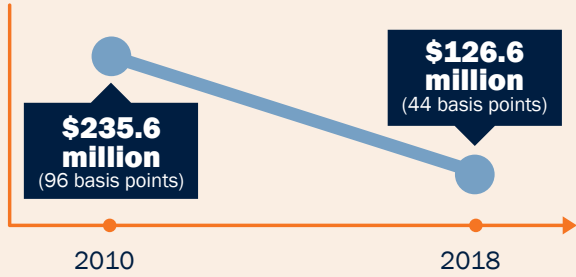


### SERS decreased manager investment expenses



In 2018  
SERS retired  
**4,680**  
members  
and welcomed  
**11,257**  
new members

SERS paid nearly  
**\$3.4 billion**  
in benefits in 2018

**41%** of SERS active employees belong to post-Act 120 classes of service

### As of Dec 31, 2018 SERS had

**103,147**  
active members

**131,007**  
annuitants

### 2018 Contributions to the SERS Fund

**\$394 million**  
members contributed

**\$2.2 billion**  
employers contributed

### Total FY 19/20 Spending Request



**\$34.4 million**

\$1.5 million

directed commissions

**\$20.0 million**  
personnel

**\$15.6 million**  
operations

**\$0.3 million**  
fixed assets

Samples from operations =

- IT consulting-system upgrade **\$4.3 million**
- real estate **\$2.1 million**
- treasury services **\$1.5 million**
- postage **\$0.7 million**
- legal services **\$0.6 million**
- office equipment **\$0.2 million**

### SERS average active member

**46** years old

**12** years of service

### SERS average retired member

**72** years old

receives  
**\$28,880**  
per year

Global Public Equity  
**-10.3%**

Private Equity  
**11.7%**

Cash  
**2.1%**

Legacy Hedge Funds  
**-13.7%**

Real Estate  
**-1.3%**

Fixed Income  
**-0.9%**

In 2018  
the SERS  
fund returned  
**-4.3%**  
(unaudited)

Data throughout is estimated/unaudited

# SERS 2019 Supplemental Budget Book

January 31, 2019

Honorable Stan Saylor  
Majority Chairman  
House Appropriations Committee  
245 Main Capitol  
Harrisburg, PA 17120-2094

Honorable Matt Bradford  
Democratic Chairman  
House Appropriations Committee  
512 E. Main Capitol  
Harrisburg, PA 17120-2070

Gentlemen and Members of the Appropriations Committee:

On behalf of the State Employees' Retirement System (SERS), I am pleased to provide you with the enclosed detailed information concerning SERS operations, investments, and request for spending authority. We trust the information provided within will be useful in your deliberations related to the development and passage of the FY 2019-20 commonwealth budget.

For FY 2019-20, SERS proposes a \$30.5 million spending authority, which is drawn from SERS funds, not general government operating accounts and \$3.8 million, which is expected to be appropriated from non-SERS funds, for the new defined contribution plan.

This year SERS will serve approximately 240,000 active, vested, and retired members. The average retiree who has worked to full retirement age received an average annual annuity of \$28,880. The system paid out nearly \$3.4 billion dollars in 2018, of which approximately \$3.1 billion – approximately 91% – was paid to members who live within Pennsylvania.

In 2018, SERS experienced an estimated investment loss of 4.3%, due in large part to the high level of market volatility that occurred throughout the year, but especially during the fourth quarter. The impact was felt across the globe. During 2018, the Dow Jones Average fell 5.6%. The S&P 500 was down 6.2% and the Nasdaq fell 3.9%. Globally, the FTSE All-World index, which tracks thousands of stocks across a range of markets, fell 11.3% in 2018 – the index's worst performance since the global financial crisis, and a sharp reversal from its nearly 25% gain in 2017. In short, it was a challenging year.

Even in the face of such economic challenges, SERS continues to strive to improve services to our stakeholders, as well as improving efficiencies in the delivery of benefits and reducing cost in the administration of the system to our employers. Reducing investment fees has been an ongoing goal for SERS. Since 2010, we have reduced fees and expenses for our investment program by more than \$109 million.

During 2018, SERS also provided information and testimony to the Public Pension Management and Asset Investment Review Commission, which was created as a result of Act 2017-5 for the purpose

of studying, identifying and recommending ways the Commonwealth's public pension funds might improve their processes in regard to transparency, investment strategies and performance, stress testing and more. The SERS board is currently reviewing more than 100 specific recommendations that were identified in the commission's final report. We look forward to working with the general assembly to review and act upon their recommendations.

Act 2017-5 also resulted in a number of important fundamental changes to the retirement options for most new hires beginning January 1, 2019. For most new members, this legislation establishes two hybrid defined benefit/defined contribution tiers and a straight defined contribution plan. In addition to new hires, current members will have the opportunity to opt-in between January 1, 2019, and March 31, 2019. During the second half of 2018, SERS staff worked hard to develop communications programs to educate members about their choices, and we are working with them now to provide guidance and support as they make their selections.

Members can be assured that their retirement system is administered well, and that staff carefully manages the funds entrusted to the Board.

We continue to value our commitment to our members and the taxpayers of Pennsylvania to employ a prudent investment policy to ensure that meaningful retirement benefits are available to those employees who have served the people of Pennsylvania. It has been, and will continue to be, our honor to do so with the help and support of the members of this committee, as well as the entire general assembly. SERS budget hearing before the House will be February 12th at 10:00 a.m. If you have questions, comments, or concerns before then, please do not hesitate to call.

Sincerely,



David R. Fillman  
Chairman

# SERS 2019 SUPPLEMENTAL BUDGET BOOK

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# SERS Organization

# SERS ORGANIZATION

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## Mission, Vision & Guiding Principles

Established in 1923, SERS is one of the nation's oldest and largest statewide retirement plans for public employees, with approximately 240,000 members. SERS is among the largest of public and corporate pension funds, with assets of approximately \$26.8 billion as of December 31, 2018.

SERS is responsible for administering the State Employees' Retirement Code in accordance with the expressed intent of the General Assembly and bears a fiduciary obligation to plan beneficiaries, including state employees and retirees.

State law provides that the administration of the SERS Fund and the fiduciary responsibility for its management be vested in an 11-member board. The management of SERS is the responsibility of the executive director who, with the approval of the board, contracts for professional services and employs the staff needed to operate the system.

### Mission

The mission of SERS is to provide retirement benefits and services to our members through sound administration and prudent investments.

### Vision

SERS vision is to navigate organizational, fiscal, and legislative challenges so that SERS continues to progress toward fully-funded status while enhancing and sustaining effective and responsive member services.

### Guiding Principles

- Demonstrate Integrity
- Develop and Empower Employees
- Focus on Customer Service
- Fulfill Fiduciary Obligations
- Lead Innovation and Improvement
- Learn from Mistakes
- Safeguard Information, Facilities, and Staff
- Share Knowledge
- Think Strategically

# SERS ORGANIZATION

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## Services & Operations

The approximately 200 employees who work for the State Employees' Retirement System share a singular focus: serving SERS members. Some SERS employees serve members by investing and overseeing approximately \$26.8 billion. Other SERS employees serve members by ensuring that every monthly payment is made correctly and on time. Still others audit and account for each penny, provide online information, or answer members' questions in person or over the phone.

Some work is behind-the-scenes, while other work touches members more directly. Examples of services offered to active and vested members include:

- Issuing annual statements of account
- Offering individual and group educational sessions about retirement benefits
- Helping with the purchase of service, change of beneficiaries, etc.
- Calculating retirement, disability, and vesting estimates
- Providing one-on-one counseling for those leaving state service
- Walking members step-by-step through their retirement experience

Examples of services offered to retired members include:

- Issuing annual statements of account and tax forms
- Providing income tax withholding, direct deposit, address change, and other forms, as requested, as well as assistance in filling out and submitting forms, as needed
- Processing changes to retiree health coverage
- Helping members understand implications of and, if necessary, effecting pension changes related to marriage, divorce, or death
- Tracking and reissuing payments, if necessary
- Assisting spouses, children, and other survivors upon the death of a SERS member

# SERS ORGANIZATION

## Services & Operations

Approximately a quarter of SERS employees are wholly dedicated to direct member services through a network of field offices statewide, including:

**Bensalem Regional Counseling Center.** Serving retired members who live and active members who work in Berks, Bucks, Chester, Delaware, Lancaster, Montgomery, and Philadelphia counties.

**Harrisburg Regional Counseling Center.** Serving retired members who live and active members who work in Adams, Cumberland, Dauphin, Lebanon, Perry, and York counties.

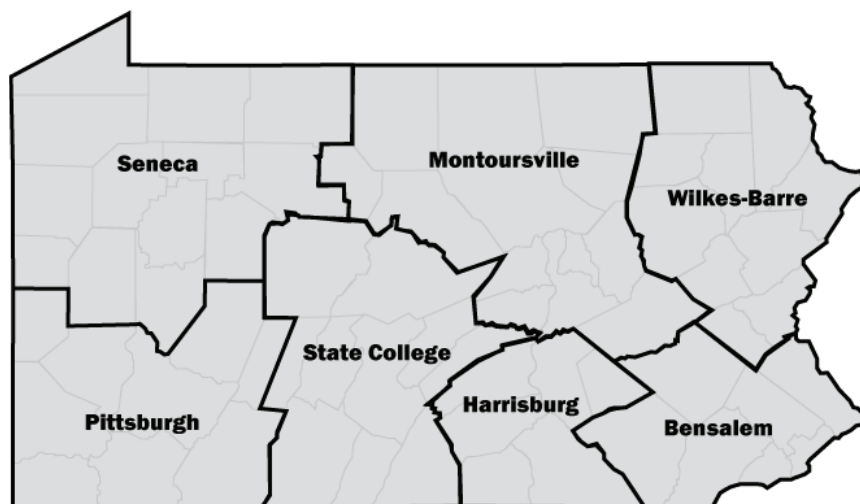
**Montoursville Regional Counseling Center.** Serving retired members who live and active members who work in Bradford, Cameron, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Schuylkill, Snyder, Sullivan, Tioga, and Union counties.

**Pittsburgh Regional Counseling Center.** Serving retired members who live and active members who work in Allegheny, Beaver, Western Cambria, Fayette, Greene, Indiana, Somerset, Washington, and Westmoreland counties.

**Seneca Regional Counseling Center.** Serving retired members who live and active members who work in Armstrong, Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, and Warren counties.

**State College Regional Counseling Center.** Serving retired members who live and active members who work in Bedford, Blair, Eastern Cambria, Centre, Clearfield, Franklin, Fulton, Huntingdon, Juniata, and Mifflin counties.

**Wilkes-Barre Regional Counseling Center.** Serving retired members who live and active members who work in Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Susquehanna, Wayne, and Wyoming counties.





# SERS ORGANIZATION

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## Services & Operations

To achieve its mission overall, SERS is organized into the following business units.

The **executive office** provides strategic leadership and administrative oversight of agency operations. It directly serves the State Employees' Retirement Board, including facilitating communications, and managing meetings and documentation. The communications and policy office, a component of the executive office, works with the General Assembly on policy-related matters; administers the agency's right-to-know program; serves as liaison to the media; and offers an array of communications support to the agency.

The **office of member services** provides direct assistance to SERS active, vested, and retired members as well as their families. It conducts individual and group educational sessions statewide. The office also supports SERS employers and processes member enrollments, retirements, status changes, payments, and a host of other transactions.

The **investment office** works closely with the State Employees' Retirement Board to oversee investments in SERS defined benefit, deferred compensation, and defined contribution plans. The office establishes and implements investment policies; sets the strategic asset allocation; monitors fund cash flow, investment managers, fund risks, and performance; and researches and recommends investment opportunities. The office also maintains deep and current expertise related to the analysis of capital and global markets.

The **office of finance and administration** maintains accounting controls and oversees all SERS funds. It administers all transactions including, for example, member payments; member and employer contributions; investment purchases and sales; and operational expenses and budgeting. The office also manages facilities and procurement, and oversees the accounting and financial reporting for the deferred compensation and defined contribution plans.

The **internal audit division** tests business processes and internal controls to confirm that they are adequate and operating properly to ensure vigilant stewardship of SERS funds. It performs on-site audits of investment consultants and managers, as deemed necessary. The division also coordinates independent, external audits of SERS on an annual basis and performs special projects at the direction of the State Employees' Retirement Board and audit committee.

The **legal office** advises the State Employees' Retirement Board on matters related to member appeals and administrative hearings, securities actions and litigation matters, the administration of the Commonwealth of Pennsylvania Deferred Compensation Program and State Employees' Defined Contribution Plan, and other general legal issues for which the board requests advice. In addition, the office reviews, negotiates, assists in drafting, and finalizes all investment contracts, as well as other general business contracts. The office also provides legal support related to legislative drafting, right-to-know requests, and member transactions.

# SERS ORGANIZATION

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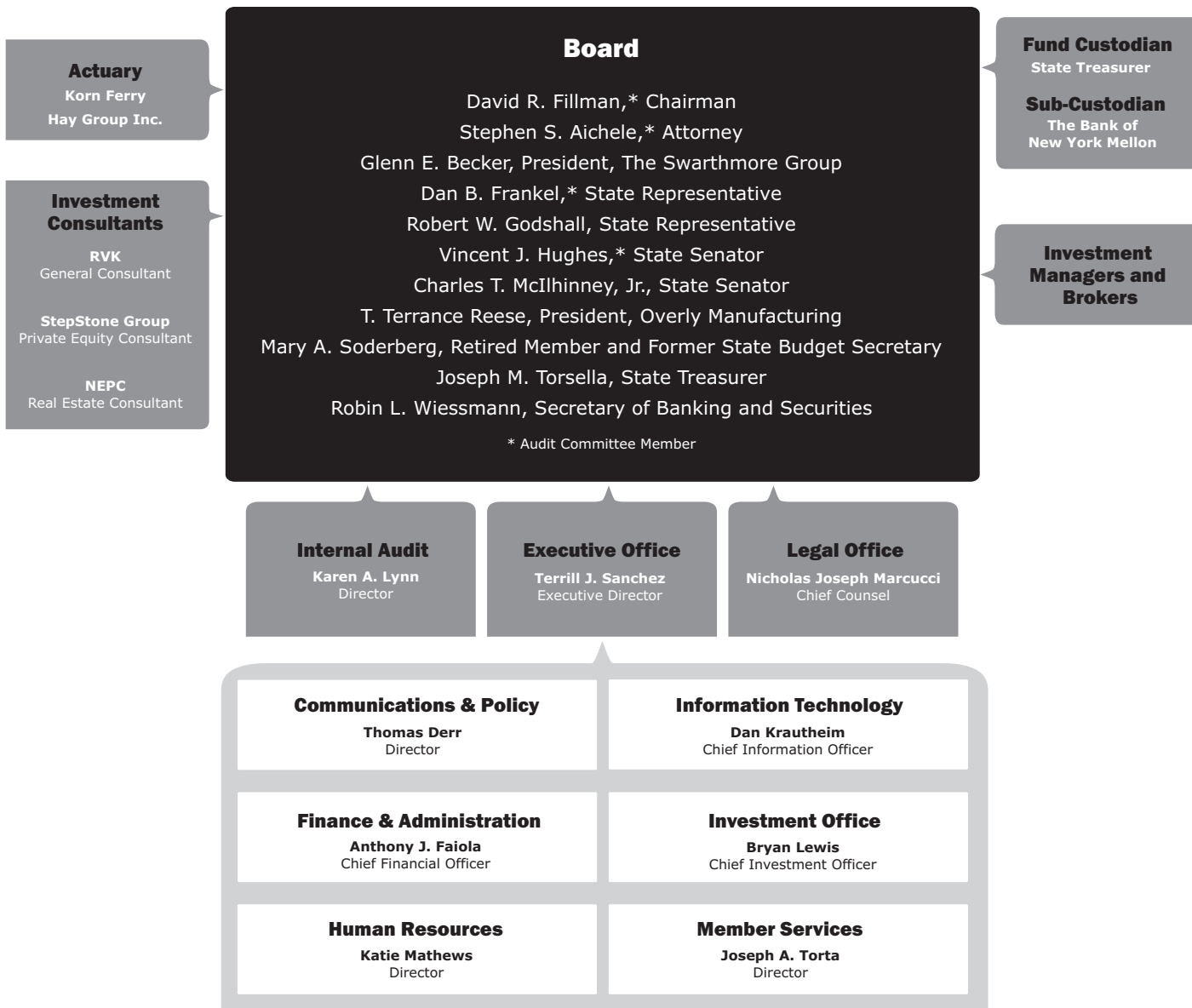
## Services & Operations

The **office of information technology** administers the agency's computing infrastructure. It ensures the performance and security of complex databases, which contain sensitive personal and financial information and are relied upon to track investments, process payments, and account for funds. The office also links the regional field offices, develops applications to provide members with online access to SERS information, and provides user support.

The **human resources division** supports the agency by hiring, developing, and managing employees. The division is responsible for classification, compensation, disability services, employee relations, equal employment, onboarding, performance management, staffing, time administration, training, and work-related injury programs. The division also facilitates the annual financial disclosure processes for SERS board members and staff.

# SERS ORGANIZATION

## Services & Operations



As of 12/31/18

# SERS ORGANIZATION

## Proposed FY 2019-20 Administrative Budget

	Rebudget 2015-2016	Rebudget 2016-2017	Rebudget 2017-2018	Rebudget 2018-2019	Budget Request
<b>Personnel Services</b>	\$16,934,000	\$16,548,700	\$18,560,500 <sup>1/</sup>	\$17,084,000 <sup>1/</sup>	\$17,518,000
<b>Operational</b>					
Travel	56,400	54,300	55,800	65,800	90,000
Training	116,950	125,600	79,500	138,550	103,600
Communication Services	418,400	472,500	481,400	471,500 <sup>1/</sup>	548,000
Consultants - Non EDP	401,600	349,700	811,000 <sup>1/</sup>	820,000 <sup>1/</sup>	953,500
Legal Services/Fees	386,000	280,000	641,000 <sup>1/</sup>	521,100 <sup>1/</sup>	355,500
Specialized Services	455,670	545,550	630,350 <sup>1/</sup>	1,571,400 <sup>1/</sup>	1,207,000
Advertising	5,000	8,000	10,000	8,000	8,000
IT Consulting	1,200,000	1,620,100	6,150,500 <sup>1/</sup>	4,353,000 <sup>1/</sup>	4,228,000
Contracted Maintenance Non-IT	41,300	49,300	58,900	65,400	47,300
Hardware/Software and Maintenance	1,071,160	1,518,500	2,123,600 <sup>1/</sup>	1,610,250	1,539,000
Real Estate	1,680,091	1,710,100	1,727,390	1,926,250 <sup>1/</sup>	1,971,000
Vehicles	25,600	23,000	25,800	25,000	26,800
Office Equipment	94,600	95,300	146,250 <sup>1/</sup>	215,800 <sup>1/</sup>	157,400
Other Rentals/Leases	3,600	3,600	3,600	6,300	4,000
Office Supplies	107,000	139,200	122,500	117,050 <sup>1/</sup>	106,000
Educational Supplies	3,140	2,200	153,100 <sup>1/</sup>	82,000 <sup>1/</sup>	1,700
Motorized Equipment Maintenance	3,500	3,500	3,500	4,000	6,000
Postage	352,100	471,960	646,500 <sup>1/</sup>	610,500 <sup>1/</sup>	600,500
Freight	3,500	3,500	3,200	3,200	4,000
Printing	157,100	226,400	217,450 <sup>1/</sup>	209,600 <sup>1/</sup>	132,000
Subscriptions & Licensing	35,590	59,350	39,150	43,900	57,800
Membership Dues	26,000	26,540	25,300	27,900	37,900
Conference Expenses	8,400	8,600	14,300	16,500	27,900
Insurance, Surety, & Fidelity Bonds	13,000	13,000	13,000	13,000	13,000
Treasury Services	1,190,000	1,255,000	1,145,360	1,475,500	1,500,000
Other Operational	203,299	203,300	119,900	530,500	552,100
<b>Total Operational</b>	<b>8,059,000</b>	<b>9,268,100</b>	<b>15,448,350</b>	<b>14,932,000</b>	<b>14,278,000</b>
<b>Fixed Assets</b>	<b>250,000</b>	<b>250,000</b>	<b>110,000</b>	<b>250,000</b>	<b>250,000</b>
<b>Less Directed Commissions</b>	<b>1,500,000</b>	<b>1,500,000</b>	<b>1,500,000</b>	<b>1,500,000</b>	<b>1,500,000</b>
<b>Total Annual Budget</b>	<b>\$23,743,000</b>	<b>\$24,566,800</b>	<b>\$32,618,850</b>	<b>\$30,766,000</b>	<b>\$30,546,000</b>

<sup>1/</sup>Figures include amounts needed to implement the defined benefit portion of Act 2017-5.

# SERS ORGANIZATION

## Proposed FY 2019-20 Administrative Budget

### Directed Commission Revenue & Expense

	FY 2018-19 Budget	FY 2019-20 Budget
<b>Beginning Balance</b>	<b>\$3,219,240</b>	<b>\$1,819,240</b>
Directed Commission Revenue	100,000	100,000
<b>Total Available</b>	<b>3,319,240</b>	<b>1,919,240</b>
Directed Commission Expense	1,500,000	1,500,000
<b>Ending Balance</b>	<b>\$1,819,240</b>	<b>\$419,240</b>

Directed commissions are reimbursements to the system for a portion of the fee paid to a broker for executing a trade.

### Proposed FY 2019-20 Defined Contribution Budget

	Rebudget 2017-2018 <sup>4</sup>	Rebudget 2018-2019 <sup>4</sup>	Budget Request
<b>Personnel Services</b>	<b>\$1,891,000</b>	<b>\$2,782,000</b>	<b>\$2,497,000</b>
<b>Operational</b>			
Travel	0	0	9,400
Training	0	0	12,500
Consultants - Non EDP	250,000	287,500	125,000
Legal Services/Fees	279,000	193,000	200,000
Specialized Services	1,890,000	1,230,000	541,000
IT Consulting	400,000	100,000	100,000
Telecom - Voice - Services	0	2,500	0
Hardware/Software and Maintenance	50,000	0	0
Facilities and Equipment	58,750	0	0
Real Estate	0	56,000	150,000
Educational Supplies	150,000	0	0
Maintenance Material and Supplies	0	0	50,000
Postage	200,000	125,000	101,000
Printing	100,000	125,000	48,100
<b>Total Operational</b>	<b>3,377,750</b>	<b>2,119,000</b>	<b>1,337,000</b>
<b>Total Annual Budget</b>	<b>\$5,268,750</b>	<b>\$4,901,000</b>	<b>\$3,834,000</b>

<sup>4</sup>Figures include amounts needed to implement the defined contribution portion of Act 2017-5.

# SERS ORGANIZATION

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## Legislation

No legislation that affected SERS operations was enacted in 2018.

# SERS Members

# SERS MEMBERS

## Demographics as of December 31

### Total Active & Annuitant Members

Year Ending December 31	Total Members <sup>1/</sup>	Active Members	Annuitants & Beneficiaries
2018	234,154	103,147	131,007
2017	232,451	102,978	129,473
2016	231,970	104,632	127,338
2015	229,714	105,025	124,689
2014	226,680	104,431	122,249
2013	225,238	105,186	120,052
2012	223,109	106,048	117,061
2011	222,363	107,021	115,342
2010	220,968	109,255	111,713
2009	219,746	110,107	109,639

<sup>1/</sup>Totals do not include inactive members.

### Active Members: Age & Service

Average Age	46.3
Average Years of Service	11.8

### Total Annuitants & Beneficiaries: By Category

	2015	2016	2017	2018
Normal	61,753	63,315	64,796	65,968
Early	43,272	43,974	44,284	44,383
Disability	8,512	8,578	8,593	8,626
Beneficiary/Survivor	11,152	11,471	11,800	12,030

### Annuitants & Beneficiaries: Average Age

	2015	2016	2017	2018
Normal	72.3	72.3	72.3	72.4
Early	64.0	64.3	64.7	65.1
Disability	63.0	63.4	63.7	64.1
Beneficiary/Survivor	74.6	74.5	74.6	74.6

### Annuitants & Beneficiaries: Average Annual Pension

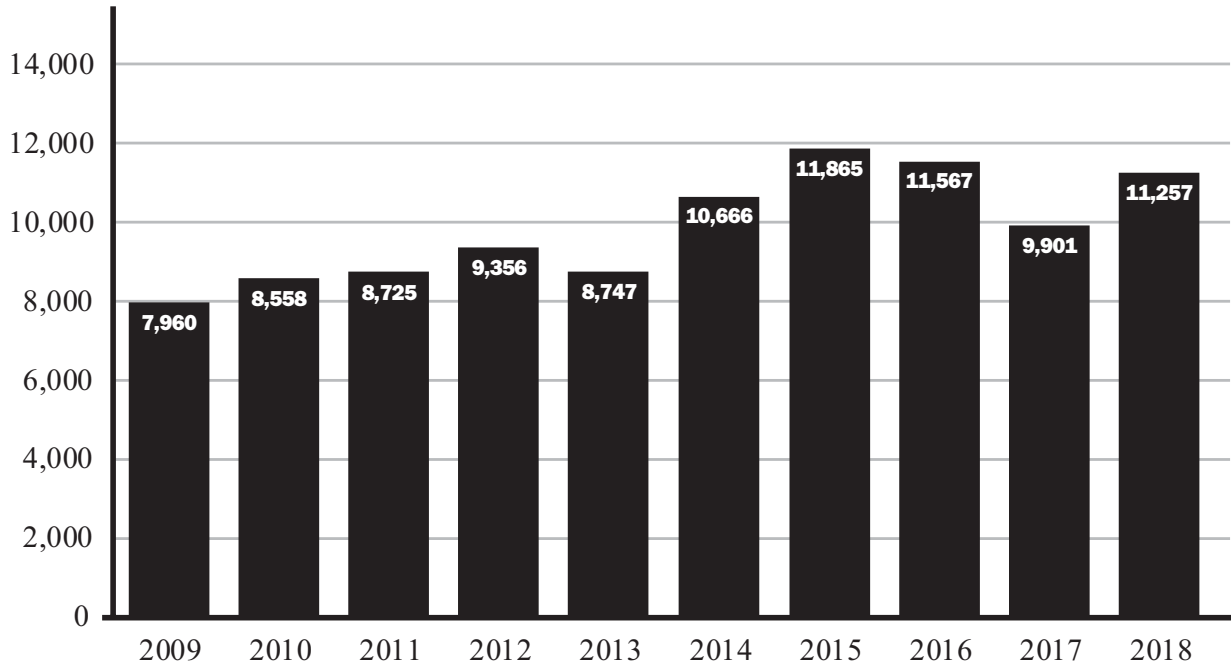
	2015	2016	2017	2018
Normal	\$27,042	\$27,722	\$28,352	\$28,880
Early	16,934	17,412	17,751	18,096
Disability	15,020	15,245	15,521	15,753
Beneficiary/Survivor	12,007	12,505	12,947	13,350



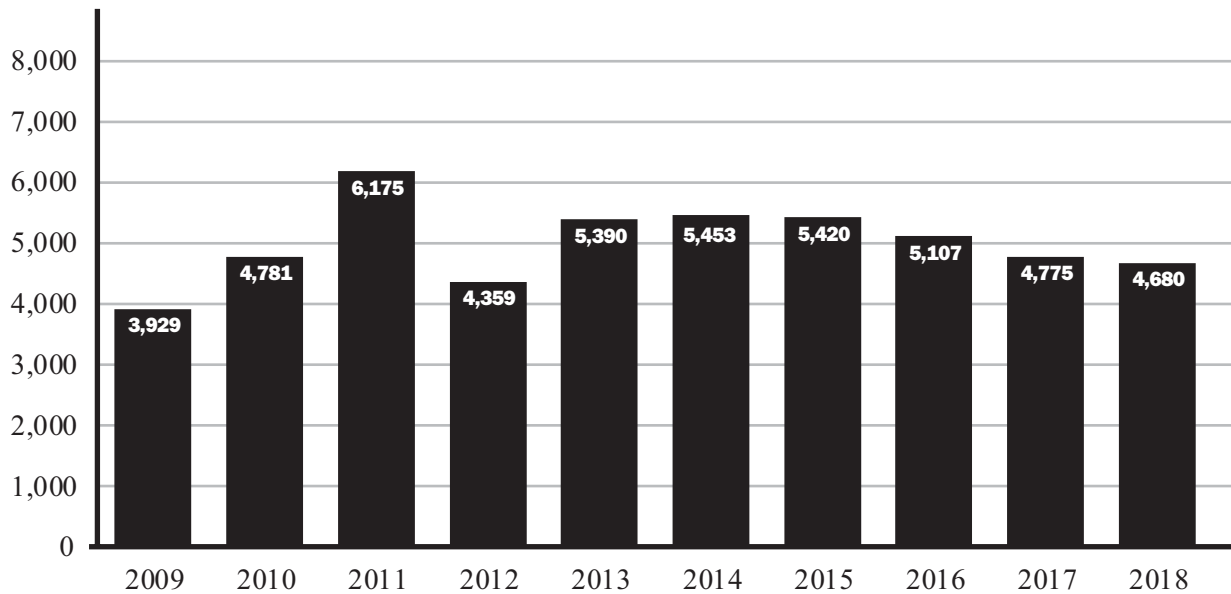
# SERS MEMBERS

## Demographics as of December 31

### New Member Enrollments



### Normal & Early Retirements



# SERS Fund

# SERS FUND

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## Funding Process

### Defined Benefit Plan

The Pennsylvania State Employees' Retirement System currently administers four retirement plans that contribute to the financial security of the commonwealth's public workforce in its retirement years. Most state employees are required to participate in Pennsylvania's defined benefit plan. Employees who are eligible to participate in the defined benefit plan may choose to supplement their retirement savings by also voluntarily participating in the deferred compensation plan. The economic engine of the defined benefit plan is the SERS Fund, which is reviewed in depth in this section. Details about the deferred compensation plan are provided in the last section of this book.

In the defined benefit plan, both the employer and the member pay a certain percentage of the member's salary to the SERS Fund for as long as the member works for the commonwealth. For FY 2018-19, employers are contributing 32.9% of payroll and most members are paying 6.25%. SERS invests this money to achieve returns to help ensure sufficient funds are available to make payments to current and future retirees.

When members meet certain milestones, such as working a specific number of years or reaching a certain age, they become eligible to receive monthly retirement payments for the rest of their lives. The payment amount is based on a formula that includes the member's length of service, age, compensation over a period of time, and an accrual rate, or multiplier that is determined by the general assembly.

### Act 2017-5

In addition to administering these two traditional plans, the system spent much of 2018 working to implement a new plan that was established under the auspices of Act 2017-5, which was signed into law on June 12, 2017, and took effect January 1, 2019.

Act 2017-5 established two new side-by-side hybrid defined benefit (DB)/defined contribution (DC) benefit options and a new DC-only option for most state employees who first enter SERS membership on or after January 1, 2019. Most hazardous duty employees are exempt from the new benefit options. However, hazardous duty employees starting on or after January 1, 2019, will have a 10% cap on voluntary overtime that is includable for retirement covered earnings.

Additionally, all current SERS members will have a one-time, irrevocable option to select one of the three new retirement benefit options between January 1, 2019, and March 31, 2019. The newly elected option takes effect July 1, 2019, and generally will apply to all future service.

### 2018 Overview

In 2018, SERS made approximately \$3.4 billion in benefit payments, approximately \$3.1 billion of

# SERS FUND

## Funding Process

which stayed in Pennsylvania. The average annual pension paid to a retired member who worked to full retirement age was \$28,880.

### Determining Adequate Funding for a Defined Benefit Plan

Defined benefit plans are long-term propositions. When underlying principles remain intact, defined benefit plans offer efficient, stable, and sustainable models for growing assets and delivering benefits through complete economic cycles. A standard feature of these types of plans is that employee and employer contributions invested throughout the member’s working career provide sufficient funding to pay for that particular member’s expected lifetime retirement benefit.

Because a defined benefit plan guarantees a monthly payment to every retiree for life, it is impossible to develop precise, before-the-fact costs and cash flows for the plan. The number of people paying into the plan, the amount they earn, how long they work, the number of people retiring, the age at which each person retires, and how long each retiree lives are among the myriad factors that vary from day-to-day, month-to-month, and year-to-year.

#### What is an unfunded liability?

An unfunded liability—also commonly called an unfunded actuarial liability or UAL—is the degree to which the current and projected liabilities exceed the current and projected assets of a defined benefit plan.

In other words, it is the difference between what the commonwealth’s defined benefit plan is legally obligated to pay and what assets have been set aside to make those payments.

#### Current Key Actuarial Assumptions

7.25%  
long-term investment  
return

5.6%  
average salary growth

2.6%  
rate of inflation

#### Funding Process

Actuarial science is used to develop accurate predictions. It applies available data to a number of interrelated mathematical and statistical methods and uses investment and financial practices to forecast uncertain future events.

SERS actuarial firm conducts an in-depth investigation and analysis—known as an experience study every five years. The actuary uses actual and expected experience and data to set economic and demographic assumptions. Economic assumptions include rates of investment return and salary growth, for example, which are significantly impacted by inflation. Demographic assumptions include workforce, disability, and mortality trends. In 2016, SERS delivered its most recent experience study. It is available at [SERS.pa.gov](http://SERS.pa.gov).

The selection of economic and demographic assumptions used is generally guided by the Actuarial Standards Board. In SERS’ case, some very important assumptions—such as the length of time over which investment gains and losses are recognized—are set by Pennsylvania law.

Each year, SERS’ actuarial firm uses the most recent active member and retiree demographic data to

# SERS FUND

## Funding Process

determine total expected future obligations. The actuary then compares those obligations to the expected value of the fund’s assets, based on current audited financial statements and future economic assumptions.

This calculation is factored in with the statutorily set member contribution rate and the assumed investment rate of return as the basis for calculating how much employers need to contribute in order to fully fund their employees’ retirement benefits.

Defined benefit plans are designed to remain stable by receiving three regular funding streams—member contributions, investment earnings, and employer contributions.

### *Member Contributions*

Active members pay a certain percentage of their pay toward their retirement benefit. While different classes of membership pay different rates, most members currently pay 6.25% of their pay. The percentage is set by statute and the rate does not change from year to year. Members’ contributions are withheld from their paychecks and sent directly from their employer to SERS. In 2018, member contributions to SERS totaled an estimated \$394 million.

Courts have ruled that public retirement benefits may not be retroactively changed in any way that may be a “net detriment” to employees. “Net detriment” has been interpreted as a reduction in benefits already earned, and/or as an increase in member contributions required to maintain such benefits.

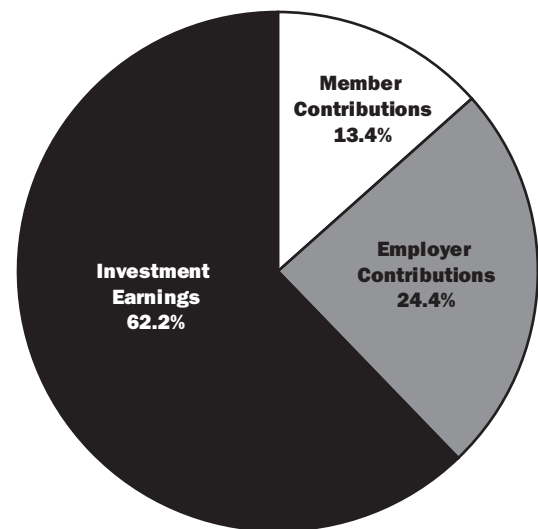
There are some instances, however, in which member contributions can increase. For example, Pennsylvania’s Act 2010-120 introduced a “risk sharing” provision whereby if there is a multi-year period of investment returns below the assumed rate and if employers have met their contribution obligations to the pension system, the contributions paid by those who entered SERS membership on or after January 1, 2011, could increase. In addition, Act 2017-5 created new classes that have shared gain and loss, and adjusted Act 2010-120 classes to add a shared gain provision. The result is that all classes with shared risk are treated similarly. To date, the shared risk provision has not been triggered. It will be reviewed again in 2020, considering investment performance for calendar years 2011 through 2019.

### *Investment Earnings*

SERS overall investment objective is to assure adequate fund reserves at the least cost to commonwealth citizens and to protect against the erosion of principal by inflation. SERS seeks to provide investment earnings that meet, or preferably exceed, the assumed rate of return over complete economic cycles.

**SERS Funding Sources**

(20-Year Cumulative History)



# SERS FUND

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## Funding Process

SERS strives to meet this objective by applying acceptable risk parameters and allocations to investments that are diversified by type, industry, quality, and geography.

Investment earnings can vary widely from year to year; the SERS Fund, for example, produced an approximate 25% return in 2003 and experienced more than a 28% loss in 2008's worldwide downturn. For funding valuation purposes in order to minimize volatility, Pennsylvania law requires that the differences between actual performance and the assumed rate of return be recognized over a five-year period at a rate of 20% per year—a concept often referred to as “smoothing.”

SERS examines and sets its assumed rate of return each year based on global market dynamics, investment performance, and other considerations. For example, in 2009, SERS reduced its assumed rate of return from 8.5% to 8%, largely as a result of 2008's global economic collapse.

As a result of SERS' 90-plus years of operation and the trend of people living longer, the system now has more retired members than active members. In 2019, SERS is projected to pay out approximately \$96 million more each month than it takes in through member and employer contributions.

As a normal outcome of a maturing pension system, the liquidity needs of its fund increase requiring ongoing rebalancing of assets. In recognition of this fact and in acknowledgement of continuing economic challenges, SERS again reduced its assumed rate of return in 2017; this time, from 7.5% to 7.25%. This change has implications for the employer contribution rate, as discussed below. For 11 of the last 20 years, SERS has exceeded its assumed rate of return.

Factoring in the unprecedented market volatility and the precipitous market decline of 2008, the fund has achieved a 20-year rate of return of 6.0%, a 25-year rate of return of 7.7%, and a 30-year return of 8.4%. SERS reports its returns net-of-fees. This demonstrates that the long-horizon approach to investing members' money continues to provide the fund with stable footing.

The “shared risk” provision as previously discussed, is designed to moderate the need for future employer rate increases that may be prompted by investment underperformance. To date, the shared risk provision has not been triggered. It will be reviewed again in 2020, considering investment performance for calendar years 2011 through 2019.

### *Employer Contributions*

Employer contributions make up the final portion of SERS overall funding. The employer contribution rate is calculated by an independent actuary, taking into account member contributions, demographic activity, investment earnings, and future liabilities. Because it is highly unlikely that every assumption could be correct, the Pennsylvania State Employees' Retirement Code requires SERS to adjust the employer contribution rate each year based on actual experience and investment performance.

The employer normal cost is expressed as a percentage of payroll and is the amount employers would contribute if all actuarial assumptions were precisely correct, including the fund earning exactly its

# SERS FUND

## Funding Process

assumed rate of return. The normal cost of benefits as of the 2017 actuarial valuation was 4.88%.

Based on the actuary’s recommendation, the SERS Board annually certifies an employer contribution rate. The rate has fluctuated dramatically over the years: in 1981 the rate was approximately 18%, but from 2001-03 it was 0%. The rate for the current fiscal year is 32.9%.

The total dollars contributed by employers has grown significantly in recent years. In 1988, employer contributions totaled \$382 million. In 2018 that figure was approximately \$2.2 billion.

According to the Governor’s Budget Office, SERS employers under the Governor’s jurisdiction paid less than half of the employers’ total—about 45%—from the general fund. About 27% was paid from special funds; about 15% was funded from federal funds; and about 13% was provided from other sources.

The employer contribution rate has two parts: the cost of the benefit for new SERS members in the current year (as applied to all active members) and a contribution toward the unfunded liability. When SERS reduced its assumed rate of return from 7.5% to 7.25% in 2017, the change increased the unfunded liability by approximately \$1 billion.

FY 2017-18 was the first year since contribution rates were mandated through Act 2010-120 that rate collars were no longer needed and the commonwealth paid the full actuarially required contribution. Thanks in large part to widespread market turbulence that cast a shadow on much of 2018, the FY 2019-20 employer contribution rate is currently projected to bump up slightly to 33.4% of payroll. Of that contribution rate, approximately 4.9% will go to fund the benefits of new SERS members in the current year (normal cost) and approximately 28.5% will go to pay down the unfunded liability.

<b>Long-Term Snapshot</b>		
	<b>1988</b>	<b>2018</b>
<b>Employer Rate</b>	13.03%	32.93%
<b>Employer Contributions</b>	\$382 million	\$2.2 billion
<b>Member Rate</b>	5.00%	6.25%
<b>Member Contributions</b>	\$153 million	\$394 million
<b>Active Members</b>	109,000	103,000
<b>Annuitants</b>	71,000	131,000

Looking at the relative sizes of the current-year and unfunded liability components of the employer rate listed above, it is clear that the unfunded liability is the most significant driving factor in the employer contribution rate. Extreme volatility in 2018 delayed an anticipated decrease in the projected employer rate for FY 2019-20, but beginning in FY 2023-24, employer rates are expected to decline annually.

The system currently uses a modified entry-age funding method. Act 2017-5 requires a traditional entry-age funding method with the 2021 valuation that will result in a single-year increase in the FY 2022-23 rate with a steady decline thereafter.

# SERS FUND

## Funding Process

### Projected Payout, Funding Status & Employer Contributions

Assuming a modified entry-age funding method through 2020 with a traditional entry-age funding method starting in 2021, level-dollar amortization, five-year smoothing of assets, no FY 18 or later for Act 2010-120 collars, 5.6% salary growth, 2.6% inflation, -4.3% investment return in CY 2018 with 7.25% return thereafter, 6.25% pre Act 2017-5 employee contribution, 8.25% Act 2017-5 employee contribution for hybrid class A-5, 7.5% Act 2017-5 employee contribution for both hybrid class A-6 and 401a Defined Contribution only election.

Valuation Year Ended Dec 31	CY Payout		CY Funding Status		FY Employer Contribution		
	Benefits & Expenses (\$ billions)	Funded Ratio	Unfunded Liability (\$ billions)	Fiscal Year	Expected FY Payroll (\$ millions)	Employer Contribution Rate	Expected FY Contribution (\$ millions)
2018	\$3.4	56.5%	\$22.32	2019/20	\$6,446.8	33.37%	\$2,151.4
2019	3.6	56.3	22.72	2020/21	6,633.7	33.50	2,222.5
2020	3.7	56.8	22.72	2021/22	6,826.1	33.16	2,263.6
2021	3.8	62.6	18.19	2022/23	7,024.0	34.47	2,421.2
2022	4.0	62.5	18.45	2023/24	7,227.7	34.38	2,484.8
2023	4.1	63.6	18.04	2024/25	7,437.4	33.57	2,496.5
2024	4.2	64.9	17.57	2025/26	7,653.0	32.75	2,506.1
2025	4.3	66.1	17.04	2026/27	7,875.0	31.93	2,514.7
2026	4.4	67.5	16.46	2027/28	8,103.3	31.13	2,522.3
2027	4.5	68.8	15.82	2028/29	8,338.3	30.33	2,529.2
2028	4.6	70.2	15.13	2029/30	8,580.2	29.56	2,536.1
2029	4.7	71.7	14.39	2030/31	8,829.0	28.80	2,543.1
2030	4.8	73.2	13.59	2031/32	9,085.0	28.08	2,550.9
2031	4.9	74.8	12.74	2032/33	9,348.5	27.47	2,568.2
2032	5.0	76.5	11.82	2033/34	9,619.6	26.90	2,587.8
2033	5.1	78.3	10.82	2034/35	9,898.6	26.33	2,606.5
2034	5.1	80.3	9.74	2035/36	10,185.6	25.77	2,624.6
2035	5.2	82.5	8.57	2036/37	10,481.0	25.22	2,642.8
2036	5.3	84.9	7.31	2037/38	10,784.9	24.67	2,660.7
2037	5.4	87.5	5.95	2038/39	11,097.7	24.14	2,679.3
2038	5.5	90.4	4.49	2039/40	11,419.5	23.62	2,697.5
2039	5.6	93.7	2.91	2040/41	11,750.7	19.15	2,250.6
2040	5.7	96.3	1.68	2041/42	12,091.5	15.88	1,920.5
2041	5.8	98.4	0.71	2042/43	12,442.1	10.38	1,291.1
2042	5.9	99.7	0.14	2043/44	12,803.0	8.04	1,029.3
2043	6.1	100.4	(0.14)	2044/45	13,174.2	7.68	1,012.4
2044	6.2	101.1	(0.42)	2045/46	13,556.3	7.26	984.6
2045	6.4	101.9	(0.67)	2046/47	13,949.4	6.25	871.6
2046	6.5	102.4	(0.82)	2047/48	14,354.0	5.74	824.5
2047	6.7	103.0	(0.92)	2048/49	14,770.2	5.66	835.7

<sup>1</sup>Figures are based on 2017 actuarial funding valuation.



# SERS FUND

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## Actuarial Status

### Restoring SERS Defined Benefit Plan Funding

The SERS funded ratio is expected to improve as those who entered SERS membership before January 2011 retire and post-January 2011 members continue to grow in number. In 2018, SERS retired 4,680 members and added 11,257 new members. Currently, approximately 41% of SERS' active members belong to the post Act 2010-120 classes of service.

Act 2010-120 projected savings of approximately \$1.5 billion over 30 years by reducing the retirement benefit accrual rate, increasing the normal retirement age, eliminating the lump sum withdrawal option, extending the vesting period from five years to 10 years and including other provisions for those who entered SERS membership on or after January 1, 2011. One aspect of Act 2010-20 is that retirement provisions for legislators elected after December 1, 2010, were reduced and made consistent with those of most rank-and-file employees.

Even more impactful, Act 2010-120 also recognized the need for greater rates of employer funding and allowed employer contributions to increase over time. To ensure predictability and to moderate overall budget impacts, the general assembly set rate collars for increased employer contribution rates.

In 2018, extreme market volatility led to losses for investors across the board, including pension funds such as SERS, resulting in a projected slight uptick in the employer contribution rate.

As the employer rate has increased significantly over the last several years, its impact on paying down the liability is dramatic. Such funding is among the most crucial components of the overall, long-term stability of the pension system.

### Current Funded Position of SERS Defined Benefit Plan

The funded position of a defined benefit plan is measured by its funded ratio, which is the actuarially calculated value of assets divided by the actuarially calculated sum of retirement benefits earned by all existing SERS members—approximately 240,000 active, inactive, vested, and retired.

In general, a funding ratio of 80% or better is considered “healthy” for a pension system. Per a 2017 Wilshire report, Pennsylvania is among 74 out of 103 other state retirement systems that are currently below the 80% threshold. At the close of 2018, SERS' estimated funded ratio was 56.5% (actuarial value) or 52.8% (market value). SERS projects reaching the 80% funded threshold in 2034.

# SERS FUND

## Actuarial Status

SERS funded ratio has varied significantly over time. In 1984, it dipped below 60%, as it is now. By 2001, however, it had climbed back to well over 100%. Recent funded ratios include:

### SERS Funding Status

Year	Funded		Unfunded Actuarial Liability (\$ billions)
	Actuarial Value	Market Value	
2018	56.5%	52.8%	\$22.32
2017	59.4	60.7	19.66

The 2018 estimated unfunded liability is \$22.3 billion, which is now expected to decline as the required contribution payments are maintained.

Factors influencing the unfunded liability have been building over time, including but not limited to:

- Sustained periods of employer contributions below normal costs: 1992 through 2009
- Losses that neutralized past investment gains used to justify the low employer contributions: -10.9% in 2002 and -28.7% in 2008
- Benefit increases—including cost of living adjustments and increased accrual rates—without providing sufficiently off-setting funding streams: Act 2001-9 and Act 2002-38
- Legislatively mandated actuarial changes that extended the time over which liabilities be paid or artificially suppressed employer contribution rates: Act 2003-40 and Act 2010-120
- Cumulative negative impact of the above on the overall size of the fund and its ability to realize investment returns in positive-earning years

# SERS FUND

## Actuarial Status

### Additions and Deductions to Fiduciary Net Position<sup>1/</sup>

(\$ millions)

Calendar Year	Member Contributions	Investment Earnings	Employer Contributions	Benefits & Expenses	Fair (Market) Value
2009	\$349	\$3,561	\$253	(\$2,297)	\$24,662
2010	349	3,076	273	(2,474)	25,886
2011	351	480	392	(2,732)	24,377
2012	348	2,794	566	(2,696)	25,389
2013	352	3,724	795	(2,866)	27,394
2014	366	1,462	1,084	(2,968)	27,338
2015	372	88	1,360	(3,103)	26,055
2016	375	1,587	1,622	(3,251)	26,388
2017	383	4,066	1,898	(3,330)	29,405
2018 <sup>2/</sup>	394	(1,701) <sup>3/</sup>	2,172	(3,449)	26,821
<b>10-Year Total</b>	<b>\$3,639</b>	<b>\$19,137</b>	<b>\$10,415</b>	<b>(\$29,166)</b>	

<sup>1/</sup>10-year net additions and deductions were \$4,025.

<sup>2/</sup>2018 figures are unaudited

<sup>3/</sup>Figure does not include 4<sup>th</sup> quarter earnings for all Private Equity and Real Estate. Data not yet available.

# SERS Fund

## Overview

# SERS FUND

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## Investment Program | Overview

### Investment Policy

The SERS Board originally adopted a formal *Statement of Investment Policy* (policy) in 1979. It has been revised periodically to reflect and incorporate legislative changes governing investments and amendments to policies and procedures guiding the investment of the defined benefit portfolio. The policy was last amended in March 2017.

The purpose of the policy is to formalize the board's investment objectives and policies, and to define the duties and responsibilities of the various individuals and entities involved in the investment process.

The major elements of the policy are:

- The assets of the SERS Fund will be managed with the primary objectives of the payment of benefit obligations to participants in the plans as well as to maximize return with acceptable risk considerations and sufficient liquidity so that employer contributions can be minimized.
- The SERS Fund's overall investment objective is to provide a total rate of return, over full economic cycles, which achieves SERS long-term, actuarially assumed rate of return consistent with the board's tolerance for risk.
- The board's investment authority is governed by the prudent investor standard as set forth in Title 71, Pennsylvania Consolidated Statutes, Section 5931(a).
- The members of the board, employees of the board, and agents thereof shall stand in a fiduciary relationship to the members of the system regarding the investments and disbursements of any of the monies of the fund and shall not profit either directly or indirectly with respect thereto.
- The board employs an investment staff which is responsible to the board to review and analyze the current investment climate, and to recommend adjustments with respect to the policy that are appropriate to take optimum advantage of new conditions and strategies as they arise in the market place. The staff also reviews and analyzes the philosophies, policies, and strategies employed by the investment managers, evaluating the appropriateness of their decision-making processes and their investment styles in relation to present and projected investment horizons.
- The board continually seeks to employ investment managers that possess superior capabilities in the management of assets of public retirement systems. Each manager has full discretion to carry out its investment mandate subject to the investment strategy statement contained in the investment management agreement and will be expected to conduct business on behalf of SERS in accordance with the mandate for which they were retained.

# SERS FUND

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## Investment Program | Overview

- SERS will employ investment consultants, who act as fiduciaries to the fund, and who will provide investment consulting services in their respective areas of expertise.
- Where investment characteristics are equivalent, the policy will favor investments that will have a positive impact on the economy of the Commonwealth of Pennsylvania.
- SERS instituted an Emerging Investment Manager Program designed to identify and gain early access to talented investment managers in their early stages to generate above benchmark returns (net of fees).

## Investment Objectives

As indicated in SERS *Statement of Investment Policy*, the objectives of the SERS Fund are to provide benefit payments to participants and beneficiaries at the lowest cost to the commonwealth and to fund the program through a carefully planned and executed investment program.

Consistent with achieving these objectives, the board has established the following goals relative to investment performance:

- Achieve a net total return equivalent to the actuarial assumed rate of return, or preferably, in excess of this rate in order to improve the funded ratio of the SERS Fund through investment earnings and favorably impact future employer and employee contribution rates.
- Achieve a net, total long-term return that meets or exceeds an appropriate, composite plan benchmark index on a five- to 10-year rolling time horizon. The composite benchmark index will be based on the asset allocation set forth in the investment plan approved by the board.

# SERS FUND

## Investment Program | Overview

### Asset Allocation Trend

#### *Prudent Investor Investment Standards*

The board's investment authority is governed by the prudent investor standard as set forth in Title 71, Pennsylvania Consolidated Statutes, Section 5931(a). Enactment of the prudent investor standard in Act 1994-29 and asset/liability studies completed by SERS general investment consultant and the SERS investment staff are the foundation of SERS investment strategy. With prudent investor investment authority, SERS is able to pursue a broader array of investment opportunities that enhance the ability to achieve reasonable rates of return while maintaining risk at acceptable levels. An asset/liability study demonstrated that the prudent application of this expanded authority should result in a more efficient portfolio that better serves the needs of SERS.

#### *Total Fund Asset Allocation*

SERS develops a biennial investment plan which provides direction for the SERS investment program. The 2018-2019 Strategic Investment Plan will be implemented over a 10-year period. The fund's asset allocation strategy will evolve over this timeframe through a series of interim targets until the long-term target for each asset class is achieved.

#### *Investment Program Summary*

The assets of SERS are administered by the board. The board adopted an investment policy that incorporates the provisions of the Retirement Code, which governs the investment of SERS assets. SERS investment plan is reviewed and updated biennially for strategic asset allocation purposes, as well as for diversification needs within each asset class.

### Asset Allocation

(\$ millions as of December 31, 2018)

Asset Class	Market Exposure	% of Total Fund	Long-Term 10-Year Strategic Target
Private Equity	\$3,911.2	14.6%	16.0%
Global Public Equity	13,802.0	51.5	48.0
Real Estate	1,935.9	7.2	12.0
Multi-Strategy	2,369.2	8.8	10.0
Legacy Hedge Funds	47.1	0.2	*
Fixed Income	3,999.0	14.9	11.0
Cash	757.0	2.8	3.0
<b>Total Fund</b>	<b>\$26,821.4</b>	<b>100.0%</b>	<b>100.0%</b>

\*Legacy Hedge Funds asset class is in liquidation.

# SERS FUND

## Investment Program | Overview

### Number of Investment Managers

Asset Class	Investment Managers
Private Equity	62
Global Public Equity	15
Real Estate	30
Multi-Strategy	11
Legacy Hedge Funds	10
Fixed Income	11
Cash	1
<b>Total Managers</b>	<b>140</b>

### Number of Investment Portfolios

Asset Class	Investment Portfolios
Private Equity	176
Global Public Equity	19
Real Estate	61
Multi-Strategy	13
Legacy Hedge Funds	10
Fixed Income	13
Cash	1
<b>Total Portfolios</b>	<b>293</b>



**SERS Fund**

**Performance**

# SERS FUND

## Investment Program | Performance

### Estimated Calendar Year, Net-of-Fees Returns<sup>1/</sup>

For the period ending December 31, 2018

Asset Class	1-Year Total Return	3-Year Total Return	5-Year Total Return	10-Year Total Return
Private Equity <sup>2/,5/</sup>	11.7%	10.4%	10.1%	9.4%
<i>Burgiss All Private Equity Custom Index<sup>3/,5/</sup></i>	16.6	13.8	13.4	11.1
<i>Russell 3000 Index+3%<sup>4/,5/</sup></i>	21.1	20.6	16.9	15.4
Global Public Equity	-10.3	6.5	4.1	10.2
<i>MSCI ACW IM Index (Net)</i>	-10.1	6.5	4.2	9.7
Real Estate <sup>5/</sup>	-1.3	1.3	4.8	2.4
<i>Real Estate Custom Benchmark<sup>5/,6/</sup></i>	7.2	7.6	9.4	5.1
<i>Consumer Price Index+3%<sup>5/</sup></i>	5.3	5.0	4.6	4.5
Multi-Strategy	0.0	NA	NA	NA
<i>Russell 3000 Index</i>	-5.2	9.0	7.9	13.2
<i>S&amp;P/LSTA Leveraged Loan Index</i>	0.4	4.8	3.1	8.6
Legacy Hedge Funds	-13.7	-1.9	-1.9	0.4
<i>HF Custom Index<sup>7/</sup></i>	-6.2	1.4	1.5	5.0
Fixed Income	-0.9	3.1	2.5	6.8
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>	0.0	2.1	2.5	3.5
Cash	2.1	1.4	1.1	0.7
<i>BofA ML 3 Month U.S. T-Bill Index</i>	1.9	1.0	0.6	0.4
<b>Total Fund</b>	<b>-4.3%</b>	<b>5.5%</b>	<b>4.6%</b>	<b>7.2%</b>
<i>Total Fund Custom Benchmark</i>	<i>-2.1%</i>	<i>6.4%</i>	<i>5.3%</i>	<i>8.4%</i>
<i>Total Fund Custom Public Market Equivalent Benchmark</i>	<i>-1.0%</i>	<i>7.6%</i>	<i>6.2%</i>	<i>9.2%</i>

<sup>1/</sup>Returns for periods greater than one year are annualized. Performance was calculated using the Modified Dietz day-weighted return methodology.

<sup>2/</sup>Historical Private Equity performance includes Buyouts, Special Situations, and Venture Capital.

<sup>3/</sup>Intended to compare the program's performance to its peers.

<sup>4/</sup>Long-term benchmark by which SERS measures its private market performance. Shorter term variances (1-year and 3-year) can be pronounced due to the nature of private assets and are not as relevant for benchmark purposes.

<sup>5/</sup>Private Equity, Real Estate, and their corresponding benchmarks are reported on a quarter lagged basis.

<sup>6/</sup>Calculated monthly using beginning of the month asset class weights applied to each corresponding primary benchmark return. The custom benchmark consists of the NCREIF ODCE Index (AWA) (Net) (Qtr Lag), the FTSE NAREIT US Real Estate Index (Qtr Lag), and the Consumer Price Index+3% (Qtr Lag).

<sup>7/</sup>Beginning April 2014, the HF Custom Index is comprised of the HFRI Fund-of-Funds Strategic Index consistent with board approval of the 2014-2015 *Strategic Investment Plan*, which establishes this index as the appropriate benchmark for Hedge Funds with regard to its composition and objectives.

# SERS FUND

## Investment Program | Performance

### Fiscal Year, Net-of-Fees Returns<sup>1/</sup>

For the period ending June 30, 2018

Asset Class	1-Year Total Return	3-Year Total Return	5-Year Total Return	10-Year Total Return
Private Equity <sup>2/,5/</sup>	13.0%	9.3%	10.3%	7.7%
<i>Burgiss All Private Equity Custom Index<sup>3/,5/</sup></i>	17.8	12.5	13.6	9.2
<i>Russell 3000 Index+3%<sup>4/,5/</sup></i>	17.2	13.5	16.4	12.9
Global Public Equity	11.2	8.5	9.8	5.5
<i>MSCI ACW IM Index (Net)</i>	11.1	8.3	9.6	6.1
Real Estate <sup>5/</sup>	5.2	4.6	7.5	2.0
<i>Real Estate Custom Benchmark<sup>5/,6/</sup></i>	6.1	7.9	9.7	4.3
<i>Consumer Price Index+3%<sup>5/</sup></i>	5.4	4.9	4.4	4.6
Multi-Strategy <sup>7/</sup>	NA	NA	NA	NA
<i>S&amp;P/LSTA Leveraged Loan Index</i>	4.4	4.2	4.0	5.2
<i>Russell 3000 Index</i>	14.8	11.6	13.3	10.2
Legacy Hedge Funds	-2.3	-1.5	0.9	0.8
<i>HF Custom Index<sup>8/</sup></i>	5.8	2.2	5.2	5.5
Fixed Income	0.1	1.9	2.6	4.7
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>	-0.4	1.7	2.3	3.7
Cash	1.6	1.1	0.9	0.7
<i>BofA ML 3 Month U.S. T-Bill Index</i>	1.4	0.7	0.4	0.4
<b>Total Fund</b>	<b>8.6%</b>	<b>6.6%</b>	<b>7.6%</b>	<b>4.5%</b>
<i>Total Fund Custom Benchmark</i>	<i>8.4%</i>	<i>6.9%</i>	<i>7.8%</i>	<i>5.9%</i>
<i>Total Fund Custom Public Market Equivalent Benchmark</i>	<i>9.0%</i>	<i>7.4%</i>	<i>8.6%</i>	<i>6.6%</i>

<sup>1/</sup>Returns for periods greater than one year are annualized. Performance was calculated using the Modified Dietz day-weighted return methodology.

<sup>2/</sup>Historical Private Equity performance includes Buyouts, Special Situations, and Venture Capital.

<sup>3/</sup>Intended to compare the program's performance to its peers.

<sup>4/</sup>Long-term benchmark by which SERS measures its private market performance. Shorter term variances (1-year and 3-year) can be pronounced due to the nature of private assets and are not as relevant for benchmark purposes.

<sup>5/</sup>Private Equity, Real Estate, and the corresponding Real Estate Custom Benchmark are reported on a quarter lagged basis.

<sup>6/</sup>Calculated monthly using beginning of the month asset class weights applied to each corresponding primary benchmark return. The custom benchmark consists of the NCREIF - ODCE Index (AWA) (Net) (Qtr Lag), the FTSE NAREIT U.S. Real Estate Index (Qtr Lag), and the Consumer Price Index+3% (Qtr Lag).

<sup>7/</sup>The Multi-Strategy asset class has an inception date of October 1, 2017. Performance returns of one year or greater are unavailable as of June 30, 2018.

<sup>8/</sup>Beginning April 2014, the HF Custom Index is comprised of the HFRI Fund-of-Funds Strategic Index consistent with board approval of the 2014-15 Strategic Investment Plan, which establishes this index as the appropriate benchmark for Hedge Funds with regard to its composition and objectives.

# SERS FUND

## Investment Program | Performance

### Fund Values and Annual Return

(\$ millions)

Year Ended	SERS Fund Fair Value	Annual Total Fund Rate of Return <sup>1/</sup>
1989	\$9,785	17.8%
1990	9,886	1.0
1991	11,940	22.6
1992	12,453	7.4
1993	13,701	13.2
1994	13,330	-1.1
1995	16,343	25.2
1996	18,492	15.4
1997	21,312	18.5
1998	24,123	16.3
1999	28,093	19.9
2000	27,880	2.2
2001	24,706	-7.9
2002	20,880	-10.9
2003	24,536	24.3
2004	26,641	15.1
2005	28,752	14.5
2006	32,053	16.4
2007	35,516	17.2
2008	22,796	-28.7
2009	24,662	9.1
2010	25,886	11.9
2011	24,377	2.7
2012	25,389	12.0
2013	27,394	13.6
2014	27,338	6.4
2015	26,055	0.4
2016	26,388	6.5
2017	29,405	15.1
2018 <sup>2/</sup>	26,821	-4.3

<sup>1/</sup>Returns were calculated using the Modified Dietz day-weighted return methodology.

<sup>2/</sup>2018 values are estimated and unaudited. Fund fair values for all Private Equity and Real Estate Investments are reported on a quarter lagged basis.

# SERS Fund

## Expenses & Fees

# SERS FUND

## Investment Program | Expenses & Fees

### Investment Expenses

Expense Category	Expenses
Manager	\$126,624,117
Consultant	3,830,847
Personnel	3,088,645
Custodian	1,364,064
Subscription and membership	258,134
Operational	142,072
Legal	3,226
<b>Total Investment Expenses</b>	<b>\$135,311,105</b>

### Consultant Expenses

Firm	Service Type	Expenses <sup>1/</sup>
StepStone Group	Private equity investments	\$1,975,000
RVK	General investments	621,218
NEPC	Real estate investments	505,584
Fairview Capital Partners	Investment portfolio management	359,198
STP	Data warehouse hosting	172,500
Institutional Shareholders Services	Proxy services	92,680
GCM Customized Investment Group	Investment portfolio management	53,667
Abel/Noser	Transaction cost analysis	51,000
<b>Total Consultant Expenses</b>		<b>\$3,830,847</b>

<sup>1/</sup>Korn Ferry Hay Group, SERS actuary, was paid \$355,366. These are not included in the table above because they are considered an administrative expense.

### Manager Investment Expenses

Asset Class	Fees/Expenses	Fees/Expenses <sup>2/</sup> (in basis points)
Private Equity	\$67,636,111	170.6
Global Public Equity	21,638,401	14.0
Real Estate	19,185,153	86.4
Multi-Strategy	10,239,558	43.9
Legacy Hedge Funds	236,624	24.3
Fixed Income	7,688,270	18.9
<b>Total Manager Fees and Expenses</b>	<b>\$126,624,117</b>	<b>43.7</b>

<sup>2/</sup>The fees/expenses were divided by SERS total fund and asset class quarterly average values during calendar year 2018 to arrive at the basis point calculations.

### History of Manager Investment Expenses

Calendar Year	Fees/Expenses	Fees/Expenses (in basis points)
2014	\$177,383,430	64.8
2015	157,930,597	59.1
2016	159,447,442	61.3
2017	126,541,221	45.6
2018	126,624,117	43.7

# SERS FUND

## Investment Program | Expenses & Fees

SERS employs outside investment managers for their investment expertise. The managers of the SERS investment portfolio are paid through non-budget appropriation. Their fees are treated as a reduction of the investment revenue of the SERS Fund, rather than as a direct administrative expense. Thus, when investment performance is reported, numbers are reported net-of-fees - that is, performance after all investment manager fees have been paid.

### 2018 Manager Investment Expenses Detail

Manager	City	State/Country	Fees/ Expenses
<b>Private Equity</b>			
ABRY Advanced Securities Fund	Boston	MA	\$4,346
ABRY Partners V	Boston	MA	2,241
ABRY Partners VI	Boston	MA	58,665
ABRY Partners VII	Boston	MA	122,085
ABRY Partners VIII	Boston	MA	438,135
ABRY Senior Equity II	Boston	MA	27,790
ADV Opportunities Fund I	Hong Kong	China	504,554
Advent International GPE VI-A	Boston	MA	134,331
Advent International GPE VII-B	Boston	MA	387,246
Advent International GPE VIII-B	Boston	MA	746,635
Advent Latin American Private Equity Fund IV	Boston	MA	80,514
Advent Latin American Private Equity Fund V	Boston	MA	151,360
Advent Latin American Private Equity Fund VI	Boston	MA	500,000
ASF VII B	New York	NY	456,164
ASF VII PA Coinvestment Fund	New York	NY	37,169
Asia Alternative Capital Partners V	San Francisco	CA	495,385
Asia Alternatives Capital Partners	San Francisco	CA	23,165
Asia Alternatives Capital Partners II	San Francisco	CA	90,740
Asia Alternatives Capital Partners III	San Francisco	CA	218,445
AXA Secondary Fund V B	Paris	France	138,448
Berkshire Fund VII	Boston	MA	142,974
Berkshire Fund VIII	Boston	MA	612,490
Blackstone Capital Partners VII	New York	NY	750,000
Capvis Equity IV	Baar	Switzerland	856,247
Carlyle Energy Mezz Opp Fund	New York	NY	389,192
Centerbridge Capital Partners I	New York	NY	123,002
Centerbridge Capital Partners III	New York	NY	408,733
Clearlake Capital Group	Santa Monica	CA	214,281
Clearlake Capital V	Santa Monica	CA	927,065
CVC Capital Partners VII	London	United Kingdom	1,648,905
Dover Street VII	Boston	MA	30,000
Energy Spectrum Partners V	Dallas	TX	31,432

# SERS FUND

## Investment Program | Expenses & Fees

### 2018 Manager Investment Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
<b>Private Equity (continued)</b>			
Eureka II	Yardley	PA	\$48,315
Eureka III	Yardley	PA	340,000
Francisco Partners III	San Francisco	CA	100,124
Francisco Partners IV	San Francisco	CA	173,991
FSN Capital IV	Oslo	Norway	333,820
FSN Capital V	Oslo	Norway	1,640,610
Great Hill Equity Partners IV	Boston	MA	202,774
GTCR XI	Chicago	IL	166,340
GTCR XII	Chicago	IL	606,033
H.I.G. Bayside Debt & LBO Fund II	London	United Kingdom	355,852
H.I.G. Bayside Loan Opportunity Fund III	London	United Kingdom	420,106
H.I.G. Bayside Loan Opportunity Fund IV	London	United Kingdom	315,351
H.I.G. Brazil and Latin America Partners	Rio de Janeiro	Brazil	1,250,000
H.I.G. Europe Capital Partners II	Miami	FL	1,483,837
H.I.G. Growth LBO & Equity Fund II	Miami	FL	239,461
Hahn & Company II	Seoul	Korea	939,429
Hahn & Company III	Seoul	Korea	507,473
HarbourVest Partners VII	Boston	MA	111,942
HarbourVest Partners VIII	Boston	MA	724,950
HarbourVest V-Asia Pacific & Rest of World	Boston	MA	193,188
Horizon Impact Fund - HarbourVest	Boston	MA	397,103
Horizon Impact Fund B - HarbourVest	Boston	MA	353,020
Insight Venture Partners IX	New York	NY	787,240
Insight Venture Partners VII	New York	NY	183,490
Insight Venture Partners VIII	New York	NY	740,614
Insight Venture X	New York	NY	1,949,444
JMI Equity Fund VI	Baltimore	MD	341,141
JMI Equity Fund VII	Baltimore	MD	145,972
JMI Equity Fund VIII	Baltimore	MD	365,000
Kelso VIII	New York	NY	151,020
Keystone Legacy Fund	West Hartford	CT	9,477,086
KPS Special Situations Fund IV	New York	NY	21,768
LBC Credit Partners III	Philadelphia	PA	537,931
Lexington Capital Partners VI	New York	NY	7,871
Lightspeed India Partners	New Delhi	India	357,750
Lightspeed Venture Partners VII	Menlo Park	CA	207,724
Lightspeed Venture Partners VIII	Menlo Park	CA	232,156
LLR Equity Partners III	Philadelphia	PA	185,996
LLR Equity Partners IV	Philadelphia	PA	612,504



# SERS FUND

## Investment Program | Expenses & Fees

### 2018 Manager Investment Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
<b>Private Equity (continued)</b>			
LLR PE Ptrn V	Philadelphia	PA	\$2,316,378
Madison Dearborn Capital Partners VI	Chicago	IL	134,895
Meritech Capital Partners IV	Palo Alto	CA	300,000
Meritech Capital Partners V	Palo Alto	CA	517,500
New Enterprise Associates 12	Baltimore	MD	306,953
Newbridge Asia IV	San Francisco	CA	45,995
NewSpring Growth Capital II	King of Prussia	PA	65,431
NewSpring Growth Capital III	King of Prussia	PA	338,896
Oaktree Opportunities Fund IX	Los Angeles	CA	579,653
Oaktree Opportunities Fund VIII	Los Angeles	CA	43,102
Oaktree Opportunities Fund VIIIb	Los Angeles	CA	96,539
OCM Opportunities Fund VII	Los Angeles	CA	20,876
OCM Opportunities Fund VIIb	Los Angeles	CA	53,125
OCM Power Opportunities Fund III	Los Angeles	CA	68,553
Permira VI	London	United Kingdom	983,886
Primavera Capital Fund II	Hong Kong	China	978,760
Providence Equity Partners VI	Providence	RI	61,951
Providence Strategic Growth II	Providence	RI	560,735
Providence Strategic Growth III	Providence	RI	1,500,000
Ridgemont Equity II	Charlotte	NC	198,860
RRJ Capital Master Fund III	Hong Kong	China	919,781
Silver Lake Partners V	Cupertino	CA	167,289
Sterling Group Partners IV	Houston	TX	372,965
T. Rowe Price Stock Distribution Account	Baltimore	MD	519,490
TDR Capital IV	London	United Kingdom	1,545,899
TPG Asia V	Fort Worth	TX	47,895
TPG Partners VI	Fort Worth	TX	134,981
Vista Equity Partners Fund VI	Oakland	CA	2,135,695
Weathergage Venture Capital	Redwood City	CA	164,024
Weathergage Venture Capital II	Redwood City	CA	208,125
Wind Point VIII	Chicago	IL	667,175
<b>Private Equity Manager Fees</b>			<b>54,015,572</b>
<b>Private Equity Manager Expenses</b>			<b>13,620,539</b>
<b>Total Private Equity Manager Investment Expenses</b>			<b>67,636,111</b>
<b>Global Public Equity</b>			
Ashmore Emerging Markets Small Cap <sup>1/</sup>	Arlington	VA	55,711
BlackRock MSCI Emerging Markets Index	New York	NY	534,316
BlackRock MSCI World Ex U.S. Index	New York	NY	603,406

# SERS FUND

## Investment Program | Expenses & Fees

### 2018 Manager Investment Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
<b>Global Public Equity (continued)</b>			
Delaware Emerging Markets	Philadelphia	PA	\$1,736,865
Emerald U.S. Small Cap Growth	Lancaster	PA	3,027,127
FIS Group	Philadelphia	PA	498,493
Globeflex Emerging Markets Small Cap	San Diego	CA	631,678
Harris Associates	Chicago	IL	4,009,585
Iridian Asset Management	Westport	CT	2,195,413
Martin Currie Emerging Markets All-Cap Concentrated	Edinburgh	United Kingdom	4,172,240
Mellon Capital Management Russell 1000 Index	Pittsburgh	PA	381,685
Mellon Capital Management Russell 2000 Core Index	Pittsburgh	PA	64,674
Mellon Capital Management Russell 2000 Value Index	Pittsburgh	PA	120,227
Walter Scott & Partners Limited	Edinburgh	United Kingdom	3,596,213
<b>Global Public Equity Manager Fees</b>			<b>21,627,633</b>
<b>Global Public Equity Manager Expenses</b>			<b>10,768</b>
<b>Total Global Public Equity Manager Investment Expenses</b>			<b>21,638,401</b>
<b>Real Estate</b>			
Berwind Investment Partnership IX	Yardley	PA	204,832
Berwind Investment Partnership V	Yardley	PA	573
Berwind Investment Partnership VI	Yardley	PA	8,126
Berwind Investment Partnership VII	Yardley	PA	96,632
Berwind Investment Partnership VIII	Yardley	PA	41,557
Blackstone Property Partners	New York	NY	1,482,103
Blackstone Real Estate Partners VI	New York	NY	77,435
Blackstone Real Estate Partners VII	New York	NY	580,716
CBRE Clarion Real Estate	Radnor	PA	486,421
CenterSquare Real Estate Securities	Plymouth Meeting	PA	469,716
Clerestory Small Cap Fund I	New York	NY	5,666
Colony Investors VIII	Los Angeles	CA	7,227
Fidelity Real Estate Opportunistic Income Fund	Smithfield	RI	419,991
Forest I.M.A.	Atlanta	GA	37,391
Hawkeye Scout Fund II	Austin	TX	253,669
Heitman American Real Estate Trust	Chicago	IL	1,352,402
Heitman I.M.A.	Chicago	IL	933,432
LaSalle I.M.A.	Chicago	IL	3,599,649
LEM Real Estate High-Yield Debt Fund III	Philadelphia	PA	147,012
Lowe GTO	Los Angeles	CA	940,972
Lowe I.M.A.	Los Angeles	CA	2,300,095

# SERS FUND

## Investment Program | Expenses & Fees

### 2018 Manager Investment Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
<b>Real Estate (continued)</b>			
Lubert Adler Fund IV	Philadelphia	PA	\$2,854
Lubert Adler Fund V	Philadelphia	PA	27,574
Lubert Adler Fund VI	Philadelphia	PA	38,521
Lubert Adler Fund VII	Philadelphia	PA	211,826
Mesirow RE Value III	Chicago	IL	458,333
Oak Street Real Estate Capital Fund IV, LP	Chicago	IL	173,015
Prudential Latin America Residential Fund III	Parsippany	NJ	46,743
Prudential Latin America Retail Fund I	Parsippany	NJ	3,916
Prudential Senior Housing IV	Parsippany	NJ	201,871
Prudential Senior Housing V	Parsippany	NJ	484,013
Rockpoint Finance Fund I	Dallas	TX	8,626
Rockpoint Real Estate Fund II	Dallas	TX	11,840
Rockpoint Real Estate Fund III	Dallas	TX	86,920
Rockpoint Real Estate Fund V	Dallas	TX	748,279
SRE Opportunity Fund III	Chicago	IL	908,333
Starwood Fund VIII	Greenwich	CT	144,600
UBS Trumbull Property Fund	Stamford	CT	735,381
UBS Trumbull Property Income Fund	Stamford	CT	702,154
ValStone Opportunity Fund V	Birmingham	MI	219,951
Westbrook Fund V	Dallas	TX	47,001
Westbrook Fund VI	Dallas	TX	54,028
Westbrook Fund VII	Dallas	TX	176,523
Westbrook Fund VIII	Dallas	TX	103,491
<b>Real Estate Manager Fees</b>			<b>19,041,410</b>
<b>Real Estate Manager Expenses</b>			<b>143,743</b>
<b>Total Real Estate Manager Investment Expenses</b>			<b>19,185,153</b>
<b>Multi-Strategy</b>			
Apollo Hybrid Value Fund	New York	NY	28,473
Blackstone Keystone	New York	NY	5,838,807
Eaton Vance Management	Boston	MA	397,139
ICG Europe VII	New York	NY	184,208
Mellon Capital Management Russell 3000 Index	Pittsburgh	PA	137,671
SEI Structured Credit Fund	Oaks	PA	2,879,704
TSSP TAO 4	San Francisco	CA	773,556
<b>Total Multi-Strategy Manager Investment Expenses</b>			<b>10,239,558</b>

# SERS FUND

## Investment Program | Expenses & Fees

### 2018 Manager Investment Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
<b>Legacy Hedge Funds<sup>1/</sup></b>			
Arden Keystone	New York	NY	\$34,785
Entrust Keystone	New York	NY	149,433
Mesirow Financial	Chicago	IL	10,149
PAAMCO	Irvine	CA	41,462
Rock Creek	Washington	DC	795
<b>Total Legacy Hedge Funds Manager Investment Expenses</b>			<b>236,624</b>
<b>Fixed Income</b>			
BNY Mellon Cash Investment Strategies	Pittsburgh	PA	273,737
Brandywine Global	Philadelphia	PA	750,117
Brown Brothers Harriman	New York	NY	264,376
New Century Advisors TIPS	Chevy Chase	MD	263,624
NISA Custom TIPS Intermediate	St. Louis	MO	482,808
PIMCO Core	Newport Beach	CA	1,436,035
PIMCO US Treasuries	Newport Beach	CA	499,122
Pyramis Global Advisors	Boston	MA	1,948,814
Stone Harbor Emerging Market Debt	New York	NY	664,458
Stone Harbor High Yield	New York	NY	684,978
Taplin Canida Habacht (TCH)	Miami	FL	420,201
<b>Total Fixed Income Manager Investment Expenses</b>			<b>7,688,270</b>
<b>Total Manager Investment Expenses</b>			<b>\$126,624,117</b>

<sup>1/</sup>Public market or hedge fund manager in liquidation or liquidated.

# **SERS Fund**

## **Portfolio Snapshots**

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

### Role in the SERS Fund

SERS Private Equity program seeks the highest return and growth opportunities, which capture market inefficiencies through active management in the private markets.

### Program Structure

Investments in Private Equity are in the form of closed-end limited partnership interests. As an investor, SERS is a limited partner and does not have control of distributions in Private Equity investments. The investment horizon is typically seven or more years. SERS Private Equity program endeavors to continue to build long-term strategic partnerships by investing in world class top-quartile funds. Private Equity investments require commitments greater than seven years and therefore, must offer premium returns to compensate for illiquidity and risks.

### Objective

The objective of the Private Equity program is to generate annualized net-of-fee returns that exceed the total return of public equity markets by at least 3% (illiquidity premium) and exceed the mean return for the asset class over a seven- to 10-year period.

Performance is measured relative to the following benchmarks:

- Public Market Benchmark – Russell 3000 + 300 basis points (illiquidity premium)
- Private Market Benchmark – Burgiss All Private Equity Custom Index

### Private Equity as of December 31, 2018

	Unfunded Commitments (\$ millions)	Fair Value (\$ millions)	% of Total Fund
<b>Core Sub-Asset Classes</b>			
Buyout	\$1,822.1	\$1,853.5	6.9%
Special Situations	272.5	550.2	2.1
Venture Capital	154.3	504.6	1.9
<b>Total Core Sub-Asset Classes</b>	<b>2,248.9</b>	<b>2,908.3</b>	<b>10.9</b>
<b>Non-Core Holdings<sup>1/</sup></b>			
Keystone Legacy Fund	211.5	1,002.9	3.7
<b>Total Private Equity</b>	<b>\$2,460.4</b>	<b>\$3,911.2</b>	<b>14.6%</b>

<sup>1/</sup>163 of SERS' Private Equity Holdings from each of the core sub-asset classes buyouts, special situations, and venture capital have been reclassified to non-core holdings to be managed through a special purpose vehicle, Keystone Legacy Fund.

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

### Portfolio Exposure

The Private Equity program is well diversified by sub-sector, geography, and industry focus. As of September 30, 2018, based on fair value, the program's exposure was:

<b>By Fund Sub-Sector</b>		<b>By Geography<sup>2/</sup></b>		<b>By Industry<sup>2/</sup></b>	
U.S. Private Equity	38.9%	United States	68.3%	Information Technology	30.5%
Non-U.S. <sup>1/</sup>	26.7	China	7.8	Financials	29.9
U.S. Venture Capital	16.5	United Kingdom	3.3	Consumer Discretionary	13.0
Distressed/Oppportunistic	12.6	South Korea	2.3	Industrials	9.0
Pennsylvania-Related	5.3	India	2.1	Health Care	7.8
		Germany	2.0	Energy	3.4
		Brazil	1.5	Materials	2.8
		Rest of World	12.7	Consumer Staples	2.0
				Telecommunication Services	1.0
				Utilities	0.6

<sup>1/</sup>Some managers with a domestic investment focus may invest globally. Thus, non-U.S. exposure measured on a portfolio company basis will be greater.

<sup>2/</sup>Geography and industry are determined by the portfolio company.

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

The capital committed column represents total dollars allocated from SERS to each limited partnership. Accumulated capital drawn is the portion of SERS capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The accumulated distributions column shows the value of capital and profits returned to SERS.

### Buyouts Committed, Drawn, and Distributed

	Active Buyout Funds Limited Partnership	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
1.	ABRY Partners IV	Middle	3/30/2001	\$35,000,000	\$25,497,290	\$74,633,973
	ABRY Partners V	Middle	7/29/2005	45,000,000	41,735,010	83,070,227
	ABRY Partners VI	Middle	3/26/2008	50,000,000	59,957,644	107,565,315
	ABRY Partners VII	Middle	8/10/2011	30,000,000	37,036,196	48,564,738
	ABRY Partners VIII	Middle	5/5/2015	25,000,000	23,018,013	7,648,750
2.	Advent Latin American Private Equity Fund IV	Middle	8/2/2007	30,000,000	30,797,073	39,725,921
	Advent International GPE VI-A	Large	7/7/2008	35,000,000	35,146,325	65,520,372
	Advent Latin American Private Equity Fund V	Middle	5/17/2010	15,000,000	14,430,000	5,287,500
	Advent International GPE VII-B	Large	12/6/2012	40,000,000	37,600,000	27,840,639
	Advent Latin American Private Equity Fund VI	Middle	5/11/2015	25,000,000	14,900,000	5,000,000
	Advent International GPE VIII-B	Large	9/26/2016	50,000,000	32,450,000	0
3.	Apollo Investment Fund IV	Mega	9/30/1998	75,000,000	74,838,620	124,814,033
	Apollo Investment Fund V	Mega	8/23/2001	50,000,000	44,972,146	122,447,998
	Apollo Investment Fund VI	Mega	7/19/2006	40,000,000	38,911,805	56,634,320
	Apollo Investment Fund IX	Mega	*	85,400,000	0	0
4.	Asia Alternatives Capital Partners	Fund of Funds	6/26/2007	50,000,000	25,175,064	39,839,925
	Asia Alternatives Capital Partners II	Fund of Funds	3/7/2008	50,000,000	28,716,277	34,110,627
	Asia Alternatives Korea Buyout Investors (Hahn & Co)	Small	7/22/2011	7,000,000	8,409,401	7,785,068
	Asia Alternatives Capital Partners III	Fund of Funds	8/3/2012	50,000,000	52,143,408	30,087,985
	Penn Asia Investors	Fund of Funds	9/28/2012	133,000,000	72,121,076	29,232,874
	Asia Alternatives Capital Partners V	Fund of Funds	10/5/2017	50,000,000	3,091,094	79,869
5.	Audax Private Equity Fund VI	Middle	*	75,000,000	0	0
	Audax Private Equity Fund	Middle	5/25/2000	35,000,000	36,839,098	56,057,910
	Audax Private Equity Fund II	Middle	6/17/2005	25,000,000	25,517,152	45,240,610
	Audax Private Equity Fund III	Middle	11/7/2007	37,000,000	42,498,691	75,668,400
	Audax Private Equity Fund V	Middle	1/25/2016	50,000,000	27,841,604	3,687,612
6.	Berkshire Fund VI	Middle	7/11/2002	20,000,000	18,828,770	50,433,676
	Berkshire Fund VII	Middle	11/15/2006	32,000,000	32,612,736	59,036,527
	Berkshire Fund VIII	Middle	8/25/2011	30,000,000	29,081,458	28,336,796



# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

### Buyouts Committed, Drawn, and Distributed (continued)

Active Buyout Funds Limited Partnership	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
7. Blackstone Communications Partners I	Mega	8/29/2000	\$25,000,000	\$25,114,042	\$30,998,189
Blackstone Capital IV	Mega	2/26/2003	75,000,000	69,055,278	187,102,881
Blackstone Capital Partners V	Mega	5/30/2006	150,000,000	149,911,432	234,220,011
Blackstone Capital Partners VII	Mega	10/21/2016	50,000,000	21,080,759	1,046,910
8. Capvis Equity IV	Middle	1/30/2014	49,855,591	41,764,846	29,023,875
9. Carlyle Energy Mezzanine Opportunities Fund	Small	9/5/2012	50,000,000	60,664,539	25,597,737
Horizon Strategic Fund - Carlyle Group	Small	1/23/2014	100,000,000	86,075,971	16,934,926
10. CVC Capital Partners VII	Mega	*	91,202,040	0	0
11. Energy Spectrum Partners V	Small	7/9/2007	28,326,735	27,637,356	51,487,729
12. Eureka II	Growth Equity	1/30/2006	20,000,000	21,807,603	20,777,356
Eureka Growth Capital III	Growth Equity	10/21/2013	20,000,000	12,849,982	10,514,420
13. Francisco Partners	Middle	7/27/2000	50,000,000	47,769,948	61,464,903
Francisco Partners II	Middle	7/10/2006	30,000,000	29,383,916	41,240,515
Francisco Partners III	Middle	10/17/2011	20,000,000	20,046,401	27,949,721
Francisco Partners IV	Middle	4/15/2015	25,000,000	24,597,173	2,822,173
14. FSN Capital IV	Middle	12/19/2013	46,049,703	37,755,593	35,577,736
FSN Capital V	Middle	1/4/2017	77,189,328	20,495,041	7,103,931
15. GTCR VIII	Middle	7/7/2003	75,000,000	69,393,599	120,471,948
GTCR IX	Middle	12/1/2006	50,000,000	47,916,718	86,149,702
GTCR Fund XI	Middle	9/2/2014	25,000,000	21,649,585	11,061,321
GTCR Fund XII	Large	3/31/2018	32,500,000	1,677,000	286,544
16. Great Hill Equity Partners III	Middle	3/7/2006	35,000,000	35,000,000	41,373,122
Great Hill Equity Partners IV	Middle	9/8/2008	25,000,000	25,125,662	43,569,581
17. H.I.G. Growth Buyouts & Equity Fund II	Growth Equity	7/20/2011	15,000,000	12,635,329	4,086,778
H.I.G. Europe Capital Partners II	Small	1/10/2014	27,544,596	16,364,744	542,327
H.I.G. Brazil and Latin America Partners	Middle	8/12/2015	50,000,000	16,619,177	9,139
18. Hahn & Company II	Middle	5/29/2015	50,000,000	39,771,304	4,640,962
Hahn & Company III	Middle	*	56,250,000	0	0
Hahn & Company III - Supplemental Fund	Middle	*	18,750,000	0	0
19. HarbourVest IPEP III	Fund of Funds	6/30/1998	40,000,000	39,400,000	61,092,165
HarbourVest Partners VI	Fund of Funds	5/7/1999	200,000,000	196,586,055	249,916,050
HarbourVest Partners VII	Fund of Funds	3/24/2003	75,000,000	73,687,500	103,049,718
HIPEP V-Asia Pacific & Rest of World	Fund of Funds	5/9/2006	30,000,000	28,245,316	34,025,749
HarbourVest Partners VIII	Fund of Funds	10/5/2006	100,000,000	98,000,000	120,879,011
Horizon Impact Fund	Small	10/24/2014	50,000,000	39,004,802	10,399,736
Horizon Impact Fund B	Small	5/31/2017	100,000,000	17,250,000	0

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

### Buyouts Committed, Drawn, and Distributed (continued)

Active Buyout Funds Limited Partnership	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
20. Hellman & Friedman Capital Partners IX	Buyout	*	\$90,000,000	\$0	\$0
Hellman & Friedman Capital Partners V	Large	12/20/2004	80,000,000	71,563,406	192,198,376
Hellman & Friedman Capital Partners VI	Large	6/5/2007	125,000,000	119,913,412	217,035,494
Hellman & Friedman Capital Partners VIII	Large	9/1/2016	50,000,000	34,486,364	3,530,532
21. Incline Equity Partners III	Small	1/14/2013	15,000,000	15,637,582	13,568,696
22. JMI Equity Fund V	Growth Equity	6/7/2005	24,000,000	24,009,205	128,903,788
JMI Equity Fund VI	Growth Equity	6/27/2007	40,000,000	40,000,246	67,630,800
JMI Equity Fund VII	Growth Equity	2/14/2011	10,000,000	9,780,000	10,289,532
JMI Equity Fund VIII	Growth Equity	10/1/2015	25,000,000	18,025,000	5,700,223
23. Kelso VII	Middle	10/18/2004	40,000,000	41,169,937	65,700,625
Kelso VIII	Middle	11/29/2007	150,000,000	146,004,916	127,302,885
24. LLR Equity Partners II	Middle	1/29/2004	25,000,000	25,000,000	44,945,591
LLR Equity Partners III	Middle	7/24/2008	30,000,000	29,108,722	38,837,202
LLR Equity Partners IV	Middle	3/14/2014	50,000,000	45,485,764	26,526,316
LLR Equity Partners V	Middle	3/21/2018	75,000,000	14,710,417	2,706,267
25. Madison Dearborn Capital Partners IV	Middle	4/2/2001	90,000,000	90,365,390	169,072,775
Madison Dearborn Capital Partners V	Middle	10/20/2006	75,000,000	71,558,278	113,628,059
Madison Dearborn Capital Partners VI	Middle	5/27/2008	50,000,000	51,070,609	74,156,247
26. NGP Keystone	Large	*	25,000,000	0	0
NGP XII	Large	*	75,000,000	0	0
27. Newbridge Asia IV	Middle	9/27/2005	40,000,000	38,903,378	85,754,593
28. NewSpring Growth Capital II	Growth Equity	12/5/2006	10,000,000	9,850,000	13,962,639
NewSpring Growth Capital III	Growth Equity	7/27/2012	25,000,000	22,397,102	2,218,985
29. OCM/GFI Power Opportunities Fund II	Small	5/9/2005	25,000,000	13,470,852	41,644,215
Oaktree Power Opportunities Fund III	Middle	10/18/2010	25,000,000	17,464,459	22,150,923
30. Permira European Fund II	Large	6/7/2000	48,000,000	45,672,612	91,464,087
Permira European Fund III	Large	1/12/2004	115,960,000	127,340,454	217,778,356
Permira IV	Large	12/14/2006	127,779,198	137,230,712	203,511,684
Permira VI	Large	1/10/2017	56,202,000	25,473,614	0
31. Primavera Capital Fund II	Large	11/17/2015	50,000,000	49,733,659	3,601,127
32. Providence Equity Partners IV	Large	11/27/2000	25,000,000	23,420,840	56,065,270
Providence Equity Partners V	Large	4/4/2005	45,000,000	42,692,171	51,743,883
Providence Equity Partners VI	Large	3/16/2007	50,000,000	53,854,821	56,559,060
Providence Strategic Growth II	Small	12/7/2016	60,000,000	47,789,012	18,335,697
Providence Strategic Growth III	Small	3/31/2018	75,000,000	13,325,397	7,852
33. Ridgmont Equity Partners II	Small	11/30/2015	50,000,000	38,267,743	8,709,714
34. Sentinel Capital Partners V	Middle	7/15/2014	10,000,000	8,671,252	4,324,736
35. Silver Lake Partners V	Large	3/31/2018	78,000,000	15,452,880	0

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

### Buyouts Committed, Drawn, and Distributed (continued)

	Active Buyout Funds Limited Partnership	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
36.	Sterling Group Partners IV	Middle	6/15/2016	\$20,000,000	\$7,906,532	\$342,813
37.	TA X	Middle	4/25/2006	70,000,000	69,732,009	90,382,009
38.	TDR Capital IV	Middle	*	83,638,400	0	0
39.	Thoma Bravo Fund XIII	Mega	*	75,000,000	0	0
40.	TPG Partners III	Mega	1/13/2000	75,000,000	64,119,169	165,990,273
	TPG Partners IV	Mega	12/29/2003	30,000,000	27,981,463	57,884,226
	TPG Partners V	Mega	6/27/2006	88,831,038	92,531,812	116,367,518
	TPG Asia V	Large	2/19/2008	22,500,000	21,964,311	21,268,474
	TPG Partners VI	Mega	5/22/2008	44,294,641	50,104,252	57,470,348
41.	TSG8	Middle	*	100,000,000	0	0
42.	Vista Equity Partners Fund VII	Large	*	75,000,000	0	0
	Vista Equity Partners Fund VI	Large	12/29/2016	150,000,000	138,018,382	2,489,894
43.	Wind Point Partners VIII	Small	9/14/2017	100,000,000	44,872,788	3,870,252
<b>Total Active Buyouts</b>				<b>\$6,231,273,270</b>	<b>\$4,484,633,546</b>	<b>\$5,599,400,567</b>

Cash flows as of September 30, 2018.

\*Not funded as of September 30, 2018.

<sup>1/</sup>Commitments as of December 31, 2018.

<sup>2/</sup>Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

The capital committed column represents total dollars allocated from SERS to each limited partnership. Accumulated capital drawn is the portion of SERS capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The accumulated distributions column shows the value of capital and profits returned to SERS.

### Special Situations Committed, Drawn, and Distributed

Active Special Situations Funds Limited Partnership	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
1. ABRY Mezzanine Partners	Mezzanine	3/15/2002	\$30,000,000	\$26,731,187	\$49,707,116
ABRY Senior Equity II	Mezzanine	7/27/2006	30,000,000	28,237,194	44,861,146
ABRY Advanced Securities Fund	Distressed/Restructuring	8/1/2008	25,000,000	23,430,048	38,682,209
2. ADV Opportunities Fund I	Distressed/Restructuring	10/5/2015	50,000,000	52,830,992	5,047,634
3. AXA Secondary Fund III	Secondaries	11/19/2004	26,000,000	21,737,894	37,244,706
AXA Secondary Fund III-2	Secondaries	11/24/2004	14,000,000	11,677,210	19,062,764
AXA Secondary Fund IV	Secondaries	2/26/2007	80,000,000	70,134,752	98,638,689
AXA Secondary Fund V B	Secondaries	6/19/2012	75,000,000	61,318,230	83,447,664
ASF VII B LP	Secondaries	2/19/2016	100,000,000	30,768,276	303,544
ASF VII PA Co-Invest	Secondaries	5/18/2016	50,000,000	19,897,216	0
4. Avenue Asia Special Situations Fund IV	Distressed/Restructuring	6/30/2006	50,000,000	31,897,973	34,473,134
Avenue Special Situations Fund VI	Distressed/Restructuring	11/2/2010	20,000,000	20,068,464	20,720,289
5. Centerbridge Capital Partners I	Distressed/Restructuring	2/27/2007	50,000,000	57,244,781	109,750,572
Centerbridge Capital Partners III	Distressed/Restructuring	5/21/2015	30,000,000	16,341,078	4,455,977
6. Clearlake Capital Partners IV	Distressed/Restructuring	9/1/2015	15,000,000	15,993,263	9,262,748
Clearlake Capital Partners V	Distressed/Restructuring	2/1/2018	55,000,000	12,105,324	13,248
7. Dover Street VII	Secondaries	7/2/2008	30,000,000	28,696,128	37,014,173
8. H.I.G. Bayside Debt & LBO Fund II	Distressed/Restructuring	6/17/2008	30,000,000	30,982,191	36,627,337
H.I.G. Bayside Loan Opp. Fund III	Distressed/Restructuring	6/12/2013	50,000,000	40,418,122	19,171,731
H.I.G. Bayside Loan Opp. Fund IV	Distressed/Restructuring	1/16/2015	25,000,000	12,742,811	6,923,518
9. KPS Special Situations Fund IV	Distressed/Restructuring	5/8/2014	25,000,000	12,311,512	7,148,620
10. LBC Credit Partners III	Mezzanine	3/4/2013	50,000,000	46,770,412	38,902,404
11. Lexington Capital Partners III	Secondaries	1/26/1999	35,000,000	34,516,449	43,363,378
Lexington Capital Partners V	Secondaries	1/17/2002	75,000,000	74,623,418	124,262,980
Lexington Capital Partners VI	Secondaries	10/21/2005	50,000,000	53,066,325	67,778,343

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

### Special Situations Committed, Drawn, and Distributed (continued)

Active Special Situations Funds Limited Partnership	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
12. OCM Opportunities Fund IV	Distressed/Restructuring	9/26/2001	\$70,000,000	\$70,000,000	\$115,676,649
Oaktree Capital Management	Distressed/Restructuring	5/28/2004	40,000,000	40,581,778	130,313,268
OCM Opportunities Fund V	Distressed/Restructuring	8/12/2004	40,000,000	40,003,507	65,384,725
OCM Opportunities Fund VI	Distressed/Restructuring	9/28/2005	40,000,000	40,000,000	63,171,009
OCM Principal Opportunities Fund IV	Distressed/Restructuring	1/24/2007	20,000,000	20,400,000	34,019,822
OCM Opportunities Fund VII	Distressed/Restructuring	5/16/2007	40,000,000	40,000,000	52,739,295
OCM Opportunities Fund VII b	Distressed/Restructuring	6/3/2008	40,000,000	36,000,000	60,255,994
OCM Opportunities Fund VIII	Distressed/Restructuring	9/20/2010	12,500,000	12,583,425	17,147,629
OCM Opportunities Fund VIII b	Distressed/Restructuring	8/22/2011	12,500,000	12,500,000	9,480,383
Oaktree Opportunities Fund IX	Distressed/Restructuring	3/26/2013	50,000,000	50,000,000	16,447,715
13. Platinum Equity Capital Partners III	Distressed/Restructuring	8/5/2013	50,000,000	45,366,112	47,710,334
14. RRJ Capital Master Fund III	Distressed/Restructuring	12/10/2015	50,000,000	35,290,365	2,254,306
<b>Total Active Special Situations</b>			<b>\$1,535,000,000</b>	<b>\$1,277,266,437</b>	<b>\$1,551,465,053</b>

Cash flows as of September 30, 2018.

<sup>1/</sup>Commitments as of December 31, 2018.

<sup>2/</sup>Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

The capital committed column represents total dollars allocated from SERS to each limited partnership. Accumulated capital drawn is the portion of SERS capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The accumulated distributions column shows the value of capital and profits returned to SERS.

### Venture Capital Committed, Drawn, and Distributed

Active Venture Capital Funds Limited Partnership	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
1. Battery Ventures VIII	Balanced	8/13/2007	\$25,000,000	\$25,050,751	\$52,255,913
Battery Ventures VIII Side Car Fund	Balanced	8/29/2008	9,000,000	6,803,790	17,412,210
2. Insight Venture Partners VI	Balanced	8/21/2007	30,000,000	32,244,176	73,211,458
Insight Venture Partners VII	Balanced	4/27/2011	20,000,000	21,320,103	20,375,609
Insight Venture Partners VIII	Balanced	7/10/2013	50,000,000	52,250,000	22,790,180
Insight Venture Partners IX	Balanced	3/24/2015	50,000,000	47,875,000	5,351,113
Insight Venture Partners X	Balanced	3/31/2018	100,000,000	21,000,000	0
3. Lightspeed Venture Partners VII	Early Stage	2/27/2006	18,000,000	18,000,000	48,795,961
Lightspeed Venture Partners VIII	Early Stage	6/27/2008	15,000,000	14,550,000	24,023,518
Lightspeed India Partners I	Early Stage	8/14/2015	15,000,000	11,175,000	0
4. Meritech Capital Partners II	Late Stage	1/2/2001	26,475,166	24,842,529	40,350,206
Meritech Capital Partners III	Late Stage	4/5/2006	35,000,000	35,000,000	187,689,525
Meritech Capital Partners IV	Late Stage	2/10/2011	20,000,000	19,100,000	21,729,175
Meritech Capital Partners V	Late Stage	9/3/2014	23,000,000	21,332,500	1,465,847
5. New Enterprise Associates IX	Early Stage	11/15/1999	20,000,000	19,600,000	7,721,519
New Enterprise Associates X	Early Stage	12/11/2000	35,000,000	35,028,000	32,493,542
New Enterprise Associates 11	Early Stage	3/1/2004	25,000,000	25,000,000	58,004,534
New Enterprise Associates 12	Early Stage	6/26/2006	35,000,000	35,631,130	42,164,278
6. T.Rowe Price Stock Distribution Account <sup>3/</sup>	Late Stage	1/3/2005	0	999,119,561	982,610,757
7. TCV X	Large	*	75,000,000	0	0
8. Weathergage Venture Capital	Fund of Funds	6/26/2007	25,000,000	22,875,000	27,361,174
Weathergage Venture Capital II	Fund of Funds	6/29/2010	25,000,000	23,250,000	8,991,238
<b>Total Active Venture Capital</b>			<b>\$676,475,166</b>	<b>\$1,511,047,540</b>	<b>\$1,674,797,757</b>

Cash flows as of September 30, 2018.

\*Not funded as of September 30, 2018.

<sup>1/</sup>Commitments as of December 31, 2018.

<sup>2/</sup>Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

<sup>3/</sup>T. Rowe Price acts as a stock liquidation account. All cash and stock distributions are reflected in the corresponding distributions.

# SERS FUND

## Investment Program | Portfolio Snapshot | Private Equity

The capital committed column represents total dollars allocated from SERS to each limited partnership. Accumulated capital drawn is the portion of SERS capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The accumulated distributions column shows the value of capital and profits returned to SERS.

### Legacy Private Equity Committed, Drawn, and Distributed

Legacy Private Equity Funds Limited Partnership	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
1. Keystone Legacy Fund <sup>3/</sup>	Various	7/1/2018	\$5,502,595,213	\$5,483,352,580	\$6,674,680,914
<b>Total Legacy Private Equity</b>			<b>\$5,502,595,213</b>	<b>\$5,483,352,580</b>	<b>\$6,674,680,914</b>

Cash flows as of September 30, 2018.

<sup>1/</sup>Commitments as of December 31, 2018.

<sup>2/</sup>Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

<sup>3/</sup>Effective July 1, 2018, 163 Private Equity Holdings with total commitments in the aggregate of \$5.5 billion were reclassified from each of the core sub-asset classes buyouts, special situations, and venture capital to non-core holdings to be managed through a special purpose vehicle, Keystone Legacy Fund.

# SERS FUND

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## Investment Program | Portfolio Snapshot | Global Public Equity

### Role in the SERS Fund

SERS Global Public Equity program seeks high returns through capital appreciation and income from dividend payments while also improving the total fund's liquidity. SERS Global Public Equity program contributes a high expected long-term return to the fund but also may be the greatest contributor to near-term volatility.

### Program Structure

Investments in public equity are achieved through buying and holding publicly-traded securities of companies throughout the developed world and in emerging markets. These companies exhibit a wide range of market capitalizations in many industries and sectors, and offer vastly different equity return opportunities.

### Objective

The objective of the Global Public Equity program is to generate annualized net-of-fee returns that exceed its benchmark, the MSCI All Country World Investable Market Index, over a three- to five-year period.



# SERS FUND

## Investment Program | Portfolio Snapshot | Global Public Equity

### Global Public Equity

Manager	Investment Style	Market Exposure as of 12/31/18 <sup>4/</sup> (\$ millions)
<b>Global Mandates</b>		
1. Walter Scott & Partners Limited	Global Growth	\$865.9
<b>Total Global Mandates</b>		<b>865.9</b>
<b>U.S. Equity</b>		
2. Emerald Advisers	U.S. Small-cap growth	564.4
3. Iridian Asset Management	U.S. Mid-cap value	371.9
4. Mellon Capital Management Russell 1000 Index	Russell 1000 Index	4,804.8
Mellon Capital Management Russell 2000 Core Index	Russell 2000 Core	277.7
Mellon Capital Management Russell 2000 Value Index	Russell 2000 Value	508.0
<b>Total U.S. Equity</b>		<b>6,526.8</b>
<b>Non-U.S. Developed Markets Equity</b>		
5. Artisan Partners - Global ex U.S.	Global ex-U.S. growth	1.2
6. BlackRock MSCI World ex U.S. Index	Developed ex-U.S. Index	4,254.0
7. Harris Associates	Non-U.S. Small-cap value	479.1
Mellon Capital Management MSCI World ex U.S. Index	MSCI World ex-U.S. Index	6.4
8. Morgan Stanley Investment Management Limited-developed ex U.S.	EAFE value	1.4
9. Templeton Investment Counsel - Global ex U.S.	Global ex-U.S. value	1.4
10. FIS Group Inc.	International Small-cap	174.6
<b>Total Non-U.S. Developed Markets Equity</b>		<b>4,918.1</b>
<b>Emerging Markets Equity</b>		
BlackRock/Emerging Markets Index Fund	MSCI Emerging Markets Index	623.5
11. GlobeFlex Capital	Small-cap - GARP	84.0
12. Macquarie Emerging Markets	Mid/large cap value	296.2
13. Martin Currie Investment Management	All-cap	285.1
14. Leading Edge	Emerging Markets	201.1
<b>Total Emerging Markets Equity</b>		<b>1,489.9</b>
<b>Transition Assets</b>		
15. Northern Trust	Transition	1.3
<b>Total Transition Assets</b>		<b>1.3</b>
<b>Total Global Public Equity</b>		<b>\$13,802.0</b>

<sup>4/</sup>Includes securities and cash, which the manager had available for investment.

# SERS FUND

## Investment Program | Portfolio Snapshot | Real Estate

### Role in the SERS Fund

Real Estate has several roles within SERS overall investment portfolio, including enhancing returns and providing diversification, income, and an inflation hedge. As in the past, SERS has emphasized a balance between value-add/opportunistic real estate strategies which can provide competitive total returns through capital appreciation, with core/core plus strategies, which have a larger emphasis on income, and in many cases, increased liquidity. SERS will seek to achieve this balanced risk profile by focusing on top-tier managers in each aspect of Real Estate, which is expected to result in attractive, long-term risk-adjusted returns.

### Program Structure

Investments in Real Estate are categorized into four strategies: core/core plus, value-add and opportunistic, real estate securities, and natural resources/infrastructure related strategies and funds. SERS will build its Real Estate allocation towards its long-term target by steadily increasing investments in both relatively stable, core/core plus investments as well as value-add and opportunistic strategies. New target allocations within the Real Estate program are designed to balance expected return, liquidity, diversification, and inflation hedging, while decreasing expected risk. SERS Real Estate program is subject to the investment pacing established by the investment plan to help manage the liquidity profile of the total fund to align with the projected increase in retirement benefit payments.

### Objective

The objective of the Real Estate program is to generate annualized net-of-fee returns that exceed a custom benchmark (NCREIF Fund Index - Open End Diversified Core Equity, FTSE NAREIT U.S. Real Estate Index for real estate securities, & CPI plus a 3% premium for natural resources/infrastructure, with the various components weighted according to long-term allocation targets within the asset class), over a seven- to 10-year period.

### Real Estate

as of December 31, 2018

Sub-Asset Class	Fair Value (\$ millions)	% of Total Fund
Core/Core Plus <sup>1/</sup>	\$589.4	2.2%
Value Add/Opportunistic SMA	716.5	2.7
Value Add/Opportunistic Funds <sup>1/</sup>	400.7	1.5
Natural Resources/Infrastructure	5.6	0.0
Real Estate Securities (REITs)	223.7	0.8
<b>Total Real Estate</b>	<b>\$1,935.9</b>	<b>7.2%</b>

<sup>1/</sup>As of September 30, 2018, unfunded commitments are \$383.5 million.

# SERS FUND

## Investment Program | Portfolio Snapshot | Real Estate

The capital committed column represents total dollars allocated from SERS to each fund/manager. Accumulated capital drawn is the portion of SERS capital commitments drawn by the fund/manager to be invested. This amount may also include recycled capital (capital that was distributed and later recalled by the manager to be reinvested) as well as manager fees paid outside of the fund. The accumulated distributions column shows the value of capital and profits returned to SERS.

### Real Estate

Fund/Manager	Asset Type	SERS Initial Funding	Capital Committed <sup>v</sup>	Accumulated Capital Drawn	Accumulated Distributions
<b>Core/Core Plus</b>					
1. Blackstone Property Partners	Diversified	2017	\$300,000,000	\$300,000,000	\$2,180,246
2. Heitman America Real Estate Trust	Diversified	2007	100,000,000	100,000,000	0
3. UBS Trumbull Property Fund	Diversified	1988	25,558,525	25,558,525	67,265,772
UBS Trumbull Property Income Fund	Diversified	1988	33,332,027	33,332,027	87,606,992
<b>Total Core/Core Plus</b>			<b>458,890,552</b>	<b>458,890,552</b>	<b>157,053,010</b>
<b>Value Add/Opportunistic Funds</b>					
4. AG Asia Realty Fund	Diversified	2007	25,000,000	23,500,000	20,812,500
5. Apollo Real Estate Fund III	Diversified	1998	50,000,000	50,000,000	74,810,023
6. Berwind Investment Partnership V	Diversified	1999	25,000,000	24,136,964	43,926,194
Berwind Investment Partnership VI	Diversified	2002	25,000,000	24,543,712	41,584,267
Berwind Investment Partnership VII	Diversified	2005	25,000,000	25,000,000	9,095,711
Berwind Investment Partnership VIII	Diversified	2007	15,588,238	14,912,018	19,049,366
Berwind Investment Partnership IX	Diversified	2012	25,000,000	24,303,409	22,328,308
Blackstone Real Estate Partners IV	Diversified	2003	25,000,000	25,000,000	36,944,774
Blackstone Real Estate Partners V	Diversified	2006	50,000,000	47,912,974	92,970,654
Blackstone Real Estate Partners VI	Diversified	2007	75,000,000	71,319,075	145,326,608
Blackstone Real Estate Partners VII	Diversified	2011	75,000,000	63,677,499	65,529,067
7. C-III Recovery Fund III	Diversified	2017	100,000,000	19,671,122	0
8. Clerestory Small Cap Fund I	Diversified	2010	18,000,000	15,228,956	13,844,513
9. Colony Investors VIII	Diversified	2007	22,500,000	21,655,800	7,962,017
10. Fidelity Real Estate Opportunistic Income Fund	Debt	2007	35,000,000	35,000,000	75,242,679
11. Fillmore West Fund	Diversified	2008	30,000,000	29,342,336	31,763,691
12. Hawkeye Scout Fund I	Diversified	2009	75,000,000	75,000,000	116,323,890
Hawkeye Scout Fund II	Diversified	2016	30,000,000	27,630,079	0
13. LEM Real Estate High-Yield Debt Fund III	Debt	2013	25,000,000	6,795,058	20,772,914

# SERS FUND

## Investment Program | Portfolio Snapshot | Real Estate

### Real Estate (continued)

Fund / Manager	Asset Type	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions
14. Lubert Adler Fund III	Diversified	2000	\$30,000,000	\$28,729,020	\$44,171,118
Lubert Adler Fund IV	Diversified	2004	25,000,000	23,820,755	11,552,208
Lubert Adler Fund V	Diversified	2006	30,000,000	30,000,000	5,783,261
Lubert Adler Fund VI	Diversified	2008	20,927,116	19,200,031	15,763,543
Lubert Adler Fund VI-A	Diversified	2010	4,072,884	3,347,634	6,209,104
Lubert Adler Fund VII	Diversified	2014	25,000,000	22,925,725	6,211,006
15. Mesirow Financial Real Estate Value Fund III	Diversified	2018	25,000,000	7,405,659	74,261
16. Oak Street Real Estate Fund IV	Diversified	2017	100,000,000	24,857,109	751,893
17. OCM Real Estate Opp Fund III	Diversified	2003	25,000,000	25,000,000	42,218,554
18. Oxford GSA Fund	Diversified	2006	30,000,000	21,369,627	18,384,338
19. Prudential Latin America Retail Fund I	Retail	2006	25,000,000	2,271,117	8,162,626
Prudential Latin America Residential Fund III	Multi-Family	2008	29,654,968	24,708,749	11,380,777
Prudential Senior Housing Fund IV	Senior Housing	2011	25,000,000	20,799,516	16,718,852
Prudential Senior Housing Fund V	Senior Housing	2015	50,000,000	30,958,534	1,782,081
20. Rockpoint Finance Fund I	Residential Land	2007	50,000,000	2,527,500	1,899,395
Rockpoint Real Estate Fund II	Diversified	2005	35,000,000	34,138,784	30,679,156
Rockpoint Real Estate Fund III	Diversified	2007	50,000,000	46,391,722	65,247,824
Rockpoint Real Estate Fund V	Diversified	2015	50,000,000	25,946,245	0
21. Singerman III	Diversified	2017	50,000,000	2,000,000	0
Singerman III Select	Diversified	*	50,000,000	0	0
22. Starwood Fund IV	Diversified	1997	37,750,000	37,750,000	81,388,229
Starwood Fund VI	Diversified	2001	50,000,000	50,000,000	51,299,808
Starwood Fund VII	Diversified	2006	35,000,000	35,000,000	25,486,147
Starwood Fund VIII	Diversified	2009	50,000,000	45,356,281	67,386,219
23. ValStone Opportunity Fund V	Diversified	2014	14,663,402	14,663,402	3,209,834
24. Westbrook Fund V	Diversified	2004	25,000,000	25,000,000	44,485,779
Westbrook Fund VI	Diversified	2006	35,000,000	35,000,000	31,087,858
Westbrook Fund VII	Diversified	2007	50,000,000	50,000,000	50,363,635
Westbrook Fund VIII	Diversified	2009	50,000,000	50,000,000	62,318,055
<b>Total Value Add/Opportunistic Funds</b>			<b>1,828,156,608</b>	<b>1,363,796,412</b>	<b>1,542,302,738</b>

# SERS FUND

## Investment Program | Portfolio Snapshot | Real Estate

### Real Estate (continued)

Fund / Manager	Asset Type	SERS Initial Funding	Capital Committed <sup>4/</sup>	Accumulated Capital Drawn	Accumulated Distributions
<b>Value Add/Oppportunistic SMA<sup>2/</sup></b>					
Heitman I.M.A.	Diversified	1988	NA	\$813,635,039	\$1,092,759,873
25. LaSalle I.M.A.	Diversified	1994	NA	444,715,936	527,795,686
LaSalle Takeover I.M.A.	Diversified	2018	NA	204,196,078	0
26. HotelAVE I.M.A.	Hotel	2018	NA	58,890,000	0
27. Lowe I.M.A.	Diversified	1994	NA	715,229,496	1,069,043,541
Lowe GTO	Diversified	2012	NA	349,069,212	343,848,419
<b>Total Value Add/Oppportunistic SMA</b>				<b>2,585,735,760</b>	<b>3,033,447,518</b>
<b>Natural Resources/Infrastructure<sup>2/</sup></b>					
28. Forest I.M.A.	Timberland	1992	NA	124,231,969	242,367,376
<b>Total Natural Resources/Infrastructure</b>				<b>124,231,969</b>	<b>242,367,376</b>
<b>REITs<sup>2/</sup></b>					
29. CBRE Clarion Real Estate Securities	Diversified	1996	NA	210,848,120	669,514,323
30. CenterSquare Real Estate Securities	Diversified	2002	NA	26,282,779	36,168,336
<b>Total REITs</b>				<b>237,130,899</b>	<b>705,682,659</b>
<b>Total Real Estate</b>			<b>\$2,287,047,160</b>	<b>\$4,769,785,592</b>	<b>\$5,680,853,301</b>

Cash flows as of September 30, 2018.

<sup>\*/</sup>Not funded as of September 30, 2018.

<sup>4/</sup>Commitments as of December 31, 2018.

<sup>2/</sup>Due to the nature of the investments, there are no capital commitments for value add/opportunistic SMA, natural resources/infrastructure, and real estate securities managers.

# SERS FUND

## Investment Program | Portfolio Snapshot | Multi-Strategy

### Role in the SERS Fund

SERS Multi-Strategy program is structured to provide attractive long-term returns which capture market inefficiencies through active management in multiple markets. Multi-Strategy increases investment flexibility to invest in strategies with high return generating potential which may not fit the characteristics of other asset classes.

### Program Structure

SERS Multi-Strategy program invests in a diverse set of strategies including distressed debt, direct lending, structured credit, niche credit, and opportunistic equity. The program will be less liquid than traditional strategies.

### Objective

The objective of the Multi-Strategy program is to generate annualized net-of-fee returns that exceed the public equity market over a long-term period but with lower volatility and beta to traditional markets, measured by recession to recession. The benchmark is the S&P/LSTA Leveraged Loan Index.

#### Multi-Strategy

as of December 31, 2018

Sub-Asset Class	Fair Value (\$ millions)	% of Total Fund
Private Credit Funds <sup>1/</sup>	\$90.8	0.3%
Credit-Focused Strategies	892.3	3.3
Opportunistic Equity and Fixed Income	1,386.1	5.2
<b>Total Multi-Strategy</b>	<b>\$2,369.2</b>	<b>8.8%</b>

<sup>1/</sup>As of September 30, 2018, unfunded commitments are \$802.6 million.

# SERS FUND

## Investment Program | Portfolio Snapshot | Multi-Strategy

### Private Markets

The capital committed column represents total dollars allocated from SERS to each limited partnership. Accumulated capital drawn is the portion of SERS capital commitments drawn by the general partner to be invested with underlying portfolio companies along with any reinvested capital. The accumulated distributions column shows the value of capital and profits returned to SERS.

#### Private Credit Committed, Drawn, and Distributed

Active Private Credit Funds	Strategy/Stage	SERS Initial Funding	Capital Committed <sup>1/</sup>	Accumulated Capital Drawn	Accumulated Distributions <sup>2/</sup>
1. Apollo Hybrid Value Fund	Distressed and Credit	*	\$100,000,000	\$0	\$0
2. Audax Direct Lending Solutions Fund-A	Direct Lending	*	100,000,000	0	0
3. Brightwood Capital Fund IV	Direct Lending	4/24/2018	100,000,000	30,000,000	1,237,567
4. Glendon Opportunities Fund II	Distressed and Credit	*	150,000,000	0	0
5. ICG Europe Fund VII	Distressed and Credit	8/24/2018	91,522,400	6,261,492	0
ICG North American Private Debt Fund II	Distressed and Credit	*	50,000,000	0	0
6. TAO Global Contingent Fund	Distressed and Credit	*	150,000,000	0	0
7. TSSP Adjacent Opportunities Partners (B)	Distressed and Credit	11/9/2017	100,000,000	33,901,056	0
TSSP Opportunities Partners IV	Distressed and Credit	*	50,000,000	0	0
<b>Total Active Private Credit Funds</b>			<b>\$891,522,400</b>	<b>\$70,162,548</b>	<b>\$1,237,567</b>

### Public Markets

Manager	Investment Style	Market Exposure as of 12/31/18 <sup>3/</sup> (\$ millions)
<b>Credit-Focused Strategies</b>		
8. Blackstone Keystone	Fund-of-Funds	\$892.3
<b>Total Credit Focused Strategies</b>		<b>892.3</b>
<b>Opportunistic Equity &amp; Fixed Income</b>		
9. Eaton Vance	Global Macro Strategy	189.2
10. Mellon Capital Management Russell 3000 Index	Russell 3000 Core	876.8
11. SEI Structured Credit Fund	High Yield Bank Loans	320.0
<b>Total Opportunistic Equity &amp; Fixed Income</b>		<b>1,386.0</b>
<b>Total Public Market Multi-Strategy</b>		<b>\$2,278.3</b>

Cash flows as of September 30, 2018.

\*Not funded as of September 30, 2018.

<sup>1/</sup>Commitments as of December 31, 2018.

<sup>2/</sup>Distributions include stock distributions. Distributions may include fees that are recorded as negative distributions to be offset against future distributions of the underlying limited partnership investment.

<sup>3/</sup>Includes securities and cash, which the manager had available for investment.

# SERS FUND

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## Investment Program | Portfolio Snapshot | Legacy Hedge Funds

### Role in the SERS Fund

SERS legacy hedge fund program was historically designed to provide total returns comparable to the total fund return but with lower volatility and correlation to other asset classes. However, with the development of SERS' Multi-Strategy allocation SERS is no longer actively investing in this space.

### Program Structure

The current structure of this portfolio consists of legacy investments that will continue to decrease over time as investments are realized, liquidated, and redeemed.

### Objective

SERS will continue to work with existing legacy managers as well as explore options to work with strategic partners to expedite the redemption process in a thoughtful and cost effective way.

### Status

SERS legacy hedge fund portfolios are currently in liquidation. The remaining balance has continued to decrease as SERS has successfully redeemed assets from legacy managers.



# SERS FUND

## Investment Program | Portfolio Snapshot | Legacy Hedge Funds

### Legacy Hedge Funds

	Manager	Investment Style	Market Exposure as of 12/31/18 <sup>4/</sup> (\$ millions)
<b>Funds-of-Hedge Funds</b>			
1.	Entrust Keystone	Fund-of-Funds	\$10.5
<b>Total Funds-of-Hedge Funds</b>			<b>10.5</b>
<b>Absolute Return Strategies</b>			
2.	Arden	Fund-of-Funds	13.5
3.	Blackstone - Stable Alpha	Fund-of-Funds	5.8
4.	Morgan Stanley Alternative Investment Partners	Fund-of-Funds	3.5
5.	PAAMCO	Fund-of-Funds	5.4
6.	Robeco Investment	Fund-of-Funds	0.2
7.	Rock Creek	Fund-of-Funds	0.2
8.	Legacy Hedge Funds	Fund-of-Funds	4.2
<b>Total Absolute Return Strategies</b>			<b>32.8</b>
<b>Direct Investments</b>			
9.	Luxor Capital Partners	Direct Hedge Fund	2.6
10.	Pine River Fund	Direct Hedge Fund	1.2
<b>Total Direct Investments</b>			<b>3.8</b>
<b>Total Legacy Hedge Funds</b>			<b>\$47.1</b>

<sup>4/</sup>Includes securities and cash, which the manager had available for investment.

# SERS FUND

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## Investment Program | Portfolio Snapshot | Fixed Income

### Role in the SERS Fund

SERS Fixed Income program is structured to:

- Generate income to pay benefits
- Provide additional liquidity to minimize capital impairment risk
- Reduce volatility of the total fund
- Protect SERS against deflation (and inflation via TIPS)
- Contribute total return to SERS when market conditions permit

### Program Structure

Fixed income includes investments in publicly-traded debt obligations of sovereign, quasi-sovereign, and corporate entities. The asset class generates current income and the repayment of principal at maturity. Shorter duration fixed income has substantially lower volatility than equity, and most fixed income investments have a low correlation with equity returns. SERS Fixed Income program is categorized into four strategies and a separate cash allocation to improve transparency on SERS unallocated cash amount.

### Objective

The objective of the Fixed Income program is to generate annualized net-of-fee returns that exceed its benchmark, the Bloomberg Barclays U.S. Aggregate Bond Index, over a three- to five-year period.

# SERS FUND

## Investment Program | Portfolio Snapshot | Fixed Income

### Fixed Income

Manager	Investment Style	Market Exposure as of 12/31/18 <sup>4/</sup> (\$ millions)
<b>Core Plus Fixed Income</b>		
1. Brandywine Global	Global Sovereign Credit	\$186.3
2. Pyramis Global Advisors	Commercial Mortgage-Backed Securities	317.6
3. Stone Harbor	Emerging Market Debt	160.6
Stone Harbor	Global High Yield	159.7
4. W.R. Huff	High Yield (liquidating)	0.2
5. Waterfall Asset Management	Asset-Backed Securities	0.2
<b>Total Core Plus</b>		<b>824.6</b>
<b>Core Fixed Income</b>		
6. Mellon Capital Management	Bloomberg Barclays U.S. Aggregate	1,028.9
7. PIMCO Core	Bloomberg Barclays U.S. Aggregate ex. Treasuries	612.4
8. Taplin, Canida & Habacht (TCH)	U.S. Credit	178.5
<b>Total Core</b>		<b>1,819.8</b>
<b>Global Treasury Inflation Protected Securities (TIPS)</b>		
9. Brown Brothers Harriman	Global TIPS	213.7
10. New Century Advisors	Global TIPS	111.0
11. NISA Investment Advisors	U.S. TIPS	481.1
<b>Total Global Treasury Inflation Protected Securities (TIPS)</b>		<b>805.8</b>
<b>Nominal U.S. Treasuries</b>		
PIMCO U.S. Treasuries	Domestic Treasuries	548.8
<b>Total Nominal U.S. Treasuries</b>		<b>548.8</b>
<b>Total Fixed Income</b>		<b>\$3,999.0</b>

<sup>4/</sup>Includes securities and cash, which the manager had available for investment.

# SERS FUND

## Investment Program | Portfolio Snapshot | Cash

### Role in the SERS Fund

SERS investment program endeavors to maintain an appropriate level of cash to pay retirement benefits and covenants during prolonged periods of market decline and state budgetary constraints.

### Program Structure

Cash investments emphasize the use of higher credit quality debt instruments that are liquid and have short maturities and durations, or have floating rates and have historically been invested in the Pennsylvania Treasury Group Investment Fund, a short-term investment fund.

### Objective

The objective of Cash is to generate annualized net-of-fee returns that exceed its benchmark, the Bank of America 90-Day T-Bill Index, over a three-year period.

<b>Cash</b>		
Manager	Investment Style	Market Exposure as of 12/31/18 <sup>1/</sup> (\$ millions)
<b>Cash</b>		
1. PA State Treasury (STIF)	Cash	\$757.0
<b>Total Cash</b>		<b>\$757.0</b>

<sup>1/</sup>Includes securities and cash, which the manager had available for investment.

**SERS Fund**

**Pennsylvania Investments**

# SERS FUND

## Investment Program | Pennsylvania Investments

### Pennsylvania Investments

The board, employees of SERS, and agents of the board stand in a fiduciary relationship to the members and beneficiaries of the system regarding the investments and disbursements of the SERS Fund. Subject to prudent investor investment responsibilities contained in the Retirement Code and the Fiscal Code, the board has exclusive control and management of the SERS Fund and full power to invest the assets of the SERS Fund.

The board adopted a formal *Statement of Investment Policy* in 1979, which was last revised March 2017. Where investment characteristics are equivalent, the board's policy favors investments that have a positive impact on the economy of Pennsylvania.

Although the board's fiduciary duty is to SERS members and beneficiaries, investments in Pennsylvania provide an ancillary and subordinate benefit to the state's economy. The investment policy acknowledges that such benefit, derived from investments in Pennsylvania-based companies or firms employing Pennsylvanians, should be considered after other primary fiduciary investment characteristics are satisfied.

Fair value of Pennsylvania investments as of December 31, 2018, was approximately \$741.5 million, or 2.8% of the SERS Fund.

### Pennsylvania Investments by Asset Class

(\$ millions)

Asset Class	Total PA Fair Value
Private Equity	\$65.0
Global Public Equity	269.5
Real Estate	381.6
Fixed Income	25.4
<b>Total Pennsylvania Investments</b>	<b>\$741.5</b>

### Private Equity

SERS Private Equity program dates back to 1985. Initially the program targeted a 1% allocation to venture capital with a focus to invest with managers located in Pennsylvania or with managers who had Pennsylvania investment mandates. Over its life, the program has grown to include national and international based private equity, special situation, and venture capital managers. Since inception, SERS Private Equity program has made commitments of over \$1.3 billion to 66 limited partnerships based in Pennsylvania. In addition, the number of non-Pennsylvania based managers investing in companies that impact the state comprises a meaningful portion of the program.

# SERS FUND

## Investment Program | Pennsylvania Investments

As of December 31, 2018, SERS active Private Equity managers held investments in 56 Pennsylvania-based companies. SERS pro-rata investment value in these companies is approximately \$65.0 million. This equates to 1.7% of the Private Equity program fair value and does not include investments headquartered outside of Pennsylvania that may have impactful operations within the state.

### Global Public Equity and Fixed Income

SERS maintains a universe of institutionally investable Pennsylvania-based companies. The PA-based company universe is comprised of 154 institutionally investable publicly-traded corporations which:

- Name their headquarters as Pennsylvania and have Pennsylvania employees or operations
- Have Pennsylvania-based employment exceeding 25% of total corporate employment

SERS had approximately \$270 million invested in stocks of Pennsylvania-based companies, as of December 31, 2018. These securities are held in SERS various externally managed global public equity portfolios.

### Pennsylvania Investments - Global Public Equity

(\$ millions)

Manager	Fair Value
<b>Emerald Advisers</b>	\$75.6
<b>Iridian Asset Management</b>	16.4
<b>Martin Currie Investment Management</b>	5.2
<b>Mellon Capital Management</b>	172.3
<b>Total Pennsylvania Investments - Global Public Equity</b>	<b>\$269.5</b>

### Pennsylvania Based Companies

#### Top 10 Public Equity Positions

As of December 31, 2018

Air Products & Chemicals Inc.
American Eagle Outfitters Inc.
CNB Financial Corporation
Comcast Corporation
Epam Systems Inc.
Five Below Inc.
Nutrisystem Inc.
Ollie's Bargain Outlet Holding
PNC Financial Services Group Inc.
Versum Materials Inc.

# SERS FUND

## Investment Program | Pennsylvania Investments

SERS had approximately \$25.4 million invested in fixed income securities issued by Pennsylvania-based companies, as of December 31, 2018. These securities are held in SERS various externally managed bond portfolios.

SERS has approximately \$757 million invested in the Pennsylvania Treasury Department's short-term investment pool.

### Pennsylvania Investments - Fixed Income

(\$ millions)

Manager	Fair Value
Brandywine Global	\$3.5
Mellon Capital Management	7.3
PIMCO	5.8
Stone Harbor	3.5
Taplin, Canida & Habacht	5.3
<b>Total Pennsylvania Investments - Fixed Income</b>	<b>\$25.4</b>

### Real Estate

In 1987, SERS began investing directly in the Pennsylvania commercial real estate market. SERS has invested as a limited partner in several real estate funds, which have acquired, and currently hold, numerous properties in Pennsylvania. All of the above noted investments are reflected in the data below.

As of December 31, 2018, the SERS real estate portfolio contained approximately 29 Pennsylvania investments totaling 3.1 million square feet of office, retail, and warehouse space, as well as, 2,924 apartment, hotel, and senior housing units and 630,000 square feet of self-storage, representing 5,354 units.

The gross fair value of the Pennsylvania real estate portfolio investments totaled \$1.6 billion, of which SERS ownership share was \$370 million.

In addition to the above, SERS held \$11.6 million in PA based real estate investment trusts.



# **SERS Fund**

## **Minority/Woman-Owned Managers and Brokers**

# SERS FUND

## Investment Program | Minority/Woman-Owned Managers and Brokers

### Minority/Woman-Owned Investment Managers

The following firms classify themselves as minority and/or woman-owned firms and were under contract with SERS to provide investment management services within SERS Global Public Equity or Fixed Income portfolio as of December 31, 2018:

Firm	Status	SERS Assets Under Management
FIS Group	Minority/Woman-Owned	\$175 million market value
GlobeFlex Capital	Minority/Woman-Owned	\$84 million market value
Leading Edge Investment Advisors	Minority-Owned	\$201 million market value
New Century Advisors	Woman-Owned	\$111 million market value

The following firms were recognized by SERS consultants or self-reported as minority and/or woman-owned firms and were under contract with SERS to provide investment management services within SERS Private Equity or Real Estate portfolio as of December 31, 2018:

Firm	Status	SERS Committed Capital
Asia Alternatives Capital Partners	Minority/Woman-Owned	\$340 million
Avenue Capital Group	Woman-Owned	\$70 million
Brightwood Capital	Minority-Owned	\$100 million
Clearlake Capital Partners	Minority-Owned	\$70 million
hotelAVE	Woman-Owned	NA
Hawkeye Partners	Woman-Owned	\$105 million
Incline Equity Partners	Minority-Owned	\$15 million
Kline Hawkes & Co.	Minority-Owned	\$15 million
Technology Crossover Ventures	Minority-Owned	\$75 million
Oak Street	Minority-Owned	\$100 million
Thoma Bravo	Minority-Owned	\$75 million
TSG Consumer Partners	Woman-Owned	\$100 million
Vista Equity Partners	Minority-Owned	\$225 million
Weathergage Capital	Woman-Owned	\$50 million
Wind Point	Minority-Owned	\$100 million

Effective July 1, 2018, 163 of SERS' Private Equity Holdings with total commitments in the aggregate of \$5.5 billion were reclassified from each of the core sub-asset classes buyouts, special situations, and venture capital to non-core holdings via a special purpose vehicle, Keystone Legacy Fund to be managed by Minority/Woman-Owned firm, Fairview Capital Partners.

# SERS FUND

## Investment Program | Minority/Woman-Owned Managers and Brokers

### Minority/Woman-Owned Brokers Brokerage Commissions

The table below lists the minority/woman-owned brokerage firms utilized by SERS external investment managers during calendar year 2018.

The board seeks to have managers direct trades through minority/woman-owned firms and reserves the right to establish proposed trading targets. However, the responsibility for the selection and use of minority brokerage firms is delegated to the investment managers. Minority/woman-owned brokerage firms' commissions totaled \$455,680 for the year. It is estimated this year that SERS U.S. equity managers directed approximately 9% of their trades through minority/woman-owned brokerage firms. Fixed Income managers traded a combined \$258.3 million of securities through minority/woman-owned brokerage firms.

Firm	Minority/ Woman-Owned Commissions
Cabrera Capital Markets	\$36,624
Castleoak Securities	2,069
C.L. King Directed	22,531
CV Brokerage	2,429
Drexel Hamilton	17,447
Loop Capital	51,026
Mischler Direct	21,408
North South Capital	8,899
Sturdivant & Company	52,918
Susquehanna Direct	110,173
Telsey Advisory	42,388
The Fig Group	79,773
Tribal Capital Markets	2,160
Vandham Securities	4,924
Williams Capital Group	911
<b>Total Minority/Woman-Owned Commissions</b>	<b>\$455,680</b>

# Deferred Compensation Plan

# DEFERRED COMPENSATION PLAN

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## History, Growth & Highlights

As discussed earlier in this book, the Pennsylvania State Employees' Retirement System administers four retirement plans to help safeguard the financial security of the commonwealth's public workforce in its retirement years -- a defined benefit pension plan, a defined contribution investment plan, a hybrid plan that combines the pension and investment plans into one benefit, and a supplemental deferred compensation (deferred comp) plan. While most employees are required to participate in either the pension, investment, or hybrid plans; most employees also have access to the voluntary deferred comp plan, which allows participants to have some of their pay automatically deducted on a pre- and/or post-tax basis and invested for retirement.

The economic engine of the defined benefit plan is the SERS Fund, which is reviewed in-depth in the previous section. Details about deferred comp are provided here.

### Deferred Comp History

Act 1987-81 charged the SERS Board with establishing and managing a deferred compensation plan for the commonwealth's employees and officers. Deferred comp allows employees to voluntarily build retirement savings and achieve certain tax advantages by deferring a portion of their salaries to selected investment options.

Deferred comp was established as a trust and is administered in accordance with Internal Revenue Code Section 457(b). The array of investment options from which participants may choose is examined, selected, and overseen by the SERS Board.

SERS uses a competitive request-for-proposals process to retain a third-party administrator for deferred comp. Responsibilities of the third-party administrator include, but are not limited to, marketing deferred comp, maintaining participant records, and counseling participants with regard to the benefit offered. The most recent competitive process was conducted and a contract was awarded in 2018 to Great-West Life & Annuity Insurance Company, which has retained this role since 2003. Today, Empower Retirement is the brand name for the company's retirement services division, and Great-West Financial is the brand for its insurance, annuity, and investment businesses.

The cost of administering deferred comp is extremely low and is borne solely by participants, using no commonwealth funds.

In 2012, deferred comp began accepting deferrals into designated Roth accounts. Participants pay federal income tax on the amount of their Roth deferrals at the time of investment and then qualified distributions from their Roth accounts are tax-free in retirement.

In October 2014, the plan document was amended to allow in-plan conversions of assets to Roth assets.

In 2017, the SERS Board selected Invesco Advisers to take over deferred comp's Stable Value Fund from Weaver C. Barksdale.

# DEFERRED COMPENSATION PLAN

## History, Growth & Highlights

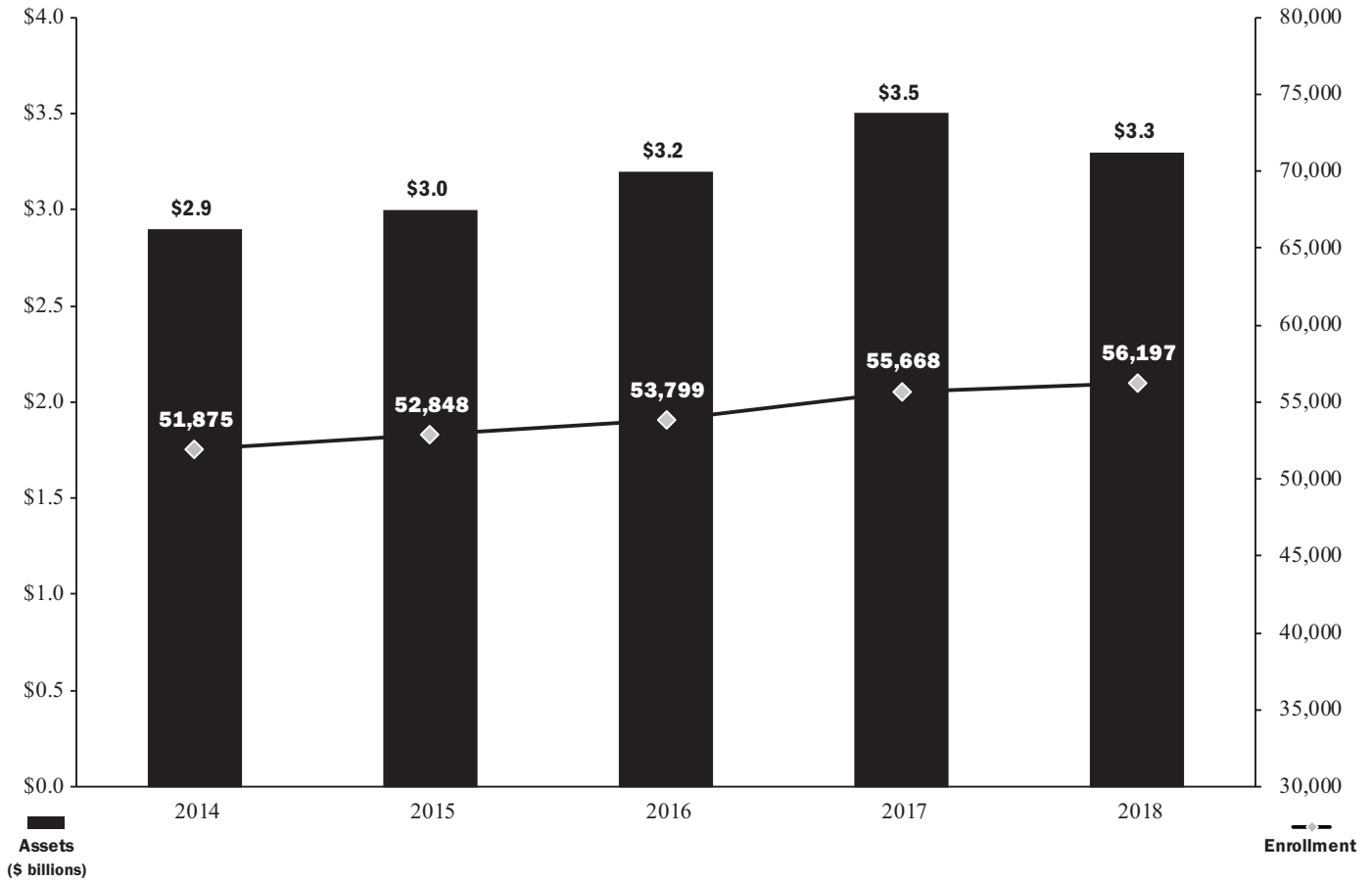
### Growth of Deferred Comp

In 2018, over 56,000 participants had saved approximately \$3.3 billion in deferred comp.

As of December 31, there were 34,102 active and 22,095 inactive participants in deferred comp. From 2014 to 2018, annual deferrals have ranged from \$129 million to \$146 million per year and total fund value grew from approximately \$2.9 billion to approximately \$3.3 billion.

When employees leave state service, they gain access to the amount they have saved, including the earnings and/or losses on their investments. Benefit payments have grown from approximately \$75 million in 2014 to \$107 million in 2018.

**Deferred Comp Assets & Enrollment**



# DEFERRED COMPENSATION PLAN

## History, Growth & Highlights

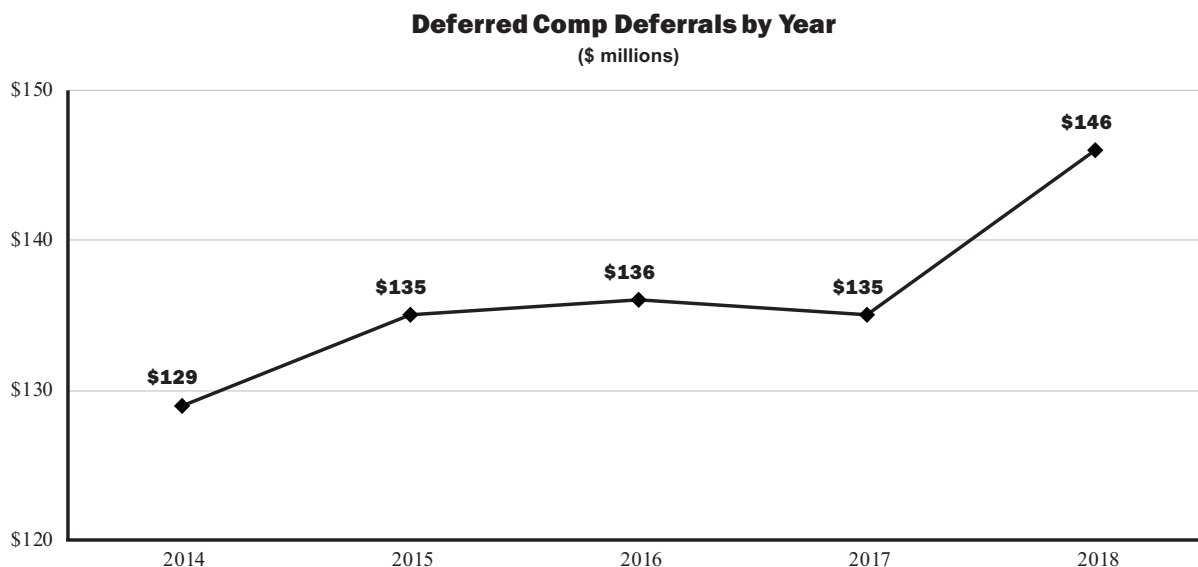
### Deferred Comp Highlights

In deferred comp, employees may elect to have any sum they choose—as little as \$5 or 0.5% per pay period up to IRS limits— withheld from their pay to save for retirement and achieve certain tax advantages. They may change the amount of their deferrals at any time and it is up to each deferred comp participant to allocate their investments among the options provided. Once money is invested in deferred comp, it must remain until an employee leaves state service or an emergency exists that is within code parameters.

To assist deferred comp participants, Empower Retirement offers individual and group counseling sessions at worksites statewide as well as in their downtown Harrisburg walk-in office.

Counselors are also available via a toll-free number. In addition to providing personal assistance, the toll-free line offers a host of automated selections including providing account balances and allowing participants to transfer funds among investment options.

Empower Retirement manages a website that allows participants to view their investment position, change their deferral amounts, transfer money among investment options, change their future allocation, update their beneficiaries, and more. Free educational videos are also available on financial, investment, and retirement topics.



# DEFERRED COMPENSATION PLAN

## Performance, Expenses & Fees

### Estimated Calendar Year, Net-of-Fees Returns

For the period ending December 31, 2018

Fund Name	Inception Date	1 Year	3 Year	5 Year	10 Year
Stable Value Fund	07-1995	2.22%	2.02%	2.11%	2.76%
Short-Term Investment Fund	10-1988	2.08	1.25	0.81	0.56
U.S. Bond Index Fund	02-1995	0.01	2.02	2.49	3.36
60/40 Balanced Stock & Bond Fund	05-2006	-2.19	6.52	6.23	9.48
U.S. Large Company Stock Index Fund	12-1994	-4.39	9.26	8.50	13.15
U.S. Small/Mid Company Stock Index Fund	08-1998	-9.33	7.54	5.32	13.70
International Company Stock Index Fund	08-1998	-13.39	3.40	0.75	6.42
Aggressive Portfolio Fund	10-2003	-5.66	6.58	5.50	10.17
Moderate Portfolio Fund	10-2003	-4.07	5.52	4.82	8.60
Conservative Portfolio Fund	10-2003	-1.58	3.63	3.32	5.46

### Expenses and Fees

As of December 31, 2018

Fund Name	Investment Manager Fund Operating Expense	Annual Asset Fee <sup>1/</sup>	Annual Administrative Fee <sup>2/</sup>
Stable Value Fund	0.2870%	0.07%	\$24
Short-Term Investment Fund	0.0000	0.07	24
U.S. Bond Index Fund	0.0200	0.07	24
60/40 Balanced Stock & Bond Fund	0.0140	0.07	24
U.S. Large Company Stock Index Fund	0.0100	0.07	24
U.S. Small/Mid Company Stock Index Fund	0.0200	0.07	24
International Company Stock Index Fund	0.0200	0.07	24
Aggressive Portfolio Fund	0.0152	0.07	24
Moderate Portfolio Fund	0.0164	0.07	24
Conservative Portfolio Fund	0.0143	0.07	24

<sup>1/</sup>Assessed at 0.0058% monthly and prorated against all available core investment options. For those in the Self-Directed Brokerage Option (SDB), the asset fee is assessed against the balance in the SDB but the actual deduction is prorated against the core investment options separately.

<sup>2/</sup>Deducted at \$2.00 monthly and also prorated against all available core investment options.