage account because the mutual funds purchased through it are selected by members.

Defined contribution fund investment options offer diversification to minimize the impact of loss from individual positions. In addition to diversification, the program is passively managed for the target date funds and OPERS funds. The self-directed brokerage account offers participants a broad range of mutual fund choices that are self-selected and subject to the program parameters.

Fixed Income

A broad exposure to fixed-income asset classes to ensure diversification and provide a competitive return is the overriding goal. In doing so, OPERS is better positioned to provide for the known liabilities associated with the defined benefit plan and the health care trust. Diversification is established via activity in a variety of sub-asset classes including market debt, floating rate debt, securities debt, Treasury inflation-protected securities (TIPS), high yield, global high yield and U.S. Treasuries.

Both active and passive management strategies are used by internal and external portfolio managers. Internal managers position the majority of the fixed income portfolio with risk-controlled active strategies focusing on investment-grade securities and manage the TIPS and U.S. Treasury allocations as indices. External managers, with special expertise, manage the high-yield, emerging debt, global high yield and floating rate debt investments.

Public Equities (domestic and international stocks)

With both active (active trades) and passive (indexed funds) components, this program provides broad exposure to global, publicly traded, stock markets. The active management of the program is structured to allow managers to identify and capture opportunities.

Both active and passive components are designed to produce risk-adjusted return, net of fees, that exceeds benchmarks over a complete market cycle—at all times conducting business within pre-established risk constraints.

This program is monitored using a tracking error range—tracking error is a statistical variance measurement that shows the degree to which OPERS returns differ from industry returns:

Asset Class	Benchmark	Tracking Error Range
U.S. Equity	Russell 3000 Stock Index	0-100 basis points
Non-U.S. Equity	Custom benchmark of the following indices: 55% MSCI World Index x U.S. Standard (net) 10% MSCI World Index x U.S. Small Cap (net) 31% MSCI Emerging Markets Standard (net) 4% MSCI Emerging Markets Small Cap (net)	0-300 basis points

Real Estate

The global real estate program encompasses both private and public markets.

The private market real estate initiative has one manager who actively manages the program and who is limited to 20 percent of the private-market activity. A summary of the long-term guidelines are as follows:

- At least 80 percent of the private real estate portfolio is invested in apartment, industrial, office and retail assets.
- Holdings outside the U.S. are limited to no more than 25 percent of the total.
- Any single direct investment is limited to 15 percent of the target allocation.
- Single closed-end commingled funds are limited to either $400 million or five percent of the target allocation, whichever is greater.
- Single open-end commingled funds are limited to 10 percent of the target allocation.

The public market real estate portfolio manager is internal and uses a passive-management strategy.

The OPERS real estate program performance is monitored, or benchmarked, using the National Council of Real Estate Investment Fiduciaries (NCREIF) Fund Index—Open End Diversified Core Equity (ODCE). This asset class is expected to meet or exceed the net ODCE plus 85 basis points, over rolling five-year periods. Health Care portfolio real estate is benchmarked against the Dow Jones U.S. Select RESI Total Return Index.

Private Equity

Private equity seeks competitive returns plus a liquidity premium by investing with managers who have a consistent record of producing superior returns. Not publicly traded, this sub-asset class provides access to opportunities that may be long term.

Exclusively using external managers using active management strategies, private equity adds diversification to the Defined Benefit portfolio. Risk is managed by limiting single, closed-end commingled fund exposure to $400 million. Additionally, specific quantitative and qualitative constraints govern the fund.

Performance is benchmarked against the State Street Private Equity Index (SSPEI).

Cash Management

Cash Management seeks to preserve principal, provide liquidity and exceed its target benchmark, net of fees. This program actively invests cash and lending cash collateral relative to the target benchmarks for each portfolio. Interest rate, credit and liquidity risk are managed with quantitative and qualitative constraints.

Derivatives

Derivatives are used periodically to mitigate risk and to smooth trading efficiencies so that the risk/return profile of individual securities or portfolios are better managed. Derivatives may be used to enhance returns and reduce risk by managing or hedging exposure including, but not limited to stock markets, commodities and currencies.

Derivatives are grouped into three categories:

- **Category I:** Securities-based and traded either via an exchange or over-the-counter.
- **Category II:** Non-securities-based, exchange-traded such as futures, options on futures or options.
- **Category III:** Non-securities-based, over-the-counter transactions.

To manage overall fund liquidity and to balance the use of derivatives and physical securities, limits have been established:

- Use of Category III derivatives are limited to 10% of the total net asset value of public market assets held in separate accounts, excluding foreign exchange derivatives used for hedging. (Additional portfolio-level restrictions may apply.)
- The combined gross notional exposure of Category II and Category III derivatives will not exceed 20% of total net asset value, excluding foreign exchange derivatives used for hedging. (Additional portfolio-level restrictions may apply.)
- Currency forwards are one year or less to maturity, unless approved by the chief investment officer.

Hedge Funds

Hedge fund investments are structured to preserve capital and provide competitive returns with a low correlation to traditional asset classes. Hedge funds provide diversification, reduced volatility of returns and long-term return enhancement.

The performance objective is a custom benchmark using the HFRI single-strategy indices weighted by the target allocation.

The requirements for establishing appropriate risk metrics for each hedge fund include: (1) providing risk parameter and performance reporting on a monthly basis; (2) seeking advice from legal counsel, the due diligence consultant and/or investment advisor to determine if audited financial statements are required based on the specific structure of each investment; and, (3) establishing position-level transparency targets. Hedge fund allocations are limited to $400 million, or 10 percent, of the sub-asset class fair value, whichever is greater for hedge fund managers; and, direct hedge fund managers are limited to 12 percent of the Hedge Fund's sub-asset class market value.

Securities Lending

The Securities Lending program actively lends securities through various programs to qualified borrowers to provide incremental income to the respective asset classes. Performance of the securities lending program is assessed annually.

Cash reinvestment risk and counterparty risk are managed through a combination of quantitative and qualitative constraints. Excess collateral, marked-to-market daily, is held for each loan in the amount of 102 percent for domestic securities and 105 percent for international securities. The maximum percentage of assets that may be on loan is 50 percent of the eligible assets while the maximum amount that may be on loan with any one borrower is 15 percent of the eligible assets.

Commodities

Commodity investments provide exposure to global commodities and achieve returns comparable to or in excess of the benchmark return, net of fees. Commodity portfolios are governed by guidelines that establish management parameters to achieve competitive commodity-based returns. Commodity investments may be in any of the commodities that comprise the Standard and Poor's-Goldman Sachs Commodity Index and/or the Bloomberg Commodity Index at the time of purchase.

Opportunistic

Investments in the Opportunistic sub-asset class include investment strategies or assets not currently used in the respective Defined Benefit or Health Care portfolios, but which have the potential to improve investment results over time. Assets and strategies used must have the potential to be mainstreamed into the investment program over time, or be opportunistic-based on either valuation or circumstances.

Every strategy within the Opportunistic sub-asset class has a specific performance benchmark. The overall benchmark is the market value weight of the underlying benchmarks. Long-term returns should match or exceed the OPERS Total Fund benchmark, which is a measure of the cost of investing in this category.

The primary risk control mechanisms are the limited size of the opportunistic allocation and the limits on the size of single assets and strategies. No single investment strategy or portfolio assigned to the same benchmark within the Opportunistic sub-asset class may exceed 0.5% of the sum of the Defined Benefit or Health Care portfolio assets at the time of funding.

Global Tactical Asset Allocation (GTAA)

GTAA capitalizes on short-term opportunities among global capital market assets. The strategy focuses on general movements in the market rather than on performance of individual securities. GTAA investments are expected to provide fund-level diversification and an additional source of excess return.

GTAA assets may be invested in all types of instruments intended to obtain exposure to a wide variety of asset types including equities, fixed income (both sovereign and credit-based exposures), inflation-linked bonds, commodities and other asset types. Instruments used may be exchange-traded or non-exchange traded and may be physical securities or derivatives, and some degree of leverage may be employed.

The overall benchmark for GTAA is the market value weight of the underlying managers' benchmarks. Concentration to any one manager is limited. Investment advisors will help identify managers, using a process approved by the chief investment officer. In addition to the investment due-diligence process, each manager will undergo an operational due-diligence review prior to funding to evaluate non-investment related risk factors.

Risk Parity

Risk Parity is an alternative allocation of assets designed to achieve a better balance of economic outcomes in growth and inflation environments. This requires investing in multiple asset types and leveraging exposures to global markets in order to obtain the desired risk exposure. The Risk Parity allocation is structured to achieve roughly balanced risk exposure across equities, nominal fixed income, and inflation-sensitive assets, targeting a total volatility level comparable to that of the Defined Benefit and Health Care portfolios.

The overall benchmark is the market value weight of the underlying managers' benchmarks. The Board sets performance expectation through approval of the *Annual Investment Plan*. By allocating to multiple Risk Parity managers, concentration to any one manager is limited.

Investment Rates by Portfolio—Defined Benefit and Health Care

OPERS uses several rates to evaluate the results of the investment portfolios. Actual and benchmark returns for the years listed can be found in this section. The expected rate of return is based on the asset allocation in place during the year presented and the actuarial assumed rate of return is the assumption used by our actuaries for the annual actuarial valuations, described further in the Actuarial Section. Finally, the single discount and long-term municipal bond rates are applicable to the implementation of Governmental Accounting Standards Board Statement No. 74 in 2017, including 2016 opening balances. These rates are used in the Accounting Basis valuations for health care and not available prior to 2016.

Rates are presented for six years in the following table:

Investment Rates by Portfolio

	2018	2017	2016	2015	2014	2013
Defined Benefit Portfolio						
Actual Rate of Return	(2.99%)	16.82%	8.31%	0.33%	6.96%	14.38%
Benchmark Return	(3.07)	15.19	8.64	0.25	5.81	14.24
Long-Term Expected Rate of Return	8.00	8.00	8.00	8.00	8.00	8.00
Actuarial Assumed Rate of Return	7.20	7.50	7.50	8.00	8.00	8.00
Health Care Portfolio[1]						
Actual Rate of Return	(5.76%)	15.25%	7.55%	(2.18%)	5.28%	11.36%
Benchmark Return	(5.96)	14.31	7.75	(1.88)	5.01	10.70
Long-Term Expected Rate of Return	6.50	6.50	6.50	6.50	6.50	6.50
Actuarial Assumed Rate of Return	6.00	6.50	5.00	5.00	5.00	5.00
Single Discount Rate (GASB 74)[2]	3.96	3.85	4.23	N/A	N/A	N/A
Long-Term Municipal Bond Rate[2]	3.71	3.31	3.78	N/A	N/A	N/A

[1] In 2016, the 401(h) Health Care Trust closed and assets were transferred to the 115 Health Care Trust. The 2016 partial year results for both of these portfolios can be found in this section, reflecting six month returns for the 401(h) Health Care Trust. For 2016, this chart displays the combined health care rates as disclosed in this section. For previous years, the rates represent the 401(h) Health Care Trust, as the majority of the health care assets resided in this trust until transferred to the 115 Health Care Trust.

[2] Projected benefit payments are required to be discounted to their actuarial present value using a Single Discount Rate that reflects (1) a long-term expected rate of return on other post-employment benefits (OPEB) plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits), and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met). Additional information on the Single Discount Rate can be found in Note 9 of the Notes to Combining Financial Statements found in the Financial Section.

Structure and Relationship of Investment Policies

The following exhibit illustrates the structure and relationship of the 28 investment policies within the total System and its three investment portfolios in 2018.

OPERS FUNDS

POLICIES

Pension

- Defined Benefit Portfolio Summary of Investment Objectives & Policies
- Defined Contribution Portfolio Summary of Investment Objectives & Policies

Health Care

- Health Care Portfolio Summary of Investment Objectives & Policies

ASSET/SUB-ASSET CLASS POLICIES

Cash Policy
Commodities Policy
Fixed Income Policy
Global Tactical Asset Allocation Policy
Hedge Funds Policy
Opportunistic Policy
Private Equity Policy
Public Equity Policy
Real Estate Policy
Risk Parity Policy

INVESTMENT-WIDE POLICIES

Broker-Dealer Policy
Corporate Governance Policy
Derivatives Policy
External Investment Managers' Insurance Policy
Iran and Sudan Divestment Policy
Leverage Policy
Liquidity Policy
Material Nonpublic Information Policy
Office of Foreign Assets Control Compliance Policy
Ohio-Qualified and Minority-Owned Manager Policy
Personal Trading Policy
Proxy Voting Guidelines
Responsible Contractor Policy
Securities Lending Policy
Soft Dollar Policy

OPERS works to minimize the impact of change

To survive—organizations and individuals must adapt to change. That said, most find change to be somewhat unsettling. We know that. That's why we work to minimize the impact of any change made that may affect our stakeholders.

Through the years, any change proposed has one common goal—to strengthen the stability of the System so that our commitment to current and future generations of retirees can continue to be met. Commitments are met because OPERS anticipates needs, proposes potential solutions and works to scrutinize those solutions from every possible angle. We seek input from experts, value the thoughts of stakeholders and always, always work to educate all on the importance of any proposed change. We are neither haphazard nor impulsive. When changes are implemented, they are implemented in a cautious and caring manner.

The ability to anticipate and adapt to our world has enabled OPERS to continue to absorb events such as poor markets and increased longevity without jeopardizing our commitment to members.

OPERS

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June 3, 2019

The Retirement Board
Ohio Public Employees Retirement System
277 East Town Street
Columbus, Ohio 43215

Dear Board Members:

The basic financial objective of the defined benefit pension portion of the Ohio Public Employees Retirement System (OPERS) is to establish and receive contributions which:

- When expressed in terms of percents of active member payroll will remain approximately level from generation to generation, and
- When combined with present assets and future investment return will be sufficient to meet the financial obligations of OPERS to present and future retirees and beneficiaries.

This financial objective is addressed within the annual actuarial funding valuation of the defined benefit pension portion of OPERS. The purposes of the funding valuation are as follows:

- Measure the financial position of OPERS,
- Assist the Board in establishing employer and employee contribution rates necessary to fund the pension defined benefits provided by OPERS, and
- Determine the number of years required to amortize the unfunded actuarial accrued liabilities based upon established contribution rates.

The most recent funding valuation was completed based upon population data, asset data, and plan provisions as of December 31, 2018. A report containing the results of the funding valuation is produced annually, in some cases due to timing issues after the publication of the Comprehensive Annual Financial Report (CAFR).

In addition to the funding valuation report for the defined benefit pension plan, separate reports are issued to provide financial reporting information for OPERS in accordance with Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 (pension benefits) and Nos. 74 and 75 (retiree health benefits, or OPEB). Reports containing the actuarial results of the financial reporting valuations are produced annually, in some cases after the publication of the CAFR. Financial reporting information has been produced based upon a measurement date of December 31, 2018 for GASB Statement Nos. 67 and 68 and December 31, 2018 for GASB Statement Nos. 74 and 75.

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The Retirement Board
Ohio Public Employees Retirement System
June 3, 2019
Page 2

The following schedules in the Actuarial Section and Financial Section of the CAFR were prepared based upon certain information presented in the previously mentioned funding and financial reporting valuation reports:

Actuarial Section

- Summary of Assumptions
- Schedules of Average Defined Benefits Paid
- Actuarial Valuation Data – Pension
- Schedules of Funding Progress
- Short-Term Solvency Test
- Analysis of Financial Experience

Financial Section

- Net Pension Liability/(Asset)
- Key Methods and Assumptions Used in Valuation of Total Pension Liability
- Sensitivity of Net Pension Liability/(Asset) to Changes in the Discount Rate
- Net OPEB Liability – Health Care
- Key Methods and Assumptions Used in Valuation of Total OPEB Liability
- Sensitivity of Net OPEB Liability to Changes in the Discount Rate
- Sensitivity of Net OPEB Liability to Changes in the Health Care Cost Trend Rate
- Schedule of Changes in Net Pension Liability and Related Ratios
- Schedules of Member and Employer Contributions
- Schedule of Changes in Net OPEB Liability and Related Ratios

The individual member statistical data required for the valuations was furnished by OPERS, together with pertinent data on financial operations. The cooperation of OPERS in furnishing these materials is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the data. Assets are valued on a market related basis that recognizes each year's difference between actual and assumed investment return over a closed four-year period. For determining the Net Pension Liability (NPL) under GASB Statement No. 67, assets are valued on a market basis. The long-term assumed rate of investment return on pension fund assets is 7.20%. Based upon the results of a projection performed in accordance with GASB Statement No. 67 parameters, the Single Discount Rate for purposes of discounting pension liabilities for pension financial reporting purposes is also 7.20%. For determining the Net OPEB Liability (NOL) under GASB Statement No. 74, assets are valued on a market basis. The long-term assumed rate of investment return on Health Care fund assets is 6.00%. Based upon the results of a projection performed in accordance with GASB Statement No. 74 parameters, the Single Discount Rate for purposes of discounting Health Care liabilities for OPEB financial reporting purposes is 3.96%.

The Retirement Board
Ohio Public Employees Retirement System
June 3, 2019
Page 3

Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. The Board adopted the actuarial assumptions after considering the advice of the actuary and other professionals. The assumptions and methods used for funding and financial reporting purposes are in conformity with the Actuarial Standards of Practice issued by the Actuarial Standards Board. They are also in conformity with the Board's funding policy. The December 31, 2018 valuations were based upon assumptions that were recommended in connection with an Experience Study covering the 2011-2015 period and updated in conjunction with an Investment Return Assumption review performed between the December 31, 2017 and December 31, 2018 valuations.

The computed pension amortization period as of the December 31, 2018 annual valuation is 27 years and the System is 78% funded with respect to pension benefits, based upon the actuarial accrued liability and the funding value of assets.

Based upon the results of the December 31, 2018 valuations, we are pleased to report to the Board that the Public Employees Retirement System of Ohio is meeting its basic financial objective and continues to operate in accordance with the actuarial principles of level percent of payroll financing.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan 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 (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

Readers desiring a more complete understanding of the actuarial condition of OPERS are encouraged to obtain and read the complete valuation reports. The Actuarial and Financial Sections of this CAFR contain some, but not all of, the information in the valuation reports.

Brian B. Murphy and Mita D. Drazilov are Members of the American Academy of Actuaries (MAAA), are independent of the plan sponsor and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,

Brian B. Murphy

Brian B. Murphy, FSA, EA, FCA, MAAA, PhD

Mita Drazilov

Mita D. Drazilov, ASA, FCA, MAAA

BBM/MDD:ah

GRS

The defined benefit pension and health care actuarial information presented in this *2018 Comprehensive Annual Financial Report* (CAFR) is based on the most current actuarial valuations for the System. The pension valuation data is presented as of December 31, 2018; the health care valuation data is presented as of December 31, 2017, based on the most recent data available. The pension actuarial assumptions are applicable to 2018. The health care actuarial assumptions in this section are applicable to 2017, unless otherwise noted. This section presents actuarial information for pension and health care on a Funding Basis. In conjunction with Governmental Accounting Standards Board (GASB) Statement No. 67 (GASB 67), *Financial Reporting for Pension Plans—an amendment of GASB Statement No. 25*, OPERS is reporting actuarial results of pensions in the Financial Section of the CAFR on a financial reporting basis, or Accounting Basis, as required by GASB 67. Likewise, in conjunction with GASB Statement No. 74 (GASB 74), *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans* (or OPEB), OPERS is reporting actuarial results of health care as of the December 31, 2017 valuation date, rolled forward to the measurement date of December 31, 2018.

The Accounting Basis calculation methodologies defined by GASB 67 and 74 require different methods and may require different assumptions than are used to calculate the funded status of a plan. For example, both GASB 67 and 74 require the use of the fair value of assets versus the smoothed value of assets used for the Funding Basis. Both GASB 67 and 74 require that the actuarial information presented under the Accounting Basis represent the most current year-end or measurement period. The GASB 67 net pension liability and the GASB 74 net OPEB, or health care, liability results will differ from the unfunded actuarial accrued liability results provided in the Schedules of Funding Progress included in this section, beginning on page 153. GASB 67 and 74 break the link between accounting and funding. These changes affect the accounting information disclosed in the Notes to Combining Financial Statements and Required Supplementary Information, both included in the Financial Section. However, the changes do not impact the actuarial methods and assumptions used by OPERS to determine the contributions needed to fund the plans. The assumptions disclosed in this section were used for both funding and financial reporting valuations, unless otherwise noted.

OPERS conducts an experience study every five years in accordance with Ohio Revised Code Section 145.22. The Board-appointed actuary conducted an experience study for the five-year period ended December 31, 2015. Following this experience study, in consultation with the actuary, the Board approved and adopted the majority of the methods and assumptions disclosed in this section in 2016. In addition to the experience studies, conditions are monitored and assumptions are reviewed annually to ensure the assumptions remain reasonable until the next scheduled experience study. If conditions change materially, it may become necessary to review and update assumptions in advance of the next scheduled experience study. In 2018, the Board adopted changes to further reduce the long-term pension investment return assumption from 7.5% to 7.2%. The long-term health care investment return assumption was reduced from 6.5% to 6.0%.

These methods and assumptions apply to the pension plans: Traditional Pension Plan, Combined Plan, Member-Directed Plan, as well as health care.

Pension plan and health care details can be found in the Plan Statement beginning on page 217.

Funding Method

The individual entry-age actuarial-cost method of valuation was used in determining pension benefit and health care liabilities and normal cost under both of the funding valuations included in this section as well as the financial reporting valuations done under GASB 67 and 74 included in the Financial Section. Differences between assumed and actual experience (actuarial gains and losses) become part of actuarial accrued liabilities. For funding valuation purposes, unfunded actuarial accrued liabilities are amortized to produce payments (principal and interest), which are a level percent of payroll contributions.

Economic Assumptions

The following economic assumptions were used by the actuary in the pension and health care valuations, as noted:

- ***Investment Return***—For pension, 7.20% compounded annually, net of administrative expenses. For health care, 6.50% compounded annually, reduced to 6.00% in 2018, net of administrative expenses.
- ***Wage Inflation Rate***—Calculated at 3.25% per year. Wage inflation is defined to be the portion of total pay increases for an individual due to macroeconomic forces including productivity, price inflation, and labor market conditions. The wage-inflation rate does not include the effects of pay changes related to individual merit and seniority.
- ***Price Inflation***—For pension, 2.50% of the investment return rate and wage inflation rate is assumed to be price inflation.
- ***Assumed Real Rate of Return Over Wage Inflation***—For pension, 3.95% per year. For health care, 3.25% per year. The assumed real rate of return for the Funding Basis is defined as the portion of the pension and the health care investment return, 7.20% and 6.50%, respectively, that is more than the assumed total wage growth rate of 3.25%. Refer to the Notes to Combining Financial Statements, Note 9, in the Financial Section for more information on the Single Discount Rate used for the Accounting Basis calculations of the health care liability.
- ***Active Member Population***—For pension, the sum of the active members in the Traditional Pension Plan and Combined Plan is assumed to remain constant. For purposes of financing the unfunded actuarial accrued liabilities, total payroll is assumed to grow at the wage-inflation rate of 3.25% per year.
- ***Heath Care Payments***—For the 2017 health care valuation, health care expenses were assumed to increase initially at 10.00%, before leveling off to 3.25% in 2029. For projection and valuation purposes, health reimbursement arrangement accounts and retiree medical accounts (RMA), including Member-Directed Plan health care and wellness RMA accounts, are assumed to be allocated to the members and cannot be used in the future to fund other retiree health care expenses.
- ***Individual Employee Pay Increases***—An active employee's pay is assumed to increase each year, in accordance with an age-based table. Part of the assumed increase was for merit and/or seniority increases, and the balance recognizes the wage inflation rate. The following table, on the next page, describes annual increase percentages for sample ages.

Individual Employee Pay Increases

Age	Merit and Seniority State	Merit and Seniority Local	Merit and Seniority Public Safety	Merit and Seniority Law	Wage Inflation	Total Increase Next Year State	Total Increase Next Year Local	Total Increase Next Year Public Safety	Total Increase Next Year Law
30	3.38%	3.38%	3.70%	3.70%	3.25%	6.63%	6.63%	6.95%	6.95%
40	1.90	1.77	1.46	1.46	3.25	5.15	5.02	4.71	4.71
50	0.92	0.92	0.94	0.94	3.25	4.17	4.17	4.19	4.19
60	0.42	0.42	0.40	0.40	3.25	3.67	3.67	3.65	3.65

- ***Turnover*—**Represents the probabilities of separation from OPERS-covered employment before age-and-service retirement because of employment termination (withdrawal from service), death, or disability. The separation probabilities are based on historical trends of OPERS actual experience, without consideration of the manner in which the members' accounts are distributed.

Percent Separating Within Next Year—Withdrawal from Employment

Sample Ages	Years of Service	Withdrawal State Men	Withdrawal State Women	Withdrawal Local Men	Withdrawal Local Women	Withdrawal Public Safety Men	Withdrawal Public Safety Women	Withdrawal Law Enforcement Men	Withdrawal Law Enforcement Women
	0	50.00%	50.00%	40.00%	40.00%	20.00%	20.00%	16.00%	20.00%
	1	35.00	35.00	27.00	27.00	19.00	19.00	10.00	12.00
	2	20.00	20.00	18.00	18.00	15.00	15.00	8.00	9.00
	3	15.00	15.00	13.00	13.00	15.00	15.00	6.00	6.00
	4	12.00	12.00	11.00	11.00	10.00	10.00	5.00	6.00
30	5 & over	5.80	7.30	5.34	6.94	8.80	8.80	2.66	2.90
40	5 & over	3.14	3.46	2.82	3.52	3.50	3.50	1.48	1.50
50	5 & over	1.84	2.10	2.04	2.50	2.00	2.00	1.20	1.20
60	5 & over	1.80	2.10	2.00	2.50	2.00	2.00	1.20	1.20

Percent Separating Within Next Year—Death or Disability

Sample Ages	Years of Service	Death All Divisions Men	Death All Divisions Women	Disability State Men	Disability State Women	Disability Local Men	Disability Local Women	Disability Public Safety & Law Enforcement Men	Disability Public Safety & Law Enforcement Women
25	5 & over	0.05%	0.02%	0.10%	0.10%	0.10%	0.10%	0.20%	0.60%
35	5 & over	0.05	0.03	0.16	0.16	0.13	0.10	0.34	0.60
45	5 & over	0.11	0.06	0.47	0.47	0.37	0.26	0.78	1.38
55	5 & over	0.28	0.17	1.05	1.05	0.90	0.71	2.32	2.65
60	5 & over	0.48	0.26	1.25	1.25	1.00	0.85	2.60	2.75

The turnover probabilities in the tables on page 141 estimate the number of active members who will separate from employment based on the criteria of age, gender, and years of service. These members may be eligible for a refund of their account or an annuity benefit, depending on the nature of the separation. Members eligible for an annuity benefit may be eligible to participate in one of OPERS health care plans. The method of distribution and the resulting liabilities are calculated for this population based on the following assumptions:

- ***Withdrawal from Service***—Assumes that members terminating before age 35, members terminating with less than five years of service, and a percentage of all other members will withdraw their contributions and forfeit their entitlement to an employer-financed benefit. The percentage withdrawing their contributions is 100% at age 35 and is reduced for each year of age after 35, becoming 0% at age 55 (age 45 for Public Safety and Law Enforcement division members).
- ***Death-in-service and Disability Benefits***—Assumes that members with at least five years of service will elect to receive an annuity benefit. It is assumed that Combined Plan members will transfer to, and take a benefit from, the Traditional Pension Plan, unless a lump-sum distribution from the Combined Plan would have a greater value. Members eligible for an annuity may be eligible to participate in OPERS health care.

Asset Valuation Method

For actuarial purposes, and under the Funding Basis, the funding value of defined benefit pension and health care assets recognizes total assumed investment returns each year. Differences between actual and assumed investment returns are phased in over a closed four-year period. The funding value is not permitted to deviate from market value by more than 12%.

Valuation Data

The demographic and financial data used in the actuarial valuations were provided to the actuary by OPERS. The actuary examined the data for general reasonableness and year-to-year consistency, but did not audit the information.

Decrement Assumptions

The probabilities used by the actuary related to specific risk areas are displayed in the tables starting on page 144:

- ***Mortality***—For pension and health care, pre-retirement mortality rates were based on the RP-2014 Employees mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates were based on the RP-2014 Healthy Annuitant mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Post-retirement mortality rates for disabled retirees were based on the RP-2014 Disabled mortality table for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for males and females was then established to be 2015 and 2010, respectively. Mortality rates for a particular calendar year were determined by applying the MP-2015 mortality improvement scale to all of the previously noted tables.
- ***Retirement***—Probabilities of age-and-service retirement applicable to members eligible to retire are as shown in the schedules on pages 144 through 148.

Senate Bill (SB) 343 was enacted into law with an effective date of January 7, 2013. In the legislation, members were categorized into three pension groups with varying provisions of the law applicable to each group:

- **Transition Group A—**Members eligible to retire under law in effect prior to SB 343, or who would have been eligible to retire no later than five years after January 7, 2013.
- **Transition Group B—**Members who have earned at least 20 years of service credit prior to January 7, 2013, or who will be eligible to retire no later than 10 years after January 7, 2013.
- **Transition Group C—**Members who are not in either of the other groups, as well as members who were hired on or after January 7, 2013.

See the Plan Statement beginning on page 217 for additional information.

Percent of Eligible Active Members Retiring Within Next Year

With Unreduced Age-and-Service Retirement Benefits

Members may retire with no reduction in benefits if they have the following total years of service credit and have attained division specific minimum ages:

Transition Group A

- ***State and Local***—30 years of service at any age; five years of service at age 65:
  - A service-based probability is used for members who attain 30 years of service prior to age 65;
  - An age-based probability is used for members who attain 30 years of service on or after age 65.
- ***Public Safety***—25 years of service and attained the age of 52; 15 years of service at age 62.
- ***Law Enforcement***—25 years of service and attained the age of 48; 15 years of service at age 62.

	State		Local	
Service	Men	Women	Men	Women
30	37%	40%	35%	35%
31	28	33	26	30
32-39	24	26	23	24
40-42	35	33	32	24
43-44	35	33	32	20
45	25	25	32	20
46-49	25	25	25	20
50 & Over	100	100	100	100

	State		Local	
Retirement Age	Men	Women	Men	Women
65-66	22%	22%	20%	20%
67	20	20	15	20
68-71	20	20	15	17
72-76	15	20	15	17
77-78	15	25	15	17
79	15	25	15	22
80-84	25	25	20	22
85 & Over	100	100	100	100

Retirement Age	Public Safety	Law Enforcement
48-51	N/A	20%
52-53	30%	20
54-55	25	20
56-57	25	23
58-59	20	25
60	35	30
61-69	35	25
70 & Over	100	100

Transition Group B

- ***State and Local—***31 years of service at age 52; 32 years of service at any age; or five years of service at age 66:
  - > A service-based probability is used for members who attain 32 years of service at any age;
  - > An age-based probability is used for members who attain 32 years of service on or after age 66.
- ***Public Safety—***25 years of service and attained the age of 54; 15 years of service and attained the age of 64.
- ***Law Enforcement—***25 years of service and attained the age of 50; 15 years of service and attained the age of 64.

Service	State		Local	
	Men	Women	Men	Women
31	37%	40%	35%	35%
32	28	33	26	30
33-40	24	26	23	24
41-43	35	33	32	24
44-45	35	33	32	20
46	25	25	32	20
47-50	25	25	25	20
51 & Over	100	100	100	100

Retirement Age	State		Local	
	Men	Women	Men	Women
66-67	22%	22%	20%	20%
68	20	20	15	20
69-72	20	20	15	17
73-77	15	20	15	17
78-79	15	25	15	17
80	15	25	15	22
81-84	25	25	20	22
85 & Over	100	100	100	100

Retirement Age	Public Safety	Law Enforcement
50-53	N/A	20%
54-57	25%	20
58-59	20	23
60-61	35	25
62	35	30
63-69	35	25
70-71	100	25
72 & Over	100	100

Transition Group C

- ***State and Local—***32 years of service at age 55 (55 & 32 Condition); or five years of service at age 67 (67 & 5 Condition):
  > A service-based probability is used for members who attain 32 years of service at or after age 55;
  > An age-based probability is used for members who attain 32 years of service on or after age 67.
- ***Public Safety—***25 years of service and attained the age of 56; or 15 years of service and attained the age of 64.
- ***Law Enforcement—***25 years of service and attained the age of 52; or 15 years of service and attained the age of 64.

55 & 32 Condition Year of Eligibility	State		Local	
	Men	Women	Men	Women
1	37%	40%	35%	35%
2	28	33	26	30
3-10	24	26	23	24
11-13	35	33	32	24
14-15	35	33	32	20
16	25	25	32	20
17-20	25	25	25	20
21 & Over	100	100	100	100

67 & 5 Condition Retirement Age	State		Local	
	Men	Women	Men	Women
67-68	22%	22%	20%	20%
69	20	20	15	20
70-73	20	20	15	17
74-78	15	20	15	17
79-80	15	25	15	17
81	15	25	15	22
82-84	25	25	20	22
85 & Over	100	100	100	100

Retirement Age	Public Safety	Law Enforcement
52-55	N/A	20%
56-57	25%	20
58-59	20	20
60-61	35	23
62-63	35	25
64	35	30
65-69	35	25
70-73	100	25
74 & Over	100	100

Percent of Eligible Active Members Retiring Within Next Year

With Reduced Age-and-Service Retirement Benefits

Transition Group A

Members in the State and Local divisions who have a minimum of 25 years of total service credit and who have attained age 55 and members with five years of service who have attained age 60 may retire with a reduced benefit. Members in the Public Safety and Law Enforcement divisions who have a minimum of 25 years of service and who have attained age 48 and members with 15 years of service and who have attained age 52 may also retire with a reduced benefit.

Retirement Age	State		Local		Public Safety
	Men	Women	Men	Women	
48-51	N/A	N/A	N/A	N/A	8%
52-54	N/A	N/A	N/A	N/A	N/A
55-58	10%	10%	9%	11%	N/A
59	10	11	9	11	N/A
60	10	12	9	11	N/A
61	10	13	9	12	N/A
62	15	15	13	13	N/A
63	15	15	14	14	N/A
64	15	15	12	15	N/A

Transition Group B

Members in the State and Local divisions who have a minimum of 25 years of total service credit and who have attained age 55 and members with five years of service who have attained age 60 may retire with a reduced benefit. Members in the Public Safety and Law Enforcement divisions who have a minimum of 25 years of service and who have attained age 48 and members with 15 years of service and who have attained age 52 may also retire with a reduced benefit.

Retirement Age	State		Local		Public Safety	Law Enforcement
	Men	Women	Men	Women		
48-49	N/A	N/A	N/A	N/A	8%	8%
50-53	N/A	N/A	N/A	N/A	8	N/A
54	N/A	N/A	N/A	N/A	N/A	N/A
55-58	10%	10%	9%	11%	N/A	N/A
59	10	11	9	11	N/A	N/A
60	10	12	9	11	N/A	N/A
61	10	13	9	12	N/A	N/A
62	15	15	13	13	N/A	N/A
63	15	15	14	14	N/A	N/A
64-65	15	15	12	15	N/A	N/A

Transition Group C

Members in the State and Local divisions who have a minimum of 25 years of total service credit and who have attained the age of 57 and members with five years of service who have attained age 62 may retire with a reduced benefit. Members in the Public Safety division who have a minimum of 25 years of service and who have attained age 52 and members with 15 years of service who have attained age 56 may retire with a reduced benefit. Members in the Law Enforcement division who have a minimum of 25 years of service and who have attained age 48 and members with 15 years of service who have attained age 56 may also retire with a reduced benefit.

Retirement Age	State		Local		Public Safety	Law Enforcement
	Men	Women	Men	Women		
48-51	N/A	N/A	N/A	N/A	N/A	8%
52-55	N/A	N/A	N/A	N/A	8%	N/A
56	N/A	N/A	N/A	N/A	N/A	N/A
57-60	10%	10%	9%	11%	N/A	N/A
61	10	11	9	11	N/A	N/A
62	10	12	9	11	N/A	N/A
63	10	13	9	12	N/A	N/A
64	15	15	13	13	N/A	N/A
65	15	15	14	14	N/A	N/A
66	15	15	12	15	N/A	N/A

The tables below display statistical information regarding the average defined pension benefits paid to retirees receiving an age-and-service, disability, or survivor benefit. Additional benefits paid through the additional annuity and re-employed retiree programs, and annuities purchased from defined contribution accounts are excluded, as these benefits are not calculated under the defined benefit formula.

Average Defined Benefits Paid OPERS Retirees — Traditional Pension Plan

Year	Average Age at Retirement	Average Service at Retirement	Average Final Average Salary	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date
2018	57.8	23.2	$43,386	$21,456	70.7	$27,981
2017	57.7	23.1	42,479	21,016	70.4	27,192
2016	57.6	23.0	41,519	20,545	70.2	26,396
2015	57.6	22.9	40,600	20,092	69.9	25,600
2014	57.6	22.8	39,749	19,686	69.7	24,849
2013	57.4	22.8	38,760	19,299	69.5	24,220
2012	57.4	22.7	37,741	18,832	69.3	23,468
2011	57.3	22.6	36,549	18,221	69.3	22,614
2010	57.2	22.4	35,025	17,380	69.3	21,600
2009	57.2	22.2	33,808	16,725	69.3	20,731

Average Defined Benefits Paid OPERS Retirees — Combined Plan

Year	Average Age at Retirement	Average Service at Retirement	Average Final Average Salary	Average Pension at Retirement	Average Age on Valuation Date	Average Pension on Valuation Date
2018	64.8	10.6	$49,007	$4,338	68.7	$4,697
2017	64.7	10.3	47,455	4,000	68.2	4,304
2016	64.8	10.0	46,614	3,709	67.9	3,956
2015	64.6	9.8	45,141	3,401	67.3	3,596
2014	64.7	9.7	44,349	3,284	66.8	3,421
2013	64.9	8.7	43,403	2,839	67.0	2,962
2012	64.2	8.5	45,218	2,785	66.2	2,891
2011	64.2	7.9	49,751	2,757	66.0	2,828
2010	64.3	7.9	40,548	2,158	65.9	2,219
2009	65.0	7.6	35,139	1,590	66.6	1,635

The following tables display the actuarial valuation data for the active and retired members of the Traditional Pension Plan, and the defined benefit component of the Combined Plan:

Actuarial Valuation Data — Traditional Pension Plan

Valuation Year	Participating Employers[1]	Employer Units[1]	Active Members: Number	Active Members: Annual Payroll[2] ($ millions)	Active Members: Average Pay[2]	Active Members: Percent Increase in Average Pay[2]	Retired Lives: Number[3]	Retired Lives: Annual Allowance ($ millions)	Retired Lives: Average Allowance
2018	3,221	3,693	284,808[a]	$13,143	$46,147	11.95%	218,226	$5,986	$27,431
2017	3,227	3,683	323,318	13,328	41,223	2.12	216,260	5,766	26,663
2016	3,232	3,678	323,179	13,046	40,368	3.17	213,550	5,527	25,882
2015	3,247	3,683	321,383	12,575	39,128	2.53	210,792	5,296	25,124
2014	3,251	3,692	322,318	12,300	38,161	3.41	208,395	5,085	24,401
2013	3,260	3,718	325,181	12,000	36,903	1.29	201,841	4,803	23,796
2012	3,264	3,702	326,227	11,885	36,432	(1.08)	195,622	4,523	23,121
2011	3,248	3,695	328,640	12,103	36,828	1.27	189,753	4,232	22,303
2010	3,245	3,699	334,507	12,165	36,367	1.15	181,433	3,868	21,319
2009	3,264	3,714	341,777	12,288	35,953	0.29	174,637	3,576	20,477

Actuarial Valuation Data — Combined Plan

Valuation Year	Participating Employers[1]	Employer Units[1]	Active Members: Number	Active Members: Annual Payroll[2] ($ millions)	Active Members: Average Pay[2]	Active Members: Percent Increase in Average Pay[2]	Retired Lives: Number[3]	Retired Lives: Annual Allowance ($ millions)	Retired Lives: Average Allowance
2018	3,221	3,693	7,739	$429	$55,434	5.15%	339	$2	$4,697
2017	3,227	3,683	7,948	419	52,718	2.84	283	1	4,304
2016	3,232	3,678	7,803	400	51,262	4.25	239	1	3,956
2015	3,247	3,283	7,626	375	49,174	3.56	196	1	3,596
2014	3,251	3,692	7,455	354	47,485	3.85	158	1	3,421
2013	3,260	3,718	7,239	331	45,725	2.82	100	0	2,962
2012	3,264	3,702	6,948	309	44,473	0.88	57	0	2,891
2011	3,248	3,695	6,714	296	44,087	3.13	36	0	2,828
2010	3,245	3,699	6,667	284	42,748	4.56	20	0	2,219
2009	3,264	3,714	6,335	258	40,884	2.91	8	0	1,635

[a] In 2018, the data aggregation methodology was modified for active and inactive member counts after system reconfigurations. No material impact to the actuarial valuations resulted.

[1] The number of employer units exceeds the number of reporting or participating employers as some employers report multiple divisions or agencies. The employer unit count also includes private-sector employers that have assumed privatized functions from public employers for indeterminate periods. The number of participating employers is included to comply with GASB 67 requirements for presentation of a primary government and its component units as one employer.

[2] The Annual Payroll, Average Pay and Percent Increase in Average Pay values in this table, for 2014 through 2016, were restated to reflect the annual covered payroll calculated under the Funding Basis. The annual covered payroll under the Funding Basis represents the annualized pay rate for all active Traditional Pension and Combined plan members. The previous amounts reported were calculated under the Accounting Basis, which calculated annual covered payroll based on member contributions submitted within a given calendar year.

[3] The number of Retired Lives represents an individual count of retirees and beneficiaries.

Members of the Combined Plan and Member-Directed Plan may purchase a defined benefit annuity with the funds available in their defined contribution accounts. The following table displays the actuarial valuation data for these annuitized accounts:

Actuarial Valuation Data — Purchased Annuities

Valuation Year	Member-Directed Plan[1]			Combined Plan[1]		
	Number[2]	Annual Allowance ($ millions)	Average Allowance	Number[2]	Annual Allowance ($ millions)	Average Allowance
2018	280	$1	$4,948	230	$1	$3,840
2017	242	1	4,849	193	1	3,623
2016	219	1	4,593	159	1	3,618
2015	185	1	4,480	128	0	3,303
2014	155	1	4,305	101	0	3,257
2013	131	1	4,146	64	0	3,248
2012	62	0	3,516	38	0	2,922
2011	38	0	2,652	22	0	2,286
2010	18	0	2,275	12	0	1,920
2009	10	0	2,158	4	0	1,770

[1] Plan inception January 1, 2003.
[2] Number represents an individual count of retirees and beneficiaries.

The tables below display the changes in the retiree population that occurred each year within the Traditional Pension Plan and the Combined Plan. The Annual Allowances in the Rolls at End of the Year and the Average Annual Allowances represent the value of pension payments for the retiree population on the rolls at December 31, 2018.

The statistics presented below represent the number of retired members' accounts under which either the member or the members' beneficiaries are receiving defined formula benefits for age-and-service retirements, disability or survivor benefits. Annual Allowances include annual cost-of-living adjustments, but exclude other annuities such as money purchase or additional annuities (refer to the Plan Statement beginning on page 217 for a description of these benefits). Prior to 2011, the statistics excluded retired members with less than five years of service credit. Restated data for years prior to 2011 is not available.

Schedule of Retirees and Beneficiaries Added to and Removed from Rolls — Traditional Pension Plan

Year Ended	Added to Rolls			Removed from Rolls		Rolls at End of Year		Percentage Increase in Annual Allowances	Average Annual Allowances
	Number	Average Age at Retirement[1]	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances		
2018	8,294	62.7	$227,073,532	6,326	$123,469,913	210,773	$5,968,955,234	3.9%	$28,319
2017	8,610	61.5	236,113,024	6,185	115,031,952	208,805	5,746,885,962	4.3	27,523
2016	8,394		222,425,424	5,724	101,173,388	206,380	5,510,557,484	4.4	26,701
2015	8,235		202,901,884	5,849	101,124,098	203,710	5,277,086,404	4.2	25,905
2014	12,001		270,725,495	5,609	93,114,033	201,324	5,065,543,814	5.9	25,161
2013	10,946		265,957,588	5,371	83,764,472	194,932	4,784,927,394	6.3	24,547
2012	11,263		281,185,485	5,772	87,465,474	189,357	4,501,952,331	6.8	23,775
2011[a]	12,235		321,228,243	5,402	80,530,077	183,866	4,215,359,130	10.2	22,926
2010	10,607		278,758,820	4,041	59,271,884	173,235	3,824,710,874	8.0	22,078
2009	10,839		289,793,503	5,542	78,808,830	166,669	3,541,886,599	8.6	21,251

Schedule of Retirees and Beneficiaries Added to and Removed from Rolls — Combined Plan—Defined Benefit[2]

Year Ended	Added to Rolls			Removed from Rolls		Rolls at End of Year		Percentage Increase in Annual Allowances	Average Annual Allowances
	Number	Average Age at Retirement[1]	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances		
2018	54	64.4	$334,790	0	$0	337	$1,587,670	30.4%	$4,711
2017	49	64.1	279,099	4	16,442	283	1,217,952	31.0	4,304
2016	43		209,341	1	5,304	238	929,456	31.9	3,905
2015	41		162,966	1	3,333	196	704,864	33.4	3,596
2014	56		223,294	0	0	156	528,211	78.3	3,386
2013	45		133,159	0	0	100	296,172	87.2	2,962
2012	19		59,135	0	0	55	158,191	68.4	2,876
2011[a]	15		50,537	0	0	36	93,925	119.2	2,609
2010	11		29,695	0	0	19	42,849	228.7	2,255
2009	4		7,545	3	3,702	8	13,035	46.8	1,629

[a] Data aggregation methodology modified from values reported in the *2011 Comprehensive Annual Financial Report*.
[1] Average age of new age-and-service retirees only, beginning in 2017. Information for prior years unavailable.
[2] Plan inception January 1, 2003.

Schedules of Funding Progress

The Schedules of Funding Progress below include the Traditional Pension Plan, the defined benefit component of the Combined Plan and the actuarial impact of the annuitized defined contribution accounts for the Combined Plan and Member-Directed Plan. Members in the Combined Plan and Member-Directed Plan have the option of converting their defined contribution accounts to a defined benefit annuity at retirement. This section also includes the Schedules of Funding Progress for health care. Separate schedules are displayed for each pension plan and health care reflecting the funding status of the plans on a valuation, or funding, basis. See pages 193 and 195 in the Statistical Section for the schedules of funding progress on an accounting, or financial, basis, for pension and health care, respectively. Separate schedules are included in the Required Supplementary Information of the Financial Section disclosing the 10-year schedule of actuarially determined contributions and actual contributions paid.

Schedule of Funding Progress—Funding Basis[1] ($ in millions) — All Pension Plans

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Active Member Payroll	UAAL as Percent of Active Member Payroll	Amortization Years
2018	$108,705	$84,287	$24,418	78%	$13,807	177%	27
2017[c]	106,090	83,292	22,798	79	13,498	169	25
2017	102,656	83,292	19,364	81	13,498	143	18
2016	100,166	80,280	19,886	80	13,186	151	19
2015[a]	97,177	78,061	19,116	80	12,688	148	20
2015[b]	91,832	78,061	13,771	85	12,688	106	19
2014	89,285	74,865	14,420	84	12,486	114	21
2013	86,645	71,411	15,234	82	12,331	124	24
2012	83,878	67,855	16,023	81	12,193	131	26
2011	84,530	65,436	19,094	77	12,399	154	30
2010[a]	80,485	63,649	16,836	79	12,450	135	24
2010[b]	79,630	60,600	19,030	76	12,450	153	29
2009	76,555	57,629	18,926	75	12,548	151	30

Schedule of Funding Progress—Funding Basis[1] ($ in millions) — Traditional Pension Plan

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Active Member Payroll	UAAL as Percent of Active Member Payroll	Amortization Years
2018	$108,265	$83,715	$24,549	77%	$13,376	184%	28
2017[c]	105,691	82,797	22,894	78	13,085	175	26
2017	102,274	82,797	19,477	81	13,085	149	19
2016	99,818	79,865	19,953	80	12,794	156	20
2015[a]	96,863	77,700	19,163	80	12,321	152	20
2015[b]	91,535	77,700	13,835	85	12,321	110	19
2014	89,017	74,567	14,450	84	12,140	117	21
2013	86,407	71,175	15,232	82	12,000	127	25
2012	83,664	67,670	15,994	81	11,884	135	26
2011	84,325	65,274	19,051	77	12,103	157	30
2010[a]	80,307	63,515	16,792	79	12,165	138	25
2010[b]	79,459	60,461	18,998	76	12,165	156	30
2009	76,407	57,519	18,888	75	12,290	154	30

[a] Revised actuarial assumptions based on experience study.
[b] Results from original valuation prior to re-statement after completion of experience study.
[c] Revised actuarial assumptions based on change in discount rate from 7.5% to 7.2%.

[1] The amounts reported on this schedule do not include assets or liabilities for health care. For the health care funding progress, refer to the table on page 155.

The Combined Plan is a retirement plan with both a defined benefit and a defined contribution component. At retirement, members have the option to convert their defined contribution account to a defined benefit annuity. The schedule below includes the funding status for both defined formula benefits and the purchased annuities, when applicable.

Schedule of Funding Progress—Funding Basis[1] ($ in millions) Combined Plan

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities/(Assets) (UAAL)	Ratio of Assets to AAL	Active Member Payroll	UAAL as Percent of Active Member Payroll	Amortization Years
2018	$420	$552	($132)	131%	$431	0%	0
2017[c]	382	479	(97)	125	413	0	0
2017	365	479	(114)	131	413	0	0
2016	336	402	(66)	120	392	0	0
2015[a]	303	350	(47)	116	367	0	0
2015[b]	288	350	(62)	122	367	0	0
2014	260	289	(29)	111	346	0	0
2013	230	229	1	100	331	0	0
2012	212	183	29	86	310	9	1
2011	203	161	42	79	296	14	2
2010[a]	177	134	43	76	284	15	3
2010[b]	171	138	33	81	284	12	2
2009	148	110	38	74	258	15	3

[a] Revised actuarial assumptions based on experience study.
[b] Results from original valuation prior to re-statement after completion of experience study.
[c] Revised actuarial assumptions based on change in discount rate from 7.5% to 7.2%.
[1] The amounts reported on this schedule do not include assets or liabilities for health care. For the health care funding progress, refer to the table on page 155.

The Member-Directed Plan is a defined contribution plan. At retirement, members have the option to convert their defined contribution account to a defined benefit annuity. The schedule below displays the funding status of the purchased defined benefit annuities.

Schedule of Funding Progress—Funding Basis[1] ($ in thousands) Member-Directed Annuities

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities/(Assets) (UAAL)	Ratio of Assets to AAL	Active Member Payroll	UAAL as Percent of Active Member Payroll
2018	$19,917	$19,917	$0	100%	N/A	N/A
2017[d]	16,770	16,770	0	100	N/A	N/A
2016[c]	12,961	12,961	0	100	N/A	N/A
2015[a]	10,291	10,622	(331)	103	N/A	N/A
2015[b]	9,767	10,622	(855)	109	N/A	N/A
2014	8,291	8,772	(481)	106	N/A	N/A
2013	6,884	6,826	58	99	N/A	N/A
2012	2,666	2,524	142	95	N/A	N/A
2011	1,173	1,156	17	99	N/A	N/A
2010[a]	496	454	42	92	N/A	N/A
2010[b]	490	439	51	90	N/A	N/A
2009	253	206	47	81	N/A	N/A

[a] Revised actuarial assumptions based on experience study.
[b] Results from original valuation prior to re-statement after completion of experience study.
[c] Restated upon finalization of actuarial valuation subsequent to issuance of the 2016 CAFR.
[d] Revised actuarial assumptions based on change in discount rate from 7.5% to 7.2% did not have an impact on the results from original valuation prior to the change in discount rate.
[1] The amounts reported on this schedule do not include assets or liabilities for health care. Participants in the Member-Directed Plan do not have access to health care provided to the members of the Traditional Pension Plan or Combined Plan. Instead, a portion of the employer contributions are deposited in a retiree medical account. The retiree medical account can reimburse qualified medical expenses when a Member-Directed Plan participant terminates service or retires. For the health care funding progress, refer to the table on page 155.

The health care assets provide funding for a group of cost-sharing, multiple-employer health care plans that provide health care coverage for eligible benefit recipients in the Traditional Pension Plan and Combined Plan, as well as, the Member-Directed Plan retiree medical accounts. The schedule below displays the estimated solvency years the health care assets will be able to provide health care under the intermediate actuarial assumptions.

Schedule of Funding Progress—Funding Basis ($ in millions) **Health Care**

Valuation Year	Actuarial Accrued Liabilities (AAL)	Valuation Assets	Unfunded Actuarial Accrued Liabilities (UAAL)	Ratio of Assets to AAL	Active Member Payroll	UAAL as Percent of Active Member Payroll	Solvency Years[1]
2017[c]	$18,393	$12,021	$6,372	65.4%	$13,498	47%	13
2017	17,389	12,021	5,368	69.1	13,498	40	13
2016	19,924	12,098	7,826	60.7	13,186	59	12
2015[a]	19,224	11,933	7,291	62.1	12,688	57	Indefinite
2015[b]	18,515	11,933	6,582	64.5	12,688	52	Indefinite
2014	19,405	12,062	7,343	62.2	12,486	59	Indefinite
2013	19,784	12,031	7,753	60.8	12,331	63	Indefinite
2012	19,182	12,193	6,989	63.6	12,193	57	Indefinite
2011	31,020	12,115	18,905	39.1	12,399	153	10
2010[a]	30,531	12,320	18,211	40.4	12,450	146	11
2010[b]	26,929	11,267	15,662	41.8	12,450	126	11
2009	31,558	10,936	20,622	34.7	12,548	165	11
2008	29,623	10,748	18,875	36.3	12,801	147	11

[a] Revised actuarial assumptions based on experience study.
[b] Results from original valuation prior to re-statement after completion of experience study.
[c] Revised actuarial assumptions based on change in discount rate from 6.5% to 6.0%.
[1] Solvency years represent an estimate of the number of years the fund will be able to provide health care under the intermediate actuarial assumptions. Indefinite indicates funds are expected to be sufficient to fund future health care needs.

The OPERS funding objective is to pay for retirement benefits through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System will pay all promised benefits when due—the ultimate test of financial soundness.

A short-term solvency test is one means of checking a plan's progress under its funding program. In a short-term solvency test, the plan's present assets (cash and investments) are compared to: 1) active and inactive member contributions on deposit; 2) the liabilities for future benefits payable to present retired lives; and 3) the liabilities for service already rendered by active/inactive members.

In a plan following the discipline of level percent of payroll financing, the liabilities for member contributions on deposit (Columns (1)) and the liabilities for future benefits payable to present retired lives (Columns (2)) will be fully covered by existing assets (except in rare circumstances). In addition, the liabilities for service already rendered by active/inactive members (Columns (3)) will be partially covered by the remaining value of actuarial assets at year end.

The following tables display the results of the Short-Term Solvency Test for asset values in the defined benefit Traditional Pension Plan and Combined Plan, based on the actuarial value of assets at year end.

Accrued Pension Liabilities ($ in millions) — Traditional Pension Plan

Valuation Year	Aggregate Accrued Liabilities for (1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active/Inactive Members (Employer-Financed Portion)	Valuation Assets[1]	Portions of Accrued Liabilities Covered by Reported Assets (1)	(2)[d]	(3)
2018	$14,764	$68,379	$25,122	$83,715	100%	100%	2%
2017[c]	14,298	66,546	24,847	82,797	100	100	8
2017	14,298	64,834	23,142	82,797	100	100	16
2016	13,912	62,798	23,108	79,865	100	100	14
2015[a]	13,469	56,376	27,018	77,700	100	100	29
2015[b]	13,469	56,815	21,250	77,700	100	100	35
2014	13,191	55,102	20,724	74,567	100	100	30
2013	12,826	52,404	21,177	71,175	100	100	28
2012	12,640	49,667	21,357	67,670	100	100	25
2011	12,299	46,588	25,439	65,274	100	100	25
2010[a]	12,134	42,362	25,811	63,515	100	100	35
2010[b]	12,134	41,715	25,609	60,461	100	100	26
2009	11,933	38,577	25,897	57,519	100	100	27

[a] Results restated based on experience study.
[b] Results from original valuation prior to completion of experience study.
[c] Revised actuarial assumptions based on change in discount rate from 7.5% to 7.2%.
[d] By law, OPERS is obligated to pay certain benefits that have commenced with retirees. In order to make these payments each year and hold sufficient assets in this fund to pay the vested benefits of all retirees and beneficiaries as of the actuarial valuation date, OPERS transfers funds from the active member employer fund (the Employers' Accumulation Fund) to the pension funds (the Annuity and Pension Reserve Fund and the Survivors' Benefit Fund). Thus, the amount available for active member funding is negatively impacted.
[1] Does not include assets set aside for health care.

Accrued Pension Liabilities ($ in millions) — Combined Plan

Valuation Year	Aggregate Accrued Liabilities for (1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active/Inactive Members (Employer-Financed Portion)	Valuation Assets[1]	Portions of Accrued Liabilities Covered by Reported Assets (1)	(2)[d]	(3)
2018	$3	$31	$386	$552	100%	100%	134%
2017[c]	3	24	355	479	100	100	127
2017	3	23	340	479	100	100	133
2016	3	18	315	402	100	100	121
2015[a]	2	14	287	350	100	100	116
2015[b]	3	13	272	350	100	100	123
2014	3	10	246	289	100	100	112
2013	2	6	223	229	100	100	100
2012	2	3	207	183	100	100	86
2011	1	2	200	161	100	100	79
2010[a]	1	1	175	134	100	100	75
2010[b]	1	1	169	138	100	100	80
2009	1	0	147	110	100	100	74

[a] Results restated based on experience study.
[b] Results from original valuation prior to completion of experience study.
[c] Revised actuarial assumptions based on change in discount rate from 7.5% to 7.2%.
[d] By law, OPERS is obligated to pay certain benefits that have commenced with retirees. In order to make these payments each year and hold sufficient assets in this fund to pay the vested benefits of all retirees and beneficiaries as of the actuarial valuation date, OPERS transfers funds from the active member employer fund (the Employers' Accumulation Fund) to the pension funds (the Annuity and Pension Reserve Fund and the Survivors' Benefit Fund). Thus, the amount available for active member funding is negatively impacted.
[1] Does not include assets set aside for health care.

Actual vs. Recommended Contribution Rates

The Board adopted all contribution rates as recommended by the actuary.

The following tables display the actual financial experience in relation to the actuarially assumed experience for each of the defined benefit pension plans. Actuarial gains and losses in accrued liabilities result from differences between the assumed experience and actual experience.

Analysis of Financial Experience ($ in millions, continued on next page)

	Gains (or Losses) for Year			
Type of Activity	2018	2017	2016	2015
Age-and-Service Retirements When members retire at older ages than assumed, a gain results. If members retire at ages younger than assumed, a loss occurs.	$51.2	$62.2	$55.5	$71.6
Disability Retirements When disability claims are less than assumed, a gain results. If claims are greater than assumed, a loss occurs.	79.6	72.8	61.2	83.1
Death-In-Service Annuities When survivor claims are less than assumed, a gain results. If claims are greater than assumed, a loss occurs.	45.9	36.0	41.3	41.0
Other Separations When liabilities released by other separations are greater than assumed, a gain results. If liabilities released are less than assumed, a loss occurs.	31.1	(6.1)	5.2	22.1
Pay Increases When pay increases are less than assumed, a gain results. If pay increases are greater than assumed, a loss occurs.	183.0	410.6	(48.1)	367.1
Investment Return When investment returns are greater than assumed, a gain results. If investment returns are less than assumed, a loss occurs.	(1,743.5)	203.5	(467.8)	261.6
Retiree Mortality When liabilities released due to death of members are greater than assumed, a gain results. If liabilities released are less than assumed, a loss occurs.	121.8	82.4	31.9	74.4
Retiree Cost-of-Living Adjustments When cost-of-living adjustments are less than assumed, a gain results. If cost-of-living adjustments are greater than assumed, a loss occurs.	(104.6)			
Gains/(Losses) During Year From Financial Experience	**($1,335.5)**	**$861.4**	**($320.8)**	**$920.9**

Analysis of Financial Experience ($ in millions, continued on next page)

	Gains (or Losses) for Year			
Type of Activity	2018	2017	2016	2015
Age-and-Service Retirements When members retire at older ages than assumed, a gain results. If members retire at ages younger than assumed, a loss occurs.	$0.05	$0.21	$0.06	$0.07
Disability Retirements When disability claims are less than assumed, a gain results. If claims are greater than assumed, a loss occurs.	4.32	4.30	3.82	3.93
Death-In-Service Annuities When survivor claims are less than assumed, a gain results. If claims are greater than assumed, a loss occurs.	0.53	(0.04)	0.94	0.42
Other Separations When liabilities released by other separations are greater than assumed, a gain results. If liabilities released are less than assumed, a loss occurs.	(0.04)	(1.16)	(0.44)	0.23
Pay Increases When pay increases are less than assumed, a gain results. If pay increases are greater than assumed, a loss occurs.	3.42	9.89	4.09	5.92
Investment Return When investment returns are greater than assumed, a gain results. If investment returns are less than assumed, a loss occurs.	(9.22)	3.99	(2.02)	(0.08)
Retiree Mortality When liabilities released due to death of members are greater than assumed, a gain results. If liabilities released are less than assumed, a loss occurs.	0.16	0.02	(0.03)	0.29
Retiree Cost-of-Living Adjustments When cost-of-living adjustments are less than assumed, a gain results. If cost-of-living adjustments are greater than assumed, a loss occurs.	(0.12)			
Gains/(Losses) During Year From Financial Experience	**($0.90)**	**$17.21**	**$6.42**	**$10.78**

Traditional Pension Plan					
Gains (or Losses) for Year					
2014	2013	2012	2011	2010	2009
($91.9)	($77.2)	($113.2)	($179.0)	($20.5)	($27.5)
95.0	64.0	71.6	88.1	59.2	74.0
40.4	29.5	42.0	36.1	32.0	34.6
4.7	(13.0)	8.9	15.9	99.8	(58.9)
461.8	551.7	1,261.7	359.5	773.7	1,141.8
471.3	617.1	(398.4)	(1,193.8)	153.5	(620.5)
95.8	140.4				
$1,077.1	**$1,312.5**	**$872.6**	**($873.2)**	**$1,097.7**	**$543.5**

Combined Plan					
Gains (or Losses) for Year					
2014	2013	2012	2011	2010	2009
($0.16)	($0.09)	($0.11)	($0.09)	($0.12)	($0.12)
4.66	4.34	4.86	4.52	2.78	2.07
1.04	0.66	0.59	(0.02)	0.04	0.53
(0.74)	(0.09)	0.44	0.55	(1.67)	7.56
4.92	5.53	7.55	3.00	2.29	(3.35)
3.05	2.84	(0.38)	(2.69)	(3.44)	(3.25)
0.04	0.10				
$12.81	**$13.29**	**$12.95**	**$5.27**	**($0.12)**	**$3.44**

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OPERS has never missed a monthly benefit payment

Then and now: In more than 80 years, OPERS has never missed a monthly benefit payment—every retiree, every beneficiary, every month, every year. That's more than 996 months of on-time payments to each and every generation of retirees.

That's a remarkable statement, especially considering that the majority of benefit funding comes from investment returns. How can OPERS deliver on its commitment year after year? Only through responsible actions and the courage to anticipate change. Our ability to anticipate challenges has enabled this System to absorb significant changes in our landscape and still deliver on our commitments. Challenges such as members living longer in retirement than ever before, volatile global markets and an ever-changing member-to-retiree ratio have placed deeper-than-expected strains on the OPERS foundation.

Consider some of the changes OPERS has navigated:

In 1938—three years after OPERS began operation as a pension system, the U.S. was still in the depths of the Great Depression. At that time, the cost of a movie ticket was 25 cents, a U.S. Postage stamp was 3 cents, and one dozen eggs was 18 cents. Life expectancy was between 55-63 years of age (depending on race and gender)—many lived only a very few years into retirement.

In 1978—forty years after operations began, the U.S. was recovering from the mild 1973-75 recession. The cost of a movie ticket was $2, cost of a stamp was 15 cents, and cost of eggs was 48 cents. Life expectancy had jumped to between 69-74 years.

In 2018—the year of this annual report, the U.S. was still recovering from the Great Recession. The cost of a movie ticket was $10, cost of a stamp was 50 cents, and cost of eggs was up to $3. Life expectancy was more than 80 years.

OPERS provides stability accomplished through responsible actions and the willingness to anticipate and accept change. Through all the growth, all the recessionary times, all the volatile markets, and all the increased time in retirement years, OPERS met every obligation—every time.

OPERS has delivered on its commitment to every retiree generation—past and present—and works to deliver the same for future generations.

OPERS

The Statistical Section provides pertinent information to assist readers when viewing the Financial Statements, Notes to the Financial Statements and Required Supplementary Information to help in understanding and assessing the System's overall financial condition. The information reported here is in compliance with Governmental Accounting Standards Board (GASB) Statement No. 44, *Economic Condition Reporting: The Statistical Section*. This statement establishes standardized reporting requirements for the supplementary information provided in this section.

The schedules and graphs beginning on the next page show financial trend information about the growth of assets for the past 10 years (where available). These schedules provide detailed information about the trends of key sources of additions and deductions to the System's assets and assist in providing a context framing how the OPERS financial position has changed over time. The financial trend schedules presented are:

- Net Position by Plan,
- Statutory Fund Balance by Plan,
- Fiduciary Net Position by Year,
- Changes in Fiduciary Net Position,
- Additions by Source,
- Deductions by Type,
- Benefits by Type,
- Refunds by Type, and
- Number of Refund Payments by Plan.

The schedules on page 193 through 194 compare the pension assets accumulated to cover the projected pension liabilities that are ultimately due at retirement for each of the defined benefit plans and the corresponding funded ratio under both the accounting basis (GASB Statement No. 67) and the funding basis. Health care coverage is not statutorily guaranteed and may be changed to ensure long-term solvency of the plans and OPERS' ability to provide future coverage for all eligible retirees. The schedules on page 195 through 196 display similar information for health care assets and projected liabilities under both the accounting basis (GASB Statement No. 74) and the funding basis. The Health Care Solvency schedule shows the estimated number of years, under the funding basis, for which assets are available to cover the projected liabilities. Refer to the schedules of pension and health care assets vs. liabilities.

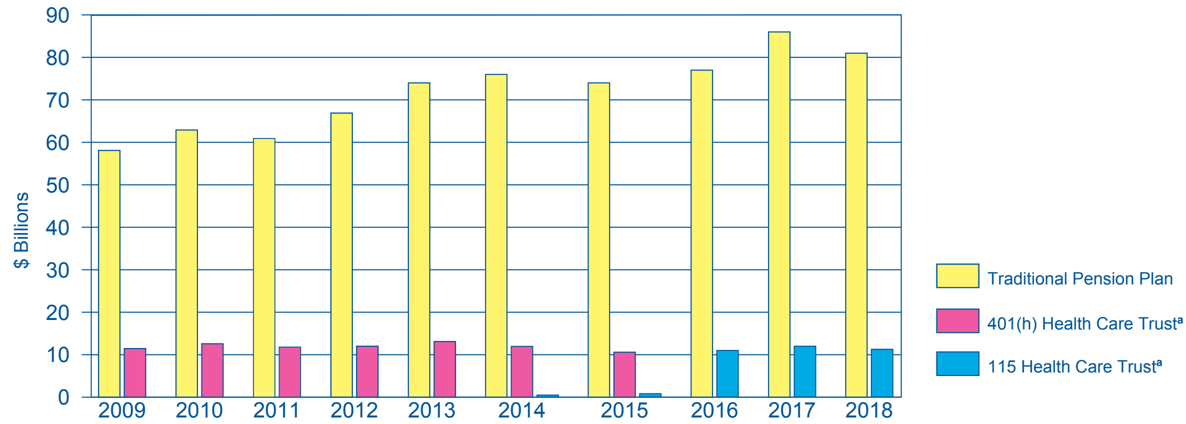
The schedules beginning on page 192 show demographic and economic information and operating information. The demographic and economic information is designed to assist in understanding the environment in which OPERS operates. The operating information is intended to provide contextual information about operations to assist in assessing the System's economic condition. The demographic and economic information and the operating information presented include:

- Funds Restricted for Member Health Care Accounts,
- Pension Assets vs. Pension Liabilities,
- Health Care Assets vs. Liabilities,
- Investment Rates by Portfolio—Defined Benefit and Health Care,
- Number of Retirees/Benefit Recipients by Category,
- Number of Covered Lives by Category,
- Schedule of Retirees by Benefit Type and Amount,
- Number of New Pension Retirees,
- Schedule of Average Benefits (Traditional Pension Plan and Combined Plan),
- Member Counts by Plan,
- 2018 Pension Benefits and Retirees by Ohio County,
- Retirees by Geographic Location,
- Contribution Rates,
- Number of Employer Units, and
- Principal Participating Employers.

All non-accounting data is derived from OPERS internal sources.

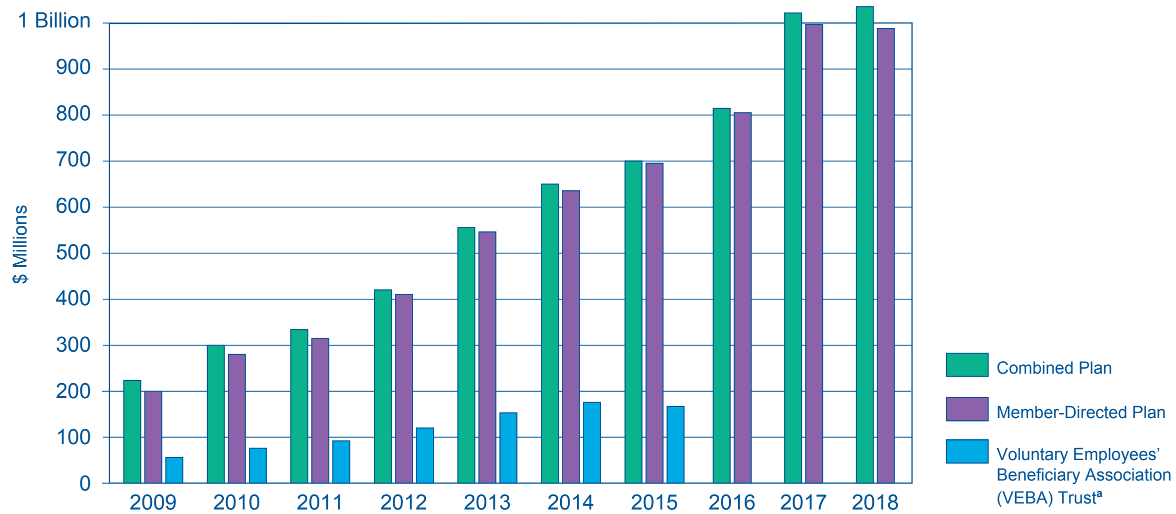
Net Position by Plan

Traditional Pension Plan, 401(h) Health Care Trust, 115 Health Care Trust



Net Position by Plan

Combined Plan, Member-Directed Plan, VEBA Trust



Net Position by Plan (last 10 fiscal years)

Year	Traditional Pension Plan	Combined Plan	Member-Directed Plan	115 Health Care Trust[1]	401(h) Health Care Trust	Voluntary Employees' Beneficiary Association (VEBA) Trust	Total Net Position
2018	$80,876,605,054	$1,036,089,962	$977,376,894	$11,252,985,702			$94,143,057,612
2017	86,585,851,024	1,022,418,029	998,717,118	12,818,833,665			101,425,819,836
2016[a]	77,109,633,485	815,852,017	804,850,860	11,880,487,863			90,610,824,225
2015	74,213,320,352	700,914,409	698,540,030	841,112,040	$10,671,068,181	$166,446,806	87,291,401,818
2014	76,956,230,642	650,249,727	635,272,613	386,080,172	12,440,522,790	175,539,164	91,243,895,108
2013	74,618,532,269	559,612,889	547,022,037		13,111,684,807	153,084,296	88,989,936,298
2012	67,668,091,799	420,197,546	410,662,967		12,828,625,322	119,615,875	81,447,193,509
2011[b]	61,330,891,370	333,095,015	317,193,338		11,959,000,311	90,696,132	74,030,876,166
2010[b]	63,153,243,166	300,437,631	279,096,442		12,682,612,422	76,231,029	76,491,620,690
2009	57,630,423,957	223,384,797	200,588,070		11,415,195,274	55,784,131	69,525,376,229

[a] The 401(h) Health Care Trust and the VEBA Trust were terminated as of June 30, 2016 and the net positions of these trusts were consolidated into the 115 Health Care Trust on July 1, 2016.
[b] Net Position by Plan was restated to correct allocation of investment income as of December 31, 2010, with the restatement rolled forward through 2011 and 2012. The restatement by plan does not impact the total net position of the System.
[1] The 115 Health Care Trust was established in 2014.

Statutory Fund Balance by Plan (last 10 fiscal years)

(continued on next page)

Year	2018	2017	2016	2015
All Plans				
Employees' Savings Fund	$14,767,713,107	$14,300,330,700	$13,914,959,537	$13,471,062,846
Employers' Accumulation Fund—Pension/Health Care	16,550,272,093	25,650,181,722	19,218,910,213	16,076,648,809
Annuity and Pension Reserve Fund	59,469,119,341	58,106,232,497	54,462,722,183	54,705,647,821
Survivors' Benefit Fund	1,766,560,528	1,742,699,663	1,669,466,891	1,694,085,497
Defined Contribution Fund—Retirement/Health Care	1,462,705,849	1,502,124,254	1,216,155,401	1,219,165,845
Income Fund	122,296,958	112,115,080	123,776,306	122,714,098
Expense Fund	4,389,736	12,135,920	4,833,694	2,076,902
Total Fund Balance	**$94,143,057,612**	**$101,425,819,836**	**$90,610,824,225**	**$87,291,401,818**
Traditional Pension Plan				
Employees' Savings Fund	$14,764,276,344	$14,297,505,057	$13,912,277,541	$13,468,694,332
Employers' Accumulation Fund—Pension	4,795,082,942	12,351,857,327	6,965,583,478	4,243,982,790
Annuity and Pension Reserve Fund	59,423,998,546	58,069,537,977	54,433,695,575	54,681,766,733
Survivors' Benefit Fund	1,766,560,528	1,742,699,663	1,669,466,891	1,694,085,497
Income Fund	122,296,958	112,115,080	123,776,306	122,714,098
Expense Fund	4,389,736	12,135,920	4,833,694	2,076,902
Total Fund Balance	**$80,876,605,054**	**$86,585,851,024**	**$77,109,633,485**	**$74,213,320,352**
Combined Plan				
Employees' Savings Fund	$3,342,013	$2,587,678	$2,629,485	$2,343,149
Employers' Accumulation Fund—Pension	499,982,476	476,864,676	372,135,835	320,876,515
Annuity and Pension Reserve Fund	28,176,089	21,799,531	17,116,877	13,366,406
Defined Contribution Fund—Retirement	504,589,384	521,166,144	423,969,820	364,328,339
Total Fund Balance	**$1,036,089,962**	**$1,022,418,029**	**$815,852,017**	**$700,914,409**
Member-Directed Plan				
Employees' Savings Fund	$94,750	$237,965	$52,511	$25,365
Employers' Accumulation Fund—Pension	2,220,973	2,626,054	703,037	(390,717)
Annuity and Pension Reserve Fund	16,944,706	14,894,989	11,909,731	10,514,682
Defined Contribution Fund—Retirement	958,116,465	980,958,110	792,185,581	688,390,700
Total Fund Balance	**$977,376,894**	**$998,717,118**	**$804,850,860**	**$698,540,030**
115 Health Care Trust[1]				
Employers' Accumulation Fund—Health Care	$11,252,985,702	$12,818,833,665	$11,880,487,863	$841,112,040
Total Fund Balance	**$11,252,985,702**	**$12,818,833,665**	**$11,880,487,863**	**$841,112,040**
401(h) Health Care Trust[1]				
Employers' Accumulation Fund—Health Care				$10,671,068,181
Total Fund Balance				**$10,671,068,181**
Voluntary Employees' Beneficiary Association (VEBA) Trust[1]				
Defined Contribution Fund—Health Care				$166,446,806
Total Fund Balance				**$166,446,806**

[a] Net Position by Plan was restated to correct the allocation of investment income as of December 31, 2010, with restatement rolled forward through 2011 and 2012. The restatement by plan does not impact the total net position of the System.

[1] The 115 Health Care Trust was established in 2014. The 401(h) Health Care Trust and the VEBA Trust were terminated as of June 30, 2016 and the net positions of these trusts were consolidated into the 115 Health Care Trust on July 1, 2016.

Statutory Fund Balance by Plan

2014	2013	2012	2011[a]	2010[a]	2009
$13,194,306,671	$12,828,423,536	$12,641,655,468	$12,300,117,438	$12,134,839,989	$11,933,642,333
22,768,644,951	22,852,975,720	19,074,270,351	15,959,261,830	22,278,219,189	20,026,006,552
52,331,183,968	50,525,254,541	47,232,908,883	43,513,048,458	39,927,499,750	35,616,195,176
1,675,926,615	1,654,787,855	1,627,212,197	1,568,050,108	1,527,374,797	1,472,264,995
1,154,079,903	1,011,655,646	763,702,610	587,622,632	522,426,170	376,419,373
114,494,235	113,671,739	107,444,000	99,016,985	99,070,651	95,184,666
5,258,765	3,167,261		3,758,715	2,190,144	5,663,134
$91,243,895,108	**$88,989,936,298**	**$81,447,193,509**	**$74,030,876,166**	**$76,491,620,690**	**$69,525,376,229**
$13,191,067,352	$12,826,142,567	$12,639,906,042	$12,298,673,251	$12,133,856,642	$11,932,873,455
9,655,043,969	9,507,406,396	6,066,140,290	3,850,924,715	9,464,360,661	8,508,596,858
52,314,439,706	50,513,356,451	47,227,389,270	43,510,467,596	39,926,390,271	35,615,840,849
1,675,926,615	1,654,787,855	1,627,212,197	1,568,050,108	1,527,374,797	1,472,264,995
114,494,235	113,671,739	107,444,000	99,016,985	99,070,651	95,184,666
5,258,765	3,167,261		3,758,715	2,190,144	5,663,134
$76,956,230,642	**$74,618,532,269**	**$67,668,091,799**	**$61,330,891,370**	**$63,153,243,166**	**$57,630,423,957**
$2,994,501	$1,894,549	$1,606,472	$1,362,904	$975,589	$768,977
286,747,478	233,588,347	179,466,995	149,374,928	131,266,975	102,108,811
8,359,792	5,481,510	3,114,881	1,514,253	644,239	251,905
352,147,956	318,648,483	236,009,198	180,842,930	167,550,828	120,255,104
$650,249,727	**$559,612,889**	**$420,197,546**	**$333,095,015**	**$300,437,631**	**$223,384,797**
$244,818	$386,420	$142,954	$81,283	$7,758	($99)
250,542	296,170	37,744	(38,124)	(20,869)	105,609
8,384,470	6,416,580	2,404,732	1,066,609	465,240	102,422
626,392,783	539,922,867	408,077,537	316,083,570	278,644,313	200,380,138
$635,272,613	**$547,022,037**	**$410,662,967**	**$317,193,338**	**$279,096,442**	**$200,588,070**
$386,080,172					
$386,080,172					
$12,440,522,790	$13,111,684,807	$12,828,625,322	$11,959,000,311	$12,682,612,422	$11,415,195,274
$12,440,522,790	**$13,111,684,807**	**$12,828,625,322**	**$11,959,000,311**	**$12,682,612,422**	**$11,415,195,274**
$175,539,164	$153,084,296	$119,615,875	$90,696,132	$76,231,029	$55,784,131
$175,539,164	**$153,084,296**	**$119,615,875**	**$90,696,132**	**$76,231,029**	**$55,784,131**

Fiduciary Net Position by Year (last 10 fiscal years)

(continued through page 169)

Year	2018	2017	2016	2015
All Plans				
Assets				
Cash and Cash Equivalents	$3,986,157,970	$4,625,708,094	$4,586,305,505	$3,064,065,686
Receivables	888,861,210	1,113,071,247	1,112,083,698	954,980,282
Investments	89,977,800,332	96,357,409,903	85,449,650,603	83,819,475,118
Collateral on Loaned Securities	8,170,412,140	7,935,816,160	8,288,355,523	8,270,812,672
Net Capital Assets	127,110,017	131,801,306	132,961,073	132,811,651
Prepaid Expenses and Other Assets	2,062,788	1,304,949	764,515	1,217,369
Total Assets	**103,152,404,457**	**110,165,111,659**	**99,570,120,917**	**96,243,362,778**
Liabilities and Net Position				
Benefits Payable	120,372,871	114,904,201	110,396,253	93,550,718
Investment Commitments Payable	702,901,475	671,584,704	539,826,060	475,568,951
Obligations Under Securities Lending	8,167,622,811	7,933,640,759	8,285,285,181	8,271,338,789
Other Liabilities	18,449,688	19,162,159	23,789,198	111,502,502
Net Position (Fund Balance)	94,143,057,612	101,425,819,836	90,610,824,225	87,291,401,818
Total Liabilities and Net Position	**$103,152,404,457**	**$110,165,111,659**	**$99,570,120,917**	**$96,243,362,778**
Traditional Pension Plan				
Assets				
Cash and Cash Equivalents	$3,374,454,554	$3,781,114,065	$3,695,255,724	$2,381,670,021
Receivables	768,486,959	954,982,358	880,590,006	637,347,978
Investments	77,239,220,653	82,334,875,328	72,913,065,131	71,514,345,166
Collateral on Loaned Securities	8,116,371,929	7,891,300,747	8,247,367,947	8,215,428,672
Net Capital Assets	96,834,232	99,218,172	98,085,389	96,541,605
Prepaid Expenses and Other Assets	2,062,788	1,304,949	764,515	1,217,369
Total Assets	**89,597,431,115**	**95,062,795,619**	**85,835,128,712**	**82,846,550,811**
Liabilities and Net Position				
Benefits Payable	840,787	260,431	1,253,982	255,699
Investment Commitments Payable	588,145,541	568,614,823	456,426,672	393,965,905
Obligations Under Securities Lending	8,113,604,843	7,889,137,549	8,244,312,788	8,215,951,266
Other Liabilities	18,234,890	18,931,792	23,501,785	23,057,589
Net Position (Fund Balance)	80,876,605,054	86,585,851,024	77,109,633,485	74,213,320,352
Total Liabilities and Net Position	**$89,597,431,115**	**$95,062,795,619**	**$85,835,128,712**	**$82,846,550,811**
Combined Plan				
Assets				
Cash and Cash Equivalents	$16,264,772	$18,789,542	$15,750,245	$10,566,328
Receivables	12,076,641	14,429,447	12,005,543	22,378,455
Investments	1,008,282,317	988,897,434	787,029,411	674,801,893
Collateral on Loaned Securities	52,042,473	42,918,686	39,693,971	34,258,885
Net Capital Assets	3,905,804	3,947,072	3,885,497	3,950,559
Total Assets	**1,092,572,007**	**1,068,982,181**	**858,364,667**	**745,956,120**
Liabilities and Net Position				
Investment Commitments Payable	4,460,993	3,657,231	2,833,383	1,801,004
Obligations Under Securities Lending	52,021,052	42,906,921	39,679,267	34,261,065
Other Liabilities				8,979,642
Net Position (Fund Balance)	1,036,089,962	1,022,418,029	815,852,017	700,914,409
Total Liabilities and Net Position	**$1,092,572,007**	**$1,068,982,181**	**$858,364,667**	**$745,956,120**
Member-Directed Plan				
Assets				
Cash and Cash Equivalents	$255,302	$1,938,245	$666,696	$334,220
Receivables	10,324,579	13,193,710	11,590,244	23,237,455
Investments	965,305,936	981,494,690	790,661,959	677,842,112
Collateral on Loaned Securities	1,997,738	1,596,727	1,293,605	2,237,421
Net Capital Assets	2,757,251	2,891,519	2,962,075	3,025,179
Total Assets	**980,640,806**	**1,001,114,891**	**807,174,579**	**706,676,387**
Liabilities and Net Position				
Investment Commitments Payable	1,266,996	801,484	1,030,593	245,260
Obligations Under Securities Lending	1,996,916	1,596,289	1,293,126	2,237,563
Other Liabilities				5,653,534
Net Position (Fund Balance)	977,376,894	998,717,118	804,850,860	698,540,030
Total Liabilities and Net Position	**$980,640,806**	**$1,001,114,891**	**$807,174,579**	**$706,676,387**

See footnotes on page 168

Fiduciary Net Position by Year

2014	2013	2012	2011[a]	2010[a]	2009
$2,882,858,353	$3,333,382,605	$2,780,697,535	$2,847,839,851	$3,654,805,279	$1,742,538,072
1,088,837,041	1,092,845,990	2,212,003,770	1,554,352,796	1,437,458,798	1,976,201,742
87,891,142,075	85,137,610,781	77,617,850,120	71,149,016,095	72,661,379,153	66,819,524,257
7,854,368,780	6,958,964,420	6,827,172,458	10,401,223,945	9,250,107,607	9,978,449,975
133,629,210	131,389,851	121,172,935	112,092,861	112,130,055	113,508,936
2,261,461	2,912,709	3,841,978	779,630	471,611	236,290
99,853,096,920	**96,657,106,356**	**89,562,738,796**	**86,065,305,178**	**87,116,352,503**	**80,630,459,272**
99,844,976	90,115,030	101,188,640	119,591,363	142,993,825	140,959,867
593,164,943	554,398,461	1,116,869,935	1,423,836,318	1,155,469,120	916,348,545
7,852,803,699	6,953,717,885	6,816,672,766	10,410,130,422	9,250,107,607	9,978,449,975
63,388,194	68,938,682	80,813,946	80,870,909	76,161,261	69,324,656
91,243,895,108	88,989,936,298	81,447,193,509	74,030,876,166	76,491,620,690	69,525,376,229
$99,853,096,920	**$96,657,106,356**	**$89,562,738,796**	**$86,065,305,178**	**$87,116,352,503**	**$80,630,459,272**
$2,357,796,670	$2,826,596,339	$2,324,824,614	$2,321,930,951	$2,969,362,112	$1,652,107,085
709,932,322	760,735,070	1,690,953,615	1,181,127,055	1,039,459,387	915,977,579
74,279,082,505	71,393,042,048	64,487,332,183	58,890,460,789	59,973,039,802	55,741,813,567
7,809,036,934	6,924,316,299	6,797,920,566	10,363,838,801	7,708,958,738	9,653,891,069
96,963,543	98,948,820	85,661,140	84,923,332	85,155,975	86,063,353
2,261,461	2,912,709	3,841,978	779,630	471,611	236,290
85,255,073,435	**82,006,551,285**	**75,390,534,096**	**72,843,060,558**	**71,776,447,625**	**68,050,088,943**
311,575	78,477	682,136	1,061,656	31,862	6,950,608
475,297,939	451,977,660	918,234,060	1,124,645,829	899,118,485	749,608,796
7,807,480,885	6,919,095,886	6,787,465,861	10,372,713,265	7,708,958,738	9,653,891,069
15,752,394	16,866,993	16,060,240	13,748,438	15,095,374	9,214,513
76,956,230,642	74,618,532,269	67,668,091,799	61,330,891,370	63,153,243,166	57,630,423,957
$85,255,073,435	**$82,006,551,285**	**$75,390,534,096**	**$72,843,060,558**	**$71,776,447,625**	**$68,050,088,943**
$8,947,770	$9,425,463	$6,574,926	$6,248,674	$7,127,776	$3,716,643
21,472,538	17,071,301	9,350,843	7,707,808	6,892,606	6,259,012
623,991,406	534,668,467	416,161,716	339,986,995	303,637,263	233,771,271
27,497,528	20,966,014	18,059,949	23,506,898	15,196,825	16,765,205
3,998,438	3,921,730	4,357,765	65,084	34,750	1,932
685,907,680	**586,052,975**	**454,505,199**	**377,515,459**	**332,889,220**	**260,514,063**
1,787,256	1,549,789	2,690,744	2,823,632	1,950,989	1,942,496
27,492,049	20,950,208	18,032,174	23,527,027	15,196,825	16,765,205
6,378,648	3,940,089	13,584,735	18,069,785	15,303,775	18,421,565
650,249,727	559,612,889	420,197,546	333,095,015	300,437,631	223,384,797
$685,907,680	**$586,052,975**	**$454,505,199**	**$377,515,459**	**$332,889,220**	**$260,514,063**
$274,295	$282,346	$91,299	$980,013	$1,349,705	$2,322,907
21,577,499	15,586,438	6,821,748	7,353,279	5,657,850	5,901,916
638,145,075	560,933,809	432,851,458	338,695,474	301,502,301	221,224,028
767,134	482,373	205,837	111,647	40,463	30,222
3,150,369	2,856,649	3,667,974	94,933	38,662	2,294
663,914,372	**580,141,615**	**443,638,316**	**347,235,346**	**308,588,981**	**229,481,367**
137,585	196,803	155,855	123,669	6,707	787,160
766,982	482,009	205,521	111,743	40,463	30,222
27,737,192	32,440,766	32,613,973	29,806,596	29,445,369	28,075,915
635,272,613	547,022,037	410,662,967	317,193,338	279,096,442	200,588,070
$663,914,372	**$580,141,615**	**$443,638,316**	**$347,235,346**	**$308,588,981**	**$229,481,367**

continued on page 168

continued from page 167

Fiduciary Net Position by Year (last 10 fiscal years)

Year	2018	2017	2016	2015
115 Health Care Trust[1]				
Assets				
Cash and Cash Equivalents	$595,183,342	$823,866,242	$874,632,840	$228,930,728
Receivables	97,973,031	130,465,732	207,897,905	173,883,586
Investments	10,764,991,426	12,052,142,451	10,958,894,102	484,975,264
Net Capital Assets	23,612,730	25,744,543	28,028,112	1,441,984
Total Assets	**11,481,760,529**	**13,032,218,968**	**12,069,452,959**	**889,231,562**
Liabilities and Net Position				
Benefits Payable	119,532,084	114,643,770	109,142,271	1,634,811
Investment Commitments Payable	109,027,945	98,511,166	79,535,412	1,789,658
Other Liabilities	214,798	230,367	287,413	44,695,053
Net Position (Fund Balance)	11,252,985,702	12,818,833,665	11,880,487,863	841,112,040
Total Liabilities and Net Position	**$11,481,760,529**	**$13,032,218,968**	**$12,069,452,959**	**$889,231,562**
401(h) Health Care Trust[1]				
Assets				
Cash and Cash Equivalents				$437,888,805
Receivables				83,230,392
Investments				10,314,427,768
Collateral on Loaned Securities				
Net Capital Assets				27,020,679
Total Assets				**10,862,567,644**
Liabilities and Net Position				
Benefits Payable				91,451,759
Investment Commitments Payable				76,923,764
Obligations Under Securities Lending				
Other Liabilities				23,123,940
Net Position (Fund Balance)				10,671,068,181
Total Liabilities and Net Position				**$10,862,567,644**
Voluntary Employees' Beneficiary Association (VEBA) Trust[1]				
Assets				
Cash and Cash Equivalents				$4,675,584
Receivables				14,902,416
Investments				153,082,915
Collateral on Loaned Securities				18,887,694
Net Capital Assets				831,645
Total Assets				**192,380,254**
Liabilities and Net Position				
Benefits Payable				208,449
Investment Commitments Payable				843,360
Obligations Under Securities Lending				18,888,895
Other Liabilities				5,992,744
Net Position (Fund Balance)				166,446,806
Total Liabilities and Net Position				**$192,380,254**

[a] Net Position by Plan was restated to correct the allocation of investment income as of December 31, 2010, with the restatement rolled forward through 2011 and 2012. The adjustment is reflected in the Cash and Cash Equivalents line and has no impact on the total net position of the System.

[1] The 115 Health Care Trust was established in 2014. The 401(h) Health Care Trust and the VEBA Trust were terminated as of June 30, 2016. The net positions of these trusts were consolidated into the 115 Health Care Trust on July 1, 2016.

Fiduciary Net Position by Year

2014	2013	2012	2011[a]	2010[a]	2009
$7,797,254					
197,641,190					
182,748,955					
388,187,399					
1,803,774					
303,453					
386,080,172					
$388,187,399					
$503,893,407	$491,371,340	$446,851,345	$516,841,401	$673,728,399	$82,384,335
125,472,731	290,484,285	500,838,389	355,160,439	383,127,242	1,046,106,655
12,008,141,647	12,510,470,437	12,167,526,143	11,492,400,597	12,011,299,168	10,567,015,643
				1,517,578,594	299,502,780
28,631,421	24,866,659	26,625,770	26,945,871	26,862,896	27,377,310
12,666,139,206	**13,317,192,721**	**13,141,841,647**	**12,391,348,308**	**14,612,596,299**	**12,022,386,723**
99,279,185	90,019,865	100,495,333	118,529,285	142,952,643	134,007,772
113,120,724	99,797,215	194,165,994	294,572,622	253,257,695	163,153,464
				1,517,578,594	299,502,780
13,216,507	15,690,834	18,554,998	19,246,090	16,194,945	10,527,433
12,440,522,790	13,111,684,807	12,828,625,322	11,959,000,311	12,682,612,422	11,415,195,274
$12,666,139,206	**$13,317,192,721**	**$13,141,841,647**	**$12,391,348,308**	**$14,612,596,299**	**$12,022,386,723**
$4,148,957	$5,707,117	$2,355,351	$1,838,812	$3,237,287	$2,007,102
12,740,761	8,968,896	4,039,175	3,004,215	2,321,713	1,956,580
159,032,487	138,496,020	113,978,620	87,472,240	71,900,619	55,699,748
17,067,184	13,199,734	10,986,106	13,766,599	8,332,987	8,260,699
885,439	795,993	860,286	63,641	37,772	64,047
193,874,828	**167,167,760**	**132,219,538**	**106,145,507**	**85,830,378**	**67,988,176**
254,216	16,688	11,171	422	9,320	1,487
1,017,665	876,994	1,623,282	1,670,566	1,135,244	856,629
17,063,783	13,189,782	10,969,210	13,778,387	8,332,987	8,260,699
				121,798	3,085,230
175,539,164	153,084,296	119,615,875	90,696,132	76,231,029	55,784,131
$193,874,828	**$167,167,760**	**$132,219,538**	**$106,145,507**	**$85,830,378**	**$67,988,176**

Changes in Fiduciary Net Position (last 10 fiscal years)

(continued through page 177)

Year	2018	2017	2016	2015
All Plans				
Additions				
Member Contributions	$1,455,771,629	$1,421,754,296	$1,387,215,220	$1,332,308,994
Employer Contributions	2,037,635,971	1,989,941,685	1,941,632,324	1,864,823,741
Contracts and Other Receipts[1]	81,169,718	93,061,535	172,338,832	172,067,637
Retiree-Paid Health Care Premiums[1]			184,368,783	248,601,375
Federal Subsidy[1]			4,065,058	175,930,875
Net Income/(Loss) from Investing Activity	(3,350,345,567)	14,619,914,555	6,926,572,065	9,415,961
Other Income/(Expense), net	2,844,546	2,641,100	(2,544,366)	(4,887,359)
Interplan Activity	25,435,260	20,961,756	17,205,339	19,759,373
Total Additions	252,511,557	18,148,274,927	10,630,853,255	3,818,020,597
Deductions				
Pension Benefits	6,109,237,279	5,839,789,809	5,588,000,966	5,401,880,992
Health Care Expenses[1]	870,284,919	952,001,573	1,197,374,344	1,822,571,428
Refunds of Contributions	453,441,020	443,220,698	429,791,141	449,265,410
Administrative Expenses	76,875,303	77,305,480	79,059,058	77,036,684
Interplan Activity	25,435,260	20,961,756	17,205,339	19,759,373
Total Deductions	7,535,273,781	7,333,279,316	7,311,430,848	7,770,513,887
Net Increase/(Decrease)	(7,282,762,224)	10,814,995,611	3,319,422,407	(3,952,493,290)
Net Position Held in Trust, Beginning of Year	101,425,819,836	90,610,824,225	87,291,401,818	91,243,895,108
Net Position Held in Trust, End of Year	**$94,143,057,612**	**$101,425,819,836**	**$90,610,824,225**	**$87,291,401,818**

Year	2018	2017	2016	2015
Traditional Pension Plan[2]				
Additions				
Member Contributions	$1,354,235,298	$1,324,457,501	$1,294,853,664	$1,246,732,014
Employer Contributions	1,895,462,837	1,722,856,378	1,556,529,162	1,498,679,737
Contracts and Other Receipts	79,562,553	90,937,696	77,862,156	75,209,820
Net Income/(Loss) from Investing Activity	(2,524,213,911)	12,586,432,979	5,947,233,326	274,898,652
Other Income/(Expense), net	2,112,353	2,516,572	(2,560,081)	(4,887,369)
Interplan Activity	25,435,260	20,961,756	11,168,557	19,759,373
Total Additions	832,594,390	15,748,162,882	8,885,086,784	3,110,392,227
Deductions				
Pension Benefits	6,101,603,746	5,835,175,377	5,584,517,896	5,398,844,664
Refunds of Contributions	388,067,394	384,615,309	352,362,641	405,320,800
Administrative Expenses	52,169,220	52,154,657	51,871,700	49,137,053
Interplan Activity				
Total Deductions	6,541,840,360	6,271,945,343	5,988,752,237	5,853,302,517
Special Item[3]			(21,414)	
Net Increase/(Decrease)	(5,709,245,970)	9,476,217,539	2,896,313,133	(2,742,910,290)
Net Position Held in Trust, Beginning of Year	86,585,851,024	77,109,633,485	74,213,320,352	76,956,230,642
Net Position Held in Trust, End of Year	**$80,876,605,054**	**$86,585,851,024**	**$77,109,633,485**	**$74,213,320,352**

See footnotes on page 176

Changes in Fiduciary Net Position

2014	2013	2012	2011[a]	2010	2009
$1,307,428,830	$1,279,945,223	$1,266,800,236	$1,286,385,298	$1,275,688,737	$1,290,805,214
1,829,907,525	1,794,039,132	1,778,728,069	1,809,470,716	1,796,343,429	1,822,639,448
270,728,202	250,228,379	218,259,489	211,847,098	197,507,372	219,182,666
238,406,380	178,140,822	159,614,898	148,370,246	111,638,313	94,370,543
176,619,891	105,965,762	182,579,917	192,118,407	142,658,293	69,132,772
5,775,317,835	11,006,164,375	10,375,431,044	179,956,702	9,268,181,189	12,274,797,785
8,304,360	13,898,739	12,103,692	11,255,503	7,930,265	794,525
10,357,663	13,034,171	16,981,683	10,077,664	10,528,250	7,879,768
9,617,070,686	14,641,416,603	14,010,499,028	3,849,481,634	12,810,475,848	15,779,602,721
5,112,123,787	4,931,491,707	4,590,938,871	4,329,918,267	3,961,552,022	3,661,174,109
1,740,814,106	1,644,244,641	1,609,157,697	1,576,457,152	1,568,065,943	1,488,266,219
425,701,829	441,284,204	307,486,279	323,672,042	233,054,714	222,580,254
74,114,491	68,619,091	69,617,155	70,101,033	71,030,458	75,844,945
10,357,663	13,034,171	16,981,683	10,077,664	10,528,250	7,879,768
7,363,111,876	7,098,673,814	6,594,181,685	6,310,226,158	5,844,231,387	5,455,745,295
2,253,958,810	7,542,742,789	7,416,317,343	(2,460,744,524)	6,966,244,461	10,323,857,426
88,989,936,298	81,447,193,509	74,030,876,166	76,491,620,690	69,525,376,229	59,201,518,803
$91,243,895,108	**$88,989,936,298**	**$81,447,193,509**	**$74,030,876,166**	**$76,491,620,690**	**$69,525,376,229**

$1,228,144,074	$1,206,808,750	$1,199,073,380	$1,221,597,118	$1,217,388,746	$1,236,966,262
1,476,074,083	1,571,758,150	1,208,150,727	1,233,002,841	1,097,711,440	1,019,582,360
114,830,564	121,818,099	122,281,629	121,560,871	113,080,115	160,232,136
5,056,307,357	9,423,847,940	8,713,817,411	274,530,266	7,678,536,712	9,822,978,753
625,549	414,878	329,493	340,460	763,943	140,494
10,357,663	13,034,171	16,918,042	10,077,664	10,501,974	7,839,790
7,886,339,290	12,337,681,988	11,260,570,682	2,861,109,220	10,117,982,930	12,247,739,795
5,109,100,939	4,928,972,847	4,589,973,216	4,329,452,581	3,961,217,461	3,661,076,709
389,707,612	411,321,700	284,217,216	302,812,289	219,808,143	212,209,227
49,832,366	46,946,971	49,179,821	51,196,146	52,375,762	56,805,048
					36,008
5,548,640,917	5,387,241,518	4,923,370,253	4,683,461,016	4,233,401,366	3,930,126,992
2,337,698,373	6,950,440,470	6,337,200,429	(1,822,351,796)	5,884,581,564	8,317,612,803
74,618,532,269	67,668,091,799	61,330,891,370	63,153,243,166	57,630,423,957	49,312,811,154
$76,956,230,642	**$74,618,532,269**	**$67,668,091,799**	**$61,330,891,370**	**$63,515,005,521**	**$57,630,423,957**

continued on page 172

continued from page 171

Changes in Fiduciary Net Position (last 10 fiscal years)

Year	2018	2017	2016	2015
Combined Plan				
Additions				
Member Contributions	$43,054,163	$41,265,878	$39,232,690	$36,685,161
Employer Contributions	60,249,275	53,636,897	47,079,023	44,022,120
Contracts and Other Receipts	515,564	688,384	620,078	492,260
Net Income/(Loss) from Investing Activity	(54,622,602)	142,733,244	63,694,711	(6,501,919)
Other Income, net		2,135		
Total Additions	49,196,400	238,326,538	150,626,502	74,697,622
Deductions				
Pension Benefits	4,489,811	3,089,538	1,981,664	1,791,115
Refunds of Contributions	16,808,080	16,220,141	21,857,512	12,577,944
Administrative Expenses	2,730,700	3,181,465	2,559,387	2,522,610
Interplan Activity	11,495,876	9,269,382	9,290,331	7,141,271
Total Deductions	35,524,467	31,760,526	35,688,894	24,032,940
Net Increase/(Decrease)	13,671,933	206,566,012	114,937,608	50,664,682
Net Position Held in Trust, Beginning of Year	1,022,418,029	815,852,017	700,914,409	650,249,727
Net Position Held in Trust, End of Year	**$1,036,089,962**	**$1,022,418,029**	**$815,852,017**	**$700,914,409**
Member-Directed Plan				
Additions				
Member Contributions	$58,482,168	$56,030,917	$53,128,866	$48,891,819
Employer Contributions	58,482,191	56,030,522	53,120,880	68,448,551
Contracts and Other Receipts	812,423	577,914	527,291	495,540
Net Income/(Loss) from Investing Activity	(71,099,374)	139,385,790	66,099,386	(13,070,950)
Other Income, net		4,511		
Total Additions	46,677,408	252,029,654	172,876,423	104,764,960
Deductions				
Pension Benefits	3,143,722	1,524,894	1,501,406	1,245,213
Refunds of Contributions	48,565,546	42,385,248	55,570,988	31,366,666
Administrative Expenses	2,368,980	2,560,880	2,305,383	2,260,306
Interplan Activity	13,939,384	11,692,374	7,187,816	6,625,358
Total Deductions	68,017,632	58,163,396	66,565,593	41,497,543
Net Increase/(Decrease)	(21,340,224)	193,866,258	106,310,830	63,267,417
Net Position Held in Trust, Beginning of Year	998,717,118	804,850,860	698,540,030	635,272,613
Net Position Held in Trust, End of Year	**$977,376,894**	**$998,717,118**	**$804,850,860**	**$698,540,030**

See footnotes on page 176

Changes in Fiduciary Net Position

2014	2013	2012	2011[a]	2010	2009
$34,604,398	$32,535,565	$30,193,165	$29,256,952	$27,272,707	$26,096,068
44,196,044	45,427,520	23,998,486	23,280,520	26,432,761	23,397,299
412,808	680,258	745,347	386,879	384,947	124,823
32,379,863	78,379,140	50,732,608	(5,810,229)	35,971,101	44,034,607
				1,267	
111,593,113	157,022,483	105,669,606	47,114,122	90,062,783	93,652,797
2,230,987	1,526,005	610,545	305,215	128,366	35,566
10,974,442	7,731,155	6,173,714	6,462,849	3,540,043	2,905,883
2,375,278	2,264,293	2,295,688	2,559,312	2,584,673	2,638,279
5,375,568	6,085,687	9,487,128	5,129,362	6,043,719	3,638,757
20,956,275	17,607,140	18,567,075	14,456,738	12,296,801	9,218,485
90,636,838	139,415,343	87,102,531	32,657,384	77,765,982	84,434,312
559,612,889	420,197,546	333,095,015	300,437,631	223,384,797	138,950,485
$650,249,727	**$559,612,889**	**$420,197,546**	**$333,095,015**	**$301,150,779**	**$223,384,797**

$44,680,358	$40,600,908	$37,533,691	$35,531,228	$31,027,284	$27,742,884
47,851,530	38,540,851	35,646,573	33,746,291	29,527,197	26,356,764
700,770	785,072	492,890	802,270	462,075	173,832
28,212,549	88,633,791	46,860,344	(10,151,205)	34,223,485	42,835,328
				1,108	
121,445,207	168,560,622	120,533,498	59,928,584	95,241,149	97,108,808
791,861	992,855	355,110	160,471	206,195	61,834
25,019,775	22,231,349	17,095,349	14,396,904	9,706,528	7,465,144
2,400,900	2,028,864	2,118,855	2,354,183	2,435,285	2,514,665
4,982,095	6,948,484	7,494,555	4,920,130	4,382,873	3,821,116
33,194,631	32,201,552	27,063,869	21,831,688	16,730,881	13,862,759
88,250,576	136,359,070	93,469,629	38,096,896	78,510,268	83,246,049
547,022,037	410,662,967	317,193,338	279,096,442	200,588,070	117,342,021
$635,272,613	**$547,022,037**	**$410,662,967**	**$317,193,338**	**$279,098,338**	**$200,588,070**

continued on page 174

continued from page 173

Changes in Fiduciary Net Position (last 10 fiscal years)

Year	2018	2017	2016	2015
115 Health Care Trust[3]				
Additions				
Employer Contributions	$23,441,668	$157,417,888	$274,419,455	$253,673,333
Contracts and Other Receipts[1]	279,178	857,541	93,306,585	95,860,582
Retiree-Paid Health Care Premiums[1]			184,368,783	
Federal Subsidy[1]			4,065,058	175,930,875
Net Income/(Loss) from Investing Activity	(700,409,680)	1,751,362,542	352,629,538	(23,073,355)
Other Income, net	732,193	117,882	15,715	10
Interplan Activity			6,036,782	
Total Additions	(675,956,641)	1,909,755,853	914,841,916	502,391,445
Deductions				
Health Care Expenses[1]	870,284,919	952,001,573	1,195,956,899	45,184,620
Administrative Expenses	19,606,403	19,408,478	21,693,387	2,174,957
Total Deductions	889,891,322	971,410,051	1,217,650,286	47,359,577
Special Item[3]			11,342,184,193	
Net Increase/(Decrease)	(1,565,847,963)	938,345,802	11,039,375,823	455,031,868
Net Position Held in Trust, Beginning of Year	12,818,833,665	11,880,487,863	841,112,040	386,080,172
Net Position Held in Trust, End of Year	**$11,252,985,702**	**$12,818,833,665**	**$11,880,487,863**	**$841,112,040**

Year	2018	2017	2016	2015
401(h) Health Care Trust[4]				
Additions				
Employer Contributions				
Contracts and Other Receipts				$9,435
Retiree-Paid Health Care Premiums				248,601,375
Federal Subsidy				
Net Income/(Loss) from Investing Activity			$490,208,570	(223,464,384)
Other Income, net				
Total Additions			490,208,570	25,146,426
Deductions				
Health Care Expenses				1,774,989,836
Administrative Expenses				19,611,199
Total Deductions				1,794,601,035
Special Item[3]			(11,161,276,751)	
Net Increase/(Decrease)			(10,671,068,181)	(1,769,454,609)
Net Position Held in Trust, Beginning of Year			10,671,068,181	12,440,522,790
Net Position Held in Trust, End of Year			**$0**	**$10,671,068,181**

See footnotes on page 176

Changes in Fiduciary Net Position

2014	2013	2012	2011[a]	2010	2009
$111,561,319					
143,813,190					
131,904,250					
(1,193,356)					
76,970					
386,162,373					
82,201					
82,201					
386,080,172					
$386,080,172					

$135,522,351	$120,056,440	$494,048,415	$503,458,216	$628,685,237	$740,817,891
10,950,386	126,941,889	94,730,390	89,087,996	83,572,868	58,649,547
238,406,380	178,140,822	159,614,898	148,370,246	111,638,313	94,370,543
44,715,641	105,965,762	182,579,917	192,118,407	142,658,293	69,132,772
648,566,894	1,397,348,823	1,549,970,894	(78,923,627)	1,511,164,964	2,356,554,863
7,601,841	13,483,861	11,774,199	10,915,043	7,163,609	654,031
1,085,763,493	1,941,937,597	2,492,718,713	865,026,281	2,484,883,284	3,320,179,647
1,738,596,173	1,642,525,598	1,607,921,528	1,575,561,578	1,567,551,611	1,488,032,855
18,329,337	16,352,514	15,172,174	13,076,814	12,782,968	13,033,595
1,756,925,510	1,658,878,112	1,623,093,702	1,588,638,392	1,580,334,579	1,501,066,450
(671,162,017)	283,059,485	869,625,011	(723,612,111)	904,548,705	1,819,113,197
13,111,684,807	12,828,625,322	11,959,000,311	12,682,612,422	11,415,195,274	9,596,082,077
$12,440,522,790	**$13,111,684,807**	**$12,828,625,322**	**$11,959,000,311**	**$12,319,743,979**	**$11,415,195,274**

continued on page 176

continued from page 175

Changes in Fiduciary Net Position (last 10 fiscal years)

Year	2018	2017	2016	2015
Voluntary Employees' Beneficiary Association (VEBA) Trust				
Additions				
Employer Contributions[5]			$10,483,804	
Contracts and Other Receipts			22,722	
Net Income/(Loss) from Investing Activity			6,706,534	$627,917
Other Income, net				
Interplan Activity				
Total Additions			17,213,060	627,917
Deductions				
Health Care Expenses			1,417,445	2,396,972
Administrative Expenses			629,201	1,330,559
Interplan Activity			727,192	5,992,744
Total Deductions			2,773,838	9,720,275
Special Item[3]			(180,886,028)	
Net Increase/(Decrease)			(166,446,806)	(9,092,358)
Net Position Held in Trust, Beginning of Year			166,446,806	175,539,164
Net Position Held in Trust, End of Year			**$0**	**$166,446,806**

[a] Net Position by Plan was restated to adjust the allocation of investment income as of December 31, 2010, with the restatement shown in the beginning net position of 2011. The restatement by plan does not impact the total net position of the System.

[1] GASB Statement No. 74 requires health care expenses be reported net of certain health care receipts. The presentation of Retiree-Paid Health Care Premiums, Federal Subsidy and formulary rebates included in Contracts and Other Receipts has been revised and is now included in Health Care Expenses, starting in 2017 upon implementation of this standard.

[2] The year 2009 was restated for reclassification of Alternative Retirement Plan contribution accrual from Employer Contributions to Contracts and Other Receipts.

[3] The 115 Health Care Trust was established in 2014. The 401(h) Health Care Trust and the VEBA Trust were terminated as of June 30, 2016. The net positions of these trusts were consolidated into the 115 Health Care Trust on July 1, 2016. The Special Item represents this interplan activity and nets to zero in consolidation.

[4] The year 2010 was restated for reclassification of Early Retirement Reinsurance Program from Contracts and Other Receipts to Federal Subsidy, and the reclassification of the Pending Medical Claims adjustment from Health Care Expenses to Other Income. Pending Medical Claims formerly consisted of the annual adjustment made to the incurred but not reported liability included in Benefits Payable. This liability fluctuates from year to year based on changes in the claims experience and is now reflected in the appropriate plan claims line item.

[5] Beginning October 2014, the Board approved the funding of the VEBA Trust participant accounts using the reserves in the VEBA Trust rather than the allocation of employer contributions. Instead, employer contributions were allocated to the Member-Directed Plan to repay the original plan start-up and administrative costs.

Changes in Fiduciary Net Position

2014	2013	2012	2011[a]	2010	2009
$14,702,198	$18,256,171	$16,883,868	$15,982,848	$13,986,794	$12,485,134
20,484	3,061	9,233	9,082	7,367	2,328
11,044,528	17,954,681	14,049,787	311,497	8,284,927	8,394,234
				338	
		63,641		26,276	39,978
25,767,210	36,213,913	31,006,529	16,303,427	22,305,702	20,921,674
2,217,933	1,719,043	1,236,169	895,574	514,332	233,364
1,094,409	1,026,449	850,617	914,578	851,770	853,358
			28,172	101,658	383,887
3,312,342	2,745,492	2,086,786	1,838,324	1,467,760	1,470,609
22,454,868	33,468,421	28,919,743	14,465,103	20,837,942	19,451,065
153,084,296	119,615,875	90,696,132	76,231,029	55,784,131	36,333,066
$175,539,164	**$153,084,296**	**$119,615,875**	**$90,696,132**	**$76,622,073**	**$55,784,131**

Additions by Source (last 10 fiscal years)

(continued through page 181)

Year	2018	2017	2016	2015
All Plans[1]				
Member Contributions	$1,455,771,629	$1,421,754,296	$1,387,215,220	$1,332,308,994
Employer Contributions	2,037,635,971	1,989,941,685	1,941,632,324	1,864,823,741
Purchase of Service	19,608,589	22,466,320	18,073,121	22,850,005
Retiree-Paid Health Care Premiums[2]			184,368,783	248,601,375
Early Retirement Incentive Payments	2,082,248	5,537,160		2,636,885
Transfers from Other Retirement Systems	43,166,016	51,563,749	44,266,370	47,270,349
Vendor Rebates and Other Receipts[2]	30,000	117,285	91,735,221	91,372,473
Additional Annuity/Voluntary Contributions	2,128,309	2,136,358	2,074,383	1,668,697
Other Employer Payments	14,154,556	11,240,663	16,189,737	6,269,228
Federal Subsidy[2]			4,065,058	175,930,875
Net Income/(Loss) from Investing Activity	(3,350,345,567)	14,619,914,555	6,926,572,065	9,415,961
Other Income/(Expense), net	2,844,546	2,641,100	(2,544,366)	(4,887,359)
Interplan Activity	25,435,260	20,961,756	17,205,339	19,759,373
Total Additions	**$252,511,557**	**$18,148,274,927**	**$10,630,853,255**	**$3,818,020,597**
Traditional Pension Plan				
Member Contributions	$1,354,235,298	$1,324,457,501	$1,294,853,664	$1,246,732,014
Employer Contributions	1,895,462,837	1,722,856,378	1,556,529,162	1,498,679,737
Purchase of Service	19,435,537	22,321,608	17,926,008	22,718,488
Early Retirement Incentive Payments	1,950,680	5,227,186		2,649,968
Transfers from Other Retirement Systems	43,166,016	51,563,749	44,199,326	43,081,440
Additional Annuity Contributions	1,014,664	1,182,500	1,235,194	830,196
Other Employer Payments	13,995,656	10,642,653	14,501,628	5,929,728
Net Income/(Loss) from Investing Activity	(2,524,213,911)	12,586,432,979	5,947,233,326	274,898,652
Other Income/(Expense), net	2,112,353	2,516,572	(2,560,081)	(4,887,369)
Interplan Activity	25,435,260	20,961,756	11,168,557	19,759,373
Total Additions	**$832,594,390**	**$15,748,162,882**	**$8,885,086,784**	**$3,110,392,227**
Combined Plan				
Member Contributions	$43,054,163	$41,265,878	$39,232,690	$36,685,161
Employer Contributions	60,249,275	53,636,897	47,079,023	44,022,120
Purchase of Service	171,324	141,951	136,029	131,373
Transfers from Other Retirement Systems				
Voluntary Contributions	326,985	398,332	336,536	353,335
Other Employer Payments	17,255	148,101	147,513	7,552
Net Income/(Loss) from Investing Activity	(54,622,602)	142,733,244	63,694,711	(6,501,919)
Other Income, net		2,135		
Total Additions	**$49,196,400**	**$238,326,538**	**$150,626,502**	**$74,697,622**
Member-Directed Plan				
Member Contributions	$58,482,168	$56,030,917	$53,128,866	$48,891,819
Employer Contributions	58,482,191	56,030,522	53,120,880	68,448,551
Purchase of Service	1,728	2,761	11,084	144
Voluntary Contributions	786,660	555,526	502,653	485,166
Other Employer Payments	24,035	19,627	13,554	10,230
Net Income/(Loss) from Investing Activity	(71,099,374)	139,385,790	66,099,386	(13,070,950)
Other Income, net		4,511		
Total Additions	**$46,677,408**	**$252,029,654**	**$172,876,423**	**$104,764,960**

See footnotes on page 180

Additions by Source

2014	2013	2012	2011	2010	2009
$1,307,428,830	$1,279,945,223	$1,266,800,236	$1,286,385,298	$1,275,688,737	$1,290,805,214
1,829,907,525	1,794,039,132	1,778,728,069	1,809,470,716	1,796,343,429	1,822,639,448
26,521,581	60,100,714	62,507,139	59,976,857	51,936,153	42,247,663
238,406,380	178,140,822	159,614,898	148,370,246	111,638,313	94,370,543
15,180,991	7,294,662	13,568,992	23,366,505	27,964,615	93,149,748
69,328,737	46,370,923	39,590,467	31,487,779	31,862,677	26,142,599
150,377,554	121,660,735	90,103,930	84,515,422	72,854,648	47,557,407
1,693,612	5,786,692	5,402,253	5,334,480	5,296,310	3,915,521
7,625,727	9,014,653	7,086,708	7,166,055	7,592,969	6,169,728
176,619,891	105,965,762	182,579,917	192,118,407	142,658,293	69,132,772
5,775,317,835	11,006,164,375	10,375,431,044	179,956,702	9,268,181,189	12,274,797,785
8,304,360	13,898,739	12,103,692	11,255,503	7,930,265	794,525
10,357,663	13,034,171	16,981,683	10,077,664	10,528,250	7,879,768
$9,617,070,686	**$14,641,416,603**	**$14,010,499,028**	**$3,849,481,634**	**$12,810,475,848**	**$15,779,602,721**
$1,228,144,074	$1,206,808,750	$1,199,073,380	$1,221,597,118	$1,217,388,746	$1,236,966,262
1,476,074,083	1,571,758,150	1,208,150,727	1,233,002,841	1,097,711,440	1,019,582,360
26,297,267	59,756,708	62,193,231	59,770,075	51,738,819	42,177,769
14,427,760	6,943,575	13,134,027	22,388,005	26,567,998	87,738,002
66,309,930	42,242,610	36,013,336	28,505,778	23,234,777	20,972,055
945,803	4,744,751	4,530,704	4,447,182	4,699,133	3,705,856
6,849,804	8,130,455	6,410,331	6,449,831	6,839,388	5,638,454
5,056,307,357	9,423,847,940	8,713,817,411	274,530,266	7,678,536,712	9,822,978,753
625,549	414,878	329,493	340,460	763,943	140,494
10,357,663	13,034,171	16,918,042	10,077,664	10,501,974	7,839,790
$7,886,339,290	**$12,337,681,988**	**$11,260,570,682**	**$2,861,109,220**	**$10,117,982,930**	**$12,247,739,795**
$34,604,398	$32,535,565	$30,193,165	$29,256,952	$27,272,707	$26,096,068
44,196,044	45,427,520	23,998,486	23,280,520	26,432,761	23,397,299
218,582	343,752	313,711	201,906	150,035	68,726
			35,957		
153,014	270,861	425,653	134,608	177,121	48,855
41,212	65,645	5,983	14,408	57,791	7,242
32,379,863	78,379,140	50,732,608	(5,810,229)	35,971,101	44,034,607
				1,267	
$111,593,113	**$157,022,483**	**$105,669,606**	**$47,114,122**	**$90,062,783**	**$93,652,797**
$44,680,358	$40,600,908	$37,533,691	$35,531,228	$31,027,284	$27,742,884
47,851,530	38,540,851	35,646,573	33,746,291	29,527,197	26,356,764
5,732	254	197	4,876	(1,168)	1,168
594,795	771,080	445,896	752,690	420,056	160,810
100,243	13,738	46,797	44,704	43,187	11,854
28,212,549	88,633,791	46,860,344	(10,151,205)	34,223,485	42,835,328
				1,108	
$121,445,207	**$168,560,622**	**$120,533,498**	**$59,928,584**	**$95,241,149**	**$97,108,808**

continued on page 180

continued from page 179

Additions by Source (last 10 fiscal years)

Year	2018	2017	2016	2015
115 Health Care Trust[3]				
Employer Contributions	$23,441,668	$157,417,888	$274,419,455	$253,673,333
Retiree-Paid Health Care Premiums[2]			184,368,783	
Early Retirement Incentive Payments	131,568	309,974		(13,083)
Transfers from Other Retirement Systems			67,044	4,188,909
Vendor Rebates and Other Receipts[2]	30,000	117,285	91,735,221	91,362,132
Other Employer Payments	117,610	430,282	1,504,320	322,624
Federal Subsidy—Medicare Part D[2]			122,044	743,345
Federal Subsidy—Medicare PDP[2]			3,943,014	175,187,530
Net Income/(Loss) from Investing Activity	(700,409,680)	1,751,362,542	352,629,538	(23,073,355)
Other Income, net	732,193	117,882	15,715	10
Interplan Activity			6,036,782	
Total Additions	**($675,956,641)**	**$1,909,755,853**	**$914,841,916**	**$502,391,445**

401(h) Health Care Trust[1, 3]				
Employer Contributions				
Purchase of Service				
Retiree-Paid Health Care Premiums				$248,601,375
Early Retirement Incentive Payments				
Transfers from Other Retirement Systems				
Vendor Rebates and Other Receipts				10,341
Other Employer Payments				(906)
Federal Subsidy—Medicare Part D				
Federal Subsidy—Medicare PDP				
Federal Subsidy—Early Retiree Reinsurance Program				
Net Income/(Loss) from Investing Activity			$490,208,570	(223,464,384)
Other Income, net				
Total Additions			**$490,208,570**	**$25,146,426**

Voluntary Employees' Beneficiary Association (VEBA) Trust[3]				
Employer Contributions[4]			$10,483,804	
Vendor Rebates and Other Receipts				
Other Employer Payments			22,722	
Net Income/(Loss) from Investing Activity			6,706,534	$627,917
Other Income, net				
Interplan Activity				
Total Additions			**$17,213,060**	**$627,917**

[1] In the year 2010, 401(h) Health Care Trust expenses were restated for reclassification of Pending Medical Claims adjustment from Health Care Medical Expense to Other Income. Pending Medical Claims consists of the annual adjustment made to the incurred but not reported liability included in Benefits Payable. This liability fluctuates from year to year based on changes in the claims experience.

[2] GASB Statement No. 74 requires health care expenses be reported net of certain health care receipts. The presentation of Retiree-Paid Health Care Premiums, Federal Subsidy and formulary rebates included in Contracts and Other Receipts has been revised and is now included in Health Care Expenses, starting in 2017 upon implementation of this standard.

[3] The 115 Health Care Trust was established in 2014. The 401(h) Health Care Trust and the VEBA Trust were terminated as of June 30, 2016. The net positions of these trusts were consolidated into the 115 Health Care Trust on July 1, 2016.

[4] Beginning October 2014, the Board approved the funding of the VEBA Trust participant accounts using the reserves in the VEBA Trust rather than the allocation of employer contributions. Instead, employer contributions were allocated to the Member-Directed Plan to repay the original plan start-up and administrative costs. Contributions to the VEBA Trust resumed January 1, 2016.

Additions by Source

2014	2013	2012	2011	2010	2009
$111,561,319					
2,742,476					
140,981,424					
89,290					
223,579					
131,680,671					
(1,193,356)					
76,970					
$386,162,373					

$135,522,351	$120,056,440	$494,048,415	$503,458,216	$628,685,237	$740,817,891
				48,467	
238,406,380	178,140,822	159,614,898	148,370,246	111,638,313	94,370,543
753,231	351,087	434,965	978,500	1,396,617	5,411,746
276,331	4,128,313	3,577,131	2,946,044	8,627,900	5,170,544
9,396,130	121,660,735	90,103,930	84,515,422	72,854,394	47,557,407
524,694	801,754	614,364	648,030	645,490	509,850
170,515	246,139	926,931	788,419	72,100,529	69,132,772
44,545,126	105,719,623	181,652,986	81,802,880		
			109,527,108	70,557,764	
648,566,894	1,397,348,823	1,549,970,894	(78,923,627)	1,511,164,964	2,356,554,863
7,601,841	13,483,861	11,774,199	10,915,043	7,163,609	654,031
$1,085,763,493	**$1,941,937,597**	**$2,492,718,713**	**$865,026,281**	**$2,484,883,284**	**$3,320,179,647**

$14,702,198	$18,256,171	$16,883,868	$15,982,848	$13,986,794	$12,485,134
				254	
20,484	3,061	9,233	9,082	7,113	2,328
11,044,528	17,954,681	14,049,787	311,497	8,284,927	8,394,234
				338	
		63,641		26,276	39,978
$25,767,210	**$36,213,913**	**$31,006,529**	**$16,303,427**	**$22,305,702**	**$20,921,674**

Deductions by Type (last 10 fiscal years)

(continued through page 185)

Year	2018	2017	2016	2015
All Plans[2]				
Pension—Annuities	$6,093,820,180	$5,828,340,070	$5,577,629,182	$5,390,859,219
Pension—Installment Payments	3,939,145	1,618,270	1,112,846	1,003,891
Pension—Other	9,578,847	7,893,619	7,857,337	8,647,208
Disability Case Management and Exams	1,899,107	1,937,850	1,401,601	1,370,674
Refunds	453,441,020	443,220,698	429,791,141	449,265,410
Medicare Parts A and B	25,719,123	23,597,598	50,445,768	77,867,474
Medical[1]	266,028,377	296,063,521	588,576,618	940,420,011
Prescription Drug	136,584,728	148,293,992	170,627,591	672,710,524
Dental[1]	31,626,966	30,321,168	55,456,293	53,818,027
Vision[1]	5,238,871	5,518,194	9,902,183	9,847,918
Disease Management[1]	79,224	3,304,104	2,090,646	3,865,654
Wellness Retiree Medical Account Plan Claims	1,607,726	15,038,205	6,990,116	16,460,228
Health Reimbursement Account Plan Claims	399,291,867	423,371,301	310,233,492	45,184,620
Member-Directed Retiree Medical Account Plan Claims	4,108,037	6,493,490	3,051,637	2,396,972
Administrative Expenses	76,875,303	77,305,480	79,059,058	77,036,684
Interplan Activity	25,435,260	20,961,756	17,205,339	19,759,373
Total Deductions	**$7,535,273,781**	**$7,333,279,316**	**$7,311,430,848**	**$7,770,513,887**

Traditional Pension Plan				
Pension—Annuities	$6,090,125,792	$5,825,344,908	$5,575,258,958	$5,388,827,561
Pension—Other	9,578,847	7,892,619	7,857,337	8,646,429
Disability Case Management and Exams	1,899,107	1,937,850	1,401,601	1,370,674
Refunds	388,067,394	384,615,309	352,362,641	405,320,800
Administrative Expenses	52,169,220	52,154,657	51,871,700	49,137,053
Interplan Activity				
Total Deductions	**$6,541,840,360**	**$6,271,945,343**	**$5,988,752,237**	**$5,853,302,517**

Combined Plan				
Pension—Annuities	$2,362,506	$1,863,005	$1,443,631	$1,255,978
Pension—Other		1,000		779
Pension—Installment Payments	2,127,305	1,225,533	538,033	534,358
Refunds	16,808,080	16,220,141	21,857,512	12,577,944
Administrative Expenses	2,730,700	3,181,465	2,559,387	2,522,610
Interplan Activity	11,495,876	9,269,382	9,290,331	7,141,271
Total Deductions	**$35,524,467**	**$31,760,526**	**$35,688,894**	**$24,032,940**

Member-Directed Plan				
Pension—Annuities	$1,331,882	$1,132,157	$926,593	$775,680
Pension—Installment Payments	1,811,840	392,737	574,813	469,533
Refunds	48,565,546	42,385,248	55,570,988	31,366,666
Administrative Expenses	2,368,980	2,560,880	2,305,383	2,260,306
Interplan Activity	13,939,384	11,692,374	7,187,816	6,625,358
Total Deductions	**$68,017,632**	**$58,163,396**	**$66,565,593**	**$41,497,543**

See footnotes on page 184

Deductions by Type

2014	2013	2012	2011	2010	2009
$5,101,735,902	$4,920,408,972	$4,582,583,776	$4,322,202,507	$3,954,057,452	$3,653,998,513
1,628,513	1,549,139	463,923	207,443	246,225	50,709
7,482,091	7,913,434	7,891,172	7,508,317	7,248,345	7,124,887
1,277,281	1,620,162				
425,701,829	441,284,204	307,486,279	323,672,042	233,054,714	222,580,254
113,967,145	112,820,822	112,530,781	109,072,281	107,770,173	105,854,803
921,172,088	912,071,417	888,700,307	872,219,550	871,299,322	877,861,028
634,474,812	551,391,403	541,552,286	530,404,030	526,054,523	494,674,419
50,907,491	48,106,058	41,711,390	38,467,223	38,978,748	
9,564,606	9,038,035	7,896,366	7,288,175	7,668,138	
3,840,401	4,535,512	4,711,813	4,620,914	2,557,254	
4,669,630	4,562,351	10,818,585	13,489,405	13,223,453	9,642,605
2,217,933	1,719,043	1,236,169	895,574	514,332	233,364
74,114,491	68,619,091	69,617,154	70,101,033	71,030,458	75,844,945
10,357,663	13,034,171	16,981,684	10,077,664	10,528,250	7,879,768
$7,363,111,876	**$7,098,673,814**	**$6,594,181,685**	**$6,310,226,158**	**$5,844,231,387**	**$5,455,745,295**
$5,100,341,567	$4,919,439,251	$4,582,082,044	$4,321,944,264	$3,953,969,116	$3,653,951,822
7,482,091	7,913,434	7,891,172	7,508,317	7,248,345	7,124,887
1,277,281	1,620,162				
389,707,612	411,321,700	284,217,216	302,812,289	219,808,143	212,209,227
49,832,366	46,946,971	49,179,821	51,196,146	52,375,762	56,805,048
					36,008
$5,548,640,917	**$5,387,241,518**	**$4,923,370,253**	**$4,683,461,016**	**$4,233,401,366**	**$3,930,126,992**
$773,394	$533,920	$273,809	$187,051	$61,125	$30,566
1,457,593	992,085	336,736	118,164	67,241	5,000
10,974,442	7,731,155	6,173,714	6,462,849	3,540,043	2,905,883
2,375,278	2,264,293	2,295,688	2,559,312	2,584,673	2,638,279
5,375,568	6,085,687	9,487,128	5,129,362	6,043,719	3,638,757
$20,956,275	**$17,607,140**	**$18,567,075**	**$14,456,738**	**$12,296,801**	**$9,218,485**
$620,941	$435,801	$227,923	$71,192	$27,211	$16,125
170,920	557,054	127,187	89,279	178,984	45,709
25,019,775	22,231,349	17,095,349	14,396,904	9,706,528	7,465,144
2,400,900	2,028,864	2,118,854	2,354,183	2,435,285	2,514,665
4,982,095	6,948,484	7,494,556	4,920,130	4,382,873	3,821,116
$33,194,631	**$32,201,552**	**$27,063,869**	**$21,831,688**	**$16,730,881**	**$13,862,759**

continued on page 184

continued from page 183

Deductions by Type (last 10 fiscal years)

Year	2018	2017	2016	2015
115 Health Care Trust[2, 3]				
Medicare Parts A and B	$25,719,123	$23,597,598	$50,445,768	
Medical	485,597,781	512,594,568	588,576,618	
Medical—Health Care Receipts	(219,569,404)	(216,531,047)		
Prescription Drug	136,584,728	148,293,992	170,627,591	
Dental	57,730,622	52,497,066	55,456,293	
Dental—Health Care Receipts	(26,103,656)	(22,175,898)		
Vision	9,562,830	9,554,018	9,902,183	
Vision—Health Care Receipts	(4,323,959)	(4,035,824)		
Disease Management	79,224	3,304,104	2,090,646	
Wellness Retiree Medical Account Plan Claims	1,607,726	15,038,205	6,990,116	
Health Reimbursement Account Plan Claims	399,291,867	423,371,301	310,233,492	$45,184,620
Member-Directed Retiree Medical Account Plan Claims	4,108,037	6,493,490	1,634,192	
Administrative Expenses	19,606,403	19,408,478	21,693,387	2,174,957
Total Deductions	**$889,891,322**	**$971,410,051**	**$1,217,650,286**	**$47,359,577**

401(h) Health Care Trust[3, 4]				
Medicare Parts A and B				$77,867,474
Medical[1]				940,420,011
Prescription Drug				672,710,524
Dental[1]				53,818,027
Vision[1]				9,847,918
Disease Management[1]				3,865,654
Wellness Retiree Medical Account Plan Claims				16,460,228
Administrative Expenses				19,611,199
Total Deductions				**$1,794,601,035**

Voluntary Employees' Beneficiary Association (VEBA) Trust[3]				
Member-Directed Retiree Medical Account Plan Claims			$1,417,445	$2,396,972
Administrative Expenses			629,201	1,330,559
Interplan Activity			727,192	5,992,744
Total Deductions			**$2,773,838**	**$9,720,275**

[1] The breakdown of medical disbursements between Medical, Dental, Vision, and Disease Management is not available before 2010.

[2] GASB Statement No. 74 requires health care expenses be reported net of certain health care receipts. The presentation of Retiree-Paid Health Care Premiums, Federal Subsidy and formulary rebates included in Contracts and Other Receipts has been revised. Starting in 2017, upon implementation of GASB 74, these line items were included in Health Care Expenses. In this schedule, the receipts are included with Medical, Dental and Vision line items beginning in 2017.

[3] The 115 Health Care Trust was established in 2014. The 401(h) Health Care Trust and the VEBA Trust were terminated as of June 30, 2016. The net positions of these trusts were consolidated into the 115 Health Care Trust on July 1, 2016.

[4] The 2010 401(h) Health Care Trust expenses were restated for reclassification of Pending Medical Claims adjustment from Health Care Medical Expense to Other Income. Pending Medical Claims formerly consisted of the annual adjustment made to the incurred but not reported liability included in Benefits Payable. This liability fluctuates from year to year based on changes in the claims experience and is now reflected in the appropriate plan claims line item within this schedule.

Deductions by Type

2014	2013	2012	2011	2010	2009
$82,201					
$82,201					

2014	2013	2012	2011	2010	2009
$113,967,145	$112,820,822	$112,530,781	$109,072,281	$107,770,173	$105,854,803
921,172,088	912,071,417	888,700,307	872,219,550	871,299,322	877,861,028
634,474,812	551,391,403	541,552,286	530,404,030	526,054,523	494,674,419
50,907,491	48,106,058	41,711,390	38,467,223	38,978,748	
9,564,606	9,038,035	7,896,366	7,288,175	7,668,138	
3,840,401	4,535,512	4,711,813	4,620,914	2,557,254	
4,669,630	4,562,351	10,818,585	13,489,405	13,223,453	9,642,605
18,329,337	16,352,514	15,172,174	13,076,814	12,782,968	13,033,595
$1,756,925,510	**$1,658,878,112**	**$1,623,093,702**	**$1,588,638,392**	**$1,580,334,579**	**$1,501,066,450**

2014	2013	2012	2011	2010	2009
$2,217,933	$1,719,043	$1,236,169	$895,574	$514,332	$233,364
1,094,409	1,026,449	850,617	914,578	851,770	853,358
			28,172	101,658	383,887
$3,312,342	**$2,745,492**	**$2,086,786**	**$1,838,324**	**$1,467,760**	**$1,470,609**

Benefits by Type (last 10 fiscal years)

(continued on next page)

Year	2018	2017	2016	2015
All Plans[1]				
Annuities and Installment Payments[2]	$5,534,199,818	$5,288,583,786	$5,272,086,225	$5,833,988,140
Disabilities	825,032,060	847,508,744	974,782,897	1,070,397,368
Other Systems/Death/QEBA[3]	13,561,339	11,737,599	11,682,188	12,010,912
Survivors	201,721,351	199,058,257	206,548,755	244,014,180
Wellness Retiree Medical Account Plan Claims	1,607,726	15,038,205	6,990,116	16,460,228
Health Reimbursement Account Plan Claims	399,291,867	423,371,301	310,233,492	45,184,620
Member-Directed Retiree Medical Account Plan Claims[2]	4,108,037	6,493,490	3,051,637	2,396,972
Total Pension Benefits and Health Care	**$6,979,522,198**	**$6,791,791,382**	**$6,785,375,310**	**$7,224,452,420**
Traditional Pension Plan				
Pension Benefits				
Age-and-Service Annuities	$5,169,969,144	$4,916,944,682	$4,676,894,918	$4,500,470,313
Disabilities	651,168,863	649,478,101	648,136,068	642,937,688
Other Systems	90,762	113,934	291,376	503,683
Survivors	198,522,383	192,915,530	187,233,171	182,549,547
Additional Annuities	5,864,866	5,698,454	5,653,264	5,491,671
Money Purchase Annuities	62,517,151	58,402,011	54,918,287	55,385,312
Death	9,578,847	7,892,618	7,857,337	8,646,429
QEBA[3]	3,891,730	3,730,047	3,533,475	2,860,021
Total Pension Benefits	**$6,101,603,746**	**$5,835,175,377**	**$5,584,517,896**	**$5,398,844,664**
Combined Plan				
Pension Benefits				
Annuities	$2,362,506	$1,863,005	$1,443,631	$1,255,978
Installment Payments	2,127,305	1,225,533	538,033	534,358
Death		1,000		779
Total Pension Benefits	**$4,489,811**	**$3,089,538**	**$1,981,664**	**$1,791,115**
Member-Directed Plan				
Pension Benefits				
Annuities	$1,331,882	$1,132,157	$926,593	$775,680
Installment Payments	1,811,840	392,737	574,813	469,533
Total Pension Benefits	**$3,143,722**	**$1,524,894**	**$1,501,406**	**$1,245,213**
115 Health Care Trust[4]				
Health Care				
Annuities[5]	$443,342,537	$454,218,561	$531,136,686	
Annuities—Health Care Receipts[5]	(155,127,413)	(151,293,354)		
Disabilities[5]	267,018,801	286,728,726	326,646,829	
Disabilities—Health Care Receipts[5]	(93,155,604)	(88,698,083)		
Survivors[5]	4,912,970	8,894,059	19,315,584	
Survivors—Health Care Receipts[5]	(1,714,002)	(2,751,332)		
Wellness Retiree Medical Account Plan Claims	1,607,726	15,038,205	6,990,116	
Health Reimbursement Account Plan Claims	399,291,867	423,371,301	310,233,492	$45,184,620
Member-Directed Retiree Medical Account Plan Claims[2]	4,108,037	6,493,490	1,634,192	
Total Health Care	**$870,284,919**	**$952,001,573**	**$1,195,956,899**	**$45,184,620**
401(h) Health Care Trust[4]				
Health Care				
Annuities				$1,269,605,295
Disabilities				427,459,680
Survivors				61,464,633
Wellness Retiree Medical Account Plan Claims				16,460,228
Total Health Care				**$1,774,989,836**
Voluntary Employees' Beneficiary Association (VEBA) Trust[4]				
Health Care				
Member-Directed Retiree Medical Account Plan Claims[2]			$1,417,445	$2,396,972
Total Health Care			**$1,417,445**	**$2,396,972**

[1] The 2010 401(h) Health Care Trust expenses were restated for reclassification of Pending Medical Claims adjustment from Health Care Medical Expense to Other Income. Pending Medical Claims formerly consisted of the annual adjustment made to the incurred but not reported liability included in Benefits Payable. This liability fluctuates from year to year based on changes in the claims experience and is now reflected in the appropriate plan claims line item within this schedule.

[2] Prior to 2016, the Member-Directed Retiree Medical Account Plan Claims were categorized with Annuities and Installment Payments. In order to consistently report all health care activity, the Member-Directed Retiree Medical Account Plan Claims is included on a separate line, similar to Wellness Retiree Medical Account Plan Claims and Health Reimbursement Account Plan Claims. The line item for Annuities and Installment Payments has been reduced for the Retiree Medical Account Plan Claims for all previous years presented.

[3] Qualified Excess Benefit Arrangement (QEBA) commenced in 2000.

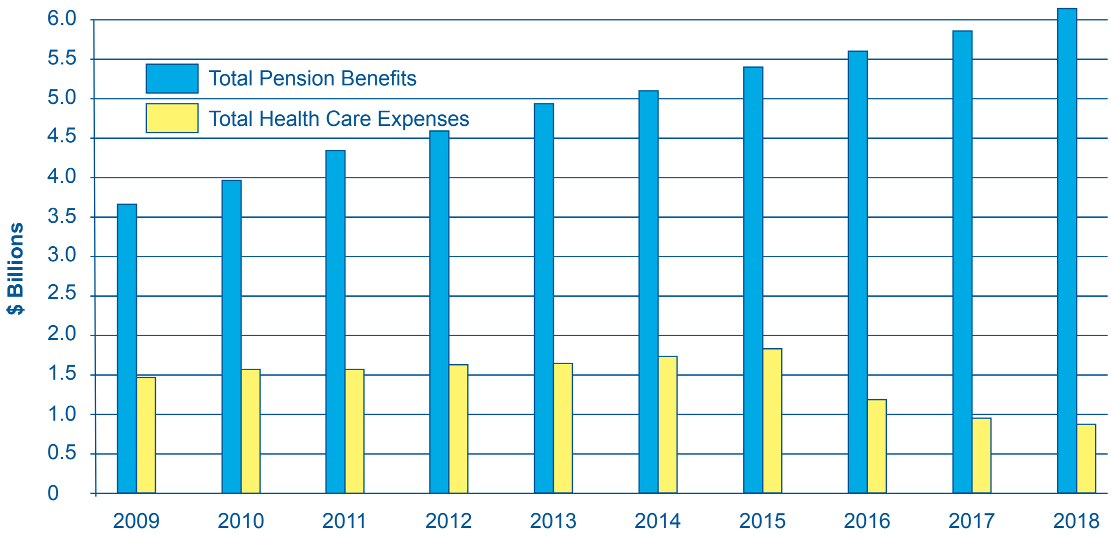
Benefits by Type

2014	2013	2012	2011	2010	2009
$5,534,152,991	$5,277,262,585	$4,903,795,068	$4,644,669,875	$4,284,189,841	$3,936,639,166
1,057,979,091	1,040,711,575	1,017,238,745	984,655,943	982,774,343	966,748,686
10,646,707	13,550,680	34,367,830	31,381,217	26,785,331	20,803,990
243,271,541	237,930,114	232,640,171	231,283,405	222,130,665	215,372,517
4,669,630	4,562,351	10,818,585	13,489,405	13,223,453	9,642,605
2,217,933	1,719,043	1,236,169	895,574	514,332	233,364
$6,852,937,893	**$6,575,736,348**	**$6,200,096,568**	**$5,906,375,419**	**$5,529,617,965**	**$5,149,440,328**
$4,228,575,327	$4,044,320,992	$3,739,845,743	$3,518,341,988	$3,185,230,279	$2,929,672,689
634,409,874	624,038,549	603,354,845	578,018,246	556,074,897	529,948,352
987,644	3,534,484	24,815,413	22,453,906	18,490,323	13,014,368
178,633,434	174,766,735	170,092,349	165,488,973	159,725,674	154,482,707
5,421,653	26,011,745	4,341,522	4,324,569	3,432,344	2,867,888
51,413,944	46,284,146	37,970,927	31,897,588	29,968,936	23,301,083
7,482,091	7,913,434	7,891,172	7,508,317	7,248,345	7,124,887
2,176,972	2,102,762	1,661,245	1,418,994	1,046,663	664,735
$5,109,100,939	**$4,928,972,847**	**$4,589,973,216**	**$4,329,452,581**	**$3,961,217,461**	**$3,661,076,709**
$773,394	$533,920	$273,809	$187,051	$61,125	$30,566
1,457,593	992,085	336,736	118,164	67,241	5,000
$2,230,987	**$1,526,005**	**$610,545**	**$305,215**	**$128,366**	**$35,566**
$620,941	$435,801	$227,923	$71,192	$27,211	$16,125
170,920	557,054	127,187	89,279	178,984	45,709
$791,861	**$992,855**	**$355,110**	**$160,471**	**$206,195**	**$61,834**
$1,245,719,219	$1,158,126,842	$1,120,671,221	$1,089,640,044	$1,065,223,721	$980,700,106
423,569,217	416,673,026	413,883,900	406,637,697	426,699,446	436,800,334
64,638,107	63,163,379	62,547,822	65,794,432	62,404,991	60,889,810
4,669,630	4,562,351	10,818,585	13,489,405	13,223,453	9,642,605
$1,738,596,173	**$1,642,525,598**	**$1,607,921,528**	**$1,575,561,578**	**$1,567,551,611**	**$1,488,032,855**
$2,217,933	$1,719,043	$1,236,169	$895,574	$514,332	$233,364
$2,217,933	**$1,719,043**	**$1,236,169**	**$895,574**	**$514,332**	**$233,364**

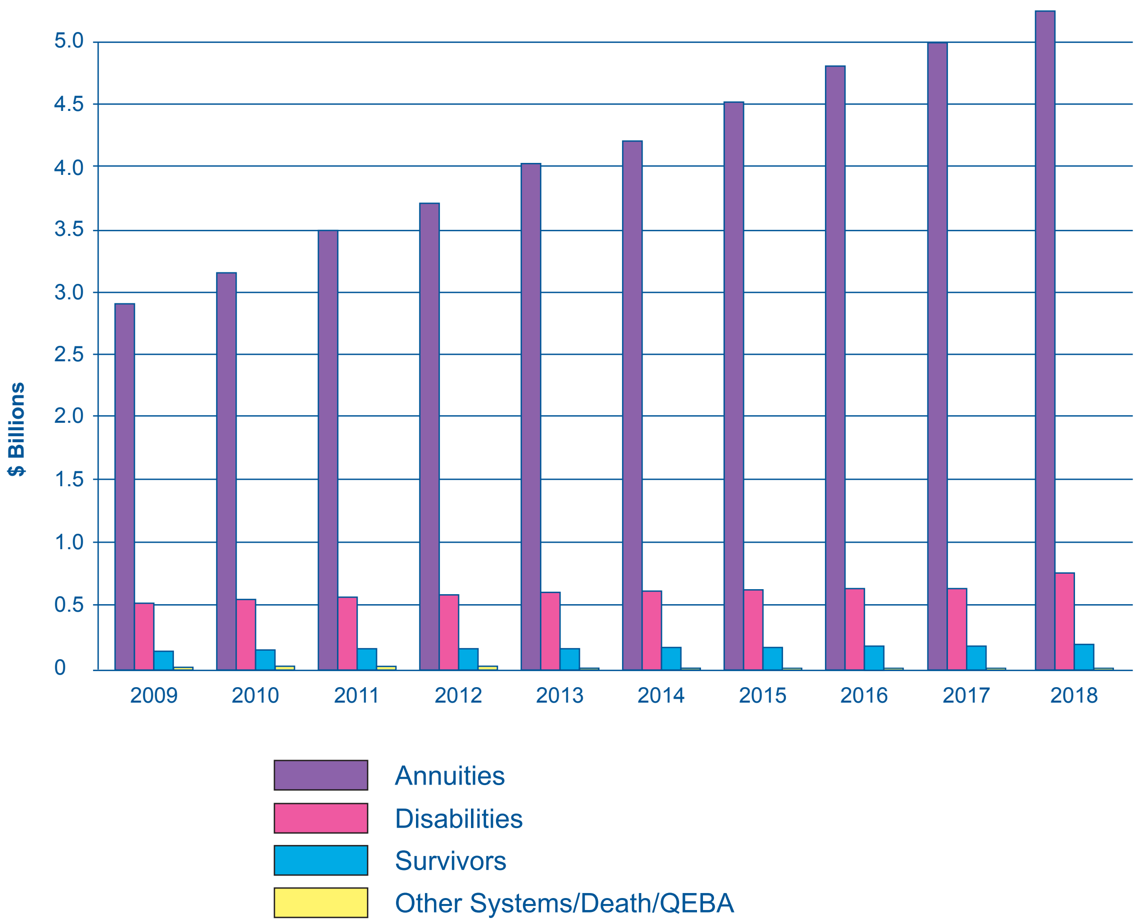
[4] The 115 Health Care Trust was established and funding began in 2014. Notional deposits to retiree accounts and initial health care disbursements began in October 2015, during the initial open enrollment period, for January 2016 premium reimbursements. The 401(h) Health Care Trust and the VEBA Trust were terminated as of June 30, 2016 and the net positions of these trusts consolidated into the 115 Health Care Trust on July 1, 2016.

[5] GASB Statement No. 74 requires health care expenses be reported net of certain health care receipts. The presentation of Retiree-Paid Health Care Premiums, Federal Subsidy and formulary rebates included in Vendor Rebates and Other has been revised and is now included in health care deductions, starting in 2017 upon implementation of this standard. These health care receipts are broken out by Annuities, Disabilities and Survivors on this schedule.

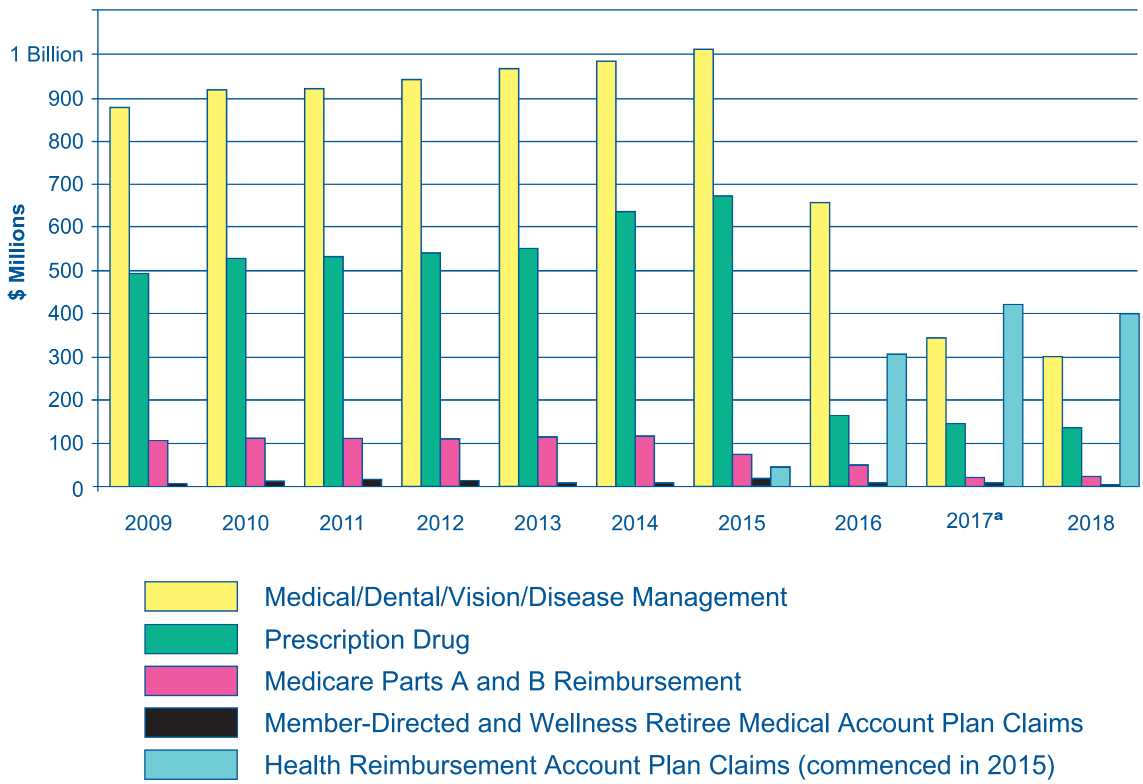
Benefits by Type



Pension Benefits by Type



Health Care Expenses by Type



[a] Beginning in 2017, GASB statement No.74 requires health care expenses to be reported net of certain health care receipts. The presentation of Retiree-Paid Health Care Premiums, Federal Subsidy and formulary rebates included in Vendor Rebates and Other has been revised and is now included in health care deductions. In this table, the receipts are netted against the Medical/Dental/Vision/Disease Management category.

Refunds by Type (last 10 fiscal years)

(continued on next page)

Year	2018	2017	2016	2015
All Plans				
Separation	$365,839,603	$348,274,709	$342,642,457	$322,526,720
Beneficiaries	32,354,667	30,944,474	31,834,420	25,357,397
Other	55,246,750	64,001,515	55,314,264	101,381,293
Total Refunds	**$453,441,020**	**$443,220,698**	**$429,791,141**	**$449,265,410**
Traditional Pension Plan				
Separation	$302,012,833	$291,311,871	$266,436,121	$279,546,170
Beneficiaries	30,807,811	29,301,923	30,612,256	24,393,337
Other	55,246,750	64,001,515	55,314,264	101,381,293
Total Refunds	**$388,067,394**	**$384,615,309**	**$352,362,641**	**$405,320,800**
Combined Plan				
Separation	$16,540,234	$15,716,660	$21,752,826	$12,254,484
Beneficiaries	267,846	503,481	104,686	323,460
Total Refunds	**$16,808,080**	**$16,220,141**	**$21,857,512**	**$12,577,944**
Member-Directed Plan				
Separation	$47,286,536	$41,246,178	$54,453,510	$30,726,066
Beneficiaries	1,279,010	1,139,070	1,117,478	640,600
Total Refunds	**$48,565,546**	**$42,385,248**	**$55,570,988**	**$31,366,666**

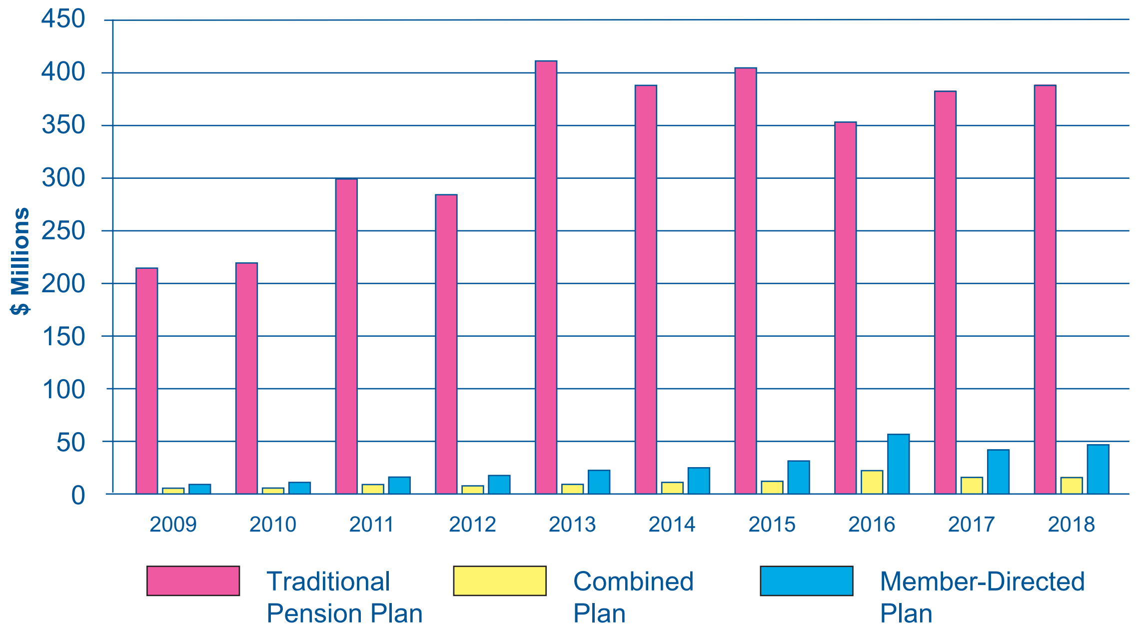
Number of Refund Payments by Plan (last 10 fiscal years)

Year	Traditional Pension Plan	Combined Plan	Member-Directed Plan	Total
2018	22,317	573	1,539	24,429
2017	23,409	544	1,401	25,354
2016	22,024	935	2,462	25,421
2015	29,454	412	998	30,864
2014	29,014	387	878	30,279
2013	25,670	378	1,071	27,119
2012	24,487	384	1,099	25,970
2011	26,686	391	893	27,970
2010	21,797	345	736	22,878
2009	21,413	389	822	22,624

Refunds by Type

2014	2013	2012	2011	2010	2009
$313,034,142	$299,488,361	$275,020,766	$291,727,781	$205,298,464	$192,467,640
22,186,469	17,577,111	23,366,136	21,276,967	20,870,868	21,549,473
90,481,218	124,218,732	9,099,376	10,667,294	6,885,382	8,563,141
$425,701,829	**$441,284,204**	**$307,486,278**	**$323,672,042**	**$233,054,714**	**$222,580,254**
$277,494,212	$270,224,068	$252,159,989	$271,336,582	$192,608,328	$182,274,674
21,732,182	16,878,900	22,957,850	20,808,413	20,314,433	21,371,412
90,481,218	124,218,732	9,099,376	10,667,294	6,885,382	8,563,141
$389,707,612	**$411,321,700**	**$284,217,215**	**$302,812,289**	**$219,808,143**	**$212,209,227**
$10,789,116	$7,605,803	$6,138,096	$6,319,318	$3,515,815	$2,824,743
185,326	125,352	35,618	143,531	24,228	81,140
$10,974,442	**$7,731,155**	**$6,173,714**	**$6,462,849**	**$3,540,043**	**$2,905,883**
$24,750,814	$21,658,490	$16,722,681	$14,071,881	$9,174,321	$7,368,223
268,961	572,859	372,668	325,023	532,207	96,921
$25,019,775	**$22,231,349**	**$17,095,349**	**$14,396,904**	**$9,706,528**	**$7,465,144**

Refunds by Plan



OPERS notionally funds and tracks member balances in the health reimbursement arrangement (HRA), Member-Directed Plan health care accounts, and wellness health care accounts. The Combining Statement of Fiduciary Net Position recognizes health care payments as liabilities when a present obligation exists and a condition requires that the event creating the liability has taken place. Therefore, health care liabilities are recognized when the benefits are currently due and payable in accordance with benefit terms, as clarified in GASB Statement No. 74 (GASB 74), *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans*. Health care liabilities recorded in the combining financial statements also contain estimates on incurred but not reported amounts for the current year. As a result, unspent balances remaining in the member health care accounts are not recorded as liabilities in the combining financial statements beyond what is described here as clarified in GASB 74. Total funds held in trust restricted for health care costs of all OPERS health care plans are $11.3 billion as of December 31, 2018. While OPERS is not required to disclose the funds restricted for health care by individual plans, we do track the funds set aside in member health care accounts. This table shows these balances and a summary of activity for the year for the member HRA, Member-Directed Plan, and wellness health care accounts, starting with the year 2016 as that was the year of implementation for the HRA and the consolidation of all health care assets into one trust.

Funds Restricted for Member Health Care Accounts (last three years, $ in millions)

Year	2018	2017	2016
Health Reimbursement Arrangement (HRA) Accounts			
Notional Deposits into Member Accounts	$441.2	$529.1	$546.8
Transferred In—Wellness RMA	0.5	8.5	
Health Care Claims Paid	(360.4)	(388.1)	(292.8)
Health Care Claims Accrued	(38.9)	(35.3)	(17.4)
Transfer to 115 Trust—Forfeitures[2]	(3.4)		
Net Increase in Member Accounts	39.0	114.2	236.6
Balance, Beginning of Year	350.8	236.6	
Balance, End of Year	**$389.8**	**$350.8**	**$236.6**
Wellness Retiree Medical Accounts (RMA)[1]			
Notional Deposits into Member Accounts			$2.5
Transferred Out—HRA	($0.5)	($8.5)	
Health Care Claims Paid	(0.6)	(4.6)	(5.4)
Health Care Claims Accrued	(0.5)	(2.0)	(1.8)
Net Decrease in Member Accounts	(1.6)	(15.1)	(4.7)
Balance, Beginning of Year	3.1	18.2	22.9
Balance, End of Year	**$1.5**	**$3.1**	**$18.2**
Member-Directed RMAs			
Notional Deposits into Member Accounts	$34.8	$30.0	$23.5
Health Care Claims Paid	(3.0)	(6.4)	(2.7)
Health Care Claims Accrued	(1.1)	(0.1)	(0.4)
Net Increase in Member Accounts	30.7	23.5	20.4
Balance, Beginning of Year	210.3	186.8	166.4
Balance, End of Year	**$241.0**	**$210.3**	**$186.8**
Net Position, End of Year, Member-Directed Health Care	**$248.9**	**$242.0**	**$195.3**
Total Funds Restricted for Member Health Care Accounts	**$632.3**	**$564.2**	**$441.6**

[1] Enrollment in wellness incentive programs was discontinued December 2016. Therefore, deposits to the wellness RMAs ceased. If wellness RMA account holders also had an HRA account, the balance in the wellness RMA was transferred to the HRA. In addition, OPERS initiated an automatic claims payment process for reimbursements for retiree health care costs paid through pension deduction. This process will reimburse members for eligible health care premiums paid to OPERS up to the member's available wellness RMA balance.

[2] Upon the death of an HRA participant, the participant's coverage terminates. Any unused amount in the deceased participant's HRA is forfeited 24 months after the date of death. The HRA program began in 2016; therefore, 2018 activity represents the first eligible forfeitures under the program.

Pension Assets vs Pension Liabilities—Accounting Basis[1] (last five fiscal years, $ in millions) — All Plans

Year	2018	2017	2016	2015	2014
Plan Fiduciary Net Position	$81,427	$87,105	$77,514	$74,560	$77,263
Total Pension Liability	$108,701	$102,653	$100,166	$91,832	$89,285
Employers' Net Pension (Asset)/Liability	$27,274	$15,548	$22,652	$17,272	$12,022
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	74.91%	84.85%	77.39%	81.19%	86.54%

Pension Assets vs Pension Liabilities—Accounting Basis[1] (last five fiscal years, $ in millions) — Traditional Pension Plan

Year	2018	2017	2016	2015	2014
Plan Fiduciary Net Position	$80,876	$86,586	$77,110	$74,213	$76,956
Total Pension Liability	$108,264	$102,274	$99,818	$91,534	$89,017
Employers' Net Pension (Asset)/Liability	$27,388	$15,688	$22,708	$17,321	$12,061
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	74.70%	84.66%	77.25%	81.08%	86.45%

Pension Assets vs Pension Liabilities—Accounting Basis[1] (last five fiscal years, $ in millions) — Combined Plan

Year	2018	2017	2016	2015	2014
Plan Fiduciary Net Position	$532	$501	$392	$337	$298
Total Pension Liability	$420	$365	$336	$288	$260
Employers' Net Pension (Asset)/Liability	($112)	($136)	($56)	($49)	($38)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	126.64%	137.28%	116.55%	116.90%	114.83%

Pension Assets vs Pension Liabilities—Accounting Basis[1] (last five fiscal years, $ in millions) — Member-Directed Plan

Year	2018	2017	2016	2015	2014
Plan Fiduciary Net Position	$19	$18	$12	$10	$9
Total Pension Liability	$17	$14	$12	$10	$8
Employers' Net Pension (Asset)/Liability	($2)	($4)	($0)	($0)	($1)
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	113.42%	124.46%	103.40%	103.91%	107.10%

[1] The Accounting Basis is calculated under GASB 67. GASB 67 was initially implemented in 2014; data for years prior to 2014 is not available. For more information on the Accounting Basis, refer to Note 8 starting on page 69 in the Financial Section.

The calculation method defined in GASB 67 (Accounting Basis) requires different assumptions than are used to calculate the funded status of a plan (Funding Basis). The following table identifies the two key differences between the two methods. Additional details on the Accounting Basis actuarial assumptions can be found in the Financial Section (see Note 8 on page 69). Funding Basis assumptions can be found in the Actuarial Section starting on page 135.

Pension Assumptions—Key Differences Between Accounting and Funding Valuations

Valuation Basis	Accounting	Funding
Measurement and Valuation Date	December 31, 2018	December 31, 2018
Assets Valuation Method	Fair Value	4-year, smoothed market-12% corridor[2]
Investment Rate of Return Used to Calculate Liability	Single Discount Rate[1] 7.2%	Actuarial Assumed 7.2%

[1] As required in GASB 67, a Single Discount Rate may be required to measure the pension liability if existing assets are not projected to be available to make all projected future benefit payments of current plan members. The GASB 67 pension calculation determined that a blended rate for the year ended December 31, 2018 was not needed. Therefore, the long-term expected rate of return on pension plan investments, 7.2%, was applied to all periods of projected benefit payments to determine the Total Pension Liability.

[2] For actuarial purposes, and under the Funding Basis, the funding value of defined benefit assets recognizes assumed investment returns fully each year. Differences between actual and assumed investment returns are phased in over a closed four-year period. The funding value is not permitted to deviate from fair value by more than 12%.

Pension Assets vs Pension Liabilities—Funding Basis[1] (last 10 fiscal years, $ in millions) — All Plans

Year	2018	2017[g]	2017	2016[f]	2015[a]	2015[b]	2014	2013	2012[d]	2012[c]	2011	2010[a, e]	2010[b]	2009
Pension Assets	$84,287	$83,292	$83,292	$80,280	$78,061	$78,061	$74,865	$71,411	$67,855	$67,855	$65,436	$63,649	$60,600	$57,629
Accrued Liabilities	$108,705	$106,090	$102,656	$100,167	$97,177	$91,832	$89,285	$86,645	$83,878	$87,105	$84,530	$80,485	$79,630	$76,555
Unfunded Liabilities	$24,418	$22,798	$19,364	$19,887	$19,116	$13,771	$14,420	$15,234	$16,023	$19,250	$19,094	$16,836	$19,030	$18,926
Funded Ratio	77.54%	78.51%	81.14%	80.15%	80.33%	85.00%	83.85%	82.42%	80.90%	77.90%	77.41%	79.08%	76.10%	75.28%
Amortization Years	27	25	18	19	20	19	21	24	26	30	30	24	29	30
Net Unrealized Gains/(Losses)[2]	($2,860)	$3,813	$3,813	($2,766)	($3,501)	($3,501)	$2,398	$3,455	$0	$0	($3,589)	$0	$3,050	$104

Pension Assets vs Pension Liabilities—Funding Basis[1] (last 10 fiscal years, $ in millions) — Traditional Pension Plan

Year	2018	2017[g]	2017	2016	2015[a]	2015[b]	2014	2013	2012[d]	2012[c]	2011	2010[a, e]	2010[b]	2009
Pension Assets	$83,715	$82,797	$82,797	$79,865	$77,700	$77,700	$74,567	$71,175	$67,670	$67,670	$65,274	$63,515	$60,461	$57,519
Accrued Liabilities	$108,265	$105,691	$102,274	$99,818	$96,863	$91,535	$89,017	$86,407	$83,664	$86,876	$84,325	$80,307	$79,459	$76,407
Unfunded Liabilities	$24,549	$22,894	$19,477	$19,953	$19,163	$13,835	$14,450	$15,232	$15,994	$19,206	$19,051	$16,792	$18,998	$18,888
Funded Ratio	77.32%	78.34%	80.96%	80.01%	80.22%	84.89%	83.77%	82.37%	80.88%	77.89%	77.41%	79.09%	76.09%	75.28%
Amortization Years	28	26	19	20	20	19	21	25	26	31	30	25	30	30
Net Unrealized Gains/(Losses)[2]	($2,839)	$3,789	$3,789	($2,755)	($3,487)	($3,487)	$2,389	$3,443	($2)	($2)	($3,581)	$0	$3,054	$111

Pension Assets vs Pension Liabilities—Funding Basis[1] (last 10 fiscal years, $ in millions) — Combined Plan

Year	2018	2017[g]	2017	2016	2015[a]	2015[b]	2014	2013	2012[d]	2012[c]	2011	2010[a, e]	2010[b]	2009
Pension Assets	$552	$479	$479	$402	$350	$350	$289	$229	$183	$183	$161	$134	$138	$110
Accrued Liabilities	$420	$382	$365	$336	$303	$288	$260	$230	$212	$226	$203	$177	$171	$148
Unfunded Liabilities	($132)	($97)	($114)	($66)	($47)	($62)	($29)	$1	$29	$43	$42	$43	$33	$38
Funded Ratio	131.43%	125.39%	130.97%	119.62%	115.59%	121.71%	111.15%	99.57%	86.32%	80.97%	79.31%	75.71%	80.70%	74.32%
Amortization Years	0	0	0	0	0	0	0	0	1	0	2	3	2	3
Net Unrealized Gains/(Losses)[2]	($20)	$23	$23	($10)	($14)	($14)	$9	$12	$2	$2	($8)	$0	($4)	($7)

Pension Assets vs Pension Liabilities—Funding Basis[1] (last 10 fiscal years, $ in millions) — Member-Directed Annuities

Year	2018	2017[g]	2017	2016[f]	2015[a]	2015[b]	2014	2013	2012	2011	2010[a, e]	2010[b]	2009
Pension Assets	$19.917	$16.770	$16.770	$12.961	$10.622	$10.622	$8.772	$6.826	$2.524	$1.156	$0.454	$0.439	$0.206
Accrued Liabilities	$19.917	$16.770	$16.770	$12.961	$10.291	$9.767	$8.291	$6.884	$2.666	$1.173	$0.496	$0.490	$0.253
Unfunded Liabilities	$0	$0	$0	$0	($0.331)	($0.855)	($0.481)	$0.058	$0.142	$0.017	$0.042	$0.051	$0.047
Funded Ratio	100.00%	100.00%	100.00%	100.00%	103.22%	108.75%	105.80%	99.16%	94.67%	98.55%	91.54%	89.63%	81.39%
Net Unrealized Gains/(Losses)[2]	($0.656)	$0.989	$0.989	($0.296)	($0.473)	($0.473)	$0.108	$0.273	$0.062	($0.044)	$0	$0.015	$0.002

[a] Information after completion of the experience study.
[b] Information prior to completion of the experience study.
[c] Information prior to benefit changes enacted January 7, 2013.
[d] Valuation revised to reflect benefit changes enacted January 7, 2013.
[e] Funding Value was set to Market Value as of December 31, 2010.
[f] Restated upon finalization of actuarial valuation subsequent to issuance of 2016 CAFR.
[g] Information after change in discount rate from 7.5% to 7.2%.

[1] Table presents actuarial information on a Funding Basis. For more information on the Funding Basis, refer to the Actuarial Section beginning on page 135.
[2] For actuarial purposes, and under the Funding Basis, the funding value of defined benefit assets recognizes total assumed investment returns each year. Differences between actual and assumed investment returns are phased in, or smoothed, over a closed four-year period. The funding value is not permitted to deviate from fair value by more than 12%. This amount represents the net unrealized investment gains/losses remaining at the end of each year to be smoothed in future years.

Health Care Assets vs Health Care Liabilities—Accounting Basis[1] (last two years, $ in millions)

Year	2018	2017
Plan Fiduciary Net Position	$11,253	$12,819
Total OPEB Liability	$24,291	$23,678
Employers' Net OPEB Liability	$13,038	$10,859
Plan Fiduciary Net Position as a Percentage of Total OPEB Liability	46.33%	54.14%

[1] The Accounting Basis is calculated under GASB 74. GASB 74 was implemented as of December 31, 2017, data prior to 2017 is not available. For more information on the Accounting Basis, refer to Note 9 on page 72 in the Financial Section.

The calculation method defined in GASB 74 (Accounting Basis) requires different assumptions than are used to calculate the funded status of the program (Funding Basis). The following table identifies the key differences between the two methods. Additional details on the Accounting Basis actuarial assumptions can be found in the Financial Section (see Note 9 on page 72). Funding Basis assumptions can be found in the Actuarial Section starting on page 135.

Health Care Assumptions—Key Differences Between Accounting and Funding Valuations

Valuation Basis	Accounting	Funding
Actuarial Valuation Date	December 31, 2017	December 31, 2017
Rolled-Forward Measurement Date	December 31, 2018	N/A
Assets Valuation Method	Fair Value	4-year, smoothed market—12% corridor[2]
Investment Rate of Return Used to Calculate Liability	Single Discount Rate[1] 3.96%	Actuarial Assumed 6.00%

[1] Projected benefit payments are required to be discounted to their actuarial present value using a Single Discount Rate that reflects (1) a long-term expected rate of return on OPEB plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits), and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the rolled-forward measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met). For the purpose of this rolled-forward measurement date valuation, the expected rate of return on OPEB plan investments is 6.00%; the municipal bond rate is 3.71% (based on the daily rate closest to but not later than the measurement date of the Fidelity 20-year Municipal GO AA Index). The resulting Single Discount Rate is 3.96%.

[2] For actuarial purposes, and under the Funding Basis, the funding value of defined benefit assets recognizes total assumed investment returns each year. Differences between actual and assumed investment returns are phased in over a closed four-year period. The funding value is not permitted to deviate from fair value by more than 12%.

Health Care Assets vs Liabilities—Funding Basis[1] (last 10 fiscal years, $ in millions) — Total Health Care Fund

Year	2017[d]	2017	2016	2015[a]	2015[b]	2014	2013	2012	2011	2010[a, c]	2010[b]	2009	2008
Health Care Assets	$12,021	$12,021	$12,098	$11,933	$11,933	$12,062	$12,031	$12,193	$12,115	$12,320	$11,267	$10,936	$10,748
Accrued Liabilities	$18,393	$17,389	$19,924	$19,224	$18,515	$19,405	$19,784	$19,182	$31,020	$30,531	$26,929	$31,558	$29,623
Unfunded Liabilities	$6,372	$5,368	$7,826	$7,291	$6,582	$7,343	$7,753	$6,989	$18,905	$18,211	$15,662	$20,622	$18,875
Funded Ratio	65.36%	69.13%	60.72%	62.10%	64.45%	62.16%	60.81%	63.56%	39.06%	40.35%	41.84%	34.65%	36.28%
Solvency Period	13	13	12	Indefinite[2]	Indefinite[2]	Indefinite[2]	Indefinite[2]	Indefinite[2]	10	11	11	11	11
Net Unrealized Gains/(Losses)[3]	$797	$797	($218)	($421)	($421)	$764	$1,080	$635	($519)	$0	$1,052	$479	($1,152)

[a] Information after completion of the experience study.
[b] Information prior to completion of the experience study.
[c] Funding Value was set to Market Value as of December 31, 2010.
[d] Information after change in discount rate from 6.5% to 6.0%.
[1] This table presents actuarial information on a Funding Basis. For more information on the Funding Basis, refer to the Actuarial Section beginning on page 135.
[2] Funds expected to be sufficient to fund future health care needs.
[3] For actuarial purposes, and under the Funding Basis, the funding value of defined benefit assets recognizes total assumed investment returns each year. Differences between actual and assumed investment returns are phased in, or smoothed, over a closed four-year period. The funding value is not permitted to deviate from fair value by more than 12%. This amount represents the net unrealized investment gains/losses remaining at the end of each year to be smoothed in the future years.

The Board approved changes to the OPERS health care plans in 2012. The ultimate goal of the health care changes was to match the income to the health care trust (assumed to be 4%) and disbursements from the health care trust (also assumed to be 4%). Additionally, the Board established a health care stabilization fund to hold income in excess of 4%. The balance of the stabilization fund will supplement income to the health care core (operating) fund when employer contributions or investment income of 4% was not available during the year or disbursements from the trust exceed 4% during the year. The stabilization fund is an accounting function only and not listed separately in the combining financial statements. Health care valuations disclosed previously (both on a Funding and Accounting basis) are prepared using total health care fund assets.
The table below displays the valuation results for the health care plans using only the core fund assets and no stabilization fund assets.

Health Care Assets vs Liabilities[1] (last six fiscal years, $ in millions) — Health Care—Core Fund

Year	2017[c]	2017	2016[d]	2015[a]	2015[b]	2014	2013	2012
Health Care Assets	$10,113	$10,113	$10,143	$10,109	$10,109	$10,622	$11,110	$11,759
Accrued Liabilities	$18,393	$17,389	$19,924	$19,224	$18,515	$19,405	$19,784	$19,182
Unfunded Liabilities	$8,280	$7,276	$9,781	$9,115	$8,406	$8,783	$8,674	$7,423
Funded Ratio	54.98%	58.16%	50.91%	52.59%	54.60%	54.74%	56.16%	61.30%
Solvency Period	10	10	10	Indefinite[2]	Indefinite[2]	Indefinite[2]	Indefinite[2]	Indefinite[2]

[a] Information after completion of the experience study.
[b] Information prior to completion of the experience study.
[c] Information after change in discount rate from 6.5% to 6.0%.
[d] Assets recalculated after issuance of 2017 report.
[1] As the stabilization fund was created in 2012, information prior to 2012 is not available.
[2] Funds expected to be sufficient to fund future health care needs.

Contribution Rates

	Actuarially Determined Contribution Rate	Employer Contribution Rate Funding Health Care		
Year	All Plans	Traditional Pension Plan	Combined Plan	Note
2018	5.75%	0.00%	0.00%	
2017	5.26	1.00	1.00	
2016	5.56	2.00	2.00	
2015	5.77	2.00	2.00	
2014	5.54	2.00	2.00	
2013	12.96	1.00	1.00	(1)
2012	11.52	4.00	6.05	(1)
2011	14.55	4.00	6.05	(1)
2010	13.34	5.08	4.31	(1) (2)
2009	13.26	5.88	5.02	(1) (3)

(1) From 2008 through 2010, the employer contribution rate allocated to health care by the Combined Plan was less than the Traditional Pension Plan. Payment of the impact of the rate difference commenced in 2011 and continued in 2012. The total repaid to the 401(h) Health Care Trust exceeded the required amount. As a result, the amount contributed to the 401(h) Health Care Trust by the Combined Plan in 2013 was less than the actual contribution rate listed above.

(2) The portion of the employer contribution rate allocated to fund health care for the Traditional Pension Plan was 5.50% for the period January 1, 2010 through February 28, 2010, and decreased to 5.00% for the period March 1, 2010 through December 31, 2010. The overall effective rate for the year was 5.08%. The rates for the Combined Plan for the same periods were 4.73% and 4.23%, respectively, for an overall effective rate for the year of 4.31%.

(3) The portion of the employer contribution rate allocated to fund health care for the Traditional Pension Plan was 7.00% for the period January 1, 2009 through March 31, 2009, and decreased to 5.50% for the period April 1, 2009 through December 31, 2009. The overall effective rate for the year was 5.88%. The rates for the Combined Plan for the same periods were 5.90% and 4.73%, respectively, for an overall effective rate for the year of 5.02%.

Health Care Self-Funding Rate[1]

Year	Rate
2017[c]	4.80%
2017	4.80
2016	4.60
2015[a]	4.70
2015[b]	4.00
2014	4.10
2013	4.10
2012	3.80
2011	6.40
2010	6.70
2009	8.00
2008	7.70

[a] Information after completion of the experience study.
[b] Information prior to completion of the experience study.
[c] Information after change in discount rate from 6.5% to 6.0%.
[1] The self-funding rate is the percentage of contribution required to fund health care indefinitely without regard to repayment of the liability within 30 years.

Investment Rates by Portfolio—Defined Benefit and Health Care

OPERS uses several rates to evaluate the results of the investment portfolios. Actual and benchmark returns for the years listed can be found in the Investment Section. The expected rate of return is based on the asset allocation in place during the year presented and the actuarial assumed rate of return is the assumption used by our actuaries for the annual actuarial valuations, described further in the Actuarial Section. Finally, the single discount and long-term municipal bond rates are applicable to the implementation of GASB 74 in 2017, including 2016 opening balances. These rates are used in the Accounting Basis valuations for health care and not available prior to 2016.

Rates are presented for six years in the following table:

Investment Rates by Portfolio

	2018	2017	2016	2015	2014	2013
Defined Benefit Portfolio						
Actual Rate of Return	(2.99%)	16.82%	8.31%	0.33%	6.96%	14.38%
Benchmark Return	(3.07)	15.19	8.64	0.25	5.81	14.24
Long-Term Expected Rate of Return	8.00	8.00	8.00	8.00	8.00	8.00
Actuarial Assumed Rate of Return	7.20	7.50	7.50	8.00	8.00	8.00
Health Care Portfolio[1]						
Actual Rate of Return	(5.76%)	15.25%	7.55%	(2.18%)	5.28%	11.36%
Benchmark Return	(5.96)	14.31	7.75	(1.88)	5.01	10.70
Long-Term Expected Rate of Return	6.50	6.50	6.50	6.50	6.50	6.50
Actuarial Assumed Rate of Return	6.00	6.50	5.00	5.00	5.00	5.00
Single Discount Rate (GASB 74)[2]	3.96	3.85	4.23	N/A	N/A	N/A
Long-Term Municipal Bond Rate[2]	3.71	3.31	3.78	N/A	N/A	N/A

[1] In 2016, the 401(h) Health Care Trust closed and assets were transferred to the 115 Health Care Trust. The 2016 partial year results for both of these portfolios can be found in the Investment Section, reflecting six month returns for the 401(h) Health Care Trust. For 2016, this chart displays the combined health care rates as disclosed in the Investment Section. For previous years, the rates represent the 401(h) Health Care Trust, as the majority of the health care assets resided in this trust until transferred to the 115 Health Care Trust.

[2] Projected benefit payments are required to be discounted to their actuarial present value using a Single Discount Rate that reflects (1) a long-term expected rate of return on OPEB plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits), and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met). Additional information on the Single Discount Rate can be found in Note 9 of the Notes to Combining Financial Statements found in the Financial Section.

Number of Retirees/Benefit Recipients by Category

The values included in the following tables represent the number of individuals receiving benefit payments. The 2011 through 2018 counts represent retired member accounts only, regardless of the number of recipients designated by the retiree's plan of payment. These statistics are representative of the OPERS contributing membership. Prior to 2011, the values represent the number of individuals receiving a benefit payment from OPERS, where one retiree's account may be issued to multiple recipients or beneficiaries. Restated data for years prior to 2011 is not available.

Traditional Pension Plan

Year End	Annuities	Disabilities	Survivors	Total
2018	179,113	20,684	12,541	212,338
2017	176,445	21,322	12,590	210,357
2016	173,500	21,848	12,569	207,917
2015	170,411	22,230	12,570	205,211
2014	167,608	22,532	12,649	202,789
2013	160,815	22,791	12,743	196,349
2012	155,008	22,768	12,712	190,488
2011	149,598	22,476	12,802	184,876
2010	143,035	23,041	13,437	179,513
2009	135,918	22,651	13,358	171,927

Annuities are comprised of a defined formula benefit paid to contributing members retiring with an age-and-service benefit, as well as, benefit annuities paid through the Additional Annuity and Money Purchase plans (refer to Plan Statement beginning on page 217). Members who retired from other Ohio retirement systems may return to OPERS-covered employment under the OPERS Money Purchase plan. These members receive an annuity in accordance with that program, based on the contributions paid during the re-employment period.

The table below displays the composition of the Traditional Pension Plan Annuities by type for 2011 through 2018. The Other Annuities column represents Money Purchase and Additional Annuity plan benefits. These benefits may accrue to members whose primary retirement is with OPERS or through another Ohio retirement system (ORS retirees).

Traditional Pension Plan Annuities

Year End	Age-and-Service Annuities	Age-and-Service Receiving Other Annuities	Subtotal Age-and-Service Annuities	Other Annuities (ORS retirees)	Total
2018	174,382	3,166	177,548	1,565	179,113
2017	171,766	3,127	174,893	1,552	176,445
2016	168,924	3,039	171,963	1,537	173,500
2015	165,997	2,913	168,910	1,501	170,411
2014	163,313	2,830	166,143	1,465	167,608
2013	156,755	2,643	159,398	1,417	160,815
2012	151,765	2,112	153,877	1,131	155,008
2011	146,687	1,901	148,588	1,010	149,598

Number of Retirees/Benefit Recipients by Category (continued)

The values included in the table below represent the number of retirees receiving benefit payments. Members in the Combined Plan receive an age-and-service defined formula benefit annuity from their employer contribution account, and may not elect a retirement distribution from their defined contribution account until they qualify for a defined benefit retirement. Prior to 2012, members in both the Combined Plan and Member-Directed Plan had the option to defer all or a portion of their defined contribution account, annuitize, or elect to receive installment payments from the defined contribution account. Effective April 1, 2012, the installment payment options were eliminated and new retirees may elect to annuitize, transfer their defined contribution account to another financial institution, or refund their account (refer to the Plan Statement beginning on page 217).

Combined Plan[1]

Year End	Age-and-Service Annuities	Annuitized DC Accounts	Installment Payments	Liquidated or Deferred DC Accounts[2]	Number of Retirees
2018	337	229	4		337
2017	283	193	6		283
2016	238	158	6		238
2015	196	128	7		196
2014	156	99	7		156
2013	100	64	7	1	100
2012	55	37	13	5	55
2011	36	22	13	1	36
2010	21	13	7	1	21
2009	9	6	3		9

[1] As of April 1, 2012, no member had elected a combination annuity and installment payment benefit distribution since commencement of the plan January 1, 2003. Retirements effective on or after April 1, 2012 no longer have this option.

[2] Beginning in 2013, the number of members receiving a defined benefit age-and-service benefit does not equal the number of members receiving a defined contribution benefit. The defined contribution options of transferring the defined contribution account to another financial institution or refunding the account are recorded in OPERS systems as refund transactions. These specific types of refunds cannot be segregated from withdrawal from service refunds.

Member-Directed Plan[1]

Year End	Annuities	Installment Payments	Total
2018	278	5	283
2017	242	5	247
2016	219	7	226
2015	185	9	194
2014	154	13	167
2013	131	14	145
2012	62	16	78
2011	38	15	53
2010	18	13	31
2009	9	10	19

[1] As of April 1, 2012, no member had elected a combination annuity and installment payment benefit distribution since commencement of the plan on January 1, 2003. Retirements effective on or after April 1, 2012 no longer have this option.

Number of Covered Lives by Category

The values included in the tables below represent the number of lives covered by OPERS health care plans. The 2010 through 2018 counts for the Health Care Plans table reflect the number of retirees and primary beneficiaries, and the number of additional dependents and other beneficiaries receiving coverage. In addition to a retiree, a primary benefit recipient could be a survivor of a deceased retiree continuing to receive coverage on the member's account. The values in this column represent OPERS contributing membership, while dependents and other beneficiaries represent other family members receiving primarily dental and vision coverage through a retiree's account. Corresponding data for years prior to 2010 is not available. These counts represent all Traditional Pension Plan and Combined Plan retirees, dependents, and beneficiaries receiving post-employment health care coverage.

Health Care Plans

Year End	Number of Retirees and Primary Beneficiaries	Number of Dependents and Other Beneficiaries	Total Covered Lives
2018	146,410	31,670	178,080
2017[a]	150,363	36,362	186,725
2016[a]	153,272	42,230	195,502
2015	170,688	52,109	222,797
2014	167,327	58,692	226,019
2013	165,967	61,041	227,008
2012	163,940	62,456	226,396
2011	161,315	62,507	223,822
2010	157,269	60,624	217,893
2009	N/A	N/A	213,220

[a] Restated amounts for Health Care Connector.

The Member-Directed Plan Retiree Medical Account is an account in the member's name that can be used to reimburse qualified medical expenses for Member-Directed Plan retirees and eligible family members. Funding for Member-Directed Plan health care was accumulated in a Voluntary Employees' Beneficiary Association Trust (VEBA Trust). The VEBA Trust was closed as of June 30, 2016 and the net position transferred into the 115 Health Care Trust (115 Trust) on July 1, 2016. Beginning July 1, 2016, funding for the Member-Directed Plan health care is accumulated in the 115 Trust.

Member-Directed Plan Retiree Health Care

Year End	Total Covered Lives
2018	6,660
2017	6,203
2016	5,605
2015	4,063
2014	3,509
2013	3,112
2012	2,589
2011	2,073
2010	1,577
2009	1,260

Schedule of Retirees by Benefit Type and Amount

The values included in the following tables represent the number of retired members receiving benefits. Other Annuities represents Money Purchase and Additional Annuity plan benefits. These benefits may accrue to members whose primary retirement is with OPERS or with another Ohio retirement system (ORS retirees).

Traditional Pension Plan (as of December 2018)

Amount of Monthly Benefit	Age-and-Service Annuities	Age-and-Service Receiving Other Annuities	Subtotal Age-and-Service Annuities	Disabilities	Survivors	Other Annuities (ORS retirees)	Total Retirees
$1-299	10,932	1,829	12,761	40	569	622	13,992
$300-499	8,450	501	8,951	99	1,745	291	11,086
$500-999	22,104	521	22,625	776	3,906	371	27,678
$1,000-1,499	21,154	159	21,313	2,385	2,734	164	26,596
$1,500-1,999	18,960	79	19,039	3,897	1,475	74	24,485
$2,000 & Over	92,782	77	92,859	13,487	2,112	43	108,501
Totals	**174,382**	**3,166**	**177,548**	**20,684**	**12,541**	**1,565**	**212,338**

Effective April 1, 2012, members electing to retire in the Combined Plan and Member-Directed Plan have the option to use their defined contribution account to annuitize, to transfer their defined contribution account to another financial institution, or to receive a refund of their defined contribution account. Prior to April 1, 2012, these members also had the option to draw on their defined contribution account under an installment payment plan. The installment payment option is still effective for members who retired prior to April 1, 2012.

Combined Plan members are also eligible for a defined formula benefit from their employer contributions. The Employer Age-and-Service Annuities column represents members receiving a formula benefit. Members may receive payments of their defined contribution accounts under the methods described above. For those members who retired prior to April 1, 2012, only installment payments with a remaining account balance are counted.

Combined Plan (as of December 2018)

Amount of Monthly Benefit	Employer Age-and-Service Annuities	Annuitized DC Accounts	DC Installment Payments
$1-299	145	133	
$300-499	105	62	
$500-999	76	26	
$1,000-1,499	10	6	
$1,500-1,999	1	1	
$2,000 & Over		1	
Various			4
Totals	**337**	**229**	**4**

The Member-Directed Plan table displays the distribution of members electing either a defined benefit annuity or an installment payment option. For those members who retired prior to April 1, 2012, only installment payments with a remaining account balance are counted.

Member-Directed Plan (as of December 2018)

Amount of Monthly Benefit	Annuitized DC Accounts	DC Installment Payments	Total Retirees
$1-299	126		126
$300-499	68		68
$500-999	63		63
$1,000-1,499	16		16
$1,500-1,999	2		2
$2,000 & Over	3		3
Various		5	5
Totals	**278**	**5**	**283**

Number of New Pension Retirees

The values included in the following tables represent the number of new benefit recipients each year. The 2011 through 2018 counts represent retired members only, regardless of the number of recipients designated by the retiree's plan of payment. These statistics are representative of contributing membership. Prior to 2011, the values represent the number of new individuals receiving a benefit payment from OPERS where one retiree account may be issued to multiple recipients or beneficiaries. Related data for years prior to 2011 is not available.

Traditional Pension Plan

Year	Annuities	Disabilities	Survivors	Total
2018	7,475	513	364	8,352
2017	7,668	550	446	8,664
2016	7,388	641	430	8,459
2015	7,209	737	355	8,301
2014	11,011	702	368	12,081
2013	9,831	971	446	11,248
2012	9,793	1,245	358	11,396
2011	10,885	1,051	400	12,336
2010	10,503	1,327	737	12,567
2009	9,026	1,132	723	10,881

Annuities are comprised of a defined formula benefit paid to contributing members retiring with an age-and-service benefit, as well as benefit annuities paid through the Additional Annuity and Money Purchase plans (refer to the Plan Statement beginning on page 217). Members who retired from other Ohio retirement systems may return to OPERS-covered employment under the OPERS Money Purchase plan. These members receive an annuity in accordance with that program based on the contributions paid during the re-employed period.

The table below displays the composition of the 2011 through 2018 Traditional Pension Plan Annuities by type. The Other Annuities column represents Money Purchase and Additional Annuity plan benefits. These benefits may accrue to members whose primary retirement is with OPERS or through another Ohio retirement system (ORS retirees). Comparable data for years prior to 2011 is not available.

Traditional Pension Plan Annuities

Year	Age-and-Service Annuities	Age-and-Service Receiving Other Annuities	Subtotal Age-and-Service Annuities	Other Annuities (ORS retirees)	Total
2018	7,402	15	7,417	58	7,475
2017	7,601	13	7,614	54	7,668
2016	7,316	7	7,323	65	7,388
2015	7,127	16	7,143	66	7,209
2014	10,915	16	10,931	80	11,011
2013	9,476	53	9,529	302	9,831
2012	9,607	53	9,660	133	9,793
2011	10,730	54	10,784	101	10,885

Number of New Pension Retirees (continued)

Effective April 1, 2012, members electing to retire in the Combined Plan and Member-Directed Plan have the option to use their defined contribution account to annuitize, to transfer their defined contribution account to another financial institution, or to receive a refund of their defined contribution account. Prior to April 1, 2012, these members also had the option to draw on their defined contribution account under an installment payment plan. The installment payment option is still effective for members who retired prior to April 1, 2012 with no new elections after that date.

Combined Plan members are also eligible for a defined formula benefit from their employer contributions. The Employer Age-and-Service Annuities column represents members receiving a formula benefit. Members may receive payments of their defined contribution accounts under the methods described above.

Combined Plan

Year	Employer Age-and-Service Annuities	Member Annuitized Defined Contribution Accounts	Defined Contribution Installment Payments	Liquidated or Deferred Defined Contribution Accounts
2018	54	36		
2017	49	38		
2016	43	30		
2015	41	30		
2014	56	35		
2013	45	27		
2012	19	15	1	3
2011	15	9	7	
2010	12	7	4	1
2009	2	1	1	

The Member-Directed Plan table displays the distribution of members electing either a defined benefit annuity or an installment payment option.

Member-Directed Plan

Year	Annuities	Installment Payments	Total
2018	38		38
2017	25		25
2016	34		34
2015	31		31
2014	24		24
2013	69		69
2012	24	1	25
2011	20	6	26
2010	8	4	12
2009	6	5	11

Schedule of Average Benefits

This schedule displays the number of new retirees each year, grouped by years of credited service. Prior-year numbers are not adjusted as members roll off the rolls. Retirement benefits are calculated based on the final average salary (FAS) of the member, representing the member's three (or five) highest years of earnings (refer to the Plan Statement beginning on page 217 for benefit eligibility requirements). The Average Final Average Salary represents a composite for each group.

The 2011 through 2018 statistics include members with less than five years of service. Comparable data for years prior to 2011 is not available. The Total New Retirees column represents the average monthly benefit and average FAS for the retiree counts listed in each year.

Schedule of Average Benefits[1] (last 10 fiscal years) — Traditional Pension Plan

		Years Credited Service							
	Retirement Effective Dates	0-4	5-9	10-14	15-19	20-24	25-30	30+	Total New Retirees
2018	Average Monthly Benefit	$670	$579	$945	$1,323	$1,828	$2,586	$3,690	$2,281
	Average Final Average Salary	$24,425	$35,398	$43,003	$45,656	$52,019	$58,989	$67,673	$54,739
	Number of Active Recipients	77	788	1,004	968	1,301	1,389	2,767	8,294
2017	Average Monthly Benefit	$625	$627	$940	$1,335	$1,866	$2,499	$3,509	$2,285
	Average Final Average Salary	$19,913	$36,979	$43,150	$46,261	$52,750	$57,846	$65,276	$54,640
	Number of Active Recipients	89	743	989	945	1,272	1,444	3,128	8,610
2016	Average Monthly Benefit	$480	$607	$924	$1,275	$1,817	$2,464	$3,476	$2,208
	Average Final Average Salary	$14,983	$34,240	$40,609	$45,105	$51,292	$57,163	$64,642	$52,969
	Number of Active Recipients	96	768	1,011	925	1,238	1,467	2,889	8,394
2015	Average Monthly Benefit	$301	$573	$865	$1,248	$1,816	$2,413	$3,464	$2,053
	Average Final Average Salary	$9,347	$33,258	$37,596	$42,780	$50,311	$56,473	$64,158	$50,136
	Number of Active Recipients	180	907	1,165	967	1,183	1,247	2,586	8,235
2014	Average Monthly Benefit	$289	$560	$832	$1,218	$1,787	$2,370	$3,282	$1,880
	Average Final Average Salary	$9,637	$31,679	$39,122	$43,897	$49,666	$55,301	$61,233	$48,693
	Number of Active Recipients	163	926	2,341	1,964	1,451	2,044	3,112	12,001
2013	Average Monthly Benefit	$310	$555	$879	$1,271	$1,823	$2,362	$3,402	$2,021
	Average Final Average Salary	$9,762	$30,394	$38,438	$43,362	$48,627	$54,957	$61,752	$48,997
	Number of Active Recipients	167	1,030	1,747	1,413	1,495	1,810	3,284	10,946
2012	Average Monthly Benefit	$236	$668	$904	$1,323	$1,824	$2,361	$3,309	$2,078
	Average Final Average Salary	$7,385	$31,007	$37,923	$43,991	$47,969	$54,624	$60,927	$49,262
	Number of Active Recipients	146	1,035	1,677	1,353	1,544	1,761	3,747	11,263
2011	Average Monthly Benefit	$309	$606	$897	$1,320	$1,857	$2,361	$3,270	$2,186
	Average Final Average Salary	$10,126	$30,676	$37,732	$43,790	$49,365	$55,207	$60,228	$50,406
	Number of Active Recipients	156	962	1,569	1,410	1,518	1,786	4,834	12,235
2010	Average Monthly Benefit		$684	$893	$1,216	$1,623	$2,218	$3,315	$2,190
	Average Final Average Salary		$30,128	$36,592	$41,616	$45,312	$51,264	$58,633	$48,897
	Number of Active Recipients		806	1,460	1,203	1,249	1,493	4,396	10,607
2009	Average Monthly Benefit		$670	$901	$1,217	$1,608	$2,195	$3,263	$2,228
	Average Final Average Salary		$30,925	$37,211	$42,333	$45,453	$51,770	$57,750	$49,335
	Number of Active Recipients		801	1,435	1,111	1,205	1,389	4,898	10,839

[1] All years begin January 1 and end December 31.

Schedule of Average Benefits (continued)

Schedule of Average Benefits[1] (last 10 fiscal years) — Combined Plan

Year	Retirement Effective Dates	0-4	5-9	10-14	15-19	20-24	Total New Retirees
		Years Credited Service					
2018	Average Monthly Benefit		$261	$527	$659	$1,429	$517
	Average Final Average Salary		$51,411	$58,150	$58,940	$122,395	$57,937
	Number of Active Recipients		13	25	15	1	54
2017	Average Monthly Benefit		$303	$507	$627	$1,097	$475
	Average Final Average Salary		$47,088	$54,249	$51,388	$62,070	$52,275
	Number of Active Recipients		13	31	4	1	49
2016	Average Monthly Benefit		$285	$471	$588		$406
	Average Final Average Salary		$49,655	$54,075	$53,375		$52,279
	Number of Active Recipients		17	23	3		43
2015	Average Monthly Benefit	$5	$272	$382	$370		$331
	Average Final Average Salary	$1,933	$54,371	$48,705	$35,431		$48,342
	Number of Active Recipients	1	15	21	4		41
2014	Average Monthly Benefit		$274	$346	$363	$270	$332
	Average Final Average Salary		$45,794	$45,889	$48,167	$15,897	$45,458
	Number of Active Recipients		10	42	3	1	56
2013	Average Monthly Benefit		$211	$300			$247
	Average Final Average Salary		$41,043	$41,121			$41,074
	Number of Active Recipients		27	18			45
2012	Average Monthly Benefit		$255	$263			$259
	Average Final Average Salary		$48,341	$39,064			$43,459
	Number of Active Recipients		9	10			19
2011	Average Monthly Benefit		$237	$454			$281
	Average Final Average Salary		$49,177	$75,127			$54,367
	Number of Active Recipients		12	3			15
2010	Average Monthly Benefit		$229	$217			$225
	Average Final Average Salary		$61,819	$33,958			$51,688
	Number of Active Recipients		7	4			11
2009	Average Monthly Benefit		$212	$232			$222
	Average Final Average Salary		$54,215	$42,062			$48,139
	Number of Active Recipients		1	1			2

[1] All years begin January 1 and end December 31.

Member Counts by Plan

The tables below represent the number of members in each retirement plan based on their status in the plan. Eligible members have the ability to change plans during their career, and leave their contribution accounts behind with the plan under which the contribution was made. Accordingly, a member may be active in one plan and inactive in another. See the table at the bottom of the next page for a composite total count of active, inactive, and retired members regardless of plan.

The 2011 through 2018 Benefit Recipient counts represent retired members only, regardless of the number of recipients designated by the retiree's plan of payment. These statistics are representative of OPERS contributing membership. Prior to 2011, the values represent the number of individuals receiving a benefit payment from OPERS where one retiree account may be issued to multiple recipients or beneficiaries.

Member Count—Pension Plans — Total All Pension Plans

Year End	Active	Inactive	Retirees	Total
2018[a]	303,920	628,091	212,953	1,144,964
2017	347,730	559,587	210,882	1,118,199
2016	346,959	537,309	208,381	1,092,649
2015	345,622	516,049	205,601	1,067,272
2014	346,509	498,610	203,112	1,048,231
2013	347,727	483,521	196,594	1,027,842
2012	348,235	467,298	190,621	1,006,154
2011	349,189	452,718	184,965	986,872
2010	356,734	438,434	179,565	974,733
2009	365,229	416,548	171,955	953,732

Member Count—Pension Plans — Traditional Pension Plan

Year End	Active	Inactive	Retirees	Total
2018[a]	285,487	620,572	212,338	1,118,397
2017	328,207	553,393	210,357	1,091,957
2016	327,705	531,533	207,917	1,067,155
2015	326,795	509,194	205,211	1,041,200
2014	328,341	492,548	202,789	1,023,678
2013	330,595	478,291	196,349	1,005,235
2012	331,836	462,597	190,488	984,921
2011	333,340	448,417	184,876	966,633
2010	341,779	434,804	179,513	956,096
2009	351,166	413,461	171,927	936,554

[a] In 2018, the data aggregation methodology was modified for Active and Inactive counts after system reconfigurations. Restated data for years prior to 2018 is not available.

Member Counts by Plan (continued)

Member Count—Pension Plans — Combined Plan

Year End	Active	Inactive	Retirees	Total
2018[a]	7,692	2,143	337	10,172
2017	7,905	1,825	283	10,013
2016	7,777	1,754	238	9,769
2015	7,587	2,031	196	9,814
2014	7,413	1,818	156	9,387
2013	7,175	1,637	100	8,912
2012	6,903	1,460	55	8,418
2011	6,674	1,314	36	8,024
2010	6,554	1,052	21	7,627
2009	6,403	942	9	7,354

Member Count—Pension Plans — Member-Directed Plan

Year End	Active	Inactive	Retirees	Total
2018[a]	10,741	5,376	278	16,395
2017	11,618	4,369	242	16,229
2016	11,477	4,022	226	15,725
2015	11,240	4,824	194	16,258
2014	10,755	4,244	167	15,166
2013	9,957	3,593	145	13,695
2012	9,496	3,241	78	12,815
2011	9,175	2,987	53	12,215
2010	8,401	2,578	31	11,010
2009	7,660	2,145	19	9,824

The table below represents a System-level member count regardless of the plan of participation selected by the member. Only OPERS members are included in this table and each member is counted only once. Actively contributing retired OPERS members who return to OPERS-covered employment under the Money Purchase Plan are reported as retirees. Comparable data for years prior to 2011 is not available.

Member Count—Pension Plans — All Plans

Year End	Active	Inactive	Retirees	Total
2018[a]	303,920	626,684	212,937	1,143,541
2017	347,729	558,205	210,868	1,116,802
2016	346,959	535,941	208,361	1,091,261
2015	345,621	514,607	205,581	1,065,809
2014	346,508	497,212	203,091	1,046,811
2013	347,727	482,156	196,575	1,026,458
2012	348,235	465,940	190,619	1,004,794
2011	349,188	451,353	184,963	985,504

[a] In 2018, the data aggregation methodology was modified for Active and Inactive counts after system reconfigurations. Restated data for years prior to 2018 is not available.

continued on page 208

Member Counts by Plan (continued)

The values included in the tables below represent the number of individuals covered by the OPERS health care plans. The 2010 through 2018 counts in these tables reflect the number of retirees and primary beneficiaries only. In addition to a retiree, a primary benefit recipient could be a survivor of a deceased retiree continuing to receive coverage on the retiree's account, which is representative of the OPERS contributing membership. Dependents and Other Beneficiaries, primarily receiving dental and vision coverage, is shown separately for 2010 through 2017. Corresponding data for years prior to 2010 is not available.

Member Count—Health Care Plans — Total All Health Care Plans

Year End	Active	Inactive	Retirees & Primary Beneficiaries	Dependents & Other Beneficiaries	Total
2018	10,976	5,081	153,070	31,670	200,797
2017[a]	11,613	4,309	156,566	36,362	208,850
2016[a]	11,469	3,976	158,877	42,230	216,552
2015	11,235	4,764	174,751	52,109	242,859
2014	10,745	4,194	170,836	58,692	244,467
2013	9,962	3,543	169,079	61,041	243,625
2012	9,501	3,189	166,529	62,456	241,675
2011	9,170	2,918	163,388	62,507	237,983
2010	8,392	2,574	158,846	60,624	230,436
2009	7,660	2,126	214,480		224,266

Member Count—Health Care Plans — Traditional Pension Plan and Combined Plan

Year End	Active	Inactive	Retirees & Primary Beneficiaries[1]	Dependents & Other Beneficiaries[1]	Total
2018	N/A	N/A	146,410	31,670	178,080
2017[a]	N/A	N/A	150,363	36,362	186,725
2016[a]	N/A	N/A	153,272	42,230	195,502
2015	N/A	N/A	170,688	52,109	222,797
2014	N/A	N/A	167,327	58,692	226,019
2013	N/A	N/A	165,967	61,041	227,008
2012	N/A	N/A	163,940	62,456	226,396
2011	N/A	N/A	161,315	62,507	223,822
2010	N/A	N/A	157,269	60,624	217,893
2009	N/A	N/A	213,220		213,220

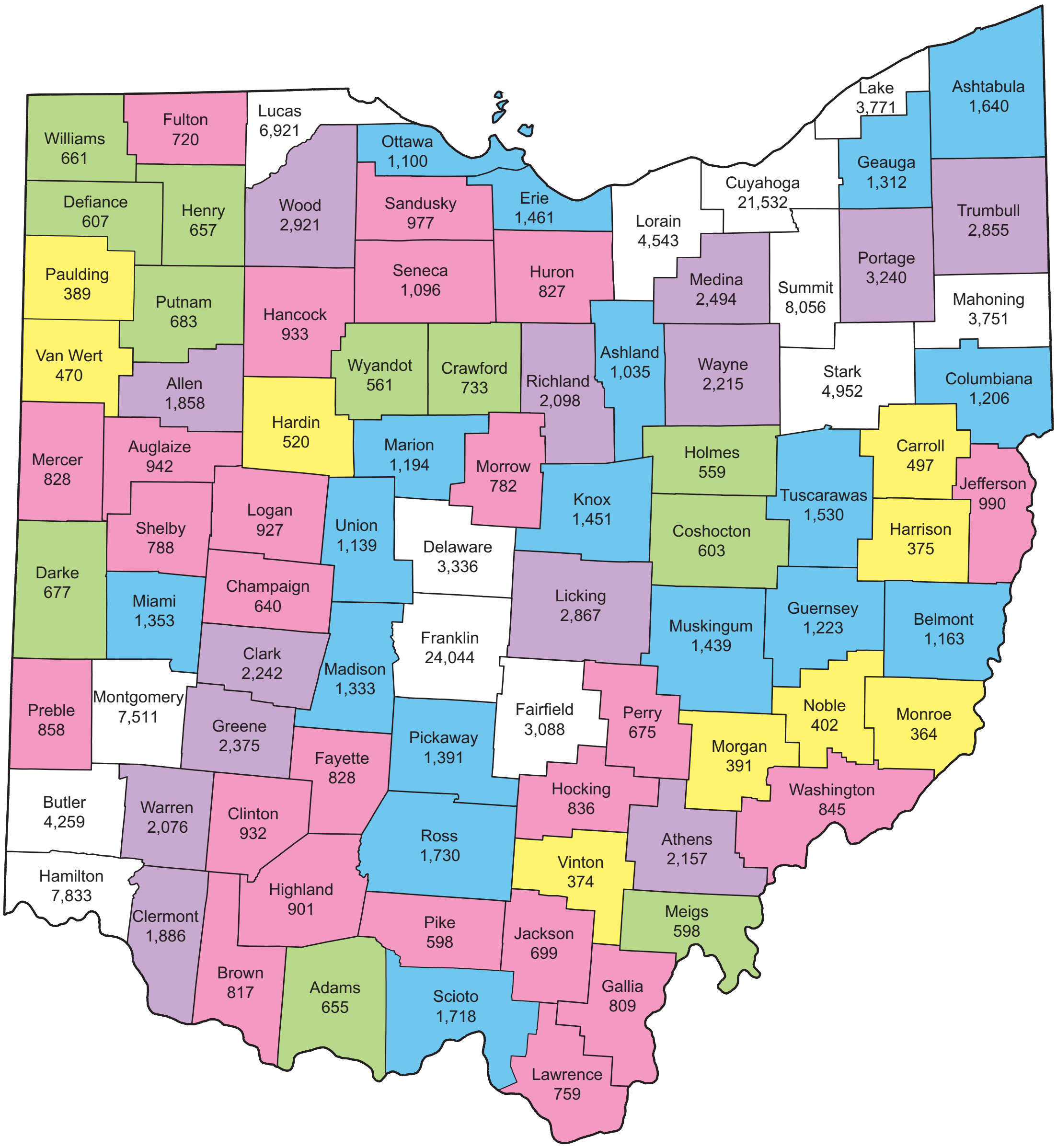
[1] Prior to 2010, Retirees & Primary Beneficiaries was defined as the total number of covered lives.
[a] Restated amounts for Health Care Connector.

Member Counts by Plan (continued)

The Member-Directed Health Care Plan table represents participant counts in this plan for members in the Member-Directed Plan. Contributions are paid into the account during the member's career for use after retirement. The account is in the member's name and can only be used by the member to pay qualified medical expenses for the retiree and eligible family members. (Refer to the Plan Statement beginning on page 217.)

Member Count—Health Care Plans				Member-Directed Health Care Plan
Year End	Active	Inactive	Retiree Recipients	Total
2018	10,976	5,081	6,660	22,717
2017	11,613	4,309	6,203	22,125
2016	11,469	3,976	5,605	21,050
2015	11,235	4,764	4,063	20,062
2014	10,745	4,194	3,509	18,448
2013	9,962	3,543	3,112	16,617
2012	9,501	3,189	2,589	15,279
2011	9,170	2,918	2,073	14,161
2010	8,392	2,574	1,577	12,543
2009	7,660	2,126	1,260	11,046

2018 Pension Benefits and Retirees by Ohio County



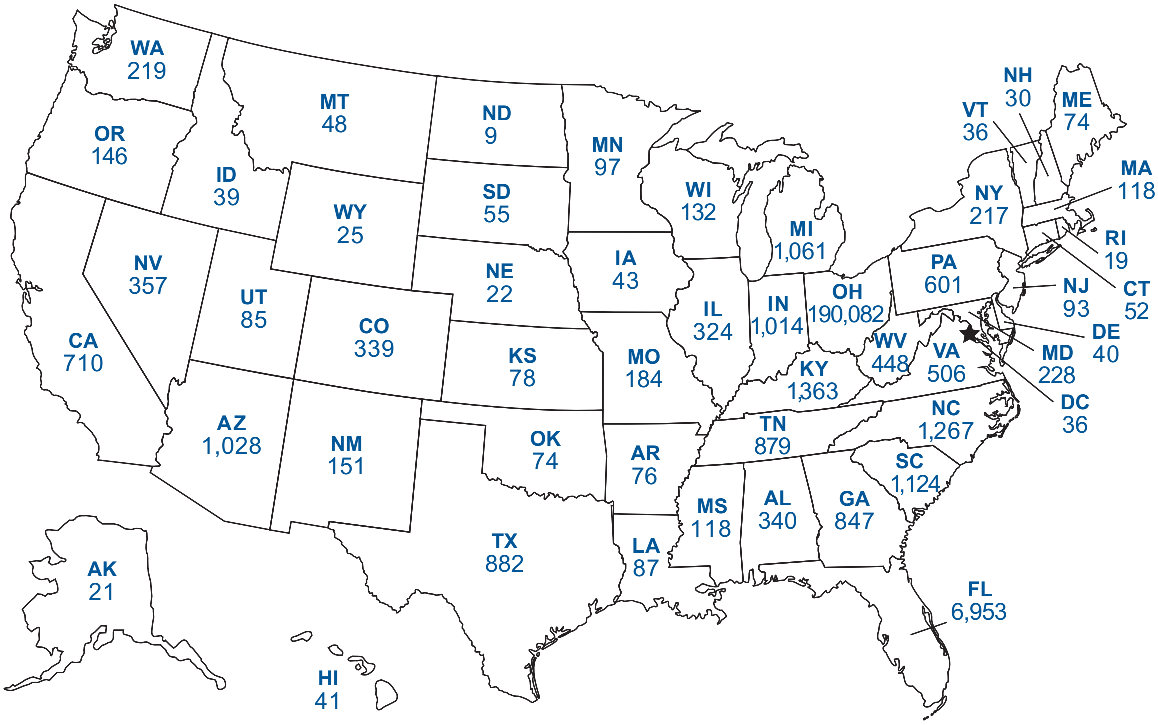
Color Key

$0 - $10 million	Yellow
$10 - $15 million	Green
$15 - $25 million	Pink
$25 - $50 million	Blue
$50 - $100 million	Purple
$100 million +	White

- Of the 212,937 OPERS retirees, 190,082, or 89.3%, remained Ohio residents as of December 31, 2018.
- Pension benefit payments of almost $5.5 billion were distributed throughout Ohio to retirees and their beneficiaries, representing the OPERS impact on the state's economy.

Retirees by Geographical Location (as of December 31, 2018)

Retirees by State



Retirees Outside United States

Armed Forces—Europe	2
Armed Forces—Pacific	5
Australia	2
Bulgaria	1
Canada	21
China	1
Costa Rica	1
Czech Republic	1
England	3
Ethiopia	1
France	4
Germany	2
Greece	2
Hungary	1
Ireland	1
Israel	5
Italy	5
Japan	2
Jordan	1
Latvia	1
Lebanon	1
Lithuania	1
Mexico	1
Northern Ireland	2
New Zealand	2
Northern Mariana Islands	1
Norway	1
Peru	1
Philippines	2
Poland	1
Puerto Rico	20
Scotland	2
Senegal	1
Serbia	1
Singapore	1
Slovakia	2
South Africa	1
Spain	3
Switzerland	1
Thailand	3
Turkey	2
United Kingdom	2
Virgin Islands	4
West Indies	1

Contribution Rates at December 31 — Traditional Pension Plan

	Year	Member Rates	Employer Rates: Normal Cost	Employer Rates: Unfunded Liability	Employer Rates: Health	Total Employer Rates	Total Aggregate Employer and Member Rates
State	2018	10.00%	3.15%	10.85%	0.00%	14.00%	24.00%
	2017	10.00	3.21	9.79	1.00	14.00	24.00
	2016	10.00	3.32	8.68	2.00	14.00	24.00
	2015	10.00	3.31	8.69	2.00	14.00	24.00
	2014	10.00	5.28	6.72	2.00	14.00	24.00
	2013	10.00	5.39	7.61	1.00	14.00	24.00
	2012	10.00	5.36	4.64	4.00	14.00	24.00
	2011	10.00	5.34	4.66	4.00	14.00	24.00
	2010[a]	10.00	5.35	3.65	5.00	14.00	24.00
	2009[b]	10.00	4.89	3.61	5.50	14.00	24.00
Local	2018	10.00%	2.82%	11.18%	0.00%	14.00%	24.00%
	2017	10.00	2.89	10.11	1.00	14.00	24.00
	2016	10.00	2.98	9.02	2.00	14.00	24.00
	2015	10.00	2.98	9.02	2.00	14.00	24.00
	2014	10.00	5.05	6.95	2.00	14.00	24.00
	2013	10.00	5.05	7.95	1.00	14.00	24.00
	2012	10.00	5.05	4.95	4.00	14.00	24.00
	2011	10.00	5.04	4.96	4.00	14.00	24.00
	2010[a]	10.00	5.06	3.94	5.00	14.00	24.00
	2009[b]	10.00	4.46	4.04	5.50	14.00	24.00
Law Enforcement	2018	13.00%	5.23%	12.87%	0.00%	18.10%	31.10%
	2017	13.00	5.34	11.76	1.00	18.10	31.10
	2016	13.00	5.45	10.65	2.00	18.10	31.10
	2015	13.00	5.44	10.66	2.00	18.10	31.10
	2014	13.00	7.18	8.92	2.00	18.10	31.10
	2013	12.60	7.90	9.20	1.00	18.10	30.70
	2012	12.10	8.16	5.94	4.00	18.10	30.20
	2011	11.60	8.43	5.67	4.00	18.10	29.70
	2010[a]	11.10	8.95	3.92	5.00	17.87	28.97
	2009[b]	10.10	9.65	2.48	5.50	17.63	27.73
Public Safety	2018	12.00%	4.07%	14.03%	0.00%	18.10%	30.10%
	2017	12.00	4.16	12.94	1.00	18.10	30.10
	2016	12.00	4.12	11.98	2.00	18.10	30.10
	2015	12.00	3.96	12.14	2.00	18.10	30.10
	2014	12.00	6.12	9.98	2.00	18.10	30.10
	2013	12.00	7.62	9.48	1.00	18.10	30.10
	2012	11.50	7.77	6.33	4.00	18.10	29.60
	2011	11.00	8.32	5.78	4.00	18.10	29.10
	2010[a]	10.50	8.55	4.32	5.00	17.87	28.37
	2009[b]	10.10	8.63	3.50	5.50	17.63	27.73

[a] The health care contribution rate decreased from 5.5% to 5.0%, effective March 1, 2010.
[b] The health care contribution rate decreased from 7.0% to 5.5%, effective April 1, 2009.

continued on page 213

continued from page 212

Contribution Rates at December 31 — Combined Plan

	Year	Member Rates	Employer Rates: Normal Cost	Employer Rates: Unfunded Liability[1]	Employer Rates: Mitigation Rate	Employer Rates: Health	Total Employer Rates	Total Aggregate Employer and Member Rates
State	2018	10.00%	7.52%	4.48%	2.00%	0.00%	14.00%	24.00%
	2017	10.00	7.52	3.98	1.50	1.00	14.00	24.00
	2016	10.00	7.56	3.44	1.00	2.00	14.00	24.00
	2015	10.00	7.54	3.69	0.77	2.00	14.00	24.00
	2014	10.00	6.99	4.24	0.77	2.00	14.00	24.00
	2013	10.00	7.20	5.03	0.77	1.00	14.00	24.00
	2012	10.00	7.18	0.00	0.77	6.05	14.00	24.00
	2011	10.00	7.18	0.00	0.77	6.05	14.00	24.00
	2010[a]	10.00	7.18	1.82	0.77	4.23	14.00	24.00
	2009[b]	10.00	7.21	1.29	0.77	4.73	14.00	24.00
Local	2018	10.00%	7.38%	4.62%	2.00%	0.00%	14.00%	24.00%
	2017	10.00	7.40	4.10	1.50	1.00	14.00	24.00
	2016	10.00	7.42	3.58	1.00	2.00	14.00	24.00
	2015	10.00	7.41	3.82	0.77	2.00	14.00	24.00
	2014	10.00	6.83	4.40	0.77	2.00	14.00	24.00
	2013	10.00	6.87	5.36	0.77	1.00	14.00	24.00
	2012	10.00	6.88	0.30	0.77	6.05	14.00	24.00
	2011	10.00	6.88	0.30	0.77	6.05	14.00	24.00
	2010[a]	10.00	6.87	2.13	0.77	4.23	14.00	24.00
	2009[b]	10.00	6.88	1.62	0.77	4.73	14.00	24.00

[a] The health care contribution rate decreased from 4.73% to 4.23%, effective March 1, 2010.
[b] The health care contribution rate decreased from 5.90% to 4.73%, effective April 1, 2009.
[1] Unfunded Liability includes the impact of defined contribution account purchases of defined benefit annuities.

Contribution Rates at December 31 — Member-Directed Plan

	Year	Member Rates	Employer Rates: Normal Cost	Employer Rates: Unfunded Liability	Employer Rates: Administrative Fee	Employer Rates: Mitigation Rate	Employer Rates: Health[1]	Total Employer Rates	Total Aggregate Employer and Member Rates
State	2018	10.00%	7.50%	N/A	0.50%	2.00%	4.00%	14.00%	24.00%
	2017	10.00	8.00	N/A	0.50	1.50	4.00	14.00	24.00
	2016	10.00	8.50	N/A	0.50	1.00	4.00	14.00	24.00
	2015	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2014	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2013	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2012	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2011	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2010	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2009	10.00	8.73	N/A		0.77	4.50	14.00	24.00
Local	2018	10.00%	7.50%	N/A	0.50%	2.00%	4.00%	14.00%	24.00%
	2017	10.00	8.00	N/A	0.50	1.50	4.00	14.00	24.00
	2016	10.00	8.50	N/A	0.50	1.00	4.00	14.00	24.00
	2015	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2014	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2013	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2012	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2011	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2010	10.00	8.73	N/A		0.77	4.50	14.00	24.00
	2009	10.00	8.73	N/A		0.77	4.50	14.00	24.00

[1] Beginning October 2014, the Board approved the funding of participant Member-Directed Plan health care accounts using the reserves in the Member-Directed Plan health care plan (formerly VEBA Trust) rather than the allocation of employer contributions. Instead, employer contributions were allocated to the Member-Directed Plan through December 31, 2015 to repay the plan start-up and administrative costs. Contributions resumed to the Member-Directed health care plan January 2016.

Number of Employer Units — All Plans[1]

Calendar Year	State	County[2]	Law Enforcement	Municipalities	Villages	Miscellaneous	Libraries	Townships	Totals
2018	247	248	236	242	656	503	253	1,308	3,693
2017	248	233	236	242	658	505	253	1,308	3,683
2016	250	221	235	244	660	507	253	1,308	3,678
2015	260	215	239	244	665	498	253	1,309	3,683
2014	264	217	241	245	667	496	253	1,309	3,692
2013	282	219	244	245	673	494	253	1,308	3,718
2012	271	214	242	245	678	491	253	1,308	3,702
2011	271	211	241	246	675	490	253	1,308	3,695
2010	269	215	241	247	675	491	253	1,308	3,699
2009	270	238	237	248	671	489	253	1,308	3,714

[1] The number of employer units exceeds the number of reporting employers as some employers report multiple divisions or agencies. This count also includes private-sector employers that have assumed privatized functions from public employers for indeterminate periods. The number of employers reporting at December 31, 2018 was 3,221.

[2] Effective January 1, 2010, House Bill 420 transferred authority for managing county law libraries to County Law Library Resource Boards within county governments. This consolidation with county governments resulted in a reduction in the number of individual employer units.

Employer Units

Employers by Employer Unit Ranking	2018			2009		
	Covered Employees	Rank	Percentage of Total System	Covered Employees	Rank	Percentage of Total System
The Ohio State University	33,430	1	11.00%	27,544	1	7.54%
MetroHealth Medical Center	7,556	2	2.48	5,570	8	1.52
Cuyahoga County	7,527	3	2.48	8,970	2	2.46
Franklin County	6,050	4	1.99	6,535	3	1.79
City of Cleveland	5,443	5	1.79	5,992	5	1.64
City of Columbus	5,060	6	1.66	6,056	4	1.66
Ohio Department of Transportation	5,034	7	1.66	5,581	7	1.53
University of Cincinnati	4,135	8	1.36	5,807	6	1.59
Ohio University	4,032	9	1.33	N/A	N/A	N/A
Hamilton County	3,761	10	1.24	4,701	10	1.29
Montgomery County	N/A	N/A	N/A	4,719	9	1.29
All Others (see table on page 215)	221,892	N/A	73.01	283,754	N/A	77.69
Total	**303,920**	**N/A**	**100.00%**	**365,229**	**N/A**	**100.00%**

Principal Participating Employers

Employers by Participating Employer Ranking	2018 Covered Employees	2018 Rank	2018 Percentage of Total System	2009[a] Covered Employees	2009[a] Rank	2009[a] Percentage of Total System
The Ohio State University	33,499	1	11.02%	27,544	1	7.54%
Cuyahoga County	7,712	2	2.54	8,970	2	2.46
MetroHealth Medical Center	7,556	3	2.49	5,570	8	1.52
Franklin County	6,649	4	2.19	6,535	3	1.79
City of Columbus	5,525	5	1.82	6,056	4	1.66
City of Cleveland	5,443	6	1.79	5,992	5	1.64
Ohio Department of Transportation	5,034	7	1.65	5,581	7	1.53
Hamilton County	4,245	8	1.40	4,701	10	1.29
University of Cincinnati	4,194	9	1.38	5,807	6	1.59
Montgomery County	4,083	10	1.34	4,719	9	1.29
All Others (see table below)	219,980	N/A	72.38	283,754	N/A	77.69
Total	**303,920**	**N/A**	**100.00%**	**365,229**	**N/A**	**100.00%**

Employers—All Other Categories[1]

	2018				2009[a]			
	Employer Units		Participating Employers		Employer Units		Participating Employers	
Employer Type	Number	Employees	Number	Employees	Number	Employees	Number	Employees
State	243	59,379	151	64,181	267	83,942	267	83,942
County	244	62,496	115	63,036	233	79,010	233	79,010
Municipalities	240	39,348	233	39,032	246	50,044	246	50,044
Miscellaneous	503	19,628	496	19,525	489	21,130	489	21,130
Libraries	253	12,255	252	12,246	253	13,611	253	13,611
Townships	1,308	9,941	1,307	11,256	1,308	14,491	1,308	14,491
Villages	656	10,677	657	10,704	671	14,115	671	14,115
Law Enforcement/Public Safety	236	8,168	N/A	N/A	237	7,411	237	7,411
Total	**3,683**	**221,892**	**3,211**	**219,980**	**3,704**	**283,754**	**3,704**	**283,754**

[a] The implementation of GASB 67 in 2014 modified the requirements of this schedule. Prior to GASB 67, OPERS reported number of employer units only. Beginning 2014, OPERS changed the presentation to reflect the number of participating employers, which is most associated with the reporting entities. A reporting entity can include multiple employer units. For example, a single reporting entity (a county) may report as three employer units (a county, hospital and law enforcement). The OPERS employer system is dynamic and historical reports based on participating employers by employer type, or reporting entities by employer type, does not exist. As a result, the values for 2009 in this table reflect the number of employers based on employer units.

[1] This table displays additional information on the All Other category in the table above and the table on the previous page. To get the total number of employers reported in the table and related footnote on page 214, combine the numbers in this table with those on page 214 for the employer units (10 plus 3,683 = 3,693 for 2018) and participating employers (10 plus 3,211 = 3,221 for 2018). GASB requires a 10 year look-back to the year being presented. Therefore, information for 2010 through 2017 is not relevant.

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Access to meaningful health care

An ounce of prevention is worth a pound of cure. Similarly, even the best health care program cannot create good health.

The best way to preserve health care programs and your health is to make good decisions—at every stage of your life. All members are encouraged to make lifestyle decisions that provide prevention—meaning decisions designed to ensure good health is preserved and enhanced.

Although health care is neither mandated nor guaranteed, OPERS works to ensure each generation of members have and will have access to affordable health care. Maintaining access to meaningful health care without jeopardizing pension funding is an overarching goal.

Some of the best healthy lifestyle decisions are straightforward:

- **Electronics warning**—Every year, almost 1.6 million people across the U.S. have a cell-phone involved accident. Choose the healthy decision of creating tech-free zones in your home and car—so that you can show up healthy and accident-free wherever your life takes you.
- **To be clear**—There is no safe tobacco. If you smoke, quit; if you don't smoke, don't start. Approximately $132-175 BILLION will be spent on direct medical care for adult smokers. Nearly 70 percent of current smokers' medical care costs could be prevented by quitting smoking.
- **Chronic disease update**—The onset of some chronic diseases can be delayed or eliminated. For example, are you at-risk for diabetes? Losing weight and regular exercise are choices you can make that could significantly reduce your risks.

OPERS

The Ohio Public Employees Retirement System (OPERS or System) was created in 1935 by the Ohio General Assembly to provide retirement, disability, and survivor benefit programs to state and local employees. This summary outlines the plan features; however, it is not a substitute for the state and federal laws that govern OPERS.

All public employees, except those covered by another state retirement system in Ohio or by the Cincinnati Retirement System, are required to become contributing members of OPERS when beginning public employment unless exempted or excluded.

The law provides for optional membership for elected public officials who did not contribute on prior elective service. Students, not already members, working for the public school, college or university they are attending may be exempt from contributing to OPERS by filing a request for exemption within the first month of employment.

OPERS provides special retirement coverage for certain Law Enforcement officers whose primary duties are to preserve the peace, to protect life and property, and to enforce the laws of Ohio. The Law Enforcement division has its own retirement, disability, and survivor benefit eligibility provisions.

Plan Types

For more than 80 years, OPERS has provided members with retirement benefits under a defined benefit plan, known as the Traditional Pension Plan.

In 2000, legislation required OPERS to establish one or more defined contribution plans to be offered to members in addition to the existing Traditional Pension Plan. OPERS began offering three retirement plans to members on January 1, 2003. The plans include the Traditional Pension Plan, the Member-Directed Plan and the Combined Plan. A brief overview of each plan is provided below.

Effective January 7, 2013, legislation modified components of the Traditional Pension and Combined plans. Members were impacted by these changes to varying degrees based on retirement group. Three retirement groups (A, B and C) were designed to ease the transition for key components of the pension plan changes.

- **The Traditional Pension Plan**

  The Traditional Pension Plan is a defined benefit plan under which a member's retirement benefit is based on a formula. The formula is determined by the years of service credit and the average of the three or five (based on retirement group) highest years of eligible salary, referred to as final average salary (FAS). OPERS investment professionals manage the investment of employee and employer contributions to ensure that funds are available to pay the formula benefit.

- **The Member-Directed Plan**

  The Member-Directed Plan is a defined contribution plan under which employee and a portion of the employer contributions are deposited into a member's individual account and the member directs the investment by selecting from professionally managed OPERS investment options. The investment options include six core funds comprised of fixed income and equity funds, 10 target date funds, and a self-directed brokerage account. Members become vested in the employer contributions at a rate of 20% for each year of participation until the member is fully vested at the end of five years. The account value available at retirement is based on employee and vested employer contributions and the investment gains and losses on those contributions.

Plan Statement

- **The Combined Plan**

The Combined Plan is a retirement plan with both a defined benefit and a defined contribution component. The employer contributions fund the defined benefit portion of the Combined Plan. The member's defined benefit retirement component is determined by a formula similar to, but lower than, the Traditional Pension Plan formula. OPERS investment professionals manage the investment of the employer contributions to ensure that funds are available to pay the formula benefit. Under the defined contribution retirement component of the Combined Plan, employee contributions are deposited into the member's individual account and the member directs the investment by selecting from professionally managed OPERS investment options. The investment options include six core funds comprised of fixed income and equity funds, 10 target date funds, and a self-directed brokerage account. The defined contribution account value available at retirement is based on employee contributions and the investment gains and losses on those contributions.

Contributions

Employers are required to make contributions to the System on the basis of a percentage of eligible salary and at a rate based upon the recommendations of the OPERS actuary, subject to the statutory limitations. Penalties and interest are assessed for late payments. The contribution rate for State and Local employers in 2018 was 14.0%. Employers in the Law Enforcement and Public Safety divisions contributed 18.1%.

The 2018 employee contribution rate for State and Local members was 10.0% of eligible salary. Members in the Public Safely division contributed 12.0% of eligible salary, while members in the Law Enforcement division contributed 13.0%. Individual accounts for each OPERS member are maintained and funds contributed by members of the Traditional Pension Plan are fully refundable at service termination or death. The refund value of contributions made by members of the Combined Plan and the Member-Directed Plan are subject to changes (gains or losses) that occur as a result of the member's selected investment options.

Additional Voluntary Contributions

- **The Traditional Pension Plan**

A member or a re-employed retiree who is contributing to a money purchase annuity may deposit additional money or rollover funds (pre- or post-tax) into the Additional Annuity Program. Voluntary after-tax additional annuity deposits are limited by federal tax law to 100% of a member's annual income from all public employers contributing to OPERS or to the current annual IRS limitation, whichever is less. Additional Annuity deposits are invested in the OPERS Stable Value Fund and are subject to daily investment gains and losses. Earnings are tax-deferred until the time of distribution.

Upon termination of employment or retirement, the member may either elect to receive a refund of the account value or an annuity. The annuity program offers the same payment options as those offered for an age-and-service retirement under the Traditional Pension Plan.

- **The Member-Directed Plan and Combined Plan**

Members participating in the Member-Directed or Combined plans may deposit additional money or rollover funds (pre- or post-tax) into their individual defined contribution account. Voluntary after-tax deposits are limited by federal tax law to 100% of a member's annual income from all public employers contributing to OPERS or to the current annual IRS limitation, whichever is less. The additional contributions are invested in the same investment options the member selected for his/her individual defined contribution account, and are subject to investment gains and losses.

Upon termination of employment or retirement, members may elect to receive either a lump-sum refund of the account value or any of the retirement distribution options available to defined contribution accounts.

Benefits under the Traditional Pension Plan or the Combined Plan

Age-and-Service Retirement

In 2012, the Ohio General Assembly enacted into law a number of significant plan design changes that became effective on January 7, 2013. In the legislation, members were categorized into three groups with varying provisions of the new law applicable to each group. Members who were eligible to retire under law in effect prior to the legislation or who will be eligible to retire no later than five years after January 7, 2013, comprise retirement Group A. Members who have 20 years of service credit prior to January 7, 2013, or who will be eligible to retire no later than 10 years after January 7, 2013, are included in retirement Group B. Group C includes those members who are not in either of the other groups and members who were hired on or after January 7, 2013.

Retirement benefits are specific to each plan and members must meet the eligibility requirements based on their age and years of service within the plan. Retirement eligibility also varies by division and retirement group. The charts below show the retirement eligibility requirements for all divisions and retirement groups. The requirements for the State and Local divisions apply to members who participate in either the Traditional Pension Plan or the Combined Plan. The Law Enforcement and Public Safety divisions are only applicable to the Traditional Pension Plan.

Unreduced	Group A		Group B		Group C	
	Age	Service	Age	Service	Age	Service
State/Local	Any	30	52	31	55	32
			Any	32		
	65	5	66	5	67	5
Law Enforcement	48	25	50	25	52	25
	62	15	64	15	64	15
Public Safety	52	25	54	25	56	25
	62	15	64	15	64	15
Law and Public Safety (public safety benefit)	52	25	54	25	56	25

Reduced	Group A		Group B		Group C	
	Age	Service	Age	Service	Age	Service
State/Local	55	25	55	25	57	25
	60	5	60	5	62	5
Law Enforcement	52	15	52	15	56	15
	N/A	N/A	48	25	48	25
Public Safety	52	15	52	15	56	15
	48	25	48	25	52	25
Law and Public Safety (public safety benefit)	48	25	48	25	52	25

Plan Statement

Benefit payments vary in amount depending on years of service credit, FAS, age, and plan of payment selection. FAS is the average of the three highest years of eligible salary for Groups A and B; and the average of the five highest years of eligible salary for members in Group C. The age-and-service formula benefit cannot exceed 100% of FAS (Law Enforcement is 90%), or the limits under Internal Revenue Code Section 415, and may be subject to the contribution-based benefit cap (CBBC). The base benefit amount calculated by the formula will be reduced if a member begins receiving a retirement benefit before he/she reaches the age-and-service requirements for an unreduced benefit.

In the Traditional Pension Plan, the benefit formula for State and Local members in retirement Groups A and B applies a factor of 2.2% to the member's FAS for the first 30 years of service. A factor of 2.5% is applied to years of service in excess of 30. The benefit formula for State and Local members in retirement Group C applies a factor of 2.2% to the member's FAS for the first 35 years of service and a factor of 2.5% is applied to years of service in excess of 35.

In the Traditional Pension Plan, the benefit formula for members in the Public Safety and Law Enforcement divisions applies a factor of 2.5% to member's FAS for the first 25 years of service as a Public Safety or Law Enforcement member. A factor of 2.1% is applied to years of service in excess of 25.

In the Combined Plan, the benefit formula for the defined benefit component of the plan for State and Local members in retirement Groups A and B applies a factor of 1.0% to the member's FAS for the first 30 years of service. A factor of 1.25% is applied to years of service in excess of 30. The benefit formula for retirement Group C applies a factor of 1.0% to the member's FAS and the first 35 years of service and a factor of 1.25% is applied to years in excess of 35. In the defined contribution component of the Combined Plan, the current value of the individual account is available at retirement. The balance can be rolled over to another eligible retirement plan, made payable to the member with taxes withheld, or converted to a lifetime annuity through OPERS, or a combination of the three options.

Beginning January 2013, the CBBC was introduced to reduce the impact of inflating FAS. For purposes of determining the CBBC, the member's accumulated contributions (less any contributions attributed to a non-law annuity) are combined with a portion of employer-paid delinquent contributions, a portion of early retirement incentive plan funding and member contributions used to fund a disability under the original plan, if applicable. The total accumulated member contributions (as calculated in the previous sentence) are multiplied by the OPERS Board of Trustees (Board)–established CBBC factor. The CBBC factor in effect for 2018 was 6.0. The member is eligible for the lesser of an annuity calculated on FAS and years of service credit or the calculated CBBC value. The CBBC applies to all new retirees, with an exception for certain members in Group A. The reduction caused by the CBBC for retirement Group A members may not exceed 5% of the retirement allowance the member would have otherwise received unless, for any full month of service after January 1, 1987, the member's monthly eligible salary was less than $1,000.

Service credit allowed under Chapter 145 of the Ohio Revised Code for retirement eligibility and calculation of a formula benefit includes:

1) Service to the state of Ohio or an Ohio political subdivision for which contributions have been paid;
2) Certain military service that interrupted contributing public service;
3) Any out-of-public service period of three years or less during which the member was receiving an award under the Ohio Bureau of Workers' Compensation;
4) Previously unreported service in Ohio;
5) Service purchased by the member for:
    a) Military service that pre-dates public employment;

   b) Prisoner-of-war service;
   c) An authorized leave of absence that did not exceed one year;
   d) Comparable public service that is not being used for other retirement programs except Social Security, performed outside Ohio or with the federal government, or for which contributions were made to an Ohio municipal retirement system;
   e) Restoration of previously refunded service;
   f) Restoration of previously refunded service from the Ohio Police and Fire Pension Fund, Ohio State Highway Patrol Retirement System, or Cincinnati Retirement System, not being used for any other retirement benefit;
   g) Service that was previously covered by a valid exemption under OPERS;
   h) The amount of 35% additional credit on completed terms of full-time contributing elected official service, or board, commission, or other public body service by members who are appointed by the Governor with the advice and consent of the Senate;
   i) Service purchased in the Combined Plan or the Traditional Pension Plan representing contributing service earned in the Member-Directed Plan or Combined Plan; and,
   j) Restoration of contributing service earned in the Traditional Pension Plan prior to January 1, 2003, that was transferred to the Member-Directed Plan or the Combined Plan at initial plan selection.

6) Service purchased by an employer under a retirement incentive plan.

Beginning 2014, the minimum eligible salary required to earn full-time service was increased to $600 per month, with an index feature that is based on salary increases granted to township trustees. Township trustees received a salary increase in 2017. Beginning January 1, 2017, the minimum eligible salary required to earn full-time service was $630; in 2018, it increased to $660.

A choice of several benefit payment plans is available. The choices include benefits payable throughout the member's lifetime (Single Life Plan) or in a lesser amount during the individual's life but continuing after the member's death to one or more survivors (Joint Life Plan or Multiple Life Plan).

A benefit payable under the Joint Life Plan or the Multiple Life Plan is the actuarial equivalent of the Single Life Plan, but the payment to the member is reduced because it is based on the combined life expectancies of the member and the beneficiary(ies).

The Multiple Life Plan is an option available to members whose retirement is effective on or after November 1, 2006. The payment plan is a multiple joint survivorship annuity providing benefits to the member throughout his/her lifetime, with payments continuing to the member's surviving beneficiaries after the member's death. The member may designate two-to-four beneficiaries, with each receiving at least 10% of the benefit (exceptions are court ordered spousal benefits). Total allocations to all beneficiaries may not exceed 100% of the benefit.

Effective January 1, 2004, OPERS established a partial lump-sum option payment (PLOP) for certain retirees and benefit recipients. The PLOP is an option at retirement that allows a recipient to receive a lump-sum benefit payment along with a reduced monthly retirement allowance. The PLOP cannot be less than six times or more than 36 times the monthly amount that would be payable to the member under the plan of payment selected, and cannot result in a monthly allowance that is less than 50% of that monthly amount. The total amount paid as a lump sum and a monthly benefit is the actuarial equivalent of the amount that would have been paid had the lump sum not been selected.

Disability Benefits

OPERS members are eligible for one of two disability programs: the original plan or the revised plan. Employees who had contributions on deposit with OPERS on July 29, 1992, had a one-time opportunity to select coverage under one of these programs. Employees hired after July 29, 1992, are covered only under the revised plan. A number of features are common to both plans.

A member who has at least five years of service credit in either the Traditional Pension Plan or the Combined Plan and who becomes permanently mentally or physically disabled from the performance of his/her last public position may apply to OPERS for monthly disability benefits. Members in the Law Enforcement or Public Safety divisions may apply for disability at any time if the disabling condition was the result of an on-duty illness or injury. Coverage is limited to illness or injury that occurs before the member's contributing service terminates or, in the case of illness or injury that results from the member's employment, becomes evident no later than two years after the date the contributing service ends. The coverage does not extend to disability resulting from elective cosmetic surgery other than reconstructive surgery.

Application must be made within two years from the date the member's contributing service ended, unless the Board determines that the member was physically or mentally incapacitated for duty and unable to make an application. The member must not be receiving an age-and-service retirement benefit or have received a refund of his/her accumulated contributions. If the Board approves the disability benefit application and the member is otherwise eligible, the benefit is effective the first day of the month following the later of: 1) the last day for which compensation was paid or 2) the attainment of eligibility for the disability benefit. A disability benefit recipient may be required to undergo periodic medical examinations. A disability benefit terminates under either disability plan if the member is no longer disabled, returns to public employment, chooses to begin receiving an age-and-service benefit, or dies.

A new disability standard will be applied to disability recipients (excluding Law Enforcement division disability recipients) whose application for disability was received by OPERS on or after January 7, 2013. Disability benefit recipients will be evaluated under an own-occupation standard (at the time of application and for the first three years of disability). This time period may be extended from three years to five years, if the recipient is receiving rehabilitative services acceptable to a physician selected by the Board. The own-occupation standard requires the benefit recipient to be physically or mentally incapable of performing the duties of his/her last public position. Subsequent to the three-year or five-year period, the benefit recipient is evaluated under an any-occupation standard. The any-occupation standard for terminating a benefit requires the benefit recipient to be physically or mentally incapable of performing the duties of any position that meets the following criteria:

1) Replaces at least 75% of the recipient's inflation-adjusted FAS;
2) Can reasonably be found in the recipient's regional job market; and
3) The recipient is qualified to perform based on the recipient's experience or education.

Members covered under the original plan must apply for disability benefits prior to turning age 60 (or age 62 for members in retirement Group C). Under the original plan, the amount of the disability allowance is based on the member's FAS and total service credit, plus the length of time between the effective date of disability and age 60 (or 62). The disability benefit cannot exceed 75%, nor be less than 30%, of the member's FAS. The disability benefit continues for the member's lifetime as long as the qualifying disability persists. The benefit is funded by the employee's accumulated contributions and reserves accumulated from employer contributions. The benefit is fully taxable until age 60 (or 62), after which a specified dollar amount each month, representing the return of previously taxed contributions, is tax-free. For a Law Enforcement member disabled due to an on-duty injury or illness, 30% of the benefit payment is excludable from taxable income.

Under the revised plan, the disability allowance is based on the member's FAS and service credit. The disability benefit cannot be less than 45%, or exceed 60%, of the member's FAS. The benefit is funded by reserves accumulated from employer contributions, and is fully taxable. For a Law Enforcement member disabled due to an on-duty injury or illness, 45% of the benefit payment is excludable from taxable income.

Benefits under the revised plan are payable for only a finite period of time, depending on the member's age on the benefit effective date. When the disability benefit ends, the member may apply for a service retirement benefit or a refund of his/her account. The service retirement benefit amount is the greater of: a) 2.2% of FAS multiplied by the years of service (contributing and disability) not to exceed 45% of FAS; or b) the regular or Law Enforcement benefit calculation using only the member's years of contributing service.

The disability benefit for Combined Plan members is calculated using the same formulas and criteria described above. Combined Plan members are required to transfer their individual defined contribution accounts to the Traditional Pension Plan to fund the benefit.

Members who apply for a disability benefit on or after January 7, 2013, are required to apply for Social Security Disability Insurance (SSDI). If a member is determined to be eligible for SSDI benefit, he/she may be subject to an offset to the extent that the member's OPERS disability benefit plus the SSDI benefit exceed the member's FAS, adjusted for inflation. The offset does not apply to a disability recipient who is a Law Enforcement member or who has at least five years of service credit for periods during which the recipient had earnings from other employment that were taxable under the Federal Insurance Contributions Act.

Survivor Benefits

A member's beneficiary is determined by statutory automatic succession unless a specific designation is made in writing on a form provided by OPERS. Listed below is the order of automatic succession under Ohio law:

1) Spouse,
2) Children,
3) Dependent parents,
4) If none of the above, parents share equally in a refund of the account; and
5) If none of the foregoing, a refund of the account is paid to the estate.

Qualified beneficiaries will be eligible to receive monthly survivor benefits if, at the time of the member's death, at least one of the following qualifications was met:

1) The member had 18 months of Ohio service credit with three of those months within the two and one-half years immediately before death; or
2) The member was receiving a disability benefit from OPERS; or
3) The member was eligible for retirement but did not retire.

If none of these qualifications was met at the member's death, a refund of the member's OPERS account value as defined by the Ohio Revised Code may be made. The member's beneficiary may choose a refund of the member's account only if no children are eligible for monthly benefits. If the member dies while receiving a disability benefit under the original plan and eligible survivors select a cash refund of the account, the amount is reduced by the amount of disability benefits that had already been paid. There is no reduction in amount if the member dies while receiving a benefit under the revised disability plan or while still working.

Qualified surviving spouses (with no children eligible for monthly benefits) may receive a benefit representing the greater of $250 a month or an annual benefit equal to 25% of the decedent's FAS. If the decedent had 20 or more years of service, the percent of FAS increases with each year of service over 20 up to a maximum of 60%. Benefits begin when a qualified surviving spouse reaches age 62, or at any age if the decedent had 10 or more years of Ohio service credit, qualifying children, or the spouse is adjudged physically or mentally incompetent. Benefits to a qualified survivor terminate when the survivor ceases to meet eligibility requirements.

If a deceased member was eligible for a service retirement benefit at time of death, a surviving spouse or other sole dependent beneficiary may elect to receive a monthly benefit calculated as though the member had retired and elected the Joint Life Plan with 100% to the survivor. This joint survivor option provides a monthly allowance that continues through the beneficiary's lifetime. The beneficiary also has the option of electing a PLOP.

A child of a deceased member may qualify for monthly benefits if the child has never been married and is under age 22. A child who is adjudged physically or mentally incompetent at the time of the member's death is eligible for benefits regardless of age. Benefits terminate upon the child's first marriage, adoption by someone other than a step-parent, abandonment, death, or during active military service.

A dependent parent is one who received at least one-half support from the member during the 12 months preceding the member's death. A dependent parent may receive survivor benefits if age 65 or older, or at any age if adjudged physically or mentally incompetent at the time of the member's death. Survivor benefit payments terminate upon the parent's death.

The eligible survivors of Combined Plan members may elect to receive monthly survivor benefits. The survivor benefit is calculated using the same formulas and criteria described above, and the member's defined contribution account is transferred to the Traditional Pension Plan to fund the benefit.

Additional Benefits

Cost-of-Living Adjustment

When a benefit recipient has received benefits for 12 months, current law provides for an annual cost-of-living adjustment. This cost-of-living adjustment is calculated on the base retirement benefit at the date of retirement and is not compounded. For those who retired prior to January 7, 2013, current law provides that the cost-of-living adjustment is 3%. For those retiring subsequent to January 7, 2013, beginning in calendar year 2019, current law provides that the cost-of-living adjustment will be based on the average percentage increase in the Consumer Price Index, capped at 3%.

Death Benefit

Upon the death of an age-and-service or disability benefit recipient, a lump-sum death benefit is paid to the qualified beneficiary. The benefit ranges from $500 to $2,500 based on the recipient's years of service credit.

Qualified Excess Benefit Arrangement

Total benefit payments to an individual are subject to the limitations identified in Section 415(b) of the Internal Revenue Code. In 2003, OPERS implemented a Qualified Excess Benefit Arrangement (QEBA) that allows OPERS recipients to receive the amount of their benefit that is subject to the IRS limits.

Refunds

A refund may be issued after two months have elapsed since the member terminated public service. For members of the Traditional Pension Plan, the refund value is equal to their member contributions plus interest. Members of the Combined Plan may refund their defined contribution account balance comprised of member contributions and investment gains or losses on those contributions, and any member contributions plus interest in the defined benefit portion of the plan arising from the purchase of eligible service. Members of the Traditional Pension Plan and the Combined Plan may also qualify for an additional amount calculated on their eligible contributions. If the member has at least five but less than 10 years of qualified service credit in the plan, the additional amount is 33% of the member's eligible contributions. Members with at least 10 years of qualified service credit in the plan may receive an additional amount equal to 67% of eligible contributions.

Under the Traditional Pension Plan, full recovery of all employee contributions to OPERS is guaranteed. If the individual is eligible for a monthly retirement benefit and is legally married at the time the refund application is filed, spousal consent is required. A Traditional Pension Plan member who is also a member of the State Teachers Retirement System of Ohio or the School Employees Retirement System of Ohio is not required to refund from all systems at the time the member seeks a refund from OPERS.

Refunded service credit may be restored in the Traditional Pension Plan and the Combined Plan if the member returns to OPERS-covered employment for at least 18 months in the plan from which the refund was issued. The amount refunded, including interest and the additional amount (if applicable), must be repaid for service credit to be restored. The member must also pay interest (compounded annually) at a rate determined by the Board for the period from the date of refund to the date the refunded amount is repaid.

Benefits under the Member-Directed Plan

Retirement

Members participating in the Member-Directed Plan are eligible to retire after they reach age 55. The current vested value of the individual account is available at retirement. The balance can be converted to a lifetime annuity through OPERS; or a portion of the balance can be converted to an annuity through OPERS and the remainder can be rolled over to another eligible retirement plan or made payable to the member with taxes withheld.

Disability and Survivor Benefits

Participants in the Member-Directed Plan are not eligible for disability or survivor benefits. In the event of disability or death, the vested portion of the member's individual account is available for refund to the member or qualified beneficiaries.

Refunds

A refund may be issued after two months have elapsed since the member terminated public employment. Members participating in the Member-Directed Plan may receive employee contributions and investment gains or losses on those contributions. Depending on length of participation in the Member-Directed Plan, a member may also receive a portion of the employer contributions, plus any investment gains or losses on those contributions, based on the schedule below.

Years of Participation	Percent Vested
Less than 1 year	0%
1 year	20%
2 years	40%
3 years	60%
4 years	80%
5 or more years	100%

Coverage and Benefits for Re-employed Retirees

After a member retires, re-employment in an OPERS-covered job, including service in an elected position, is permitted but may affect continuing receipt of an age-and-service retirement benefit. Contributions must begin from the first day of re-employment. However, members who are re-employed anytime within the first two months after their effective retirement benefit date will forfeit their retirement benefit during this two-month period. This prohibition applies even if salary is waived for the two-month forfeiture period. OPERS health care coverage is also not available during any period of pension forfeiture, and contributions remitted during the two-month forfeiture period will not be included in the calculation of a Money Purchase Plan benefit.

An OPERS retiree who returns to work in an OPERS-covered position must enroll in the employer's health care plan if the employer offers a plan to other employees in similar positions. After the two-month forfeiture period, the retiree may continue his/her participation in an OPERS health care plan. The coverage provided by the employer plan is primary and the OPERS coverage is secondary. Federal law prohibits retirees from being covered by the OPERS health care plans as secondary coverage if the retiree is enrolled in a high deductible health plan and a health savings account. If the OPERS retiree is over age 65 and employer-sponsored coverage is not available, the retiree may elect to participate in the OPERS-sponsored coverage offered to re-employed retirees. Their health reimbursement arrangement (HRA) allowance deposit is suspended during the period of re-employment. The HRA was established for the OPERS Medicare Connector. Refer to the Health Care Coverage for Traditional Pension Plan and Combined Plan section below for more information on the OPERS Medicare Connector.

Retirees cannot continue to receive benefits and work as an independent contractor under a contract for any period of time for the employer from which they retired. This prohibition is applicable regardless of the number of hours or days actually worked. A retiree may be compensated under a contract for services as an independent contractor for another public employer. If this occurs within the first two months of retirement, he or she will forfeit pension benefits for the entire period of service as an independent contractor.

During re-employment, the retiree participates in the Money Purchase Plan. Upon termination of re-employment, retirees under age 65 may receive a refund of their Money Purchase account consisting of their employee contributions made during the period of re-employment, plus interest. Retirees age 65 and older may receive an annuity benefit that is based on the amount of their employee contributions during the period of re-employment plus interest, and an amount from the employer's contributions established by the Board. The additional amount paid from employer contributions is currently set at 67% of the employee contributions and interest. Payment options are the same as those described under the Age-and-Service Retirement section.

Health Care Coverage for Traditional Pension Plan and Combined Plan

With one exception, OPERS-provided health care coverage is neither guaranteed nor statutorily required. Ohio law currently requires Medicare Part A equivalent coverage or Medicare Part A premium reimbursement for eligible retirees and their eligible dependents.

Eligibility

Members who applied for age-and-service retirement with effective dates of December 1, 2014, or earlier, and who had 10 or more years of service credit, had access to OPERS-provided health care coverage on a subsidized basis. Beginning January 1, 2015, members must be at least age 60 with 20 years of qualifying service. Members in Group A are eligible for coverage at any age with 30 or more years of qualifying service. Members in Groups B and C are eligible for coverage at any age with 31 and 32 years of qualifying service, respectively. See the Age-and-Service Retirement section beginning on page 220 for a description of Groups A, B and C.

Qualifying service credit for determining eligibility to participate in the health care plans includes the following types of credit: contributing service, other Ohio retirement system service transfers, interrupted military (USERRA), unreported time, and restored (refunded) service. Beginning January 1, 2014, contributing service credit for health care will be accumulated only if the member's eligible salary is at least $1,000 per month. Partial health care credit will not be granted for months in which eligible salary is less than $1,000. Credit earned prior to January 2014 will not be affected by this requirement.

In addition to retirees, access to health care coverage is also available for disability recipients and survivor recipients. Spouses and dependents of eligible recipients, as defined in rules governing the health care plans, may be covered through additional premiums.

Recipients of disability benefits prior to January 1, 2014 have continued access to health care coverage while the disability benefit continues and will not be subject to the five-year rule described below. The allowance will be determined in the same way as an age-and-service retiree. If the recipient does not meet minimum age-and-service requirements, the minimum allowance will be used. Recipients with an initial disability effective date on or after January 1, 2014 will have coverage during the first five years of disability benefits. After five years, the recipient must meet minimum age-and-service health care eligibility requirements or be enrolled in Medicare (due to disability status) to remain enrolled in OPERS health care. If enrolled, the allowance will be determined in the same way as an age-and-service retiree.

Coverage Options

Currently, Medicare eligible retirees are able to select medical and prescription drug plans from a range of options and may elect optional vision and dental plans. Retirees and eligible dependents enrolled in Medicare Parts A and B have the option to enroll in a Medicare supplement plan with the assistance of the OPERS Medicare Connector. The OPERS Medicare Connector is a relationship with a vendor selected by OPERS and tasked with assisting retirees, spouses and dependents with selecting a medical and pharmacy plan. Monthly allowances, based on years of service and the age at which the retiree first enrolled in OPERS coverage, are deposited into an HRA.

For non-Medicare retirees and eligible dependents, OPERS sponsors medical and prescription coverage through a professionally managed self-insured plan. An allowance to offset a portion of the monthly premium is offered to retirees and eligible dependents. The allowance is based on the retiree's years of service and age when they first enrolled in OPERS coverage.

Medicare-eligible retirees who choose to become re-employed or survivors who become employed in an OPERS-covered position are prohibited from participating in an HRA by federal law. For this group of retirees, OPERS sponsors secondary coverage through a professionally managed self-insured program. Retirees who enroll in this plan are provided with a monthly allowance to offset a portion of the monthly premium. Medicare-eligible spouses and dependents can also enroll in this plan as long as the retiree is enrolled.

A monthly allowance for health care coverage for retirees and their eligible dependents is provided by OPERS. The base allowance is determined by OPERS. For those retiring on or after January 1, 2015, the allowance provided is based on years of qualifying service credit and age when the retiree first enrolled in OPERS health care. Monthly allowances range between 51% and 90% of the premium base. Those who retired prior to January 1, 2015, with an allowance at or above 75%, will have an allowance of at least 75%. Members retiring at any age with 30 or more years (based on retirement group) of qualifying service have at least a 71% allowance.

While spouses have access to health care, the allowances for spouses have been phased out. Spouses who are not Medicare-eligible currently have access to OPERS group coverage at full cost. Spouses who are Medicare-eligible have access to the OPERS Medicare Connector also at full cost. If the retiree has at least 20 years of qualifying service and is enrolled in OPERS health care, children (up to age 26) will receive half of the retiree's allowance percentage.

Medicare Part A

OPERS reimburses retirees who do not have premium-free Medicare Part A (hospitalization) for their Part A premiums as well as any applicable surcharges (late-enrollment fees). Retirees within this group must enroll in Medicare Part A and select medical coverage, and may select prescription coverage, through the OPERS Medicare Connector. OPERS also will reimburse 50 percent of the Medicare Part A premium and any applicable surcharges for eligible spouses. Proof of enrollment in Medicare Part A and confirmation that the retiree is not receiving reimbursement or payment from another source must be submitted. The premium reimbursement is added to the monthly pension benefit.

Medicare Part B

When they become eligible, recipients and their covered dependents enrolled in OPERS health care must enroll in Medicare Part B (medical) to participate in a plan sponsored by OPERS.

Low Income Discount

Recipients not yet eligible for Medicare with household income at or below 200% of the poverty level may apply for a 30% reduction in the cost of medical and pharmacy premiums. In 2017, OPERS expanded the low-income discount policy for surviving spouses. Surviving spouses enrolled in Medicare Parts A and B meeting the income requirements of the program are eligible to continue receiving a 2018 spousal HRA allowance for health care in 2019. Recipients who may be eligible for the discount or the HRA allowance are required to provide proof of income and re-apply each year.

Dental and Vision Coverage

Recipients and dependents also have access to dental and vision coverage. These are fully insured products with the benefit recipient paying the total cost of coverage, including premiums, plan deductibles, and out-of-pocket expenses.

Health Care for Member-Directed Plan Participants

Members participating in the Member-Directed Plan have a portion of the employer contribution credited to an individual retiree medical account. Beginning January 1, 2017, interest on the accounts will accrue only if the investment Health Care portfolio earns a return greater than zero in the prior year. Members with an account prior to July 1, 2015 become vested in the account at a rate of 20% for each year of participation until the member is fully vested at the end of five years. For members establishing accounts on or after July 1, 2015, the vesting schedule is below. Upon a refund or retirement, distribution of the vested balance in the member's account may be used for the reimbursement of qualified medical expenses.

Years of Participation	Percent Vested
0-5 years	0%
6 years	10%
7 years	20%
8 years	30%
9 years	40%
10 years	50%
11 years	60%
12 years	70%
13 years	80%
14 years	90%
15 years	100%

Note: The information contained in this section is intended to be a summary only. Complete pension and health care details can be obtained through OPERS. This document reflects information as of the date listed and approved changes. All plans are subject to change. Health care is not a statutorily guaranteed benefit. As such, the Board has the discretion to review, rescind or modify the health care plans at any time. There is no promise, guarantee, contract, or vested right to health care coverage or an allowance.