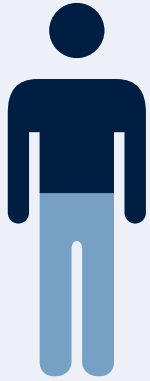


**DEFINED
BENEFIT
PLAN**

Traditional Pension

Defined Benefit Plan



In 2020
SERS retired
5,831
members
and welcomed
8,284
new members

59.4% funded
\$22.2 billion unfunded liability

paid more than
\$3.6 billion
in pension benefits

48% 
of SERS active employees belong
to post-Act 120 classes of service

\$34.5
billion
in assets

102
employers

SERS Fund 2020
Investment Return
11.1%



\$33.6 million
FY 2021-22 Administrative Budget

As of and for the year ended December 31, 2020

133,334
retirees &
beneficiaries

100,965
active members

average retired member
73 years old receives
\$30,050 per year at full retirement

average active member
47 years old **12** years of service

**DEFINED
CONTRIBUTION
PLAN**

Investment Option

Defined Contribution Plan



\$4.4 million
FY 2021-22 Administrative Budget



13,162
accounts

102
employers

\$321,000
distributions/withdrawals

\$35.7
million in
assets

Contributions
participant **\$11.7 million**
employer **\$7.8 million**



SERS 2021 Supplemental Budget Book

February 15, 2021

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

Honorable Patrick M. Browne
Majority Chairman
Senate Appropriations Committee
281 Main Capitol
Harrisburg, PA 17120-3016

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

Honorable Vincent J. Hughes
Democratic Chairman
Senate Appropriations Committee
545 Main Capitol
Harrisburg, PA 17120-3007

Chairmen and Members of the Appropriations Committee:

I am pleased to present you with this financial overview for the Pennsylvania State Employees' Retirement System for FY 2021-22. For the coming fiscal year, SERS proposes a \$33.6 million administrative budget for our Defined Benefit Plan, funded from member and employer contributions and investment earnings.

As we know, 2020 brought an array of challenges, mostly resulting from the COVID pandemic. Initially, the financial markets experienced extreme volatility, but eventually recovered. Thanks in part to our investment strategy and the asset allocation adopted in December 2019, SERS finished 2020 on a positive note.

During 2020, SERS experienced investment gains of approximately 11.1% for our Defined Benefit Plan, which is several points above the fund's assumed rate of return. Thanks to these positive returns, five years of full funding from the General Assembly, the receipt of \$1.06 billion from Penn State's prepayment of its unfunded liabilities (made possible by Act 2019-105), and our ongoing efforts to implement efficiencies across SERS, we continue to progress toward our long-term goal of eliminating our unfunded liability.

Additionally, in 2020, there were important legislative changes made to improve the funding stability of our Defined Contribution Plan. These include establishing the ability for SERS to assess a per-participant charge to all employers to cover the fees, costs, and expenses associated with the plan, as well as allowing for SERS to utilize unvested employer contributions towards paying the administrative costs of the plan.

SERS expects to receive more than \$2.1 billion (33.48% of payroll) from commonwealth employers in our Defined Benefit Plan during this fiscal year. For FY 2021-22, the employer contribution is projected to drop to 33.10%, which will generate an estimated \$2.1 billion. While these significant contribution amounts will continue through the next decade, large annual increases have peaked following significant steps by the Governor and legislature over the past decade to fully fund retirement obligations.

This year SERS will serve nearly 240,000 members and participants, and administer more than 57,000 Deferred Compensation Plan accounts. In 2020, the average retiree who worked to full retirement age was 73 years old and received an average pension annuity of \$30,050. In 2020, SERS paid out nearly \$3.6 billion pension benefit payments to the commonwealth's retirees and their beneficiaries, of which more than \$3.2 billion was paid to members living in Pennsylvania.

We remain committed to preparing our members and participants to achieve financial success and security in retirement.

Sincerely,



David R. Fillman
Chairman

SERS 2021 SUPPLEMENTAL BUDGET BOOK

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SERS Organization

SERS ORGANIZATION

Agency Description

Established in 1923, SERS is one of the nation's oldest and largest statewide retirement plans for public employees. SERS is responsible for administering nearly \$39 billion in assets held in trust for nearly 240,000 members and participants, as of December 31, 2020. SERS also administers more than 57,000 accounts on behalf of those who participate in the supplemental Deferred Compensation Plan.

Most state employees are required to participate in a SERS-administered retirement plan, as directed by the State Employees' Retirement Code. SERS is responsible for administering the 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 benefit plans and the fiduciary responsibility for their management be vested in an 11-member board. The management of SERS is the responsibility of the executive director who employs the staff needed to administer all SERS retirement plans and, with the approval of the board, contracts for professional services.

SERS administers four retirement plans for state employees – three plans require mandatory employee and employer contributions and one plan involves only voluntary employee contributions:

- **Hybrid Plan** – is a combination of two Internal Revenue Code-defined plans – a traditional pension or IRC section 401(a) defined benefit plan with an IRC section 401(a) defined contribution investment plan. This plan requires mandatory contributions from both the employee and the employer. There are two classes of service within the Hybrid Plan, class A-5 and class A-6.

- **Defined Contribution Plan** – is an IRC section 401(a) investment plan. This plan requires mandatory contributions from both the employee and the employer.
- **Defined Benefit Plan** – is a traditional pension plan defined by IRC section 401(a). This plan requires mandatory contributions from both the employee and the employer.
- **Deferred Compensation Plan** – is a voluntary supplemental plan defined by IRC section 457(b). This plan involves only voluntary employee contributions.

Most new state employees are automatically enrolled in the Hybrid Plan A-5 class of service, with the right to opt out of that class of service into the A-6 class of service or the Defined Contribution Plan. The exceptions are hazardous-duty employees and those who contributed to the traditional defined benefit pension plan in the past. In those two cases, the employee is automatically enrolled in the traditional defined benefit pension plan.

Each plan is described in greater detail, including participation, asset value, and contribution rates, in the following sections.

Recent Changes

In 2020, the agency made the following changes:

- **Reorganized Agency Structure** – Without adding or abolishing positions, the reorganization established two executive deputies, one to better coordinate agency administrative functions and one recognizing the increased responsibility of administering the new Defined Contribution Plan.

SERS ORGANIZATION

Agency Description

- **Enhanced Annual Retirement Statement** – In 2020, SERS members and participants received an annual retirement statement that reflected a summary of all their SERS retirement plans as of December 31, 2019. It was the first year that the SERS statement included a summary of the supplemental Deferred Compensation Plan. This information, when added to the summary of the Defined Contribution Plan that was also included, provides state employees with a more complete view of their retirement readiness in one document.
- **Developed Forward-Looking Strategic Business Plan for FY 2020-21 Through FY 2022-23** – Beginning in 2019 and throughout 2020, the board and senior staff worked together to assess the agency's current services, procedures, and processes, and considered what our mission is and how we can achieve it. That work resulted in a demanding strategic business plan that spells out our mission, vision, strategic priorities, and guiding principles. It also lists specific goals for what we intend to achieve through FY 2022-23 and how we intend to do it. The plan, developed specifically to help prepare our members and participants to achieve financial success and security in retirement, is available on our public website.
- **Published Responses to Public Pension Management and Asset Investment Review Commission Recommendations** – The review commission, established by state Act 2017-5, conducted an in-depth review

of the commonwealth's two state retirement systems culminating in a report of more than 100 recommendations issued in December 2018. The recommendations related to a range of topics including full funding, stress testing, transparency, portfolio implementation, performance and asset allocation, cost-savings options and analysis, consolidation of pension investment operations, procurement, and diversity.

In early 2019, the board began working through each recommendation, which included assigning each one to a board committee to take the lead in researching the recommendation, possible actions and industry standards related to the recommendation, taking action on the recommendation, when appropriate, and responding to the recommendations. That work culminated in December 2020, when the SERS Board issued a final report of its responses to each recommendation. The report is available on our public website.

- **Began Livestreaming SERS Board Meetings** – The December 2020 SERS board meetings, including board committee meetings, were livestreamed for easy public access. Recordings are posted to the SERS website.
- **Initiated a Series of White Papers** – During 2020, SERS initiated a series of white papers to help members, participants, legislators, staff, and other stakeholders better understand issues and factors that can affect the health and sustainability of a public retirement system such as SERS.

SERS ORGANIZATION

Mission, Vision, Strategic Priorities & Guiding Principles

In the fall of 2020, SERS adopted a new strategic plan that will guide the agency's work beginning FY 2020-21 through FY 2022-23. This plan lays out the following mission, vision, strategic priorities, and guiding principles.

Mission

The mission of SERS is to prepare our members and participants to achieve financial success and security in retirement.

Vision

SERS' vision is to become fully funded and the recognized leader among pension organizations providing innovative, best-in-class services and products to our customers and stakeholders.

Strategic Priorities

- Modernize Systems
- Leverage External Engagement
- Invest Efficiently and Accountably
- Improve Member and Participant Experiences
- Cultivate Workforce Transformation

Guiding Principles

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

SERS ORGANIZATION

Services & Operations

The approximately 200 employees who work for SERS share a singular focus: serving SERS' members and participants. Some SERS employees serve members by investing and overseeing nearly \$39 billion in plan assets. Other SERS employees serve members by ensuring that every payment is made correctly and on time. Still others audit and account for plan assets, provide key membership data, or answer member and participant questions in person or over the phone.

Some work is behind-the-scenes, while other work touches members and participants more directly.

Examples of services offered to active and vested members and participants include:

- Issuing annual statements that present a snapshot of each of the member's and participant's SERS plans in one document
- 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 benefit application process

Examples of services offered to retired members include:

- Issuing annual statements 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 the implications of pension changes related to marriage, divorce, or death
- Tracking and reissuing pension payments
- Assisting spouses, children, and other survivors upon the death of a SERS member or participant

SERS ORGANIZATION

Services & Operations

Approximately a quarter of SERS employees are wholly dedicated to providing services to members and participants through a network of regional offices statewide, including:

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

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

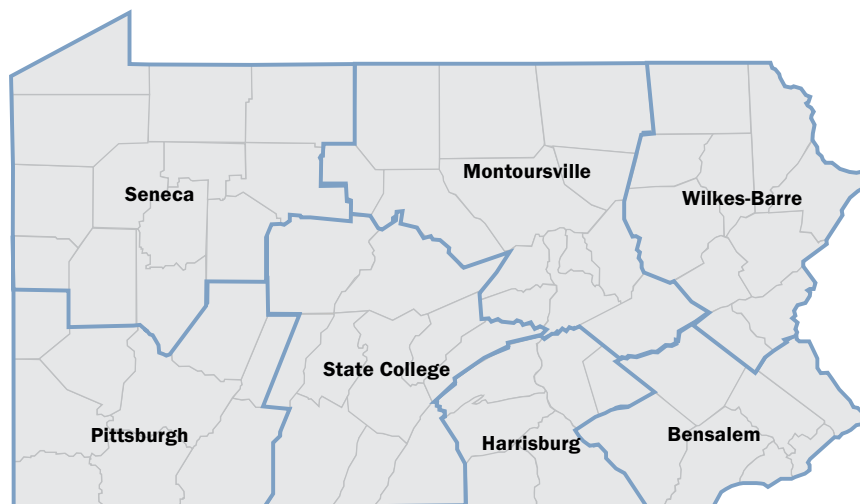
Montoursville Regional Office. Serving retired members who live and active members who work in Bradford, Cameron, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Schuylkill, Snyder, Sullivan, Tioga, and Union counties.

Pittsburgh Regional Office. 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 Office. 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 Office. 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 Office. 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

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. The Executive Director (Secretary) is expressly charged with statutorily prescribed duties including review and analysis of legislation, maintaining files and records required for actuarial evaluations, and responding to information inquiries and requests from press, commonwealth officials, state employees and the general public, among others. The executive office 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, engages with the General Assembly and Administration, as well as other key stakeholders, on legislation and other policy-related matters; administers the agency's right-to-know program; serves as liaison to the media; develops educational materials in print and electronic format about SERS retirement plans and the agency; works with the third-party administrator to market the Deferred Compensation Plan; manages the agency's social media accounts; administers four e-mail accounts to help members and participants engage with plan specialists who can help them with their retirement plan questions and to help the public engage with agency leadership; works with industry and thought leaders at the state and national levels to share best practices, common concerns, developing issues, and new solutions; and provides an array of communications support to the agency.

The **Office of Member and Participant Services** provides direct assistance to SERS active, vested, and retired members and participants, as well as their families. It conducts individual and group educational sessions statewide. The office also supports

SERS employers and processes member and participant enrollments, retirements, status changes, payments, and a host of other transactions. This office is divided into two main bureaus, the **Bureau of Benefit Administration** and the **Bureau of Member and Participant Services**.

The **Investment Office** works closely with the State Employees' Retirement Board to oversee investments in SERS' retirement plans. The office recommends and implements investment policies; manages the strategic asset allocation; monitors fund cash flow, investment managers, fund risks, and performance; and researches and recommends investment opportunities. The office also maintains a high level of expertise related to the analysis of capital and global markets.

The **Office of Financial Management** is responsible for the accounting and financial reporting associated with SERS' retirement plans. It ensures the appropriate accounting controls exist and the financial statements for each plan are presented in accordance with generally accepted accounting principles. It administers all financial transactions including, member and participant payments; member, participant, and employer contributions; investment purchases, sales and other activity; and oversees the budgeting and expense monitoring for all funds.

The **Internal Audit Office** 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 the Audit, Risk, and Compliance Committee.

SERS ORGANIZATION

Services & Operations

The **Chief Counsel's Office** advises the State Employees' Retirement Board on matters related to member appeals and administrative hearings, securities actions and litigation matters, the administration of SERS' retirement plans, 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.

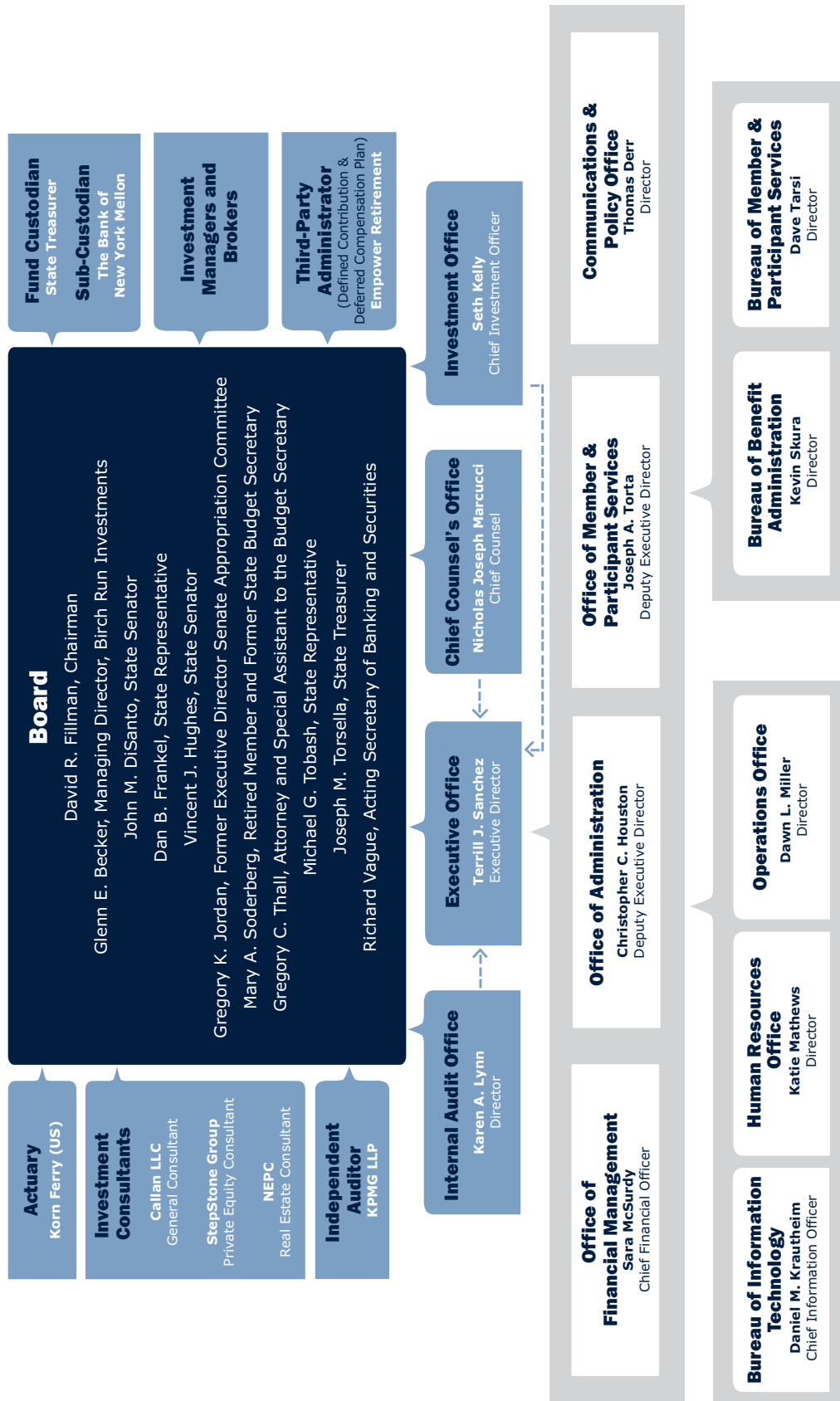
The **Office of Administration** is responsible for overseeing all administrative support functions for the agency which includes contracting, purchasing, leasing, facilities management, safety and security, continuity of operations, printing, mailing, fleet management, records retention, information technology, telecommunications, human resources, strategic planning and project management, board education, and board governance. The office is comprised of the following:

- The **Bureau of Information Technology** administers the agency's computing and telecommunications architecture. It ensures the performance and security of complex applications and databases which contain sensitive personal and financial information and are relied upon to manage member accounts, process payments, and account for funds. The bureau also links the regional offices, develops applications to provide members with online access to SERS information, and provides user support.

- The **Human Resources Office** supports the agency by hiring, developing, and managing employees. The office is responsible for classification, compensation, disability services, employee relations, equal employment, onboarding, performance management, staffing, time administration, training, and work-related injury programs. The office also facilitates the annual financial disclosure processes for SERS board members and staff.
- The **Operations Office** provides a variety of agency support functions including contracting, purchasing, leasing, facilities management, safety and security, continuity of operations, printing, mailing, fleet management, records retention, and surplus.

SERS ORGANIZATION

Services & Operations



As of 12/31/20

SERS ORGANIZATION

Proposed FY 2021-22 Budget

The budget includes the costs to administer SERS' defined benefit pension plan. The plan receives revenue from employee contributions, employer contributions, and income derived from its investment portfolio. Funds in the plan

are used to pay retirement, disability, and death benefits to members and their beneficiaries, as well as the associated costs of administration. These funds are appropriated annually by the general assembly.

Proposed FY 2021-22 Administrative Budget

	Rebudget FY 2017-18	Rebudget FY 2018-19	Rebudget FY 2019-20	Rebudget FY 2020-21	Budget Request
Personnel Services	\$18,560,500 ^{1/}	\$17,084,000 ^{1/}	\$18,380,500	\$19,030,000	\$19,354,600
Operational					
Travel	55,800	65,800	90,000	115,050	122,350
Training	79,500	138,550	103,300	167,500	216,350
Communication Services	481,400	471,500 ^{1/}	548,000	659,100	518,985
Consultants - Non EDP	811,000 ^{1/}	820,000 ^{1/}	1,053,500	1,301,200	1,090,000
Legal Services/Fees	641,000 ^{1/}	521,100 ^{1/}	755,500	525,500	280,500
Specialized Services	630,350 ^{1/}	1,571,400 ^{1/}	1,221,600	912,300	1,118,165
Advertising	10,000	8,000	8,000	5,000	5,000
IT Consulting	6,150,500 ^{1/}	4,353,000 ^{1/}	4,228,000	2,451,100	5,720,100
Contracted Maintenance Non-IT	58,900	65,400	47,300	58,000	60,500
Hardware/Software and Maintenance	2,123,600 ^{1/}	1,610,250	1,639,000	2,068,900	1,792,838
Real Estate	1,727,390	1,926,250 ^{1/}	1,971,000	1,772,500	1,994,500
Vehicles	25,800	25,000	26,800	29,100	30,400
Office Equipment	146,250 ^{1/}	215,800 ^{1/}	159,400	376,000	170,950
Other Rentals/Leases	3,600	6,300	4,000	10,000	10,000
Office Supplies	122,500	117,050 ^{1/}	106,000	84,350	81,400
Educational Supplies	153,100 ^{1/}	82,000 ^{1/}	1,700	500	3,000
Motorized Equipment Maintenance	3,500	4,000	6,000	10,100	10,100
Postage	646,500 ^{1/}	610,500 ^{1/}	595,500	595,500	718,391
Freight	3,200	3,200	4,000	2,700	2,750
Printing	217,450 ^{1/}	209,600 ^{1/}	132,000	150,200	142,050
Subscriptions & Licensing	39,150	43,900	58,100	57,500	179,250
Membership Dues	25,300	27,900	37,900	53,700	74,713
Conference Expenses	14,300	16,500	31,900	12,000	15,320
Insurance, Surety, & Fidelity Bonds	13,000	13,000	13,000	13,000	13,000
Treasury Services	1,145,360	1,475,500	1,500,000	0	0
Other Operational	119,900	530,500	336,000	1,485,200	972,300
Total Operational	15,448,350	14,932,000	14,677,500	12,916,000	15,342,912
Fixed Assets	110,000	250,000	250,000	250,000	370,000
Less Directed Commissions	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Total Annual Budget	\$32,618,850	\$30,766,000	\$31,808,000	\$30,696,000	\$33,567,512

^{1/}Figures include amounts needed to implement the defined benefit portion of Act 2017-5.

SERS ORGANIZATION

Proposed FY 2021-22 Budget

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

Directed commissions are included as part of the administrative budget as augmenting revenue and are not appropriated.

Directed Commission Revenue & Expense

	FY 2020-21 Budget	FY 2021-22 Budget
Beginning Balance	\$3,579,541	\$2,179,541
Directed Commission Revenue	100,000	50,000
Total Available	3,679,541	2,229,541
Directed Commission Expense	1,500,000	1,500,000
Ending Balance	\$2,179,541	\$729,541

SERS ORGANIZATION

Proposed FY 2021-22 Budget

This budget includes the investment related expenses associated with the defined benefit pension plan's investment portfolio.

These expenses are netted from investment earnings and are not appropriated.

Proposed FY 2021-22 Investment Budget

	Rebudget FY 2017-18	Rebudget FY 2018-19	Rebudget FY 2019-20	Rebudget FY 2020-21	Budget Request
Personnel Services	\$3,433,000	\$4,786,000	\$4,601,000	\$4,894,000	\$4,912,000
Operational					
Travel	203,500	202,200	302,500	309,000	156,400
Training	46,500	45,900	61,100	72,200	64,060
Consultants - Non EDP	4,642,100	3,753,600	4,162,500	4,095,000	3,890,000
Legal Services/Fees	0	300,000	200,000	280,000	80,000
Specialized Services	1,000	1,000	214,000	98,400	93,600
Advertising	10,000	24,000	34,000	15,000	15,000
IT Consulting	0	0	0	129,200	135,607
Hardware/Software and Maintenance	310,000	312,700	2,700	2,700	454,000
Real Estate	0	0	0	28,000	31,000
Vehicles	0	0	0	1,200	1,000
Office Equipment	0	0	0	37,500	5,500
Office Supplies	1,000	1,500	1,700	1,600	1,800
Printing	0	1,000	1,000	1,000	600
Subscriptions & Licensing	537,900	644,700	1,434,200	1,410,900	1,632,480
Membership Dues	64,500	66,900	66,800	56,300	57,052
Conference Expenses	1,500	2,500	2,500	0	3,100
Other Operational Expenses	0	0	0	0	79,500
Total Operational	5,818,000	5,356,000	6,483,000	6,538,000	6,700,699
Total Annual Budget	\$9,251,000	\$10,142,000	\$11,084,000	\$11,432,000	\$11,612,699

SERS ORGANIZATION

Proposed FY 2021-22 Budget

This budget includes the costs to administer SERS' Defined Contribution Plan, which was created by Act 2017-5. The Defined Contribution Plan receives revenue from employee contributions, employer contributions, and income derived from its investment portfolio. Funds in this plan are used to pay benefits to participants and their beneficiaries. All fees, costs, and expenses of

administering the plan were paid by commonwealth appropriations until FY 2020-21. At that time, a per-participant assessment was implemented and charged to employers to cover these administrative costs. Additionally, Act 2020-94 was passed in fall 2020, which allows the plan to retain all unvested employer contributions after June 30, 2020, and use them to help pay administrative costs.

Proposed FY 2021-22 Defined Contribution Plan Budget

	Rebudget FY 2017-18 ^{1/}	Rebudget FY 2018-19 ^{1/}	Rebudget FY 2019-20	Rebudget FY 2020-21	Budget Request
Personnel Services	\$1,891,000	\$2,782,000	\$2,357,000	\$2,081,000	\$2,256,000
Operational					
Travel	0	0	12,400	25,700	8,000
Training	0	0	8,500	12,200	12,500
Communication Services	0	0	0	5,400	0
Consultants - Non EDP	250,000	287,500	125,000	122,000	96,500
Legal Services/Fees	279,000	193,000	200,000	150,000	100,000
Specialized Services	1,890,000	1,230,000	541,000	1,219,000	1,290,000
Advertising	0	0	0	2,000	0
IT Consulting	400,000	100,000	100,000	280,000	357,500
Telecom - Voice - Services	0	2,500	0	0	1,015
Hardware/Software and Maintenance	50,000	0	0	27,900	32,162
Facilities and Equipment	58,750	0	0	100	0
Real Estate	0	56,000	148,700	180,000	78,000
Office Equipment	0	0	0	25,900	3,250
Office Supplies	0	0	0	10,300	3,250
Educational Supplies	150,000	0	0	100	0
Postage	200,000	125,000	101,000	250,000	30,000
Freight	0	0	0	100	0
Printing	100,000	125,000	48,100	52,700	25,000
Subscriptions & Licensing	0	0	0	200	0
Membership Dues	0	0	0	4,600	4,810
Conference Expenses	0	0	1,300	2,500	0
Insurance, Surety, & Fidelity Bonds	0	0	0	100,000	100,000
Other Operational	0	0	209,000	5,300	0
Total Operational	3,377,750	2,119,000	1,495,000	2,476,000	2,141,987
Total Annual Budget	\$5,268,750	\$4,901,000	\$3,852,000	\$4,557,000	\$4,397,987

^{1/}Figures include amounts needed to implement the defined contribution portion of Act 2017-5.

SERS ORGANIZATION

Legislation

Legislation Enacted During 2020

Act 2020-23: Fiscal Code | Defined Contribution Plan Funding

Act 2020-23, the fiscal code bill signed into law on May 29, 2020, gave new authority to the SERS Board to proportionately charge each employer for its share of the administrative fees, costs, and expenses associated with the plan. The \$4,557,000 appropriation from Act 2020-13A served as the basis for the employer charge. SERS staff subsequently developed a mechanism by which the per-participant charge is applied to employers and implemented the new authorization.

Act 2020-37: Independent Fiscal Office Requests for Information

Signed into law on June 30, 2020, this law requires the Independent Fiscal Office (IFO) to prepare actuarial notes for bills and amendments that have a “material actuarial impact” on a public employee retirement plan. The law impacts SERS and PSERS by requiring both retirement systems to respond to IFO requests for information within 14 days of receipt, and to annually submit 30-year baseline projections to the IFO that include a simulation of a 1% increase and 1% decrease in the assumed rate of return.

Act 2020-55: Non-intervening Military Service for State Police Officers

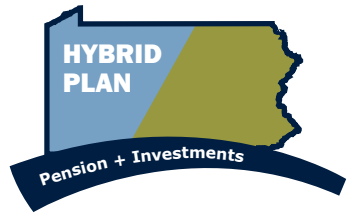
Signed into law on July 1, 2020, this law allows state police officers hired between January 1, 2019 and July 1, 2020, 90 days to elect whether to have their purchased non-intervening military service credited to their retirement account toward, or in addition to, the benefit they are eligible to receive under the DiLauro Award. The law also provides for future state police officers who purchase non-intervening military service to have the service credited toward their DiLauro Award benefit.

Act 2020-94: Enhanced Investment Reporting | Retention of Unvested Employer Contributions

Signed into law on October 29, 2020, this law requires SERS to prepare a report on its investment performance data for the period of July 1 through June 30 of each year. SERS already had implemented reporting investment performance data on both a commonwealth fiscal year and calendar year basis. The bill also authorized the SERS Board to retain unvested employer contributions and use them to offset the administrative expenses related to operating the Defined Contribution Plan. Since the effective date of this new portion of the Act was retroactive to June 30, 2020, all unvested employer contributions from employees who left state service after that date have been deposited into a plan-level account, to help pay administrative expenses and lower the future per-participant charge assessed to employers.

Act 2020-128: Stress Testing

Signed into law on November 25, 2020, this law requires SERS and PSERS to conduct annual stress tests and submit reports to the Governor, General Assembly, and the Independent Fiscal Office (IFO) no later than January 1 of each year. SERS already has implemented an annual stress testing regime that meets or surpasses the requirements stipulated in the bill. Our first comprehensive annual Stress Testing and Risk Assessment report was presented to the SERS Board and released in December 2019. In April, the Pew Charitable Trusts singled out the report as a model to emulate. Our most recent stress testing and risk assessment report was presented to the SERS Board at its meeting in September 2020. It is available at [SERS.pa.gov](https://sers.pa.gov).



Hybrid Plan



9,927
hybrid members

9,520
Class A-5

407
Class A-6

102
employers

HYBRID PLAN

Plan Description

The default retirement plan for most new state employees is the Hybrid Plan A-5 class of service that launched January 1, 2019, as established by Act 2017-5.

In this plan, a portion of the employee's retirement benefit comes from a defined benefit pension plan, which provides guaranteed monthly payments for life based on a calculation, and a portion comes from a defined contribution investment plan, which provides income in retirement based on the balance in the employee's personal investment account. Employers and employees both contribute to this plan.

The SERS Board administers the SERS pension fund, that provides the guaranteed monthly payments in retirement. The board also selects the investment options and contracts through a competitive bid with the third-party administrator of the defined contribution investment plan, currently Empower Retirement. For more information on the personal investment plan portion of the benefit, its investment options, or the third-party administrator, see the [Defined Contribution Plan section](#).

There are two classes of service in this plan, the A-5 and A-6 classes of service. The class of service defines the mandatory employee and employer contribution rates and how quickly the pension portion of the retirement benefit grows each year. For more information on the pension plan, including the benefit calculation, see the [Defined Benefit Plan section](#).

The pension portion of the hybrid benefit grows at a slower rate than the traditional pension-only plan -- at either 1.25% or 1% of the employee's final average salary for each year they work, compared to between 2% and 4% in the traditional pension-only plan. The growth or

"accrual" rate is determined by the employee's class of service in the pension system:

A-5 Class of Service

Participants in the Hybrid Plan A-5 class of service contribute a total 8.25% of their pay toward their retirement benefit, which is split between the two plans, with 5% going toward the traditional pension plan and 3.25% going toward the investment plan. Participants may make additional voluntary contributions toward the investment plan.

The amount employers contribute toward the pension portion of the benefit is calculated each year based on the assets and liabilities of the SERS pension fund. Employers also contribute an amount equal to 2.25% of the employee's pay toward the investment plan portion of the retirement benefit.

The pension portion of the benefit is guaranteed to grow by 1.25% of the employee's final average salary for each year they work.

A-6 Class of Service

Participants in the Hybrid Plan A-6 class of service contribute a total 7.5% of their pay toward their retirement benefit, which is split between the two plans, with 4% going toward the traditional pension plan and 3.5% going toward the investment plan. Participants may make additional voluntary contributions toward the investment plan.

The amount employers contribute toward the pension portion of the benefit is calculated each year based on the assets and liabilities of the SERS pension fund.

HYBRID PLAN

Plan Description

Employers also contribute an amount equal to 2% of the employee’s pay toward the investment plan portion of the retirement benefit.

The pension portion of the benefit is guaranteed to grow by 1% of the employee’s final average salary for each year they work.

The employee is eligible for monthly pension payments, or “vested” in the pension system, after working 10 years and they are eligible for

distribution of the employer contributions toward their investment account after working three years. Employee contributions are immediately vested and eligible for distribution upon retirement.

While new employees are automatically enrolled in the Hybrid Plan, A-5 class of service, they have the option to elect either the A-6 class of service or to forgo the traditional pension component altogether and participate exclusively in the Defined Contribution Plan.

Hybrid Plan Statistics

as of December 31, 2020

Participants	9,927 total 9,520 A-5 Class of Service 407 A-6 Class of Service
Assets	see the Defined Contribution Plan and Defined Benefit Plan sections for the assets in each plan.
Eligible Employers	102

**DEFINED
CONTRIBUTION
PLAN**

Investment Option

Defined Contribution Plan

\$321,000

distributions/withdrawals
in 2020

\$35.7

million in
assets

As of Dec 31, 2020



13,162
accounts

102
employers

Contributions

participant **\$11.7 million**
employer **\$7.8 million**

Total FY 2021-22 Planned Budget



\$4.4 million

**\$2.3
million**
personnel

**\$2.1
million**
operations

Excerpts from operations =

specialized services **\$1,290,000**

IT consulting-system upgrade **\$358,000**

legal services **\$100,000**

real estate **\$78,000**

postage **\$30,000**

DEFINED CONTRIBUTION PLAN

Plan Description

While the Hybrid Plan A-5 class of service is the default plan for most new state employees, they have the option to forgo the traditional pension component of those plan options and participate exclusively in the Defined Contribution Plan.

Employees in the Defined Contribution Plan contribute 7.5% of their pay and their employer contributes an amount equal to 3.5% of the employee's pay toward the employee's investment account.

The employee is eligible for distribution of the employer contributions, or is "vested" in this plan, after working three years. Employee contributions are immediately vested and eligible for distribution upon retirement.

In this plan, the amount of money an employee has for retirement is based on the balance in the employee's personal investment account.

The SERS Board selects the investment options offered through this plan, contracts with investment managers, and contracts through a competitive bid with the third-party administrator of the plan, currently Empower Retirement. Empower maintains participant records, carries out investment transactions on behalf of the participants, and counsels participants.

Investment options comprise a series of target date funds that include a post-retirement date fund, equity funds, fixed income funds, a money market fund, and a self-directed brokerage option.

On December 31, 2020, participant accounts totaled \$35.7 million.

Plan administrative costs during 2020 were funded through a FY 2019-20 commonwealth budget appropriation and a per-participant assessment charged to employers in the

second half of 2020, as described below. As of December 31, 2020, the plan had approximately \$3.4 million available for plan administration.

As the plan becomes more established, cost-saving initiatives are taking place. During 2020, staff examined internal and third-party administrator processes to find efficiencies and see where costs could be reduced and/or services improved. The work on this important initiative will continue through 2021.

Recent Changes

In 2020, the plan experienced the following changes:

- **Administered Per-Participant Charge to Employers** - While the General Assembly provided direct funding through commonwealth budget appropriations for the startup and first year of the plan, Act 2020-23 authorized the SERS Board to assess employers a per-participant charge for the administrative fees, costs, and expenses of the plan.

The per-participant charge was based on the anticipated cost to run the plan for FY 2020-21 and the employee participation count certified by SERS' Board to its actuary as of December 31, 2019. The resulting per-participant fee was \$668.77. As enrollment in the new plan increases over time and our cost-reducing efforts take shape, the per-participant charge is expected to decrease.

- **Established Process to Retain Unvested Employer Contributions** - Act 2020-94 authorized the SERS Board to retain all unvested employer contributions from employees who left state service after June 30, 2020, and

DEFINED CONTRIBUTION PLAN

Plan Description

deposit them into a plan level account to help pay administrative expenses of operating the plan.

The retention of unvested contributions will help lower the future per-participant charge assessed to employers.

Defined Contribution Plan Statistics

as of December 31, 2020

Participants	13,162 total accounts 10,237 participants contributing to the plan Hybrid Plan participants 9,927 Defined Contribution Plan participants 310 2,925 inactive accounts
Assets	\$35.7 million
Eligible Employers	102
Total Participant Mandatory Contributions	\$11.7 million
Total Employer Contributions	\$7.8 million
Total Rollovers into the Plan	95 totaling \$2.4 million
Total Rollovers Out of the Plan	57 totaling \$120,000
Total Distributions/Withdrawals	364 totaling \$321,000
Total Voluntary After-Tax Contributions	\$366,000

DEFINED CONTRIBUTION PLAN

Participation, Assets, Performance, and Fund Expense

Defined Contribution Plan Investment Options

Participation, Assets, Performance, and Fund Expense
as of December 31, 2020

Fund Name	Participants	Fund Balance	Inception Date	Estimated Calendar Year, Net-of-Fees Returns					Max Total Investment Fund Expense ^{2/}
				1 Year	3 Year	5 Year	10 Year	10 Year	
Post Retirement Date Fund	322	\$563,163	08-2005	11.97%	7.72%	7.88%	6.25%	0.0775%	
2025 Retirement Date Fund	648	1,458,663	07-2006	12.19	8.17	9.12	7.37	0.0775	
2030 Retirement Date Fund	1,041	3,399,905	08-2005	12.88	8.74	9.95	7.94	0.0775	
2035 Retirement Date Fund	1,267	3,259,859	07-2006	13.57	9.27	10.73	8.47	0.0775	
2040 Retirement Date Fund	1,224	3,183,599	08-2005	14.14	9.71	11.41	8.92	0.0775	
2045 Retirement Date Fund	1,245	4,345,437	07-2006	14.83	10.08	11.90	9.28	0.0775	
2050 Retirement Date Fund	1,472	4,439,865	09-2007	15.20	10.25	12.09	9.49	0.0775	
2055 Retirement Date Fund	1,703	4,184,167	05-2010	15.32	10.30	12.11	9.62	0.0775	
2060 Retirement Date Fund	2,064	4,250,866	11-2014	15.31	10.29	12.10	NA	0.0775	
2065 Retirement Date Fund	1,823	2,359,357	09-2019	15.14	NA	NA	NA	0.0775	
U.S. Large Company Stock Index Fund	436	1,371,187	12-1994	18.43	14.19	15.23	13.90	0.0150	
U.S. Small/Mid Company Stock Index Fund	115	298,840	08-1998	32.03	15.35	16.06	13.23	0.0250	
U.S. All Company Stock Index Fund	313	456,557	01-2011	21.20	14.43	15.38	13.51	0.0250	
Global Non-U.S. Stock Index Fund	311	717,483	03-2009	11.15	5.25	9.35	5.15	0.0550	
U.S. Bond Index Fund	281	317,580	02-1995	7.56	5.35	4.43	3.80	0.0250	
U.S. Short-Term Bond Index Fund	152	52,576	12-2017	3.36	2.98	NA	NA	0.0250	
U.S. Treasury Inflation Protected Security Index Fund ^{1/}	190	79,488	07-2007	11.00	5.91	NA	NA	0.0250	
Short-Term Investment Fund	24	939,153	10-2018	0.65	1.67	1.34	0.77	0.0000	

^{1/}There was a break in the return history of the TIPS fund between 2010 and 2017, since there were no participants during that time.

^{2/}Maximum possible expense that can be charged.

The Plan's annual recordkeeping fee is \$59.50 per participant. The Plan's employers are currently covering this fee.

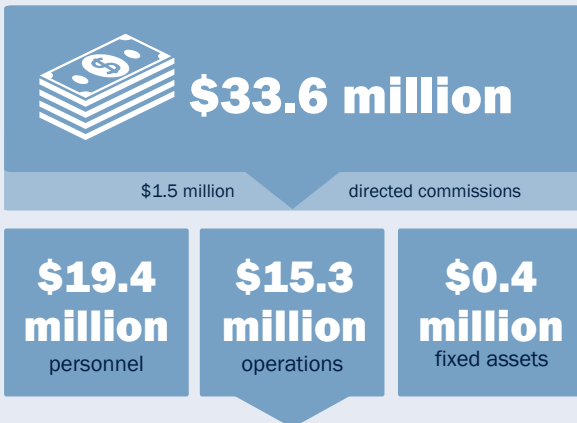
For those in the Self-Directed Brokerage Option (SDB), the asset fee is assessed against the balance in the SDB but the actual deduction is prorated against the core investment options separately.

**DEFINED
BENEFIT
PLAN**

Traditional Pension

Defined Benefit Plan

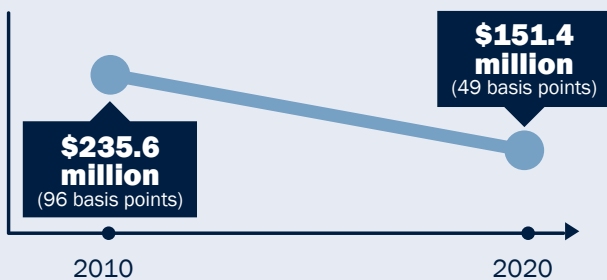
Total FY 2021-22 Spending Request



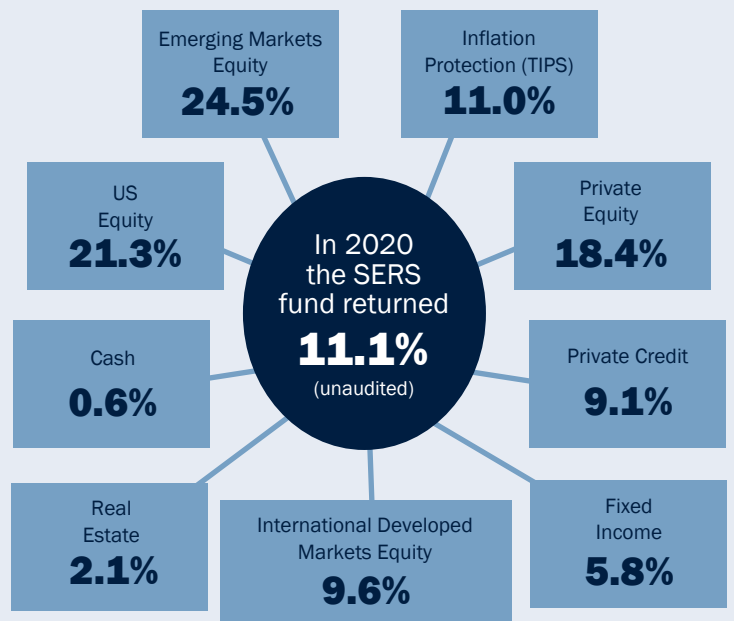
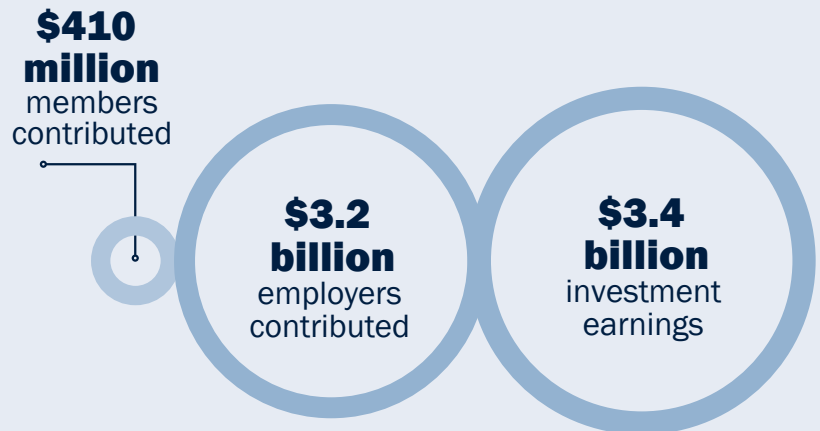
Excerpts from operations =

- IT consulting-system upgrade **\$5.7 million**
- real estate **\$2.0 million**
- hardware/software maintenance **\$1.8 million**
- postage **\$0.7 million**
- legal services **\$0.3 million**
- office equipment **\$0.2 million**

SERS decreased manager fees and expenses



2020 Contributions to the SERS Fund

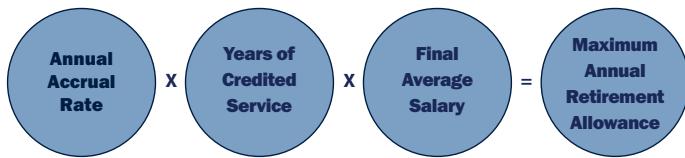


DEFINED BENEFIT PLAN

Plan Description

Employees initially hired before January 1, 2019, or into certain law enforcement and security positions after that date, are enrolled in the Defined Benefit Plan, which is a traditional pension plan.

This plan features guaranteed monthly payments for life based on a calculation that considers the employee's years of service and salary:



The economic engine of the Defined Benefit Plan is the SERS Fund, which is professionally managed by SERS and detailed in this section.

Both the employee and their employer contribute toward the Defined Benefit Plan.

The employee contributes a certain percentage of their pay, determined by their class of service in the pension system. The percentages are set by law in the State Employees' Retirement Code and are generally fixed except for a shared-risk/shared-gain provision. For employees hired after December 31, 2010, if SERS investments fail to achieve the assumed rate of return over a number of years; or conversely, if SERS investments outperform the assumed rate of return over a number of years, the employee's contribution rate could change by no more than 3% over/under the base rate for their class of service in the pension system. While contribution rates vary with the vast majority contributing between 5% and 9.3%, most employees contribute 6.25% of their pay toward their pension.

Employers contribute a percentage of their payroll as calculated each year based on the assets and liabilities of the SERS Fund.

For FY 2020-21, employers on average are contributing 33.48% of payroll toward their employees' pensions.

SERS invests the contributions to achieve returns to help ensure sufficient funds are available to make required payments to current and future retirees.

Most employees hired after December 31, 2010, are eligible for monthly pension payments, or "vested" in the pension system, after working 10 years.

If employees retire before they reach their full SERS retirement age – either age 50, 55, 60, 65, or 67 depending on their class of service in the system – their pension is reduced for early retirement.

The Defined Benefit Plan also features a disability benefit for employees who become unable to perform their job because of injury or illness and qualify, based on years of service and a review by an independent medical examiner.

Recent Changes

In 2020, the plan experienced the following changes:

- **Investment Return and Inflation Assumptions Reduced** – On July 29, 2020, the board reduced the investment return assumption from 7.125% to 7.0% and the assumed rate of inflation from 2.6% to 2.5%. The assumptions are used when valuing the pension plan and will become effective with the December 31, 2020 actuarial valuation. The changes, along with a number of demographic assumptions, were approved after the board's actuary completed a five-year study of actuarial experience.

DEFINED BENEFIT PLAN

Plan Description

- Rebalanced Portfolio to Align with New Asset Allocation** – In early 2020, SERS’ investment staff rebalanced assets to align with the new target asset allocation approved by the board in December 2019. The initial work involved withdrawing approximately \$2.85 billion from public equity and \$750 million from cash and allocating those proceeds to fixed income. SERS’ investment staff also executed several rebalancing transactions in 2020 to ensure that asset classes are near their target weights.
- PSU Made \$1.06 Billion Payment Toward its Unfunded Liabilities** – In April 2020, Penn State University submitted a payment of \$1.06 billion

toward its unfunded liability. In return, the university will receive an annual credit against their contributions for 30 years. The credit totals nearly \$93.3 million for twenty years and then decreases over the final 10 years beginning at nearly \$72.6 million and ending at approximately \$2.3 million in 2049.

The payment was made possible by Act 2019-105, that allows eligible employers to enter into an agreement with the SERS Board to make a one-time, lump-sum payment of between 75% to 100% of their unfunded liability.

Defined Benefit Plan Statistics

As of December 31, 2020

Members	239,370 total
	100,965 active contributing members
	Hybrid Plan members 9,927
	Defined Benefit Plan only members 91,038
	5,071 vested members not receiving benefits
	133,334 retired members and beneficiaries
Assets	\$34.5 billion
Number of Employers	102
Total Employee Contributions	\$410 million
Total Employer Contributions	\$3.2 billion
Total 2020 Benefit Payments	\$3.6 billion



Members

DEFINED BENEFIT PLAN

Members

Total Active & Annuitant Members

Year Ending December 31	Total Members ^{1/}	Active Members	Annuitants & Beneficiaries
2020	234,299	100,965	133,334
2019	235,581	102,850	132,731
2018	234,014	103,007	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

^{1/}Totals do not include inactive members.

Active Members: Age & Service

Average Age	46.5
Average Years of Service	11.8

Total Annuitants & Beneficiaries: By Category

	2017	2018	2019	2020
Normal	64,796	65,968	67,307	68,103
Early	44,284	44,383	44,423	44,129
Disability	8,593	8,626	8,637	8,529
Beneficiary/Survivor	11,800	12,030	12,364	12,573

Annuitants & Beneficiaries: Average Age

	2017	2018	2019	2020
Normal	72.3	72.4	72.5	72.6
Early	64.7	65.1	65.5	66.0
Disability	63.7	64.1	64.5	64.9
Beneficiary/Survivor	74.6	74.6	74.7	74.7

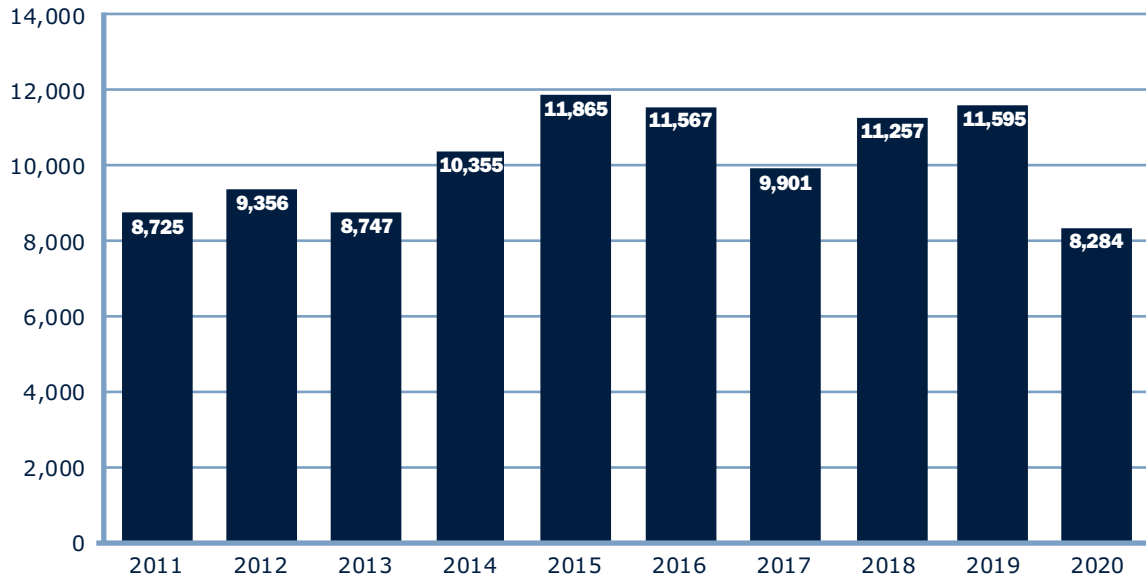
Annuitants & Beneficiaries: Average Annual Pension

	2017	2018	2019	2020
Normal	\$28,352	\$28,880	\$29,440	\$30,050
Early	17,751	18,098	18,428	18,727
Disability	15,521	15,753	15,980	16,234
Beneficiary/Survivor	12,947	13,350	13,816	14,253

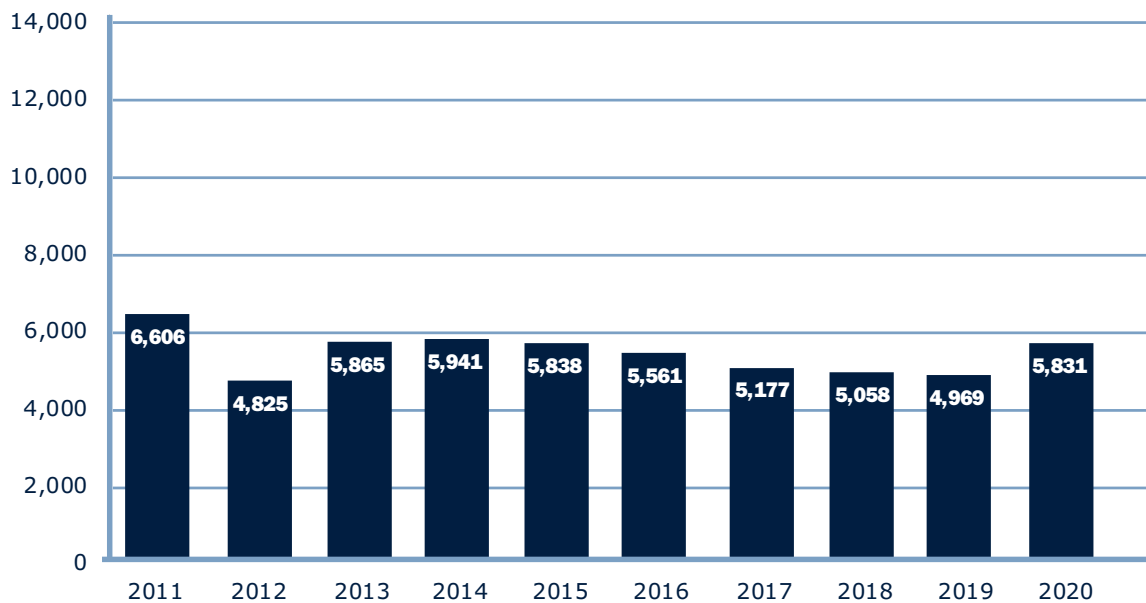
DEFINED BENEFIT PLAN

Members

New Member Enrollments



Normal, Early, & Disability Retirements





SERS Fund

DEFINED BENEFIT PLAN

SERS Fund | 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 following retirement. Most state employees are required to participate in Pennsylvania's Defined Benefit Plan, although nearly all employees hired after January 1, 2019 may elect to choose a defined contribution only option.

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 2020-21, employers are contributing 33.48% of payroll and most members are paying 6.25%. SERS invests this money to achieve returns to 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.

2020 Overview

In 2020, SERS paid nearly \$3.6 billion in pension benefit payments, approximately \$3.2 billion of which stayed in Pennsylvania. The

average annual pension paid to a retired member who worked to full retirement age was \$30,050.

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 common element of these plans is that employee and employer contributions invested throughout the member's working career provide sufficient funding to pay for that 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.

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' actuary 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, salary growth, and inflation.

DEFINED BENEFIT PLAN

SERS Fund | Funding Process

Demographic assumptions include workforce, disability, and mortality trends. In 2020, SERS' actuary delivered its most recent experience study. It is available at [SERS.pa.gov](https://sers.pa.gov). In addition to the five-year experience study, the investment rate of return assumption is reviewed every year.

The selection of economic and demographic assumptions used is generally guided by the Actuarial Standards Board. In SERS' case, some very important funding method requirements – such as the length of time over which investment gains and losses are recognized – are set by Pennsylvania law. SERS' actuary recommends and SERS Board approves all assumptions.

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

Key Assumptions		
Assumption	2019 Valuation	2020 Valuation
Investment Return	7.125%	7%
Average total salary/ career growth	5.6%	4.8%
Inflation rate	2.6%	2.5%

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

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.

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 typically does not change from year to year. Members' contributions are withheld from their paychecks and sent directly from their employer to SERS. In 2020, member contributions to SERS totaled an estimated \$410 million.

Courts have ruled that public retirement benefits may not be changed retroactively or prospectively in any way that may be a "net detriment" to current 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

DEFINED BENEFIT PLAN

SERS Fund | Funding Process

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.

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.

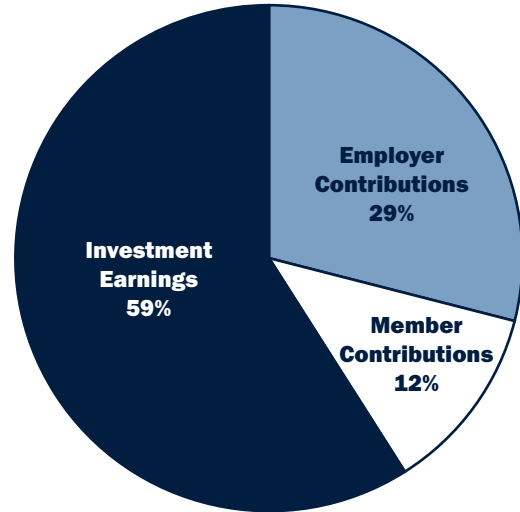
SERS strives to meet this objective by applying acceptable risk parameters and allocations to investments that are diversified by type, industry, quality, and geography.

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' nearly 100 years of operation and the trend of people living longer, the system consistently has more retired members than active members. In 2021, SERS

SERS Funding Sources
(20-Year Cumulative History)



is projected to pay out approximately \$107 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 a changing market environment and a desire to provide an opportunity to reduce risk while maintaining the potential for achieving a reasonable long-term rate of investment return, the SERS Board, in July 2020, moved to reduce its assumed rate of return from 7.125% to 7.0% effective with the December 31, 2020 actuarial valuation. This change has implications for the employer contribution rate, as discussed below. For 12 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 6.4%, a 25-year rate of return of 7.9%, and an inception to date return of 9.6%. 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 returns over time.

DEFINED BENEFIT PLAN

SERS Fund | Funding Process

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.

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.

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 to 2003 it was 0%. The rate for the current fiscal year is 33.48%.

The total dollars contributed by employers has grown significantly in recent years. In 1990, employer contributions totaled \$419 million. In 2020, that figure was approximately \$2.1 billion. This does not include the \$1.06 billion prepayment of unfunded liability received from Penn State University.

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. FY 2021-22 will be the 5th consecutive year that the commonwealth will pay the full actuarially required contributions.

According to the Governor’s Budget Office, SERS’ employers under the Governor’s jurisdiction paid less than half of the employers’ total—about 40%—from the general fund. About 52% was paid from special and federal funds, and about 8% was provided from non-state agency employers.

The employer contribution rate has two major parts: the cost of the benefit for new SERS members in the current year (applied to all active members), referred to as the employer normal cost; and a contribution toward the unfunded liability. In FY 2020-21 the largest component of the 33.48% employer contribution rate is the 31.1% contribution necessary to pay this unfunded liability.

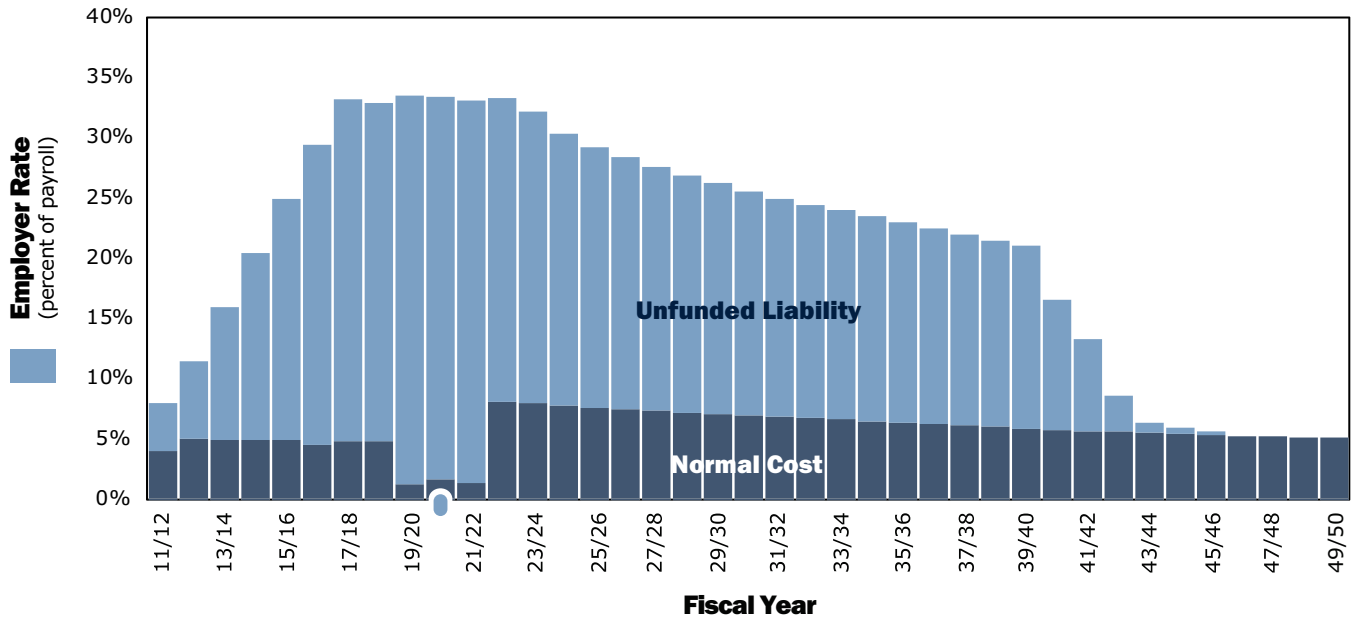
The employer normal cost is expressed as a percentage of payroll and is the amount employers would contribute to fully fund benefits if all actuarial assumptions were precisely met, including the fund earning its assumed rate of return. The normal cost of benefits for FY 2020-21 was 1.67% for newly hired members.

The system currently uses a statutorily required modified entry-age funding method, calculating employer normal rates based upon the cost of new hires only. Using this method the employer normal contribution rate is 1.67% in FY 2020-21. Act 2017-5 requires the use of a traditional entry-age funding method beginning with the 2021 valuation that will base employer normal costs on all active member costs. This shift is projected to increase employer normal costs for FY 2022-23 above 8%. However, the actuarial change will reduce the unfunded liability resulting in a total employer contribution rate that will increase only modestly above the prior year. In FY 2023-24, employer rates are then projected to decline annually until the unfunded liability is retired.

DEFINED BENEFIT PLAN

SERS Fund | Funding Process

SERS Employer Rate as a Percent of Payroll



It should be noted that Act 2017-5 included a savings “plow-back” provision requiring that the annual savings achieved through SERS’ benefit changes flow back into the system rather than to other non-pension obligations. The 33.10% projected employer contribution rate for FY 2021-22 reflects a savings return of 0.62%.

Without the plow-back provision, the employer rate would have been lower. The plow-back contributions, currently calculated to range from 0.10% to 0.93% of payroll, are expected in 11 of the next 21 fiscal years and will work to accelerate the systems’ return to fully funded status.

DEFINED BENEFIT PLAN

SERS Fund | Funding Process

Projected Payout, Funding Status & Employer Contributions

Valuation Year Ended Dec 31	CY Payout	CY Funding Status		Fiscal Year	Expected FY Payroll (\$ millions)	FY Employer Contribution	
	Benefits & Expenses (\$ billions)	Funded Ratio	Unfunded Liability (\$ billions)			Employer Contribution Rate	Expected FY Contribution (\$ millions)
2020	\$3.6	59.4%	\$22.21	2021/22	\$6,777.9	33.10%	\$2,149.6
2021	3.8	66.2	17.42	2022/23	6,967.7	33.36	2,230.3
2022	4.0	67.9	16.73	2023/24	7,162.8	32.21	2,213.0
2023	4.1	70.9	15.30	2024/25	7,363.3	30.35	2,139.9
2024	4.2	72.7	14.47	2025/26	7,569.5	29.22	2,117.0
2025	4.3	74.0	13.88	2026/27	7,781.5	28.41	2,115.9
2026	4.4	75.3	13.27	2027/28	7,999.3	27.66	2,117.2
2027	4.5	76.6	12.65	2028/29	8,223.3	26.95	2,120.3
2028	4.6	77.9	12.00	2029/30	8,453.6	26.28	2,125.4
2029	4.7	79.2	11.31	2030/31	8,690.3	25.63	2,131.6
2030	4.8	80.6	10.58	2031/32	8,933.6	25.01	2,137.8
2031	4.8	82.0	9.80	2032/33	9,183.7	24.50	2,153.2
2032	4.9	83.5	8.96	2033/34	9,440.9	24.02	2,170.3
2033	5.0	85.2	8.05	2034/35	9,705.2	23.52	2,185.6
2034	5.0	86.9	7.07	2035/36	9,977.0	23.02	2,199.1
2035	5.1	88.9	6.01	2036/37	10,256.3	22.53	2,212.4
2036	5.1	90.9	4.87	2037/38	10,543.5	22.03	2,224.4
2037	5.2	93.2	3.64	2038/39	10,838.7	21.54	2,236.3
2038	5.3	95.6	2.32	2039/40	11,142.2	21.06	2,247.1
2039	5.3	98.3	0.90	2040/41	11,454.2	16.59	1,821.4
2040	5.4	100.3	(0.18)	2041/42	11,774.9	13.33	1,505.9
2041	5.5	102.0	(1.01)	2042/43	12,104.6	8.69	1,006.4
2042	5.5	102.8	(1.46)	2043/44	12,443.5	6.37	758.5
2043	5.6	103.2	(1.63)	2044/45	12,792.0	6.04	739.7
2044	5.7	103.6	(1.79)	2045/46	13,150.1	5.65	710.7
2045	5.8	104.0	(1.93)	2046/47	13,518.3	5.31	690.4
2046	5.9	104.1	(1.95)	2047/48	13,896.8	5.24	703.4
2047	6.0	104.2	(1.92)	2048/49	14,286.0	5.18	715.0
2048	6.1	104.2	(1.89)	2049/50	14,686.0	5.13	740.0
2049	6.2	103.7	(1.58)	2050/51	15,097.2	5.08	755.7

Data calculated assuming: a modified entry-age funding method through the 2021 valuation year, with a traditional entry-age funding method starting with the 2022 valuation year, level-dollar amortization, five-year smoothing of assets, 4.6% salary growth, 2.5% inflation, 11.1% investment return in CY 2020 with 7.0% assumed 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 Defined Contribution Plan only election.

DEFINED BENEFIT PLAN

SERS Fund | 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 2020, SERS retired 5,831 members and added 8,284 new members. Currently, approximately 48.1% 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 2010-120 is that retirement provisions for legislators elected after December 1, 2010, were reduced and made consistent with those of most rank-and-file employees. Act 2010-120 also recognized the need to steadily increase employer contributions to fully fund their obligations. To ensure predictability and to moderate overall budget impacts, the general assembly set rate collars for increased employer contribution rates.

Now that SERS employers are paying the full "uncollared" contribution amount, plus making extra "plowback" contributions to return Act 2017-5 savings, the impact on paying down the liability is dramatic. This funding is crucial for the overall long-term health of the pension system.

On November 27, 2019, Governor Wolf signed Act 2019-105, which allows eligible employers to enter into an agreement with the SERS Board to make a one-time, lump-sum payment of between 75% to 100% of their unfunded liability. In April 2020, the first eligible employer to express interest in this prefunding strategy, Penn State University, submitted a payment of

\$1.06 billion toward its unfunded liability. In return, the university will receive an annual credit against their contributions for 30 years. The credit totals nearly \$93.3 million for twenty years and then decreases over the final 10 years beginning at nearly \$72.6 million and ending at approximately \$2.3 million in 2049.

The advanced payment decreased the estimated UAL as of December 31, 2020, by about \$1.1 billion and increased the funded ratio by about 2%. Currently, SERS expects to reach a 100% funded ratio in 2040. While the advance payment is not expected to change this timeline, the higher values of SERS' assets throughout the projection period means that favorable investment performance could help SERS reach the 100% funded ratio at an earlier date.

The past year, 2020, brought an array of challenges, resulting primarily from the COVID pandemic. Financial markets were hit hard during the first quarter, but eventually recovered. Thanks in part to our investment strategy and the asset allocation adopted in December 2019, SERS finished the year with investment gains of approximately 11.1% for our defined benefit plan – several percentage points above the fund's assumed rate of return.

Thanks to these positive returns, five years of full funding from the General Assembly, the receipt of nearly \$1.06 billion from Penn State's prepayment of its unfunded liabilities (made possible by Act 2019-105), and our ongoing efforts to implement efficiencies and transparency across SERS, we continue to progress toward our long-term goal of eliminating our unfunded liability.

One additional measure that would help pave a smoother road toward this ambitious but achievable goal would be the designation of a dedicated funding source for future commonwealth contributions. Doing so could provide SERS with additional stability and assurance.

DEFINED BENEFIT PLAN

SERS Fund | Actuarial Status

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 – 239,370 active, vested, and retired, as of December 31, 2020.

Many pension experts consider a funding ratio of 80% or better to be “healthy” for a pension system. Per a 2019 Wilshire report, Pennsylvania is among 63% of other state retirement systems that are currently below the 80% threshold. At the close of 2020, SERS’ estimated funded ratio was 59.4% (actuarial value) or 63.0% (market value). SERS projects reaching the 80% funded threshold in 2030.

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

SERS Funded Status

Year	Funded Ratio		Unfunded Actuarial Liability (\$ billions)
	Actuarial Value	Market Value	
2020	59.4%	63.0%	\$22.2
2019	56.5	58.7	23.0

The 2020 estimated unfunded liability is \$22.2 billion, which is 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
- Gradual reductions in assumed rates of return over the past several years, from 8.5% in 2008 to 7.0% effective with the December 31, 2020, actuarial valuation to reflect changing market conditions
- Cumulative negative impact of the above on the overall size of the fund and its ability to realize the full actuarial effect of investment returns in positive-earning years

DEFINED BENEFIT PLAN

SERS Fund | Actuarial Status

Additions and Deductions to Fiduciary Net Position^{4/}

(\$ millions)

Calendar Year	Member Contributions	Investment Earnings	Employer Contributions	Benefits & Expenses	Fair (Market) Value
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 ^{2/}	394	(1,442)	2,049	(3,421)	26,937
2019	405	5,175	2,115	(3,536)	31,096
2020 ^{3/}	410	3,352 ^{4/}	3,183	(3,588)	34,453
10-Year Total	\$3,756	\$21,286	\$15,064	(\$31,491)	

^{1/}10-year net additions and deductions were \$8,615.

^{2/}The Governmental Accounting Standards Board (GASB) issued GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions (OPEB) (GASB 75). This required SERS to record its proportionate share of net OPEB liability, (\$48), resulting in restated beginning balance of \$29,357.

^{3/}2020 figures are unaudited.

^{4/}Figure does not include 4th quarter earnings for all Private Equity, Private Credit, and Real Estate. Data not yet available.

Investment Overview

DEFINED BENEFIT PLAN

Investment Overview

Investment Policy

The SERS Board originally adopted a formal *Statement o Investment 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. On December 4, 2019, the SERS Board adopted the *SERS Defined Benefit Plan Investment Policy Statement (IPS)*.

The purpose of the IPS 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 IPS 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 moneys 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 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.

DEFINED BENEFIT PLAN

Investment Overview

- A 10-year asset allocation strategy was designed to further mitigate risk, reduce external management fees, improve fund liquidity with increased exposure to fixed income-oriented investments and simultaneously reduce exposure to less liquid non-traditional strategies, while meeting its long-term return assumption.

Investment Objectives

As indicated in SERS' IPS, 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 SERS' target rate of return over the long-term, net of fees.
- Achieve a SERS' total fund policy benchmark return over 10-year periods, net of fees. The fund policy benchmark index will be based on the asset allocation set forth in the IPS approved by the board.

SERS' investment process requires a thorough analysis of the plan liabilities, liquidity requirements, and market opportunities. The board, in collaboration with the Chief Investment Officer, actuarial consultant, and general investment consultant, establishes a target rate of return. Achieving, or exceeding this target rate of return is the primary investment performance objective of SERS' Investment Office to help meet the desired funded status.

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 subsequent 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.

Total Fund Asset Allocation

The board accepts asset allocation as the primary determinant of the system's long-term contributor to investment return and risk. Asset allocation is substantially more influential than individual mandates deployed within asset classes, managers selected to implement the mandates, or tactical asset allocation decisions. Among the factors that the board considers in developing the policy target asset allocation are the following:

- Achieve SERS' investment return assumption over the long-term, net of fees, within risk and investment management fee levels deemed prudent by the board.
- Maintain a level of liquid assets with a low correlation to the U.S. equity markets to pay retirement benefits and covenants during prolonged periods of market decline and potential state budgetary constraints.

DEFINED BENEFIT PLAN

Investment Overview

In addition, SERS' asset allocation structure was developed by considering the Fund's liabilities, benefits policy, funding policy, and each asset class' expected return, volatility, and correlation with other asset classes. Investment Office Staff, in consultation with the board and general investment consultant, combined asset classes in the most optimal structure to provide the highest expected return for a given level of risk, subject to implementation, liquidity, diversification, and cost constraints.

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 regularly for strategic asset allocation purposes, as well as for diversification needs within each asset class.

Asset Allocation

(\$ millions as of December 31, 2020)

Asset Class	Market Exposure	% of Total Fund	10-Year Strategic Targets
Private Equity	\$4,601.5	13.4%	14.0%
Private Credit	608.2	1.8	4.0
Real Estate	2,530.4	7.3	8.0
U.S. Equity	8,894.4	25.8	25.0
International Developed Markets Equity	4,614.8	13.4	13.0
Emerging Markets Equity	1,595.4	4.6	4.0
Fixed Income	9,751.3	28.3	26.0
Inflation Protection (TIPS)	1,292.0	3.7	4.0
Cash	540.0	1.6	2.0
Legacy Hedge Funds	25.2	0.1	*
Total Fund	\$34,453.2	100.0%	100.0%

*Legacy Hedge Funds asset class is in liquidation.

DEFINED BENEFIT PLAN

Investment Overview

Number of Investment Managers by Asset Class

Asset Class	Investment Managers
Private Equity	63
Private Credit	10
Real Estate	26
U.S. Equity	2
International Developed Markets Equity	9
Emerging Markets Equity	5
Fixed Income	9
Inflation Protection (TIPS)	3
Cash	1
Legacy Hedge Funds	8
Total	136

Number of Investment Portfolios

Asset Class	Investment Portfolios
Private Equity	185
Private Credit	17
Real Estate	55
U.S. Equity	4
International Developed Markets Equity	9
Emerging Markets Equity	5
Fixed Income	12
Inflation Protection (TIPS)	3
Cash	1
Legacy Hedge Funds	8
Total Portfolios	299



Performance

DEFINED BENEFIT PLAN

Performance

Estimated Calendar Year, Net-of-Fees Returns^{1/}

For the period ending December 31, 2020

Asset Class	1-Year Total Return	3-Year Total Return	5-Year Total Return	10-Year Total Return
Private Equity ^{2/,5/}	18.4%	13.2%	11.8%	11.5%
<i>Burgiss All Private Equity Custom Index^{3/,5/}</i>	13.1	12.3	12.2	12.7
<i>Global Equity +3%^{4/,5/}</i>	15.6	14.2	16.5	16.5
Private Credit ^{5/,8/}	9.1	9.7	NA	NA
<i>S&P Lvr'd Loan Index +1%^{5/}</i>	2.3	4.2	5.1	5.3
Real Estate ^{5/}	2.1	3.4	3.1	7.0
<i>Real Estate Custom Benchmark^{5/,6/}</i>	0.3	4.0	5.5	9.0
<i>Consumer Price Index +3%^{5/}</i>	4.4	4.8	4.8	4.8
U.S. Equity	21.3	13.5	14.4	13.3
<i>Russell 3000 Index</i>	20.9	14.5	15.4	13.8
International Developed Markets Equity	9.6	5.0	8.8	6.5
<i>MSCI World ex U.S. IMI</i>	8.3	4.3	7.9	5.4
Emerging Markets Equity	24.5	8.3	14.7	4.0
<i>MSCI Emerging Markets IMI</i>	18.4	5.8	12.2	3.5
Fixed Income	5.8	4.7	4.9	4.2
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>	7.5	5.3	4.4	3.8
Inflation Protection (TIPS)	11.0	5.7	5.2	3.1
<i>U.S. TIPS Index</i>	11.0	5.9	5.1	3.8
Cash	0.6	1.7	1.4	0.9
<i>ICE BofAML U.S. 3-Month Treasury Bill Index</i>	0.7	1.6	1.2	0.6
Total Fund^{7/}	11.1%	8.0%	9.1%	8.0%
Total Fund Custom Benchmark	13.5%	9.1%	9.7%	8.8%
Total Fund Custom Public Market Equivalent Benchmark	13.2%	9.2%	10.4%	9.1%
Total Fund 60/40 Index	13.6%	8.4%	9.3%	7.2%

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

^{2/}Historical Private Equity performance includes Buyouts, Special Situations, and Growth Equity.

^{3/}Intended to compare the program's performance to its peers.

^{4/}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.

^{5/}Private Equity, Private Credit, Real Estate and the corresponding benchmarks are reported on a quarter-lagged basis.

^{6/}Calculated monthly using beginning of the month asset class weights applied to each corresponding primary benchmark return. The real estate custom benchmark consists of the NCREIF ODCE Index (1 Qtr lag) and FTSE NAREIT Index (unlagged).

^{7/}Legacy Hedge Funds are in liquidation, values and performance are no longer reported. However, all performance activity continues to be reflected in SERS' Total Fund return.

^{8/}Private Credit has an inception date of December 1, 2017. As of December 31, 2020, extended period returns beyond three years are unavailable.

DEFINED BENEFIT PLAN

Performance

Fiscal Year, Net-of-Fees Returns^{1/}

For the period ending June 30, 2020

Asset Class	1-Year Total Return	3-Year Total Return	5-Year Total Return	10-Year Total Return
Private Equity ^{2/,5/}	-2.5%	7.5%	7.5%	9.7%
<i>Burgiss All Private Equity Custom Index^{3/,5/}</i>	1.4	9.7	9.7	11.8
<i>Global Equity +3%^{4/,5/}</i>	-6.0	7.3	9.0	13.5
Private Credit ^{5/,8/}	1.5	NA	NA	NA
<i>S&P Lvr'd Loan Index +1%^{5/}</i>	-8.0	0.3	2.2	4.1
Real Estate ^{5/}	1.6	2.3	3.1	7.0
<i>Real Estate Custom Benchmark^{5/,6/}</i>	2.6	5.0	6.5	10.0
<i>Consumer Price Index +3%^{5/}</i>	4.5	4.9	4.8	4.7
U.S. Equity	4.5	8.5	8.4	13.1
<i>Russell 3000 Index</i>	6.5	10.0	10.0	13.7
<i>International Developed Markets Equity</i>	-4.5	1.0	2.7	6.5
<i>MSCI World ex U.S. IMI</i>	-5.1	0.8	2.2	5.7
<i>Emerging Markets Equity</i>	1.5	3.4	4.6	3.4
<i>MSCI Emerging Markets IMI</i>	-4.0	1.4	2.4	3.1
Fixed Income	4.1	3.9	3.4	4.5
<i>Bloomberg Barclays U.S. Aggregate Bond Index</i>	8.7	5.3	4.3	3.8
Inflation Protection (TIPS)	8.0	5.0	3.7	2.8
<i>U.S. TIPS Index</i>	8.3	5.1	3.8	3.5
Cash	1.6	1.9	1.5	0.9
<i>ICE BofAML U.S. 3-Month Treasury Bill Index</i>	1.6	1.8	1.2	0.6
Total Fund^{7/}	1.2%	5.1%	5.3%	7.5%
Total Fund Custom Benchmark	3.8%	6.3%	6.4%	8.4%
Total Fund Custom Public Market Equivalent Benchmark	3.8%	6.5%	6.5%	8.7%
Total Fund 60/40 Index	4.8%	5.8%	5.7%	7.2%

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

^{2/}Historical Private Equity performance includes Buyouts, Special Situations, and Growth Equity.

^{3/}Intended to compare the program's performance to its peers.

^{4/}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.

^{5/}Private Equity, Private Credit, Real Estate and the corresponding benchmarks are reported on a quarter-lagged basis.

^{6/}Calculated monthly using beginning of the month asset class weights applied to each corresponding primary benchmark return. The real estate custom benchmark consists of the NCREIF ODCE Index (1 Qtr lag) and FTSE NAREIT Index (unlagged).

^{7/}Legacy Hedge Funds are in liquidation, values and performance are no longer reported. However, all performance activity continues to be reflected in SERS' Total Fund return.

^{8/}Private Credit has an inception date of December 1, 2017. As of June 30, 2020, extended period returns beyond one year are unavailable.

DEFINED BENEFIT PLAN

Performance

Pension Fund Values and Annual Return

(\$ millions)

Year Ended	Pension Fund Fair Value	Annual Total Pension Fund Rate of Return ^{1/}
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	26,937	-4.6
2019	31,096	18.8
2020 ^{2/}	34,453	11.1

^{1/}Returns were calculated using the Modified Dietz day-weighted return methodology.

^{2/}2020 values are estimated and unaudited. Fund fair values for all Private Equity, Private Credit, and Real Estate investments are reported on a quarter-lagged, cash-flow adjusted basis.



Fees & Expenses

DEFINED BENEFIT PLAN

Fees & Expenses

Investment Expenses

Expense Category	Expenses
Manager Fees and Expenses	\$151,382,496
Personnel	4,134,937
Consultant	3,571,962
Custodian	1,396,542
Subscription and membership	284,909
Operational	67,945
Total Investment Expenses	\$160,838,791

Consultant Expenses

Firm	Service Type	Expenses
StepStone Group	Private equity investments	\$1,951,102
NEPC	Real estate investments	527,040
Fairview Capital Partners	Investment portfolio management	450,489
Callan	General investments	400,150
Other	Other	243,181
Total Consultant Expenses		\$3,571,962

Manager Fees and Expenses

Asset Class	Fees/Expenses	Fees/Expenses ^{1/} (in basis points)
Private Equity	\$68,720,782	165.2
Private Credit	12,913,381	198.1
Real Estate	26,354,588	118.1
U.S. Equity	4,110,298	5.2
International Developed Markets Equity	11,996,282	25.5
Emerging Markets Equity	9,050,345	59.8
Fixed Income	16,911,142	21.8
Inflation Protection (TIPS)	1,273,941	10.6
Legacy Hedge Funds	51,737	17.6
Total Manager Fees and Expenses	\$151,382,496	49.2

^{1/}The fees/expenses were divided by SERS total fund and asset class quarterly average values during calendar year 2020 to arrive at the basis point calculations.

History of Manager Fees and Expenses

Calendar Year	Fees/Expenses	Fees/Expenses (in basis points)
2016	\$159,447,442	61.3
2017	126,541,221	45.6
2018	124,427,862	43.3
2019	169,969,812	58.3 ^{1/}
2020	151,382,496	49.2

^{1/}Fees include approximately \$19 million in incentive fees that were earned over a multi-year period but recorded in the current year.

DEFINED BENEFIT PLAN

Fees & Expenses

SERS employs outside investment managers for their investment expertise and services. The managers of the SERS investment portfolio are paid from investment earnings. Their fees and expenses 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 incurred.

2020 Manager Fees and Expenses Detail

Manager	City	State/Country	Fees/ Expenses
Private Equity			
ABRY Advanced Securities Fund	Boston	MA	\$1,923
ABRY Partners VI	Boston	MA	8,311
ABRY Partners VII	Boston	MA	43,884
ABRY Partners VIII	Boston	MA	104,296
ABRY Senior Equity II	Boston	MA	14,891
Advent International GPE VI-A	Boston	MA	58,168
Advent International GPE VII-B	Boston	MA	284,138
Advent International GPE VIII-B	Boston	MA	514,169
Advent Latin American Private Equity Fund IV	Boston	MA	66,424
Advent Latin American Private Equity Fund V	Boston	MA	73,527
Advent Latin American Private Equity Fund VI	Boston	MA	345,041
Apollo Investment Fund IX	New York	NY	888,878
ASF VII B	New York	NY	394,891
ASF VII PA Co-Invest	New York	NY	57,708
ASF VIII B	New York	NY	1,250,000
Asia Alternatives Capital Partners II	San Francisco	CA	39,843
Asia Alternatives Capital Partners III	San Francisco	CA	171,703
Asia Alternatives Capital Partners V	San Francisco	CA	479,632
Audax Private Equity Fund VI	Boston	MA	563,845
Berkshire Fund VII	Boston	MA	57,905
Berkshire Fund VIII	Boston	MA	388,749
Blackstone Capital Partners VII	New York	NY	599,204
Blackstone Capital Partners VIII	New York	NY	787,500
Capvis Equity IV	Baar	Switzerland	579,611
Carlyle Energy Mezzanine Opportunities Fund	New York	NY	129,348
Centerbridge Capital Partners III	New York	NY	172,365
Clearlake Capital Partners IV	Santa Monica	CA	178,868
Clearlake Capital Partners V	Santa Monica	CA	499,884
Clearlake Capital Partners VI	Santa Monica	CA	468,023
CVC Capital Partners VII	London	United Kingdom	1,387,727
Dover Street VII	Boston	MA	30,000
Eureka Growth Capital III	Yardley	PA	163,033
Francisco Partners III	San Francisco	CA	75,709
Francisco Partners IV	San Francisco	CA	253,718

DEFINED BENEFIT PLAN

Fees & Expenses

2020 Manager Fees and Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
Private Equity (continued)			
FSN Capital IV	Oslo	Norway	\$199,048
FSN Capital V	Saint Helier-Jersey	United Kingdom	1,550,759
GTCR Fund XI	Chicago	IL	264,217
GTCR Fund XII	Chicago	IL	488,533
H.I.G. Bayside Debt & LBO Fund II	London	United Kingdom	225,886
H.I.G. Bayside Loan Opp. Fund III	London	United Kingdom	414,716
H.I.G. Bayside Loan Opp. Fund IV	London	United Kingdom	195,821
H.I.G. Brazil and Latin America Partners	Rio de Janeiro	Brazil	1,250,000
H.I.G. Europe Capital Partners II	Miami	FL	521,973
H.I.G. Growth Buyouts & Equity Fund II	Miami	FL	66,095
Hahn & Company II	Seoul	Korea	900,721
Hahn & Company III	Seoul	Korea	1,125,000
Hahn & Company III - Supplemental Fund	Seoul	Korea	90,191
HarbourVest PA Co-Investment Fund	Boston	MA	73,331
HarbourVest Partners VIII	Boston	MA	590,492
Hellman & Friedman Capital Partners VIII	San Francisco	CA	64,367
Hellman & Friedman Capital Partners IX	San Francisco	CA	400,790
HIPEP V-Asia Pacific & Rest of World	Boston	MA	52,976
Horizon Impact Fund	Chicago	IL	235,875
Horizon Impact Fund B	Boston	MA	621,832
Insight Venture Partners VIII	New York	NY	292,436
Insight Venture Partners IX	New York	NY	839,641
Insight Venture Partners X	New York	NY	1,447,213
Insight Venture Partners XI	New York	NY	1,311,696
JMI Equity Fund VII	Baltimore	MD	94,864
JMI Equity Fund VIII	Baltimore	MD	405,000
Keystone Legacy Fund	West Hartford	CT	3,004,270
KPS Special Situations Fund V	New York	NY	128,814
KPS Special Situations Mid-Cap Fund	New York	NY	275,004
LBC Credit Partners III	Philadelphia	PA	236,209
Lightspeed India Partners I	New Delhi	India	385,600
Lightspeed Venture Partners VIII	Menlo Park	CA	175,874
LLR Equity Partners III	Philadelphia	PA	68,264
LLR Equity Partners IV	Philadelphia	PA	508,926
LLR Equity Partners V	Philadelphia	PA	1,303,037
Meritech Capital Partners IV	Palo Alto	CA	94,001
Meritech Capital Partners V	Palo Alto	CA	419,178
Newbridge Asia IV	San Francisco	CA	28,798
NewSpring Growth Capital III	King of Prussia	PA	229,545

DEFINED BENEFIT PLAN

Fees & Expenses

2020 Manager Fees and Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
Private Equity (continued)			
Oaktree Opportunities Fund IX	Los Angeles	CA	\$577,416
Oaktree Power Opportunities Fund III	Los Angeles	CA	68,690
OCM Opportunities Fund VIII	Los Angeles	CA	8,911
OCM Opportunities Fund VIII b	Los Angeles	CA	75,926
Permira VI	London	United Kingdom	459,736
Permira VII	New York	NY	1,146,646
Primavera Capital Fund II	Hong Kong	China	979,639
Primavera Capital Fund III	Grand Cayman	Cayman Islands	1,419,944
Providence Strategic Growth II	Providence	RI	611,804
Providence Strategic Growth III	Providence	RI	413,848
Providence Strategic Growth IV	New York	NY	1,500,000
Ridgemont Equity Partners II	Charlotte	NC	564,866
RRJ Capital Master Fund III	Hong Kong	China	287,356
Silver Lake Partners V	Cupertino	CA	841,223
Sterling Group Partners IV	Houston	TX	238,432
T.Rowe Price Stock Distribution Account	Baltimore	MD	1,027,312
TCV X	Menlo Park	CA	1,186,835
TDR Capital IV	London	United Kingdom	1,580,751
TSG8	San Francisco	CA	1,833,894
Vista Equity Partners Fund VI	Oakland	CA	1,937,599
Vista Equity Partners Fund VII	Oakland	CA	1,061,984
Weathergage Venture Capital	Redwood City	CA	96,344
Weathergage Venture Capital II	Redwood City	CA	170,100
Wind Point Partners IX-A	Chicago	IL	1,060,670
Wind Point Partners VIII	Chicago	IL	704,048
Private Equity Manager Fees			51,567,883
Private Equity Manager Expenses			17,152,899
Total Private Equity Manager Fees and Expenses			68,720,782
Private Credit			
Apollo Hybrid Value Fund	New York	NY	307,193
Ares PA Opportunities Fund - Distressed Debt	New York	NY	209,725
Ares PA Opportunities Fund - Diversified Credit	New York	NY	78,061
Audax Direct Lending Solutions Fund-A	Boston	MA	919,270
Clearlake Opportunity Partners II	Santa Monica	CA	602,979
Glendon Opportunities Fund II	Santa Monica	CA	108,359
HPS Mezzanine Partners 2019	New York	NY	886,246
ICG Europe Fund VII	New York	NY	406,292
ICG Europe Mid-Market Fund	New York	NY	745,319
Permira Credit Solutions IV Master (Feeder) SCSp	New York	NY	548,468

DEFINED BENEFIT PLAN

Fees & Expenses

2020 Manager Fees and Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
Private Credit (continued)			
TSSP Adjacent Opportunities Partners (B)	San Francisco	CA	\$920,437
TSSP Adjacent Opportunities Partners Contingent	San Francisco	CA	295,992
TSSP Opportunities Partners IV	San Francisco	CA	189,729
Private Credit Manager Fees			6,218,070
Private Credit Manager Expenses			6,695,311
Total Private Credit Manager Fees and Expenses			12,913,381
Real Estate			
Activum SG Fund VI	London	United Kingdom	997,489
Berwind Investment Partnership VI	Yardley	PA	4,157
Blackstone Property Partners	New York	NY	2,808,688
Blackstone Real Estate Partners VII	New York	NY	374,997
Blue Moon Senior Housing II	Boston	MA	622,869
Blue Moon Senior Housing II Sidecar	Boston	MA	124,358
CenterSquare Real Estate Securities	Plymouth Meeting	PA	945,665
C-III Recovery Fund III	New York	NY	1,260,652
Clerestory Small Cap Real Estate Fund I	New York	NY	11,320
Forest I.M.A.	Atlanta	GA	32,408
Hawkeye Scout Fund II	Austin	TX	229,635
Heitman America Real Estate Trust	Chicago	IL	322,185
Heitman I.M.A.	Chicago	IL	746,124
Henderson Park Enhanced Income Fund	London	United Kingdom	1,158,153
hotelAVE I.M.A.	Irvine	CA	476,381
LaSalle I.M.A.	Chicago	IL	1,243,049
LaSalle Takeover I.M.A.	Chicago	IL	4,024,248
Lowes GTO	Los Angeles	CA	41,598
Lubert Adler Fund VII	Philadelphia	PA	196,563
Mesrow Financial Real Estate Value Fund III	Chicago	IL	252,300
Oak Street Real Estate Capital Fund IV	Chicago	IL	1,070,912
Oak Street Real Estate Capital Net Lease Property Fund	Chicago	IL	647,571
Prudential Latin America Residential Fund III	Parsippany	NJ	8,677
Prudential Senior Housing Fund IV	Parsippany	NJ	3,720
Prudential Senior Housing Fund V	Parsippany	NJ	437,396
Prudential Senior Housing Fund VI	New York	New York	1,322,450
Rockpoint Real Estate Fund II	Dallas	TX	11,851
Rockpoint Real Estate Fund III	Dallas	TX	63,505
Rockpoint Real Estate Fund V	Dallas	TX	531,580
SRE Opportunity Fund III	Chicago	IL	750,000
SRE Opportunity Fund III Select	Chicago	IL	65,840

DEFINED BENEFIT PLAN

Fees & Expenses

2020 Manager Fees and Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
Real Estate (continued)			
Starwood Fund VIII	Greenwich	CT	\$92,022
UBS Trumbull Property Fund	Stamford	CT	220,844
ValStone Opportunity Fund V	Birmingham	MI	219,550
Westbrook Fund V	Dallas	TX	46,059
Westbrook Fund VII	Dallas	TX	144,395
Westbrook Fund VIII	Dallas	TX	92,835
Real Estate Manager Fees			21,602,046
Real Estate Manager Expenses			4,752,542
Total Real Estate Manager Fees and Expenses			26,354,588
U.S. Equity			
Emerald Asset Management	King of Prussia	PA	3,513,033
Mellon Investments Corporation Russell 1000	Pittsburgh	PA	422,698
Mellon Investments Corporation Russell 2000 Core	Pittsburgh	PA	68,755
Mellon Investments Corporation Russell 2000 Value	Pittsburgh	PA	105,812
U.S. Equity Manager Fees			4,110,298
U.S. Equity Manager Expenses			0
Total U.S. Equity Manager Fees and Expenses			4,110,298
International Developed Markets Equity			
BlackRock MSCI World ex U.S. Index	New York	NY	101,161
Harris Associates	Chicago	IL	2,280,524
Walter Scott & Partners Limited	Edinburgh	United Kingdom	2,722,037
Xponance	Philadelphia	PA	1,547,095
International Developed Markets Equity Manager Fees			6,650,817
International Developed Markets Equity Manager Expenses			5,345,465
Total International Developed Markets Equity Manager Fees and Expenses			11,996,282
Emerging Markets Equity			
BlackRock MSCI Emerging Markets Index	New York	NY	116,884
GlobeFlex Capital	San Diego	CA	581,121
Leading Edge Investment Advisors	San Francisco	CA	1,794,538
Macquarie Emerging Markets	Philadelphia	PA	2,504,068
Martin Currie Investment Management	Edinburgh	United Kingdom	2,430,543
Emerging Markets Equity Manager Fees			7,427,154
Emerging Markets Equity Manager Expenses			1,623,191
Total Emerging Markets Equity Manager Fees and Expenses			9,050,345

DEFINED BENEFIT PLAN

Fees & Expenses

2020 Manager Fees and Expenses Detail (continued)

Manager	City	State/Country	Fees/ Expenses
Fixed Income			
Blackstone Keystone	New York	NY	\$5,548,498
Brandywine Global	Philadelphia	PA	785,577
Eaton Vance	Boston	MA	749,786
Fidelity Institutional Asset Management	Boston	MA	1,920,091
Mellon Investments Corporation Bond Index	Pittsburgh	PA	544,991
PIMCO Core	Newport Beach	CA	2,433,486
PIMCO U.S. Treasuries	Newport Beach	CA	481,154
SEI Structured Credit Fund	Oaks	PA	2,181,536
Stone Harbor EMD	New York	NY	690,621
Stone Harbor HY	New York	NY	786,785
Taplin, Canada & Habacht (TCH)	Miami	FL	489,362
Fixed Income Manager Fees			16,611,887
Fixed Income Manager Expenses			299,255
Total Fixed Income Manager Fees and Expenses			16,911,142
Inflation Protection (TIPS)			
Brown Brothers Harriman	New York	NY	437,563
New Century Advisors	Chevy Chase	MD	291,678
NISA Investment Advisors	St. Louis	MO	544,700
Inflation Protection (TIPS) Manager Fees			1,273,941
Inflation Protection (TIPS) Manager Expenses			0
Total Inflation Protection (TIPS) Manager Fees and Expenses			1,273,941
Legacy Hedge Funds^{1/}			
Entrust Keystone	New York	NY	20,281
PAAMCO	Irvine	CA	29,833
Pine River Fund	Minnetonka	MN	1,623
Legacy Hedge Funds Manager Fees			51,737
Legacy Hedge Funds Manager Expenses			0
Total Legacy Hedge Funds Manager Fees and Expenses			51,737
Total Manager Fees and Expenses			\$151,382,496

^{1/}Hedge fund manager in liquidation or liquidated.

Assets

DEFINED BENEFIT PLAN

Assets | Private Equity

Objective

The objective of Private Equity is to achieve a return in excess of its public equity benchmark (75% Russell 3000 Index / 25% MSCI World ex U.S. Index plus a 300 basis point premium) over 10-year periods (annualized, net of fees).

Structure

Private Equity investments are non-traditional investments made in the form of closed-end limited partnership structures organized to make domestic and international private investments such as buyouts, special situations, and growth equity.

Private Equity

as of December 31, 2020

(\$ millions)

	Unfunded Commitments	Fair Value	% of Total Fund
Core Sub-Asset Classes			
Buyouts	\$1,815.9	\$2,478.1	7.2%
Special Situations	522.6	452.6	1.3
Growth Equity	189.2	1,093.6	3.2
Total Core Sub-Asset Classes	2,527.7	4,024.3	11.7
Non-Core Holdings^{1/}			
Keystone Legacy Fund ^{2/}	141.7	577.2	1.7
Total Private Equity	\$2,669.4	\$4,601.5	13.4%

^{1/}As of September 30, 2020 a total of 131 legacy holdings from the Private Equity core sub-asset classes (Buyouts, Special Situations, and Growth Equity) make up the Keystone Legacy Fund, a special purpose vehicle which is managed by a third-party.

^{2/}Unfunded commitment as of September 30, 2020.

DEFINED BENEFIT PLAN

Assets | Private Equity

Portfolio Exposure

The Private Equity program is well diversified by sub-sector, geography, and industry focus. As of September 30, 2020, based on fair value, the program's exposure was:

By Fund Sub-Sector		By Geography ^{2/}		By Industry ^{2/}	
U.S. Buyout	37.0%	United States	66.7%	Information Technology	43.3%
Non-U.S. ^{1/}	30.1	China	7.4	Consumer Discretionary	13.6
U.S. Growth Equity	22.3	United Kingdom	3.6	Industrials	11.7
Special Situations	6.5	Germany	3.0	Health Care	11.3
Pennsylvania-Related	4.1	India	2.5	Financials	7.5
		South Korea	2.4	Telecommunication Services	4.2
		Brazil	1.3	Consumer Staples	3.4
		Rest of World	13.1	Materials	2.1
				Energy	1.5
				Real Estate	0.9
				Utilities	0.5

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

^{2/}Geography and industry are determined by the portfolio company.

DEFINED BENEFIT PLAN

Assets | 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 ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
ABRY Partners IV	Small	3/30/2001	\$27,242,773	\$25,497,290	\$74,633,973
ABRY Partners V	Small	7/29/2005	45,000,000	41,752,543	84,778,199
ABRY Partners VI	Middle	3/26/2008	50,000,000	59,994,861	107,608,270
ABRY Partners VII	Middle	8/10/2011	30,000,000	37,911,447	48,786,607
ABRY Partners VIII	Middle	5/5/2015	25,000,000	29,228,068	20,190,375
Advent Latin American Private Equity Fund IV	Small	8/2/2007	30,000,000	30,797,073	43,265,921
Advent International GPE VI-A	Middle	7/7/2008	35,000,000	35,146,325	68,452,177
Advent Latin American Private Equity Fund V	Small	7/5/2011	15,000,000	14,430,000	8,325,000
Advent International GPE VII-B	Global	12/6/2012	40,000,000	37,600,000	39,766,044
Advent Latin American Private Equity Fund VI	Global	8/13/2015	25,000,000	20,300,000	5,000,000
Advent International GPE VIII-B	Global	9/26/2016	50,000,000	47,450,001	0
Altaris Health Partners V	Middle	*	50,000,000	0	0
Apollo Investment Fund IV	Large	9/30/1998	75,000,000	74,838,620	124,814,033
Apollo Investment Fund V	Large	8/23/2001	50,000,000	44,972,146	122,673,016
Apollo Investment Fund VI	Global	7/19/2006	40,000,000	38,911,805	64,467,407
Apollo Investment Fund IX	Global	3/15/2019	85,400,000	23,032,685	2,157,713
Asia Alternatives Capital Partners	Fund of Funds	6/26/2007	25,000,000	25,208,545	42,288,913
Asia Alternatives Capital Partners II	Fund of Funds	3/7/2008	29,949,500	29,017,471	52,058,091
Asia Alternatives Korea Buyout Investors (Hahn & Co)	Fund of Funds	7/22/2011	7,000,000	8,763,802	9,797,230
Asia Alternatives Capital Partners III	Fund of Funds	8/3/2012	50,000,000	54,404,036	47,177,090
Penn Asia Investors	Fund of Funds	9/28/2012	133,000,000	97,161,881	53,733,769
Asia Alternatives Capital Partners V	Fund of Funds	10/5/2017	50,000,000	23,067,550	584,065
Audax Private Equity Fund	Small	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	46,325,622
Audax Private Equity Fund III	Middle	11/7/2007	37,000,000	42,498,691	81,672,112
Audax Private Equity Fund V	Large	1/25/2016	50,000,000	44,032,670	15,657,020
Audax Private Equity Fund VI	Small	8/29/2019	75,000,000	19,489,494	1,798,070
Berkshire Fund VI	Middle	7/11/2002	20,000,000	18,819,615	54,873,734
Berkshire Fund VII	Middle	11/15/2006	32,000,000	32,613,861	68,126,503
Berkshire Fund VIII	Large	8/25/2011	30,000,000	32,062,612	29,954,225

DEFINED BENEFIT PLAN

Assets | Private Equity

Buyouts Committed, Drawn, and Distributed (continued)

Active Buyout Funds Limited Partnership	Strategy/ Stage	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
Blackstone Communications Partners I	Global	8/29/2000	\$25,000,000	\$25,114,042	\$30,998,189
Blackstone Capital IV	Middle	2/26/2003	69,379,875	69,119,097	192,546,094
Blackstone Capital Partners V	Large	5/30/2006	150,000,000	150,111,788	242,378,234
Blackstone Capital Partners VII	Middle	10/21/2016	50,000,000	49,052,538	4,551,963
Blackstone Capital Partners VIII	Global	*	70,000,000	0	0
Capvis Equity IV	Middle	1/30/2014	42,701,512	44,923,075	33,984,236
Carlyle Energy Mezzanine Opportunities Fund	Global	9/5/2012	50,000,000	65,140,434	31,410,748
Horizon Strategic Fund - Carlyle Group	Global	1/23/2014	100,000,000	86,601,204	42,848,347
CVC Capital Partners VII	Global	12/3/2018	95,437,107	45,718,040	563,383
Eureka II	Global	1/30/2006	20,000,000	21,906,935	22,678,390
Eureka Growth Capital III	Small	10/21/2013	20,000,000	15,453,524	13,697,042
Francisco Partners II	Middle	7/10/2006	30,000,000	29,383,916	42,905,515
Francisco Partners III	Global	10/17/2011	20,000,000	20,514,684	33,151,148
Francisco Partners IV	Global	4/15/2015	25,000,000	24,656,280	21,406,842
FSN Capital IV	Small	12/19/2013	37,900,476	37,755,593	55,829,456
FSN Capital V	Small	1/4/2017	80,319,520	65,981,081	13,240,086
Great Hill Equity Partners IV	Middle	9/8/2008	25,000,000	25,125,662	59,603,949
GTCR VIII	Middle	7/7/2003	75,000,000	69,393,599	120,471,948
GTCR Fund XI	Middle	9/2/2014	25,000,000	23,156,003	27,684,684
GTCR Fund XII	Small	5/4/2018	32,500,000	19,207,500	753,366
H.I.G. Growth Buyouts & Equity Fund II	Small	7/20/2011	15,000,000	15,898,204	10,010,436
H.I.G. Europe Capital Partners II	Middle	1/10/2014	24,735,655	20,061,285	4,467,565
H.I.G. Brazil and Latin America Partners	Middle	8/12/2015	50,000,000	29,942,431	9,139
Hahn & Company II	Small	5/29/2015	50,000,000	54,208,484	14,174,068
Hahn & Company III	Large	12/20/2018	56,250,000	9,704,001	83,933
Hahn & Company III - Supplemental Fund	Large	12/20/2018	18,750,000	5,944,175	57,377
HarbourVest IPEP III	Small	6/30/1998	40,000,000	39,400,000	61,092,165
HIPEP V-Asia Pacific & Rest of World	Small	5/9/2006	30,000,000	28,245,316	36,187,819
Horizon Impact Fund	Middle	10/24/2014	50,000,000	44,629,802	25,251,222
Horizon Impact Fund B	Middle	5/31/2017	100,000,000	59,250,000	990,000
HarbourVest PA Co-Investment Fund	Middle	5/14/2020	200,000,000	21,650,000	0
Hellman & Friedman Capital Partners VI	Fund of Funds	6/5/2007	125,000,000	119,913,412	222,910,013
Hellman & Friedman Capital Partners VIII	Fund of Funds	9/1/2016	50,000,000	50,622,049	6,481,085
Hellman & Friedman Capital Partners IX	Fund of Funds	1/1/2019	90,000,000	20,006,514	0
Incline Equity Partners III	Fund of Funds	1/14/2013	15,000,000	15,870,790	29,204,254
Kelso VII	Co-Investment	10/18/2004	40,000,000	41,169,937	65,821,118
Kelso VIII	Global	11/29/2007	150,000,000	146,324,156	169,841,890

DEFINED BENEFIT PLAN

Assets | Private Equity

Buyouts Committed, Drawn, and Distributed (continued)

Active Buyout Funds Limited Partnership	Strategy/ Stage	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
LLR Equity Partners II	Global	1/29/2004	\$25,000,000	\$25,000,000	\$45,084,480
LLR Equity Partners III	Global	7/24/2008	30,000,000	29,108,722	51,222,009
LLR Equity Partners IV	Small	3/14/2014	50,000,000	45,485,764	59,180,894
LLR Equity Partners V	Middle	3/21/2018	75,000,000	54,882,292	6,825,485
LLR Equity Partners VI	Large	*	50,000,000	0	0
Madison Dearborn Capital Partners IV	Small	4/2/2001	90,000,000	90,365,390	169,072,775
Madison Dearborn Capital Partners V	Small	12/14/2006	75,000,000	71,556,584	113,632,910
Madison Dearborn Capital Partners VI	Small	5/27/2008	50,000,000	53,140,073	88,197,217
NGP XII	Middle	11/14/2018	75,000,000	39,733,831	113,471
NGP Keystone	Middle	*	25,000,000	0	0
Neuberger Berman PA Co-Investment Fund	Large	*	200,000,000	0	0
OCM/GFI Power Opportunities Fund II	Large	5/9/2005	13,431,284	13,470,852	41,644,215
Oaktree Power Opportunities Fund III	Large	10/18/2010	25,000,000	19,267,532	24,445,586
Permira Susquehanna Opportunities - Buyout	Large	*	40,000,000	0	0
Permira European Fund II	Co-Investment	6/7/2000	45,672,612	45,672,612	91,560,959
Permira European Fund III	Small	1/12/2004	127,062,518	127,340,454	218,052,206
Permira IV	Middle	12/14/2006	136,324,852	138,372,478	205,123,986
Permira VI	Global	1/10/2017	57,228,368	51,150,582	7,745,206
Permira VII	Large	2/4/2020	79,935,376	13,239,036	0
Primavera Capital Fund II	Large	11/17/2015	50,000,000	54,465,356	11,173,522
Primavera Capital Fund III	Global	4/12/2019	75,000,000	58,891,548	291,169
Providence Equity Partners IV	Global	11/27/2000	25,000,000	23,420,840	56,065,270
Providence Equity Partners V	Global	4/4/2005	45,000,000	42,692,171	51,743,883
Providence Equity Partners VI	Middle	3/16/2007	49,976,748	54,576,396	60,052,733
Ridgmont Equity Partners II	Large	11/30/2015	50,000,000	48,547,530	27,657,924
Sentinel Capital Partners V	Middle	7/15/2014	10,000,000	10,070,597	8,255,441
Silver Lake Partners V	Large	6/12/2018	78,000,000	59,475,900	663,420
Sterling Group Partners IV	Global	6/15/2016	20,000,000	16,817,832	904,208
TA X	Small	4/25/2006	70,000,000	69,732,009	91,152,009
TDR Capital IV	Middle	11/16/2018	93,605,827	34,834,570	0
Thoma Bravo Fund XIII	Global	2/14/2019	75,000,000	53,937,703	35,023,707
Thoma Bravo Fund XIV	Large	*	50,000,000	0	0
Thoma Bravo Discover Fund III	Middle	*	20,000,000	0	0
Newbridge Asia IV	Global	9/27/2005	40,000,000	38,903,378	85,845,344

DEFINED BENEFIT PLAN

Assets | Private Equity

Buyouts Committed, Drawn, and Distributed (continued)

Active Buyout Funds Limited Partnership	Strategy/ Stage	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
TPG Partners III	Large	1/13/2000	\$64,375,746	\$64,119,169	\$165,990,273
TPG Partners IV	Large	12/29/2003	27,907,484	27,981,463	58,018,004
TPG Partners V	Global	6/27/2006	88,831,038	92,531,812	129,624,285
TPG Asia V	Large	2/19/2008	22,500,000	21,964,311	27,510,189
TPG Partners VI	Global	5/22/2008	44,294,641	50,432,611	67,270,468
TSG8	Large	1/3/2020	100,000,000	20,099,912	0
Vista Equity Partners Fund VI	Global	12/29/2016	150,000,000	168,175,328	56,581,291
Vista Equity Partners Fund VII	Global	2/13/2019	75,000,000	26,283,318	174,838
Wind Point Partners VIII	Small	9/14/2017	100,000,000	91,615,017	48,554,180
Wind Point Partners IX-A	Middle	2/26/2020	75,000,000	13,731,184	0
Total Active Buyouts			\$6,188,712,912	\$4,623,601,050	\$5,116,762,350

Cash flows as of September 30, 2020.

*Not funded as of September 30, 2020.

^{1/}Commitments as of December 31, 2020.

^{2/}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.

DEFINED BENEFIT PLAN

Assets | 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 ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
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	28,282,103	44,960,375
ABRY Advanced Securities Fund	Mezzanine	8/1/2008	7,262,950	23,508,684	38,682,209
ADV Opportunities Fund I	Distressed/ Turnaround	10/5/2015	50,000,000	58,077,617	9,099,825
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	99,186,788
AXA Secondary Fund V B	Secondaries	6/19/2012	75,000,000	61,682,742	97,337,534
ASF VII B	Secondaries	2/19/2016	100,000,000	56,694,086	11,274,533
ASF VII PA Co-Invest	Secondaries	5/18/2016	50,000,000	28,529,951	6,187,625
ASF VIII B	Secondaries	6/13/2019	100,000,000	18,070,147	42,362
ASF VIII PA Co-Invest	Secondaries	3/12/2020	50,000,000	5,000	0
Ares PA Opportunities Fund - Special Situations	Distressed/ Turnaround	*	100,000,000	0	0
Avenue Special Situations Fund VI	Distressed/ Turnaround	11/2/2010	20,000,000	20,068,464	20,720,289
Centerbridge Capital Partners I	Distressed/ Turnaround	2/27/2007	50,000,000	57,399,008	114,404,865
Centerbridge Capital Partners III	Distressed/ Turnaround	5/21/2015	30,000,000	26,189,002	11,987,854
Clearlake Capital Partners IV	Distressed/ Turnaround	9/1/2015	15,000,000	21,809,094	18,109,580
Clearlake Capital Partners V	Distressed/ Turnaround	2/1/2018	55,000,000	50,650,059	15,464,574
Clearlake Capital Partners VI	Distressed/ Turnaround	5/22/2020	60,000,000	8,238,827	70,231
Dover Street VII	Distressed/ Turnaround	7/2/2008	30,000,000	28,696,128	39,102,133
H.I.G. Bayside Debt & LBO Fund II	Secondaries	6/17/2008	30,000,000	30,998,253	47,092,349
H.I.G. Bayside Loan Opp. Fund III	Distressed/ Turnaround	6/12/2013	50,000,000	40,418,122	40,802,856
H.I.G. Bayside Loan Opp. Fund IV	Distressed/ Turnaround	1/16/2015	25,000,000	22,626,299	13,329,924

DEFINED BENEFIT PLAN

Assets | Private Equity

Special Situations Committed, Drawn, and Distributed (continued)

Active Special Situations Funds Limited Partnership	Strategy/ Stage	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
KPS Special Situations Fund IV	Distressed/ Turnaround	5/8/2014	\$25,000,000	\$23,342,222	\$7,222,716
KPS Special Situations Mid-Cap Fund	Distressed/ Turnaround	11/25/2019	25,000,000	4,521,833	0
KPS Special Situations Fund V	Distressed/ Turnaround	7/13/2020	75,000,000	14,199,017	0
LBC Credit Partners III	Mezzanine	3/4/2013	50,000,000	46,696,253	48,180,953
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	125,170,164
Lexington Capital Partners VI	Secondaries	10/21/2005	50,000,000	53,066,325	70,707,934
OCM Opportunities Fund V	Distressed/ Turnaround	8/12/2004	40,000,000	40,003,507	65,911,274
OCM Opportunities Fund VI	Distressed/ Turnaround	9/28/2005	40,000,000	40,000,000	63,171,009
OCM Principal Opportunities Fund IV	Distressed/ Turnaround	1/24/2007	20,000,000	20,400,000	34,058,279
OCM Opportunities Fund VII	Distressed/ Turnaround	5/16/2007	40,000,000	40,000,000	54,806,896
OCM Opportunities Fund VII b	Distressed/ Turnaround	6/3/2008	40,000,000	36,000,000	62,262,693
OCM Opportunities Fund VIII	Distressed/ Turnaround	9/20/2010	12,500,000	12,583,425	17,717,075
OCM Opportunities Fund VIII b	Distressed/ Turnaround	8/22/2011	12,500,000	12,500,000	12,982,282
Oaktree Opportunities Fund IX	Distressed/ Turnaround	3/26/2013	50,000,000	50,000,000	25,342,085
Platinum Equity Capital Partners III	Distressed/ Turnaround	8/5/2013	50,000,000	47,749,134	69,168,128
RRJ Capital Master Fund III	Distressed/ Turnaround	12/10/2015	50,000,000	44,739,703	38,469,288
Total Active Special Situations			\$1,767,262,950	\$1,307,165,915	\$1,472,404,646

Cash flows as of September 30, 2020.

*Not funded as of September 30, 2020.

^{1/}Commitments as of December 31, 2020.

^{2/}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.

DEFINED BENEFIT PLAN

Assets | 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.

Growth Equity Committed, Drawn, and Distributed

Active Growth Equity Funds Limited Partnership	Strategy/ Stage	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
Battery Ventures VIII	Venture Capital	8/13/2007	\$25,000,000	\$25,050,751	\$55,636,614
Battery Ventures VIII Side Car Fund	Venture Capital	8/29/2008	6,768,000	6,803,790	17,449,466
HarbourVest Partners VI	Fund of Funds	5/7/1999	200,000,000	196,586,055	251,156,017
HarbourVest Partners VII	Fund of Funds	3/24/2003	75,000,000	73,687,500	109,284,862
HarbourVest Partners VIII	Fund of Funds	10/5/2006	100,000,000	98,000,000	146,878,621
Insight Venture Partners VI	Medium	8/21/2007	30,000,000	32,244,177	81,709,725
Insight Venture Partners VII	Large	4/27/2011	20,000,000	21,319,992	45,165,537
Insight Venture Partners VIII	Large	7/10/2013	50,000,000	52,250,000	75,385,447
Insight Venture Partners IX	Large	3/24/2015	50,000,000	51,172,788	16,325,931
Insight Venture Partners X	Large	4/17/2018	100,000,000	93,800,000	34,245
Insight Venture Partners XI	Large	3/25/2020	75,000,000	21,000,000	7,214
JMI Equity Fund VI	Medium	6/27/2007	40,000,000	40,000,246	69,017,467
JMI Equity Fund VII	Medium	2/14/2011	10,000,000	9,780,000	15,739,201
JMI Equity Fund VIII	Medium	10/1/2015	25,000,000	26,900,000	16,068,006
Lightspeed Venture Partners VII	Venture Capital	2/27/2006	18,000,000	18,000,000	49,449,448
Lightspeed Venture Partners VIII	Venture Capital	6/27/2008	15,000,000	15,000,000	32,346,178
Lightspeed India Partners I	Venture Capital	8/14/2015	15,000,000	13,590,000	1,576,000
Meritech Capital Partners IV	Venture Capital	2/10/2011	20,000,000	19,700,000	34,341,511
Meritech Capital Partners V	Venture Capital	9/3/2014	23,000,000	21,332,500	22,683,152
New Enterprise Associates IX	Venture Capital	11/15/1999	20,000,000	19,600,000	8,228,227
New Enterprise Associates X	Venture Capital	12/11/2000	35,000,000	35,028,000	33,995,586
New Enterprise Associates 11	Venture Capital	3/1/2004	25,000,000	25,000,000	63,385,828
New Enterprise Associates 12	Venture Capital	6/26/2006	35,000,000	35,631,130	46,722,311
NewSpring Growth Capital II	Small	4/20/2007	10,000,000	9,850,000	14,203,466
NewSpring Growth Capital III	Small	7/27/2012	25,000,000	23,643,105	17,097,833

DEFINED BENEFIT PLAN

Assets | Private Equity

Growth Equity Committed, Drawn, and Distributed (continued)

Active Growth Equity Funds Limited Partnership	Strategy/ Stage	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
Providence Strategic Growth II	Medium	12/7/2016	\$60,000,000	\$68,295,442	\$44,766,872
Providence Strategic Growth III	Medium	7/26/2018	75,000,000	54,430,567	13,014,791
Providence Strategic Growth IV	Large	3/27/2020	75,000,000	13,766,574	2,293,574
Providence Strategic Growth Europe	Medium	*	75,000,000	0	0
T.Rowe Price Stock Distribution Account ^{3/}	Various	1/3/2005	0	1,214,214,292	1,123,158,314
TCV X	Large	5/17/2019	75,000,000	42,067,500	0
Weathergage Venture Capital	Fund of Funds	6/26/2007	25,000,000	22,875,000	35,101,174
Weathergage Venture Capital II	Fund of Funds	6/29/2010	25,000,000	23,250,000	23,561,515
Total Active Growth Equity			\$1,457,768,000	\$2,423,869,409	\$2,465,784,133

Cash flows as of September 30, 2020.

*Not funded as of September 30, 2020.

^{1/}Commitments as of December 31, 2020.

^{2/}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.

^{3/}T. Rowe Price acts as a stock liquidation account. All cash and stock distributions are reflected in the corresponding distributions.

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 ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
Keystone Legacy Non-Core Fund ^{3/}	Various	7/1/2018	\$4,752,570,409	\$4,771,463,241	\$6,132,843,774
Total Legacy Private Equity			\$4,752,570,409	\$4,771,463,241	\$6,132,843,774

Cash flows as of September 30, 2020.

^{1/}Commitments as of September 30, 2020.

^{2/}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.

^{3/}As of September 30, 2020 a total of 131 legacy holdings from the Private Equity core sub-asset classes (Buyouts, Special Situations, and Growth Equity) make up the Keystone Legacy Fund, a special purpose vehicle which is managed by a third-party.

DEFINED BENEFIT PLAN

Assets | Private Credit

Objective

The objective of Private Credit is to achieve a return in excess of the S&P/LSTA Leveraged Loan Index plus 100 basis points over 10-year periods (annualized, net of fees).

Structure

Private Credit investments are non-traditional investments made in the form of closed-end limited partnership structures organized to invest in a diverse set of strategies including direct lending, diversified credit, and distressed debt.

Direct lending funds will lend money to privately held firms, often as part of a private

equity leveraged buyout transaction. These loans will be predominantly medium-duration, floating rate, and senior in the capital structure.

Diversified credit funds may invest in various credit strategies including specialty lending, niche credit opportunities, mezzanine and other debt securities, credit derivatives, structured credit and structured equity.

Distressed debt funds will invest in the credit securities of distressed companies or companies in need of restructuring. Private Credit funds are less liquid than public fixed income with investment horizons of five years or more.

Private Credit

as of December 31, 2020

(\$ millions)

Sub-Asset Class	Unfunded Commitments	Fair Value	% of Total Fund
Direct Lending	\$346.3	\$206.6	0.6%
Distressed Debt	149.2	130.4	0.4
Diversified Credit	466.5	271.2	0.8
Total Private Credit	\$962.0	\$608.2	1.8%

DEFINED BENEFIT PLAN

Assets | Private Credit

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 ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
Direct Lending					
Ares PA Opportunities Fund - Direct Lending	Direct Lending	*	\$100,000,000	\$0	\$0
Audax Direct Lending Solutions Fund-A	Direct Lending	10/26/2018	100,000,000	44,987,394	11,050,547
Brightwood Capital Fund IV	Direct Lending	4/24/2018	100,000,000	95,000,000	7,362,976
HPS Mezzanine Partners 2019	Direct Lending	*	75,000,000	0	0
Permira Credit Solutions IV Master (Feeder) SCSP	Direct Lending	9/26/2019	75,000,000	24,351,401	1,768,122
Permira Susquehanna Opportunities - Credit	Direct Lending	*	60,000,000	0	0
Total Direct Lending			510,000,000	164,338,795	20,181,645
Distressed Debt					
Ares PA Opportunities Fund - Distressed Debt	Distressed Debt	12/20/2019	70,000,000	28,700,753	416,269
Glendon Opportunities Fund II	Distressed Debt	10/18/2019	150,000,000	71,250,000	0
TSSP Opportunities Partners IV	Distressed Debt	1/25/2019	50,000,000	17,263,175	1,637,192
Total Distressed Debt			270,000,000	117,213,928	2,053,461
Diversified Credit					
Apollo Hybrid Value Fund	Diversified Credit	12/24/2018	100,000,000	71,733,747	18,186,993
Ares PA Opportunities Fund - Diversified Credit	Diversified Credit	*	100,000,000	0	0
Clearlake Opportunity Partners II	Diversified Credit	8/30/2019	75,000,000	19,063,943	209,533
ICG Europe Fund VII	Diversified Credit	8/24/2018	94,527,694	34,892,455	13,618
ICG North American Private Debt Fund II	Diversified Credit	2/27/2019	50,000,000	12,995,957	1,276,557

DEFINED BENEFIT PLAN

Assets | Private Credit

Private Credit Committed, Drawn, and Distributed (continued)

Active Private Credit Funds	Strategy/Stage	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions ^{2/}
Diversified Credit (continued)					
ICG Europe Mid-Market Fund	Diversified Credit	4/8/2020	\$80,213,198	\$3,465,602	\$0
TSSP Adjacent Opportunities Partners (B)	Diversified Credit	11/9/2017	100,000,000	73,039,075	19,778,398
TSSP Adjacent Opportunities Partners Contingent	Diversified Credit	4/16/2020	150,000,000	31,742,776	306
Total Diversified Credit			749,740,892	246,933,555	39,465,405
Total Private Credit			\$1,529,740,892	\$528,486,278	\$61,700,511

Cash flows as of September 30, 2020.

*Not funded as of September 30, 2020.

^{1/}Commitments as of December 31, 2020.

^{2/}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.

DEFINED BENEFIT PLAN

Assets | Real Estate

Objective

The objective of Real Estate is to generate returns through capital appreciation and current income to achieve a return in excess of its benchmark (90% NCREIF Fund Index – Open End Diversified Core Equity (“NFI-ODCE”) / 10% FTSE NAREIT U.S. Real Estate Index) over 5-year periods (annualized, net of fees). Real Estate investments may also lower overall fund volatility and provide a moderate hedge against inflation.

Structure

Real Estate investments are non-traditional investments made in the form of individually managed accounts and pooled investment vehicles organized to invest in private market equity and debt investments in real estate and real estate related companies and public market investments in real estate investment trusts (REITs) and real estate operating companies.

Real Estate

as of December 31, 2020
(\$ millions)

Sub-Asset Class	Fair Value	% of Total Fund
Core/Core Plus^{1/}	\$1,007.0	2.9%
Value Add/Oppportunistic Funds^{2/}	529.9	1.5
Value Add/Oppportunistic SMA	716.6	2.1
Real Estate Securities	271.7	0.8
Legacy Real Assets	5.2	0.0
Total Real Estate	\$2,530.4	7.3%

^{1/}As of September 30, 2020, unfunded commitments are \$237.2 million.

^{2/}As of September 30, 2020, unfunded commitments are \$490.9 million.

DEFINED BENEFIT PLAN

Assets | 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

Active Fund/Manager	Asset Type	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions
Core/Core Plus Real Estate					
Blackstone Property Partners	Diversified	2017	\$300,000,000	\$300,000,000	\$1,744,007
Heitman America Real Estate Trust	Diversified	2007	100,000,000	100,000,000	83,249,173
Henderson Park Enhanced Income Fund	Diversified	2019	332,845,724	291,222,349	7,528,327
Oak Street Real Estate Capital Net Lease Property Fund	Diversified	2019	300,000,000	104,430,378	4,288,926
UBS Trumbull Property Fund	Diversified	1988	25,558,525	25,558,525	114,881,970
Total Core/Core Plus Real Estate			1,058,404,249	821,211,252	211,692,403
Value Add/Oppportunistic Funds					
Activum SG Fund VI	Diversified	2019	58,481,692	2,781,565	0
Activum SG Fund VI Pennsylvania Side-Car	Diversified	*	58,481,692	0	0
AG Asia Realty Fund	Diversified	2007	25,000,000	23,500,000	25,375,000
Berwind Investment Partnership V	Diversified	1999	24,136,964	24,136,964	43,947,583
Berwind Investment Partnership VI	Diversified	2002	24,543,712	24,543,712	42,799,870
Berwind Investment Partnership VII	Diversified	2005	25,000,000	25,000,000	14,245,301
Berwind Investment Partnership VIII	Diversified	2007	15,588,238	14,912,018	20,049,072
Berwind Investment Partnership IX	Diversified	2012	25,000,000	24,303,409	37,778,298
Blackstone Real Estate Partners IV	Diversified	2003	25,000,000	25,000,000	40,257,893
Blackstone Real Estate Partners V	Diversified	2006	50,000,000	47,912,974	97,253,998
Blackstone Real Estate Partners VI	Diversified	2007	75,000,000	71,319,075	151,431,753
Blackstone Real Estate Partners VII	Diversified	2011	75,000,000	65,568,746	93,441,799
Blue Moon Senior Housing II	Senior Housing	2020	50,000,000	19,192,449	0
Blue Moon Senior Housing II Sidecar	Senior Housing	2020	50,000,000	20,992,041	0
C-III Recovery Fund III	Diversified	2017	100,000,000	54,291,412	0
Clerestory Small Cap Real Estate Fund I	Diversified	2010	18,000,000	15,228,956	15,131,513
Colony Investors VIII	Diversified	2007	22,500,000	21,655,800	7,962,017
Hawkeye Scout Fund I	Diversified	2009	75,000,000	75,000,000	117,006,454
Hawkeye Scout Fund II	Diversified	2016	30,000,000	30,000,000	605,865
Lubert Adler Fund VII	Diversified	2014	25,000,000	22,820,446	8,170,946

DEFINED BENEFIT PLAN

Assets | Real Estate

Real Estate (continued)

Active Fund/Manager	Asset Type	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions
Value Add/Oppportunistic Funds (continued)					
Mesirow Financial Real Estate Value Fund III	Multi-Family	2018	\$25,145,833	\$20,979,746	\$851,387
Oak Street Real Estate Capital Fund IV	Diversified	2017	100,000,000	100,000,000	13,242,284
Oak Street Real Estate Capital Fund V	Diversified	*	50,000,000	0	0
Prudential Latin America Retail Fund I	Retail	2006	2,271,117	2,271,117	8,162,626
Prudential Latin America Residential Fund III	Multi-Family	2008	29,654,968	24,708,749	13,444,991
Prudential Senior Housing Fund IV	Senior Housing	2011	22,089,297	20,799,516	37,182,609
Prudential Senior Housing Fund V	Senior Housing	2015	50,000,000	41,137,690	3,216,633
Prudential Senior Housing Fund VI	Senior Housing	2019	100,000,000	9,043,808	0
Rockpoint Finance Fund I	Residential Land	2007	2,527,500	2,527,500	2,315,090
Rockpoint Real Estate Fund II	Diversified	2005	34,138,784	34,138,784	30,679,156
Rockpoint Real Estate Fund III	Diversified	2007	50,632,887	46,391,722	67,236,003
Rockpoint Real Estate Fund V	Diversified	2015	50,000,000	39,440,566	9,683,983
Rubicon First Ascent	Office	*	30,000,000	0	0
Rubicon First Ascent Sidecar	Office	*	20,000,000	0	0
SRE Opportunity Fund III	Diversified	2017	50,000,000	19,750,000	5,500,000
SRE Opportunity Fund III Select	Diversified	2017	50,000,000	12,625,000	0
Starwood Fund VI	Diversified	2001	50,000,000	50,000,000	51,927,126
Starwood Fund VII	Diversified	2006	35,000,000	35,000,000	27,295,581
Starwood Fund VIII	Diversified	2009	50,000,000	45,356,281	68,819,072
ValStone Opportunity Fund V	Diversified	2014	14,663,402	14,663,402	5,009,834
Westbrook Fund V	Diversified	2004	25,000,000	25,000,000	52,005,779
Westbrook Fund VI	Diversified	2006	35,000,000	35,000,000	37,571,397
Westbrook Fund VII	Diversified	2007	50,000,000	50,000,000	52,787,877
Westbrook Fund VIII	Diversified	2009	50,000,000	50,000,000	63,418,319
Total Value Add/Oppportunistic Funds			1,827,856,086	1,286,993,448	1,265,807,109
Value Add/Oppportunistic SMA^{2/}					
Heitman I.M.A.	Diversified	1988	NA	813,635,039	1,092,759,873
hotelAVE I.M.A.	Hospitality	2018	NA	59,048,685	20,191,396
LaSalle I.M.A.	Diversified	1994	NA	452,963,167	778,848,456
LaSalle Takeover I.M.A.	Diversified	2018	NA	261,647,434	28,593,427
Total Value Add/Oppportunistic SMA			NA	1,587,294,325	1,920,393,152

DEFINED BENEFIT PLAN

Assets | Real Estate

Real Estate (continued)

Active Fund/Manager	Asset Type	SERS Initial Funding	Capital Committed ^{1/}	Accumulated Capital Drawn	Accumulated Distributions
Legacy Real Assets^{2/}					
Forest I.M.A.	Timberland	1992	NA	\$124,231,969	\$242,667,376
Total Legacy Real Assets			NA	124,231,969	242,667,376
Real Estate Securities^{2/}					
CenterSquare Real Estate Securities	Diversified	2002	NA	183,616,773	36,168,336
Total Real Estate Securities			NA	183,616,773	36,168,336
Total Active Real Estate			\$2,886,260,335	\$4,003,347,767	\$3,676,728,376

Cash flows as of September 30, 2020.

*Not funded as of September 30, 2020.

^{1/}Commitments as of December 31, 2020.

^{2/}Due to the nature of the investments, there are no capital commitments for value add/opportunistic SMA, legacy real assets, and real estate securities managers.

DEFINED BENEFIT PLAN

Assets | U.S. Equity

Objective

The objective of U.S. Equity is to generate returns through capital appreciation and income from dividend payments that meet or exceed the Russell 3000 Index over 5-year periods (annualized, net of fees).

Structure

U.S. Equity investments are traditional equity investments made in the form of separate accounts and commingled funds. U.S. Equity contributes to a higher expected long-term return to the fund and is also a material contributor to volatility.

U.S. Equity

as of December 31, 2020
(\$ millions)

Manager	Investment Style	Market Exposure as of 12/31/20 ^{1/}
Emerald Asset Management	Small-cap growth	\$1,002.5
Mellon Investments Corporation Russell 1000	Russell 1000 Index	7,060.1
Mellon Investments Corporation Russell 2000 Core	Russell 2000 Core	181.2
Mellon Investments Corporation Russell 2000 Value	Russell 2000 Value	650.6
Total U.S. Equity		\$8,894.4

^{1/}Includes securities and cash, which the manager had available for investment.

DEFINED BENEFIT PLAN

Assets | International Developed Markets Equity

Objective

The objective of International Developed Markets Equity is to generate returns through capital appreciation and income from dividend payments that meet or exceed the MSCI World ex U.S. Index over 5-year periods (annualized, net of fees).

Structure

International Developed Markets Equity investments are traditional equity investments made in the form of separate accounts and commingled funds. International Developed Markets Equity contributes to a higher expected long-term return to the fund and is also a material contributor to volatility.

International Developed Markets Equity

as of December 31, 2020

(\$ millions)

Manager	Investment Style	Market Exposure as of 12/31/20 ^{1/}
Artisan Partners - Global ex U.S.	Global ex-U.S. growth	\$0.8
BlackRock MSCI World ex U.S. Index	Developed ex-U.S. Index	3,489.0
Harris Associates	Small-cap value	192.7
Mellon Investments Corporation MSCI World ex U.S. Index	MSCI World ex-U.S. Index	5.3
Morgan Stanley Investment Management Limited-developed ex U.S.	EAFE value	0.9
Northern Trust - Equity	Transition	1.7
Templeton Investment Counsel - Global ex U.S.	Global ex-U.S. value	1.1
Walter Scott & Partners Limited	Global Growth	689.0
Xponance	International Small-cap	234.3
Total International Developed Markets Equity		\$4,614.8

^{1/}Includes securities and cash, which the manager had available for investment.

DEFINED BENEFIT PLAN

Assets | Emerging Markets Equity

Objective

The objective of Emerging Markets Equity is to generate returns through capital appreciation and income from dividend payments that exceed the MSCI Emerging Markets Index over 5-year periods (annualized, net of fees).

Structure

Emerging Markets Equity investments are traditional equity investments made in the form of commingled funds since there are legal challenges for SERS to use separate accounts to open sub-custodial trading accounts in certain emerging market countries. Emerging Markets Equity contributes to a higher expected long-term return to the fund and is also a material contributor to volatility.

Emerging markets are generally regarded as less efficient than developed markets and historically have been more volatile than developed markets. Returns have been influenced by capital flows into and out of these markets; however, longer term, emerging markets can be attractive to those investors seeking to access the financial returns derived from rapidly expanding economies. Due to the high return volatility associated with emerging markets, the SERS Fund takes a diversified approach using a variety of investment strategies. The SERS Fund employs a structure diversified by investment advisor, style, and type.

Emerging Markets Equity

as of December 31, 2020
(\$ millions)

Manager	Investment Style	Market Exposure as of 12/31/20 ^{1/}
BlackRock MSCI Emerging Markets Index	MSCI Emerging Markets Index	\$14.5
GlobeFlex Capital	Small-cap - GARP	112.7
Leading Edge Investment Advisors	Emerging Markets	279.7
Macquarie Emerging Markets	Mid/large cap value	563.4
Martin Currie Investment Management	All-cap	625.1
Total Emerging Markets Equity		\$1,595.4

^{1/}Includes securities and cash, which the manager had available for investment.

DEFINED BENEFIT PLAN

Assets | Fixed Income

Objective

The objective of Fixed Income is to provide liquidity to minimize capital impairment risk, reduce volatility of the total fund, and contribute total return to the fund that meet or exceed its benchmark (Bloomberg Barclays U.S. Aggregate Bond Index) over 5-year periods (annualized, net of fees). Fixed Income should also provide diversification and low correlation with equity markets.

Structure

Fixed Income investments are traditional investments made in the form of separate accounts and commingled funds. They include 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.

SERS 2019 Investment Policy Statement Fixed Income Structure

Strategy	Description
Opportunistic Fixed Income	Investments in sovereign debt, commercial and residential non-agency mortgage-backed securities, asset-backed securities, credit strategies, and high yield debt, which seek to provide excess return when performance conditions are favorable, and offer varying potential return with a corresponding variance in expected risk.
Core Fixed Income	Investments in intermediate duration investment grade bonds of various types (e.g. agency government bonds, corporate bonds, agency-mortgage backed securities), which provide capital loss protection in difficult market conditions, and offer risk mitigation due to low correlation with equity.
Nominal U.S. Treasuries	Investments in securities matching the risk and return profile of 10-year U.S. Treasury Notes.

DEFINED BENEFIT PLAN

Assets | Fixed Income

The SERS Board adopted on December 1, 2020, the amended *SERS Defined Benefit Plan Investment Policy Statement*. The newly adopted IPS redefines the fixed income allocations within the portfolio moving towards a liability-driven or cash flow-driven investment strategy. During 2021, the Fixed Income Portfolio will be transitioning as outlined below.

Redefined Objective

The objective of the Fixed Income allocation is to provide liquidity to minimize capital impairment risk, diversify investment risk, and

enhance return and income to meet the fund's obligations. It is expected that the returns from the Fixed Income allocation will meet or exceed its benchmark performance over 5-year periods (annualized, net of fees).

Redefined Structure

Fixed Income investments are traditional investments made in the form of separate accounts and commingled funds. They include investments in publicly traded debt obligations of sovereign, quasi-sovereign and corporate entities and securitized assets.

SERS 2020 Investment Policy Statement Fixed Income Structure

Strategy	Description	% of Fixed Income Target	Allocation Range
Intermediate Treasury	Investments in intermediate duration U.S. Treasury bonds as benchmarked by the Bloomberg Barclays U.S. Intermediate Treasury Index.	5%	0% to 10%
Long Duration (Treasury and Credit)	Investments in U.S. Treasury bonds and U.S. investment grade corporate and other bonds with durations equal to or greater than ten years. The benchmark for this allocation is a combination of 50% Bloomberg Barclays U.S. Long Treasury Index and 50% Bloomberg Barclays U.S. Long Credit Index.	30%	20% to 40%
Securitized	Investments in U.S. investment grade residential mortgage-backed securities, commercial mortgage-backed securities, and other asset-backed securities as benchmarked by the Bloomberg Barclays U.S. Securitized Index.	15%	10% to 20%
Intermediate Credit	Investments in intermediate duration U.S. investment grade corporate and other bonds as benchmarked by the Bloomberg Barclays U.S. Intermediate Credit Index.	35%	25% to 45%
High Yield	Investments in U.S. below investment grade fixed income securities to generate higher returns than the other elements of the fixed income portfolio as benchmarked by the Bloomberg Barclays U.S. Corporate High Yield Index or similar index.	15%	10% to 20%

DEFINED BENEFIT PLAN

Assets | Fixed Income

Fixed Income

as of December 31, 2020
(\$ millions)

Manager	Investment Style	Market Exposure as of 12/31/20 ^{1/}
Core Fixed Income		
Taplin, Canida & Habacht (TCH)	U.S. Credit	\$226.7
Mellon Investments Corporation Bond Index	Bloomberg Barclays U.S. Aggregate	5,414.9
PIMCO Core	Bloomberg Barclays U.S. Aggregate ex. Treasuries	722.3
Total Core		6,363.9
Nominal U.S. Treasuries		
Mellon Investments Corporation Long Duration Bond Index	U.S. Long Treasuries	351.0
PIMCO U.S. Treasuries	U.S. Treasuries	692.9
Total Nominal U.S. Treasuries		1,043.9
Opportunistic Fixed Income		
Blackstone Keystone	Fund-of-Funds	994.4
Brandywine Global	Global Sovereign Credit	224.6
Eaton Vance	Global Macro Strategy	225.1
Fidelity Institutional Asset Management	Commercial Mortgage-Backed Securities	322.1
SEI Structured Credit Fund	High Yield Bank Loans	178.7
Stone Harbor EMD	Emerging Market Debt	180.5
Stone Harbor HY	Global High Yield	218.1
Total Opportunistic Fixed Income		2,343.5
Total Fixed Income		\$9,751.3

^{1/}Includes securities and cash, which the manager had available for investment.

DEFINED BENEFIT PLAN

Assets | Inflation Protection (TIPS)

Objective

The objective of Inflation Protection is to protect against both expected and unexpected higher inflation, provide liquidity to minimize capital impairment risk, reduce volatility of the total fund, and contribute total return to the fund that meet or exceed its benchmark (Bloomberg Barclays U.S. TIPS Index) over 5-year periods (annualized, net of fees).

Structure

Treasury Inflation-Protected Securities (TIPS) are traditional investments made in the form of separate accounts and commingled funds. The primary advantage of TIPS is that their return offers protection against both expected and

unexpected higher inflation, as the securities' coupon payments are directly tied to the rate of inflation. TIPS, therefore, maintain the purchasing power of the investor. The coupon payments of TIPS have two components: a real coupon rate that is established at the issuance of the bond, and an accrual equal to the rate of inflation which adds to the principal balance of the security. TIPS are also useful for hedging liabilities which are affected by inflation and for hedging a cash flow stream against the need to liquidate equities and conventional bonds at depressed prices, in order to meet pension obligations during periods of unexpected inflation.

Inflation Protection (TIPS)

as of December 31, 2020
(\$ millions)

Manager	Investment Style	Market Exposure as of 12/31/20 ^{1/}
Brown Brothers Harriman	U.S. TIPS	\$576.5
New Century Advisors	Global TIPS	137.5
NISA Investment Advisors	U.S. TIPS	578.0
Total Inflation Protection (TIPS)		\$1,292.0

^{1/}Includes securities and cash, which the manager had available for investment.

DEFINED BENEFIT PLAN

Assets | Cash

Objective

The objective of Cash is to serve as the primary source of liquidity and generate returns that meet or exceed its benchmark (ICE BofAML U.S. 3-Month Treasury Bill Index) over a three-year period.

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.

Cash

as of December 31, 2020
(\$ millions)

Manager	Investment Style	Market Exposure as of 12/31/20 ^{1/}
PA State Treasury (STIF)	Cash	\$540.0
Total Cash		\$540.0

^{1/}Includes securities and cash, which the manager had available for investment.

DEFINED BENEFIT PLAN

Assets | Legacy Hedge Funds

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.

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.

Status

SERS is no longer actively investing in this strategy; legacy hedge fund portfolios are currently in liquidation. The remaining balance has continued to decrease as SERS has successfully redeemed assets from legacy managers.

Legacy Hedge Funds

as of December 31, 2020

(\$ millions)

Manager	Investment Style	Market Exposure as of 12/31/20 ^{1/}
Arden	Fund-of-Funds	\$7.4
Entrust Keystone	Fund-of-Funds	3.7
Legacy Hedge Funds	Fund-of-Funds	7.1
Luxor Capital Partners	Direct Hedge Fund	1.6
Morgan Stanley Alternative Investment Partners	Fund-of-Funds	1.4
PAAMCO	Fund-of-Funds	3.6
Pine River Fund	Direct Hedge Fund	0.3
Robeco Investment	Fund-of-Funds	0.1
Total Legacy Hedge Funds		\$25.2

^{1/}Includes securities and cash, which the manager had available for investment.



Pennsylvania Investments

DEFINED BENEFIT PLAN

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).

Where investment characteristics are equivalent, the board's current 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, 2020, was approximately \$598.1 million, or 1.7% of the SERS Fund.

Pennsylvania Investments by Asset Class

(\$ millions)

Asset Class	Total PA Fair Value
Private Equity ^{1/}	\$42.4
U.S. Equity	253.5
Real Estate ^{1/}	254.1
Fixed Income	48.1
Total Pennsylvania Investments	\$598.1

^{1/}Private Equity and Real Estate are valued as of September 30, 2020.

Private Equity

SERS' Private Equity program dates back to 1985. Initially the program targeted a 1% allocation to growth equity 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 growth equity 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.

As of September 30, 2020, SERS' active Private Equity managers held investments in 36 Pennsylvania-based companies. SERS' pro-rata investment value in these companies is approximately \$42.4 million. This equates to 0.9% of the Private Equity program fair value and does not include investments headquartered outside of Pennsylvania that may have impactful operations within the state.

U.S. Equity and Fixed Income

SERS maintains a universe of institutionally investable Pennsylvania-based companies. The PA-based company universe is comprised of 166 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

DEFINED BENEFIT PLAN

Pennsylvania Investments

SERS had approximately \$254 million invested in stocks of Pennsylvania-based companies, as of December 31, 2020. These securities are held in SERS' various externally managed global public equity portfolios.

Pennsylvania Investments - U.S. Equity

(\$ millions)

Manager	Fair Value
Emerald Advisers	\$38.5
Mellon Investments Corporation	215.0
Total Pennsylvania Investments - U.S. Equity	\$253.5

SERS had approximately \$48 million invested in fixed income securities issued by Pennsylvania-based companies, as of December 31, 2020. These securities are held in SERS' various externally managed bond portfolios.

Pennsylvania Investments - Fixed Income

(\$ millions)

Manager	Fair Value
Mellon Investments Corporation	\$38.2
PIMCO	1.0
Stone Harbor	2.9
Taplin, Canida & Habacht (TCH)	6.0
Total Pennsylvania Investments - Fixed Income	\$48.1

SERS has approximately \$540 million invested in the Pennsylvania Treasury Department's short-term investment pool.

Real Estate

In 1987, SERS began investing directly in the Pennsylvania commercial real estate market and subsequently established two separate account real estate portfolios managed by Heitman Capital Management and Grosvenor Investment Management, whose portfolio is now managed by LaSalle Investment Management and reported as a part of the LaSalle Takeover Account. In addition, 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 September 30, 2020, the SERS real estate portfolio contained approximately 43 private real estate investments located in Pennsylvania, totaling 2.6 million square feet of office, retail, warehouse, and mixed-use space, 2,127 apartment, hotel, student housing, and senior housing units, and 2,815 self-storage units.

The gross fair value of the real estate assets located in Pennsylvania totaled approximately \$1.0 billion, of which SERS ownership share was approximately \$248 million.

In addition to the above, SERS owned approximately \$6.1 million worth of PA-based assets in publicly traded real estate investment trusts.

Minority/Woman-Owned Firms

DEFINED BENEFIT PLAN

Minority/Woman-Owned Firms

Minority/Woman-Owned Investment Managers

The board defines “diverse investment manager” as an investment management firm owned and/or controlled by a majority of persons who are women and/or minorities.

The board encourages the use of diverse investment managers in managing SERS' assets, encompassing all asset classes, within the bounds of financial and fiduciary prudence, and to take affirmative steps to remove any barriers to the full participation in investment opportunities. SERS believes that professionals and decision-makers who come from diverse backgrounds contribute different points of

view that enhance organizational quality and economic performance.

The firms listed in Table 1 classify themselves as minority and/or woman-owned firms and were under contract with SERS to provide investment management services within SERS' Equity or Fixed Income portfolio as of December 31, 2020.

The firms listed in Table 2 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 Credit, Private Equity or Real Estate portfolio as of December 31, 2020.

Table 1
Minority/Women-Owned Firms Within SERS Equity & Fixed Income Portfolios

Firm	Status	SERS Assets Under Management
GlobeFlex Capital	Minority/Woman-Owned	\$113 million market value
Leading Edge Investment Advisors	Minority-Owned	\$280 million market value
New Century Advisors	Woman-Owned	\$138 million market value
Xponance	Minority/Woman-Owned	\$234 million market value

Table 2
Minority/Women-Owned Firms Within SERS Private Credit, Private Equity & Real Estate Portfolios

Firm	Status	SERS Committed Capital
Asia Alternatives Capital Partners	Minority/Woman-Owned	\$295 million
Avenue Capital Group	Woman-Owned	\$20 million
Brightwood Capital	Minority-Owned	\$100 million
Blue Moon Capital Partners	Woman-Owned	\$100 million
Clearlake Capital Partners	Minority-Owned	\$205 million
Fairview Capital Partners	Minority/Woman-Owned	*
hotelAVE	Woman-Owned	NA
Hawkeye Partners	Woman-Owned	\$105 million
Insight Venture Partners	Minority-Owned	\$325 million
Rubicon Point Partners	Minority/Woman-Owned	\$50 million
Thoma Bravo	Minority-Owned	\$145 million
TSG Consumer Partners	Woman-Owned	\$100 million
Vista Equity Partners	Minority-Owned	\$225 million
Weathergage Capital	Woman-Owned	\$50 million
Wind Point Partners	Minority-Owned	\$175 million

*The Keystone Legacy Fund is a special purpose vehicle to manage SERS' remaining 131 non-core funds as of September 30, 2020, which includes Buyouts, Special Situations, and Growth Equity.

DEFINED BENEFIT PLAN

Minority/Woman-Owned Firms

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 2020.

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 \$218,063 for the year. It is estimated this year that SERS' Equity managers directed approximately 4% of their trades through minority/woman-owned brokerage firms. Fixed Income managers traded a combined \$115.5 million of securities through minority/woman-owned brokerage firms.

Firm	Minority/ Woman-Owned Commissions
Guzman & Company	\$4,090
Loop Capital	20,479
Mischler Financial Group	14,008
North South Capital	5,073
Sturdivant & Company	60,366
Telsey Advisory	15,181
The Fig Group	98,866
Total Minority/Woman-Owned Commissions	\$218,063

**DEFERRED
COMPENSATION
PLAN**

Supplemental Benefit

Deferred Compensation Plan

\$252 million

distributions/withdrawals
in 2020

\$4.3

billion in
assets

As of Dec 31, 2020



57,682

accounts

76

employers

Participant Contributions

\$166 million

DEFERRED COMPENSATION PLAN

Plan Description

Most state employees are eligible to participate in the voluntary Deferred Compensation Plan, commonly referred to as “deferred comp.” The plan allows participants to have some of their pay automatically deducted on a before- and/or after-tax basis and invested for retirement.

Participants can contribute as little as \$5 or 0.5% of pay each pay period and as much as the annual IRS contribution limits.

Participants are eligible for withdrawals or distribution of their deferred comp account when they retire, leave state employment, die, suffer an unforeseeable emergency as defined by the Internal Revenue Code, or to purchase service credit in the SERS Defined Benefit Plan.

Established by Act 1987-81, this voluntary supplemental investment plan was established as a trust and is administered in accordance with Internal Revenue Code 457(b). The plan allows participants the flexibility to make traditional before-tax and Roth after-tax contributions.

The SERS Board selects the investment options offered through this plan, contracts with investment managers, and contracts through a competitive bid with the third-party administrator of the plan, currently Empower Retirement. Empower maintains participant records, carries out investment transactions on behalf of the participants, counsels participants, and markets the plan.

Investment options comprise a series of target date funds that include a post-retirement date fund (effective January 3, 2020), equity funds, fixed income funds, a money market fund, and a self-directed brokerage option.

The cost of administering the deferred comp plan is borne solely by participants, using no commonwealth funds. During 2020, staff examined internal and third-party administrator processes to find efficiencies and see where costs could be reduced and/or services improved. The work on this important initiative will continue through 2021.

DEFERRED COMPENSATION PLAN

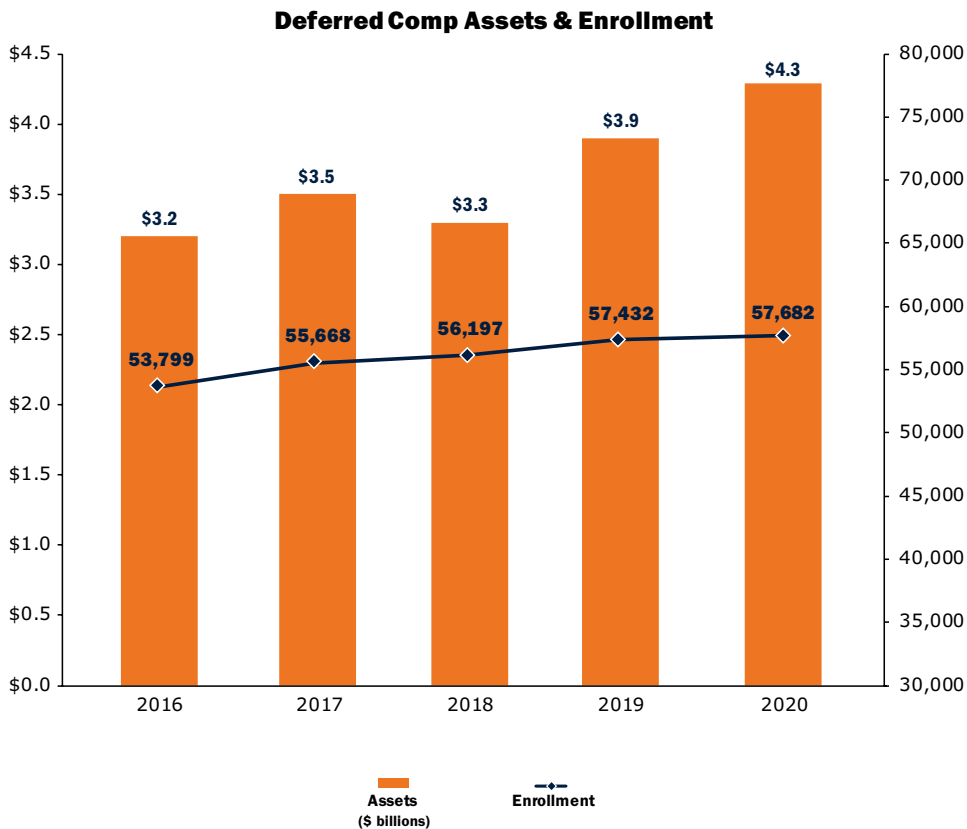
Plan Description

Growth of Deferred Comp

In 2020, more than 57,000 participants had a total of approximately \$4.3 billion invested in deferred comp.

As of December 31, 2020, there were 34,316 active and 23,366 inactive participants in

deferred comp. From 2016 to 2020, annual deferrals have ranged from \$136 million to \$166 million per year and the total fund value grew from approximately \$3.2 billion to approximately \$4.3 billion.



DEFERRED COMPENSATION PLAN

Plan Description

Recent Changes

In April 2020, the SERS Board moved to allow COVID-19-related distributions from the plan, consistent with the federal Coronavirus Aid, Relief, and Economic Security (CARES) Act. As a result, deferred comp participants could take an early distribution withdrawal on a tax-penalty-free basis from their accounts to help meet their immediate needs with the option to repay the money within three years.

While the federal CARES Act was extended in late December 2020, the extension did not include emergency distributions from retirement plans governed by IRS Code Section 457(b) and the provision expired at the end of 2020. As of December 31, 2020, 1,976 participants made withdrawals under this provision totaling nearly \$31 million.

Deferred Compensation Plan Statistics

as of December 31, 2020

Participants	57,682 total accounts 34,316 actively contributing participants
Assets	\$4.3 billion
Eligible Employers	76
Total Participant Contributions	\$166 million
Total Rollovers Into the Plan	766 totaling \$61 million
Total Rollovers Out of the Plan	1,633 totaling \$126 million
Total Distributions/Withdrawals	27,787 totaling \$252 million

DEFERRED COMPENSATION PLAN

Participation, Assets, Performance, and Fund Expense

Deferred Compensation Plan Investment Options

Participation, Assets, Performance, and Fund Expense
as of December 31, 2020

Fund Name	Participants	Fund Balance	Inception Date	Estimated Calendar Year, Net-of-Fees Returns					Max Total Investment Fund Expense
				1 Year	3 Year	5 Year	10 Year		
Stable Value Fund	35,719	\$1,188,276,562	06-1995	2.31%	2.41%	2.21%	2.45%	0.2560% ^{2/}	
Post Retirement Date Fund	4,282	262,654,165	08-2005	11.97	7.72	7.88	6.25	0.0775 ^{1/}	
2025 Retirement Date Fund	2,946	156,521,882	07-2006	12.19	8.17	9.12	7.37	0.0775 ^{1/}	
2030 Retirement Date Fund	3,371	143,506,315	08-2005	12.88	8.74	9.95	7.94	0.0775 ^{1/}	
2035 Retirement Date Fund	3,437	123,454,143	07-2006	13.57	9.27	10.73	8.47	0.0775 ^{1/}	
2040 Retirement Date Fund	2,709	74,827,975	08-2005	14.14	9.71	11.41	8.92	0.0775 ^{1/}	
2045 Retirement Date Fund	2,364	56,817,423	07-2006	14.83	10.08	11.90	9.28	0.0775 ^{1/}	
2050 Retirement Date Fund	1,860	33,948,215	09-2007	15.20	10.25	12.09	9.49	0.0775 ^{1/}	
2055 Retirement Date Fund	1,044	9,757,868	05-2010	15.32	10.30	12.11	9.62	0.0775 ^{1/}	
2060 Retirement Date Fund	565	3,547,120	11-2014	15.31	10.29	12.10	NA	0.0775 ^{1/}	
2065 Retirement Date Fund	110	1,634,042	09-2019	15.14	NA	NA	NA	0.0775 ^{1/}	
U.S. Large Company Stock Index Fund	35,291	1,158,019,863	12-1994	18.43	14.19	15.23	13.90	0.0150 ^{1/}	
U.S. Small/Mid Company Stock Index Fund	28,550	501,313,992	08-1998	32.03	15.35	16.06	13.23	0.0250 ^{1/}	
Global Non-U.S. Stock Index Fund	17,835	139,701,498	03-2009	11.15	5.25	9.35	5.15	0.0550 ^{1/}	
U.S. Bond Index Fund	21,554	225,237,129	02-1995	7.56	5.35	4.43	3.80	0.0250 ^{1/}	
Short-Term Investment Fund	15,629	81,102,676	10-2003	0.65	1.67	1.34	0.77	0.0000	

^{1/}Maximum possible expense that can be charged.

^{2/}The Stable Value Fund expense will fluctuate very little based on the balance of the fund.

The Plan's annual recordkeeping fee is \$59.50 per participant.

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.