



Investment Committee

Item Number 6 – Open Session

Subject: Annual Investment Cost Report

Presenter(s): Debra Smith and Staff

Item Type: Information

Date & Time: November 6, 2019 – 20 minutes

Attachment(s): 5

POLICY

Investment cost reporting and monitoring requirements are governed by the [CalSTRS Investment Policy and Management Plan](#), IPMP, Teachers' Retirement Board Policy Manual, Section 1000, page A-1. As the overarching policy document for the Investment Branch, the IPMP establishes the framework for meeting CalSTRS' objectives. CalSTRS Defined Benefit, Defined Benefit Supplement and Cash Balance investment portfolios are all governed by the IPMP.

HISTORY AND BACKGROUND

The Investment staff strive to operate the total portfolio in the most effective, low cost manner. Investment costs have been presented to the Investment Committee (Committee) for well over 15 years. During the investment cost presentation at the [November 2015 meeting](#), the Committee requested staff to track all expenses and fees; including those that are capitalized or netted from the investments, i.e. private asset costs. In response to the Committee's request, staff developed a plan that included engaging an investment project consultant to obtain paid management fees, partnership expenses, other expenses, and carried interest associated with CalSTRS investments in private markets. Mercer (previously Pavilion Alternatives Group, LLC) was hired as the project consultant to obtain these costs.

PURPOSE

The purpose of this informational report is threefold:

- (1) To provide the Committee, the calendar year 2018 Annual Investment Cost Report; inclusive of trend data over a four-year period for each asset class and investment strategy. Additional insight has been provided to lay the groundwork, which in the future,

will aid the discussion for the CalSTRS Collaborative Model¹ (Collaborative Model). (Attachment 3);

- (2) To provide the Committee peer comparison of investment cost data prepared by an external cost measurement service provider. Their analysis compares CalSTRS to peers and reports cost effectiveness based on their methodology (Attachment 4).
- (3) To provide the Committee, a capture ratio analysis to show cost effectiveness of the total fund, asset classes and strategies over time. This is a quantitative metric to compare costs (spending) against the returns generated from those costs (Attachment 3).

DISCUSSION

The comprehensive Annual Investment Cost Report is aligned with CalSTRS Investment Belief 3:

Belief 3 – Managing investment costs yields long-term benefits

Investment costs, if not managed appropriately, can have a significant (rather than frictional) impact upon overall portfolio performance. CalSTRS, as a large-scale investor, should focus on measuring, monitoring, and minimizing all relevant investment costs.

Investment costs are an important determinant of fund performance and require close oversight and active monitoring. As the investment industry shifts toward greater transparency and fee reporting requirements, there can be misinterpretation related to how all fees and expenses are captured and reported. This report strives to provide transparency and an in-depth look into all types of expenses incurred in managing CalSTRS investments, including the expenses that have been capitalized ('capitalized' to the cost basis of the investment). This report reflects the fees, expenses and carried interest that were paid in the calendar year 2018; therefore, CalSTRS reported gross returns for the same period is reduced by these costs.

The investment staff understands that CalSTRS member benefits are paid from net returns and not from gross returns. Since increased investment costs reduce net returns, fees and expenses are consistently monitored and factored into staff's decision-making process.

Investment Belief 8 states that CalSTRS is best served when there is contractual alignment and transparency of financial interests with its external investment advisors and managers. Asset class staff engage in rigorous negotiations and due diligence to reduce investment costs. A combination of studies, analysis and expert fiduciary opinions are used to help obtain fees that are lower

¹ One of the objectives established for the 2017/18 Investment Committee Work Plan is to review and evaluate how CalSTRS approaches the implementation decision regarding internal versus external asset management across the portfolio. The proposed model that is being studied is referred as the "Collaborative Model". It focuses on developing innovative platforms and strategies by enhancing the social capital of investment organizations to improve their effectiveness and investment efficiency.

compared to market averages. CalSTRS sheer size and reputation also plays an important role in its ability to obtain better cost structures than would otherwise be available to investors. Additionally, as part of the research related to the Collaborative Model, certain asset classes are exploring innovative investment vehicles with low cost structures and higher performance potential. Staff is constantly looking for ways to optimize all aspects of cost management and monitoring without compromising the quality of the investments.

In addition to investment cost monitoring and reporting, asset classes utilize benchmarks to measure the performance of the investment portfolio in relation to costs. The overarching criterion is to focus on ‘optimal cost’, which may not always be the lowest cost, but has the highest net payoff. Staff understands that there is an opportunity cost associated with low cost investments that can increase the overall risk of the plan. Thus, staff emphasizes efforts on well balanced risk – return (net) strategies and higher quality investments that generate the best results for CalSTRS members. Staff’s approach to investment cost management is holistic, with the prime focus on the highest overall payoff.

There is no industry standard or format for investment cost reporting. Comparability is challenging and, in many cases, not possible because every pension plan is unique. They are limited by their respective mandates, funding objectives and cash flow constraints. Additionally, private assets have characteristics such as non-standard reporting format and variability in deal structures, making cost reporting exceptionally complex; therefore, performance measurement and cost extraction is intricate and not always directly comparable to peers. While each partnership has an audited annual financial statement, which is closely reviewed by staff, the netted costs and expenses are not uniformly disclosed nor are they delineated by each respective limited partner. As a result, the information must be carefully obtained one investment at a time through direct engagement. Additionally, CalSTRS Annual Investment Cost Report sets best practice in cost reporting due to its comprehensiveness and thorough detail in reporting.

The Committee’s direction to staff to delineate the capitalized costs at the November 2015 meeting has proven to be an information exercise. Staff continues to improve and enhance this cost reporting to provide transparent information across all asset classes and to set best practices.

The following reporting enhancement was made to the Annual Investment Cost Report for 2018 compared to reports from previous years:

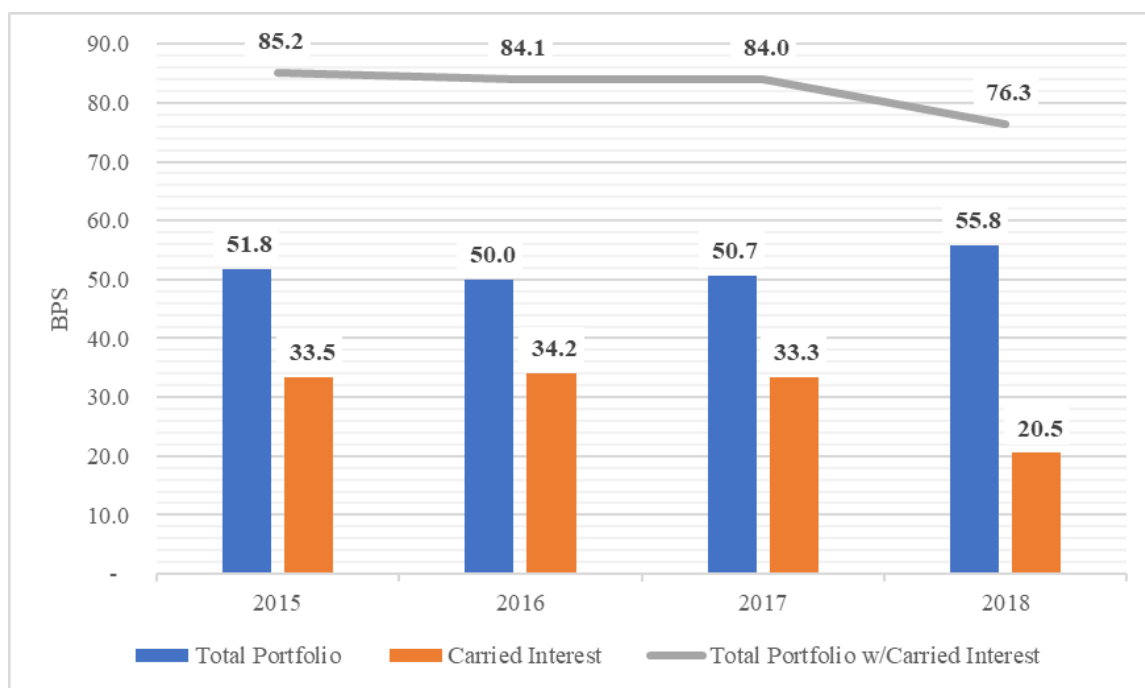
- To set the framework for aiding the Collaborative Model discussion, strategies such as co-investments and joint ventures have been carved out of external management as ‘Hybrid-Private Management²’ (Chart 4 and Table 2 on subsequent pages).

All costs and carried interest within this report are for calendar year 2018 and on a cash basis. It is important to note that information in this Cost Report is one point in time. Costs can fluctuate significantly each year depending on the life cycle of the underlying investment and/or the investment pace of the asset class or investment strategy. CalSTRS is a long-term investor and as

² Attachment 2- Glossary provides a complete definition and break down of the investment types included in Hybrid-Private Management.

such, when comparing to returns, cost data is more meaningful over long time periods such as 10-20 years.

Chart 1 – Overall Costs³ in Basis Points



Overall costs in basis points were lower in 2018, even though total portfolio costs (excluding carried interest) increased by 5 basis points. This was the result of a decrease in paid carried interest by 36% in absolute dollars (Table 1). The reduction in carried interest indicates a slowdown in realized profits from private investments made over the last several years.

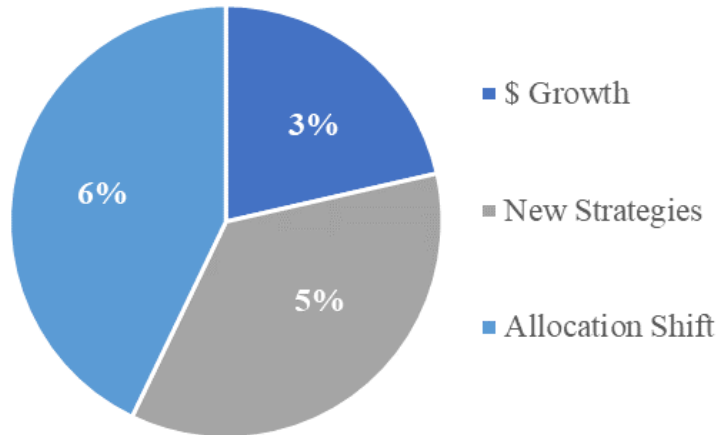
Table 1 – Net Asset Value (NAV) and Absolute Dollar Costs

(\$ in 000's)	2015	2016	2017	2018	2018 Δ
NAV	186,099,586	194,698,312	218,214,795	225,703,278	3%
Total Portfolio Costs	963,184	972,660	1,105,997	1,259,605	14%
Carried Interest Paid	622,767	665,155	727,058	462,966	-36%
Total w/Carried Interest	1,585,951	1,637,814	1,833,055	1,722,571	-6%

The 14% increase in portfolio costs (excluding carried interest; Table 1) is attributable to three drivers; NAV growth, the addition of new strategies and asset allocation shifts.

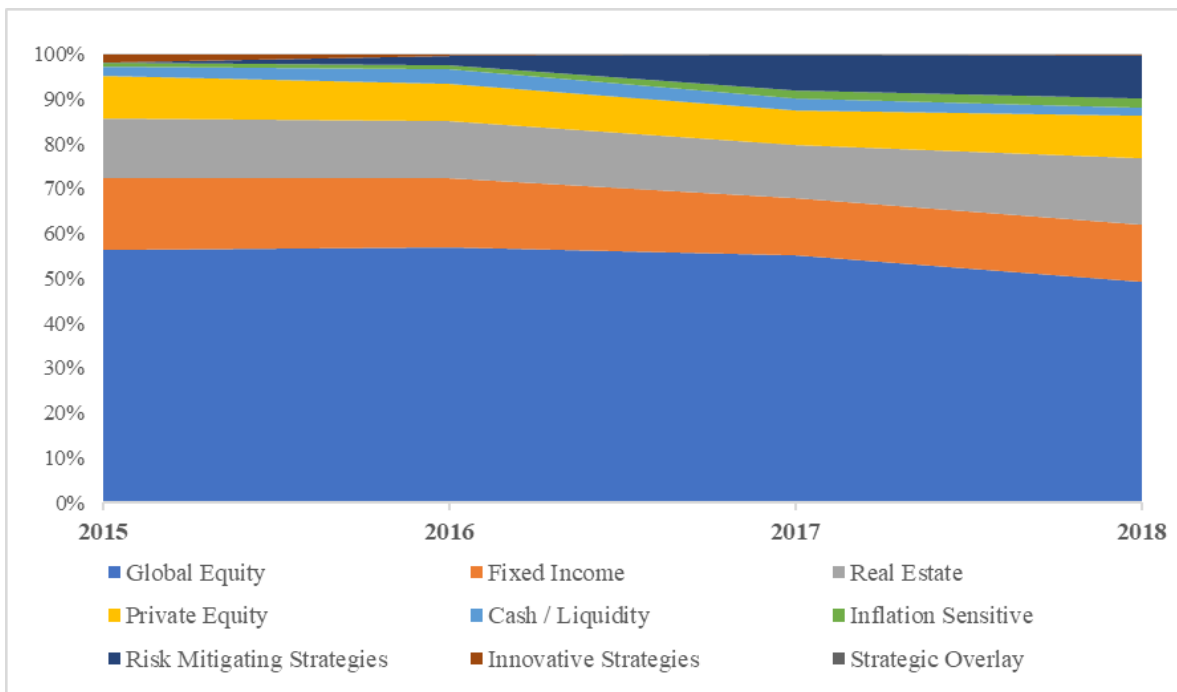
Chart 2 –Attribution of Total Portfolio Cost Increase

³ Based on total costs for the period over a smoothed NAV to account for new and exited investments during the respective calendar year. Basis point totals may not tie as a result of rounding.



The plans assets grew approximately 3% in 2018, driving up costs in absolute dollar terms. Global Equity completed the shift from a home country bias to a global structure. The new strategies have a higher fee structure, which accounted for 5% of the increase in costs. Private Assets continued to ramp up toward their target allocations, which contributed to the remaining increase of 6%. This is further reflected below in Chart 3.

Chart 3 – Asset Allocation over Time



The change in asset mix over 2018 (Chart 3) shows a slight shift from Global Equity to Private Equity, Real Estate and Risk Mitigation Strategies. This resulted from a combination of market movement and allocation shifts from the public asset classes to the private asset classes. Traditionally, the private asset classes have a higher fee structure due to their complexity and greater return potential. This shift contributed to the overall increase in total portfolio costs, even

though as a whole, each of these asset classes reduced their relative year over year fee structures for 2018. For detailed total fund, asset class and investment strategy level trends, please refer to Attachment 3.

Chart 4 – Cost Breakdown

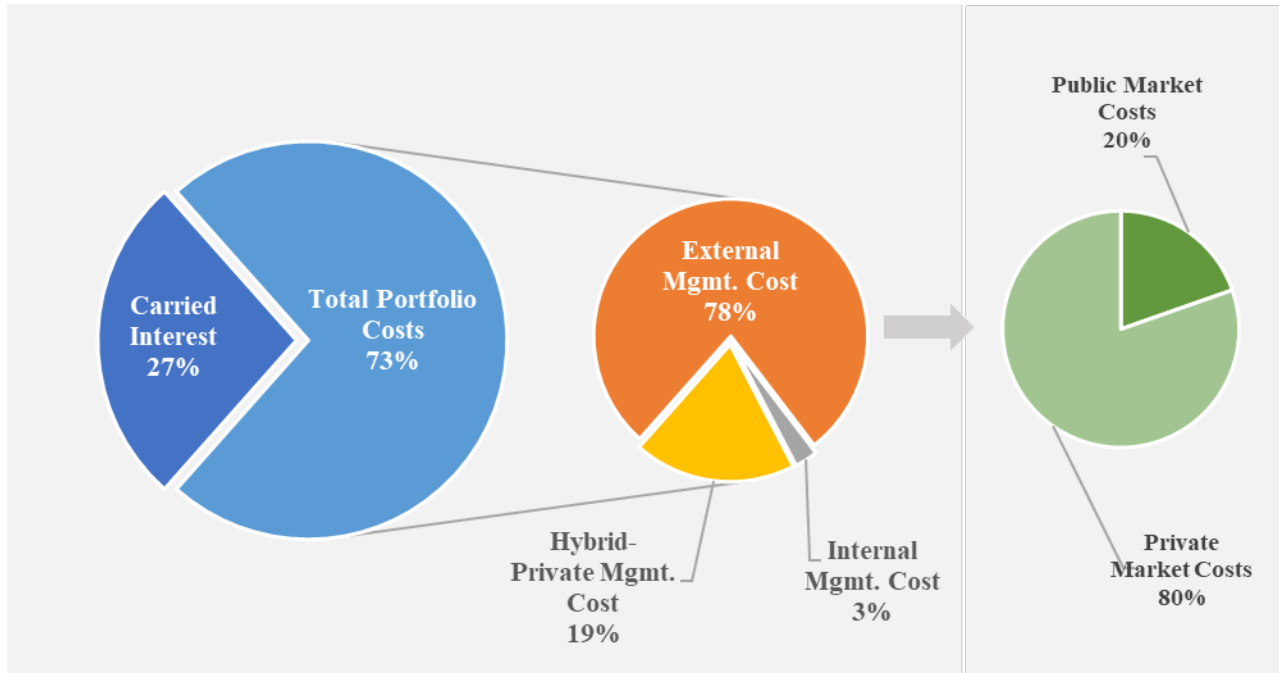


Chart 4 illustrates the ratio between carried interest and total portfolio costs. Total portfolio costs are broken out into two views:

1. External Management / Internal Management / Hybrid-Private Management
2. Public Market / Private Market

External, Internal and Hybrid-Private

In general, it costs more to manage investments externally than internally. Internal investment management allows staff to focus on specific strategies while leveraging internal knowledge and adding value by generating meaningful cost savings. However, there are strategies that require either significant infrastructure or specialized expertise that economically justify external management. For such strategies, external investment managers and partners are utilized, overseen and monitored by internal staff.

The Collaborative Model’s objective is to continually calibrate the optimum balance between retaining controlling interest in investments (internal management) and increasing the net payoff. This includes exploring collaborative strategies with external partners like co-investments and joint ventures. These are represented on Table 2 as ‘Hybrid-Private Managed’.

Table 2 – External, Internal and Hybrid-Private Costs (Excluding Carried Interest)

(\$ in Millions)	NAV		Costs		Cost % of NAV
	\$	%	\$	%	
Externally Managed	103,718	46%	983	78%	0.95%
<i>External Public</i>	58,549	26%	213	17%	0.36%
<i>External Private</i>	45,169	20%	770	61%	1.71%
Internally Managed	98,837	44%	35	3%	0.04%
Hybrid-Private Managed	23,148	10%	242	19%	1.04%
Total	225,703	100%	1,260	100%	

Table 2 shows internally managed investments account for 44% of the total portfolio NAV, yet they represent only 3% of the total portfolio costs. In 2018, external management costs were approximately \$983 million compared to \$242 million in Hybrid-Private Management and \$35 million in internal management costs. The hybrid category represents predominantly private investments where CalSTRS has collaborated with external industry partners. Relative to externally managed private assets, their cost structure will be lower (depicted by the green arrow on Table 2).

For a complete definition and break down of the investment types included in Hybrid-Private Management, please refer to Attachment 2 – Glossary.

For 2018, the Hybrid-Private cost per dollar was 104 basis points, while externally managed private assets cost 171 basis points per dollar. Internally managed costs (which are all public market related) continue to be the lowest cost basis with 4 basis points relative to public external managers who cost 36 basis points.

Public and Private Markets

As seen on Chart 4 (previous page), private market costs accounted for 80% of the total portfolio costs in 2018; approximately \$248 million in public market costs compared to approximately \$1 billion in private market costs (Attachment 5). Private market investments (private assets) are complex and require a higher degree of expertise, resulting in higher costs. Studies have shown that a private equity program can add significant value to a portfolio in terms of diversified risk and higher expected return specifically over a 10-20-year investment horizon.

There were approximately 703 private assets in 2018. The costs associated with 98% of the private assets, based on their NAV, have been obtained and reported within this report. General partners/managers of the remaining 2% of private assets were non-responsive. They are primarily composed of investments that are winding down and at the end of their life, and therefore have low costs. Staff believes that 98% coverage provides a directionally accurate cost figure, particularly given these costs must be obtained for hundreds of investments across various vintage years going back to 1992.

To obtain the cost information of the private assets, Mercer utilized the reporting template (“Fee Template”) developed by the Institutional Limited Partners Association (“ILPA”) for private assets. Data was obtained through a combination of the Fee Template and other sources, which included financial statements and supplemental schedules provided by the general partners and managers. All data was thoroughly checked for reasonableness and completeness, representing numerous validation protocols for every investment. Mercer will be available to discuss their process and answer any questions.

Carried interest, typically applicable to limited partnerships, is a profit-sharing agreement between the general partner and the limited partners (i.e. CalSTRS). It is positively correlated to investment returns and is paid to the general partner upon the profitable exit from an investment and only after specific performance thresholds have been achieved (e.g. a preferred rate of return). Typically, carried interest is not paid until limited partners receive back all contributions (including fees and expenses) and a preferred return hurdle is met.

For definitions and breakdowns of the types of expenses included in each cost, please refer to Attachment 2 - Glossary.

Peer Comparison

Data for peer comparison was compiled and prepared by one third party cost measurement service provider utilizing various customized methodologies different from this report. Information in this section is strictly for benchmarking purposes and differs from CalSTRS reported costs primarily due to the exclusion of broker commissions, partnership expenses and carried interest within the peer comparison.

- Based on a comparison of 15 global peers from \$86.2 billion to \$588.6 billion in AUM, CalSTRS investments was a low-cost fund.⁴
- CalSTRS investment cost of 42.2 bps was below its expected cost of 52.8 bps, demonstrating our fund was low cost compared to peers, given an identical asset mix.⁴
- CalSTRS Investment Branch saved 10.5 bps over the expected investment costs of 52.8 bps, which equates to approximately \$240 million saved compared to its peers.⁴

For further details on peer comparison, please refer to Attachment 4.

Capture Ratio Analysis

In the past, the Committee has expressed an interest in understanding how the cost information can be used to measure the returns generated from the private assets. Staff mentioned in the previous Cost Report that they will work closely with the Board’s private equity consultant, cost consultant and other data providers to capture relevant fiscal year cost data into the Semi-Annual Performance Reports. The Capture Ratio Analysis presented within the last report has been an acceptable concept

⁴ Data collected and compiled by CEM Benchmarking, Inc. for calendar year 2018.

by the Committee’s general consultant. Staff will continue to enhance this analysis by working closely with the general consultant and other industry experts.

Table 3 – Capture Ratio

(\$ in millions)	4-Year Period Ending December 31, 2018			Capture Ratio	4-Year Net Returns*** (TWR)	12/31/2018 Allocation
	Mngmt. Fees & Carried Interest*	Net Dollar Value Added**	Gross Dollar Value Added**			
Total Portfolio	\$ 5,068	\$ 43,213	\$ 48,280	89.5	5.5	N/A
Global Equity	443	22,141	22,584	98.0	4.9	50
Fixed Income	43	2,696	2,740	98.4	2.2	12
Private Equity	2,660	7,668	10,328	74.2	11.5	8
Real Estate	1,325	9,677	11,001	88.0	9.9	13

* Management fees and carried interest are considered the industry standard for measuring costs
 ** Cummulative dollar gain or loss over the period
 *** Annualized

Table 3 reflects the percentage of gross profits captured in the net manager return over the 4-year period ending December 31, 2018 (see Attachment 2 – Glossary for a definition of Capture Ratio). Dollar Value Added (gains and losses), as well as Management Fees & Carried Interest, are reflected as cumulative over the period. The yearly averages for each asset class are available in Attachment 3 – Trends: Comprehensive Costs and Carried Interest.

CONCLUSION

CalSTRS staff has been reporting investment fees and expenses for many years. As reflected on the investment beliefs statements, staff acknowledges the long-term benefits of managing investment costs. Reducing costs is an integral part of CalSTRS investment decision making process and staff understands the importance of monitoring and measuring costs to meet the policy objectives.

This report is comprehensive, and through this process, costs across all asset classes and strategies are scrutinized and reported. The thoroughness and dedication to transparency, even prior to legislation requiring detailed cost reporting for California pension plans, continues to make CalSTRS the front-runners amongst peers in reporting investment costs.

The Peer Comparison (Attachment 4) provides insight into how CalSTRS is performing compared to global peers. There are challenges to the comparability of costs with peers due to the lack of standard practices across the industry for reporting these costs. Therefore, the peer comparison report excludes private asset performance fees and transactions costs except as a footnote.

The Capture Ratio Analysis is a relatively new concept and may need further studying. Staff will be working on fine tuning this analysis to better reflect a volatile and complex market environment. Staff will also continue to work with third party cost measurement service providers to monitor CalSTRS effectiveness in managing investment costs compared to peers. Staff has partnered together with other institutional investors and organizations (e.g. ILPA) to advocate best practices across all the asset classes to enhance transparency and improve benchmarking. These efforts and the continued enhancements of the Annual Investment Cost Report will strive to provide the Committee the most meaningful and advanced investment cost information.

ATTACHMENT(S)

Attachment 1 – Investment Cost Report Outline

Outline of which investment costs are included in this report.

Attachment 2 – Glossary

Attachment 3 – Trends: Comprehensive Costs and Carried Interest

Takes a deeper dive into the costs of each asset class and investment strategy. Cost trend lines for total fund, asset classes and investment strategies. Also includes Capture Ratio for total fund and four major asset classes.

Attachment 4 – Peer Comparison

An overview of how CalSTRS investment costs compare to its peers. Data is based on a third-party cost measurement service provider.

Attachment 5 – Internal/External/Hybrid & Private/Public Market Costs

A view of the investment portfolio's internal, external and hybrid management costs as well as the expenses associated with private and public markets. A two-year comparison for each segment is also included.

POWERPOINT(S)

2018 Investment Cost Report

Investment Cost Report Outline

	Management Fees		Operating Expense ¹			Other Expenses ²			
Asset Class/ Investment Strategy	Base Management Fees	Performance Fees	CalSTRS Internal Salary	CalSTRS Operating Expense	CalSTRS Other Expenses	Partnership/ Fund Expenses	Brokerage Commission/ Transaction Fee	Soft Dollar Services	Carried Interest
Global Equity	✓	✓	✓	✓	✓	--	✓	✓	--
Corporate Governance	✓	✓	✓	✓	✓	✓	✓	--	✓
Fixed Income	✓	✓	✓	✓	✓	--	✓	✓	--
Cash	--	--	✓	✓	✓	--	✓	--	--
Real Estate	✓	--	✓	✓	✓	✓	✓	--	✓
Private Equity	✓	--	✓	✓	✓	✓	✓	--	✓
Inflation Sensitive	✓	--	✓	✓	✓	✓	✓	--	✓
Risk Mitigating Strategies	✓	--	✓	✓	✓	✓	✓	--	✓
Innovative Strategies	✓	--	✓	✓	✓	✓	✓	--	✓
Strategic Overlay	✓	✓	✓	✓	✓	--	✓	--	--

✓ included in reports -- not applicable

¹ “Operating Expense” throughout this report includes staff salaries, travel, supplies, training and other Investment Branch support, research services and administrative expenses.

² “Other Expenses” throughout this report include portfolio company fees that the General Partner/Manager or its related parties receive from the portfolio companies for consultancy services, broken deal fees, transaction and deal fees, board of director fees, ongoing monitoring fees and capital markets fees, as well as property management fees, construction management fees, project marketing fees, and other fees for real estate partnerships; also includes fund of fund fees. It includes private asset related partnership expenses inclusive of accounting, IT, administration, audit & tax, bank fees, custody fees, due diligence, legal, organizational, travel and entertainment, insurance, partnership level taxes and other expenses charged to the partnership. Includes brokerage commissions charged to CalSTRS for trades in the public markets. Excludes trading spread for fixed income and currency instruments.

Glossary

Asset Class/Investment Strategy	As outlined in the Investment Policy and Management Plan (IPMP); a group of securities that have similar financial characteristics, behave similarly in the market place, and are subject to the same laws and regulations. CalSTRS asset classes and investment strategies include Global Equity, SISS, Fixed Income, Private Equity, Real Estate, Inflation Sensitive, Innovative Strategies, Risk Mitigating Strategies, Strategic Overlay and Cash.
Basis Point (Bps)	A unit of measure used in finance to describe the percentage change in value or rate of a financial instrument. One hundredth of the one percent or .0001 in decimal form.
Brokerage Commissions/Fees	An agent or agent’s company charges to conduct transactions between buyers and sellers. Fees are charged for services such as purchases, sales, and advice on the transaction, negotiations or delivery. Included as “Other Expenses” within the report.
Capitalized Costs	An accounting method used to delay the recognition of expenses by recording the expense as a long-term asset.
Capture Ratio	Percentage of gross profits retained after paying management fees and carried interest.
Carried Interest (Profit Sharing)	Applicable to private assets only. A profit-sharing mechanism by which general partners are compensated for their performance, usually after meeting a certain performance threshold and returning all previously paid management fees to limited partners. Carried interest is distributed to the general partner as part of the profit before profits are paid to the limited partners (CalSTRS).
Collaborative Model	One of the objectives established for the 2017/18 Investment Committee Work Plan is to review and evaluate how CalSTRS approaches the implementation decision regarding internal versus external asset management across the portfolio. The proposed new model that is being studied is referred as the “Collaborative Model”. It focuses on developing innovative platforms and strategies by enhancing the social capital of investment organizations to improve their effectiveness and investment efficiency.
Corporate Governance	See Sustainable Investment and Stewardship Strategies (SISS).

Currency Management Program (CMP)	A program within the Strategic Overlay which manages CalSTRS total exposure to foreign currencies. Generally uses notional values, not market value, when calculating basis points.
External Asset Management	The outsourcing to external companies of asset management of various securities and other assets in order to meet specified investments goals.
External Management Costs	Costs that are associated with external management of investments. Generally, these are management fees of private and public markets, partnership expenses and related salaries, support and oversight.
Fixed Income	An asset class comprised of investment grade and non-investment grade securities in both the U.S. and non-U.S. dollar base. Examples of Fixed Income securities include debt securities and derivatives (futures, options, swap agreements or forward agreements).
General Partner	A general partner is an owner of a partnership who has unlimited liability. A general partner can be an entity or individual who is also usually a managing partner and active in the day-to-day operations of the business or investment fund.
Global Equity	An asset class comprised of U.S.; non-U.S. developed countries, and emerging markets securities. Examples of Global Equity securities include Exchange Traded Funds (ETF), stocks domiciled in the U.S., international securities traded on the exchanges of all countries contained in the MSCI All Country World Index ex U.S. and the MSCI Frontier Markets Index, units of participation in commingled index funds or trusts and derivatives (futures, options, swap agreements, structured notes, warrants, asset trusts or forward agreements).
Global Master Custodian	A bank servicing the Investment Branch that takes responsibility for reconciling its records with those of each investment manager, processing and recording trades, relieving CalSTRS of this administrative burden.
Hybrid Asset Management	Investment category that represents collaborative strategies with external partners. These were previously combined under external management but have been carved out for Co-Investments and where CalSTRS has significant ownership and control (full or primary) over investment decisions

such as purchases, sales, or financing. The investment type is specific to each asset class or investment strategy as follows:

- Co-Investments: Private Equity, Real Estate, Inflation Sensitive and SISS
- Separate Accounts and Joint Ventures: Real Estate
- Managed Accounts: Inflation Sensitive.

Inflation Sensitive	An asset class currently comprised of Infrastructure and Treasury Inflation-Protected Securities (TIPS), this asset class should produce a relatively stable return stream, with a return level between equities and fixed income, and an overall higher correlation to inflation than equity or fixed income.
Infrastructure	A strategy within Inflation Sensitive asset class comprised of limited partnerships, co-investments, commingled funds and publicly listed investments; spanning various industries such as energy resources and utilities, transportation assets, ports, water and waste and communications.
Innovative Strategies	A program where the primary objective is to invest in strategies that do not fit any of CalSTRS existing asset classes and explore new concepts that are expected to improve diversification of the overall investment portfolio when fully implemented.
Internal Asset Management	Asset management of various securities and other assets in order to meet specified investment goals performed ‘in-house’ by CalSTRS staff.
Internal Management Costs	Costs that are incurred for internal management of the investments and relevant operational support and administration.
Internal Salary	An Operating Expense that comprises of salary and benefits paid to CalSTRS staff within the Investment Branch.
Management Fee	A periodic payment made by an investment fund to the fund’s investment advisor for investment and portfolio management services which is calculated as a percentage of assets under management. Performance-based fees are paid when the advisor generates positive returns above an agreed upon performance rate. As displayed in the cost tables, manager fees include both asset base and performance base manager fees for public markets and manager fees excluding performance for private markets. Management Fee excludes internal staff salaries.

Net Asset Value (NAV)	The dollar value of the fund based on the total value of all the securities in its portfolio, any liabilities the fund has and the number of fund shares outstanding.
Notional Amount	The U.S. Dollar amount of the underlying assets.
Operating Expense	Includes staff salaries, travel, supplies, training and other Investment Branch support and administrative expenses. Includes advisor, consultant, risk and trade management system expenses. Includes investment expenses not allocated to an asset class such as custodian, audit and other organizational support budget expenses.
Other Expenses	Includes portfolio company fees that the General Partner/Manager or its related parties receive from the portfolio companies for consultancy services, broken deal fees, transaction and deal fees, board of director fees, ongoing monitoring fees and capital markets fees, as well as property management fees, construction management fees, project marketing fees, and other fees for real estate partnerships; also includes fund of fund fees. It includes private asset related partnership expenses inclusive of accounting, IT, administration, audit & tax, bank fees, custody fees, due diligence, legal, organizational, travel and entertainment, insurance, partnership level taxes and other expenses charged to the partnership. Includes brokerage commissions charged to CalSTRS for trades in the public markets. Excludes trading spread for fixed income and currency instruments.
Partnership Expenses	Applicable to private assets. Reflected under "Other Expenses" and includes private asset related partnership expenses inclusive of accounting, IT, administration, audit & tax, bank fees, custody fees, due diligence, legal, organizational, travel and entertainment; may also include insurance, partnership level taxes and other expenses charged to the partnership.
Portfolio Company Fees	Applicable to private assets. Reflected under "Other Expenses" and includes fees the General Partner/Manager or its related parties receive from the portfolio companies for consultancy services, broken deal fees, transaction and deal fees, board of director fees, ongoing monitoring fees

and capital markets fees, as well as property management fees, construction management fees, project marketing fees, and other fees for real estate partnerships; includes fund of fund fees.

Private Equity Asset Class	An asset class comprised of limited partnerships, direct investments, co-investments and secondary interests in leverage buyout, venture capital, distressed debt, mezzanine financing, natural resources and proactive private equity. The objective of private equity assets is to provide an enhanced investment return over those available in the public market.
Private Markets	Refers to the market of mostly illiquid investments that do not trade on an exchange. Investment structures can range from limited partnerships, limited liability companies and joint ventures.
Private Market Costs	The expenses associated with private assets including the costs that have been capitalized and deducted from the gross value of the investment, such as management fees for limited partnerships, portfolio company fees and other types of expenses paid to the general partner and/or its affiliates. Within our report, private market costs also include relevant staff salaries and administration costs to manage the private assets.
Public Markets	Refers to the market of securities that trade on an exchange and can be bought or sold by anyone in the general population. These securities typically trade in a systemized secondary market.
Public Market Costs	Expenses associated with the management of the publicly traded investments and fixed income securities. These include external management costs such as management fees, broker commissions and applicable internal costs.
Real Estate Asset Class	An asset class comprised of direct real estate investments, joint venture and value-added investments, and commingled funds in Office, Retail, Multifamily and Industrial sub categories.
Risk Mitigating Strategies	An asset class that invests in several investment strategies including long duration U.S. Treasuries, trend following, global macro, systematic risk premia, and other types of strategies.
Soft Dollars	Soft dollars are the benefits provided to an asset manager by a broker-dealer as a result of commissions generated from financial transaction executed by the broker-dealer for client accounts or funds managed by the

asset manager. Soft dollars, in turn might be used to pay for future commission expenses, research, advice etc.

Spread

A spread is the difference between the bid and the ask price of a security or asset.

Sustainable Investment & Stewardship Strategies (SISS)

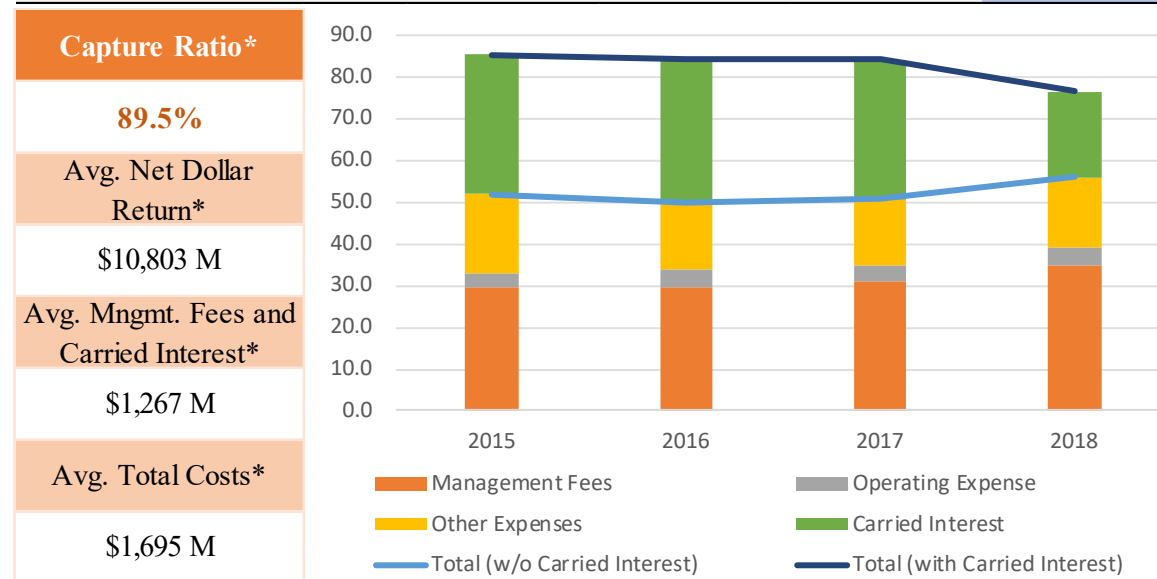
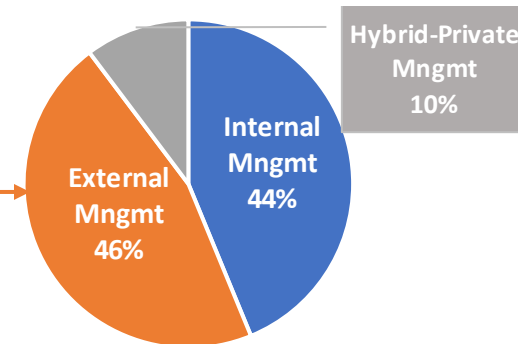
Formerly known as Corporate Governance. A program within the Global Equity asset class. Some investments are structured as limited partnerships or co-investments, focused on active management where managers take large individual positions and engage boards and management to undertake value driving change. Others are structured like traditional external asset management and integrates robust environmental, social, and governance criteria into the portfolio company selection process.

Trends: Comprehensive Costs and Carried Interest

Total Portfolio

Net Asset Value ⁺ (\$ Billions)				
100% Allocation as of 12/31/18				
	186.10	194.70	218.21	225.70
BPS	2015	2016	2017	2018
Management Fees	29.4	29.7	31.0	34.9
Operating Expense	3.5	3.9	4.0	4.2
Other Expenses	18.9	16.3	15.7	16.8
Total (w/o Carried Interest)	51.8	50.0	50.7	55.8
Carried Interest	33.5	34.2	33.3	20.5
Total (with Carried Interest)	85.2	84.1	84.0	76.3

Market Value Allocation



Cost per \$ NAV
■ 95 bps ■ 104 bps ■ 4 bps

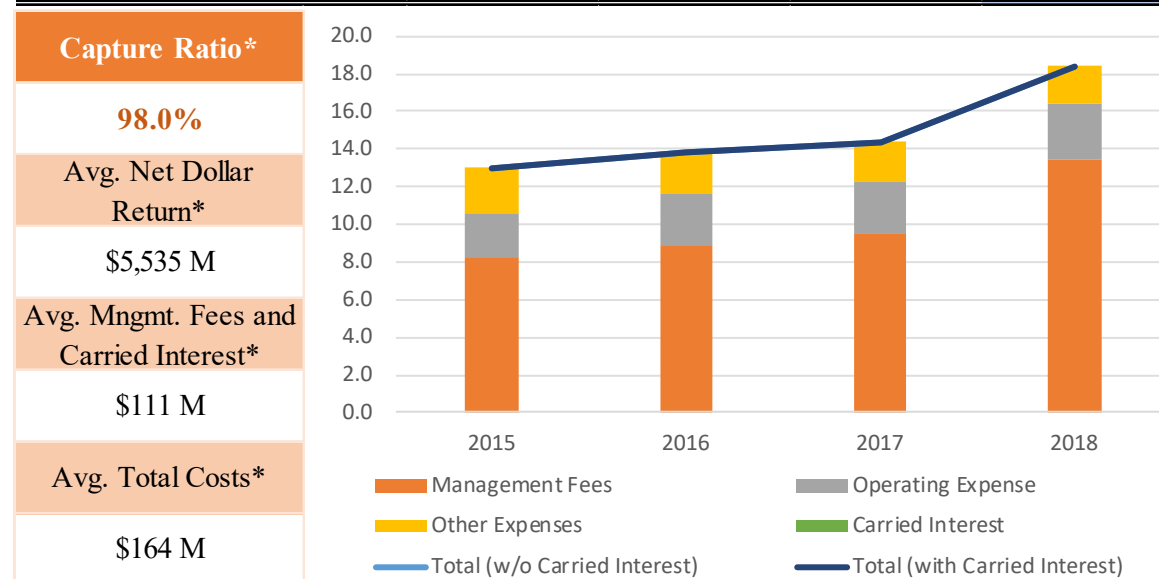
- ▶ **14% increase in total portfolio costs** (excluding Carried Interest) attributable to NAV growth, the addition of new strategies and asset allocation shifts.
- ▶ **Carried Interest decreased** indicating a slowdown in realized profits from private investments made over the last several years.

Manager	NAV	\$ Cost
Public Markets		
External	58,549	0.36%
Internal	98,837	0.04%
Private Markets		
External	45,169	1.71%
Hybrid	23,148	1.04%

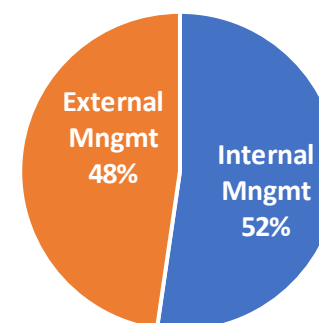
* Calculated using a 4-year average. The Capture Ratio uses the industry standard for measuring costs; which is management fees and carried interest. Partnership expenses and internal administrative costs are captured in Total Costs.
⁺ Net Asset Value is a quarterly average over the year.

Global Equity

Net Asset Value ⁺ (\$ Billions)				
50% Allocation as of 12/31/18				
	100.13	106.01	118.81	113.02
BPS	2015	2016	2017	2018
Management Fees	8.3	8.9	9.6	13.4
Operating Expense	2.4	2.7	2.7	3.0
Other Expenses	2.4	2.2	2.1	2.0
Total (w/o Carried Interest)	13.0	13.9	14.4	18.4
Carried Interest	0.0	0.0	0.0	0.0
Total (with Carried Interest)	13.0	13.9	14.4	18.4



Market Value Allocation



- ▶ **Management fees increased** as Global Equity completed the shift from a home country bias to a global structure.
- ▶ **Internal management costs remained significantly low** relative to external management; 2.9 bps per dollar compared to 35.4 bps.

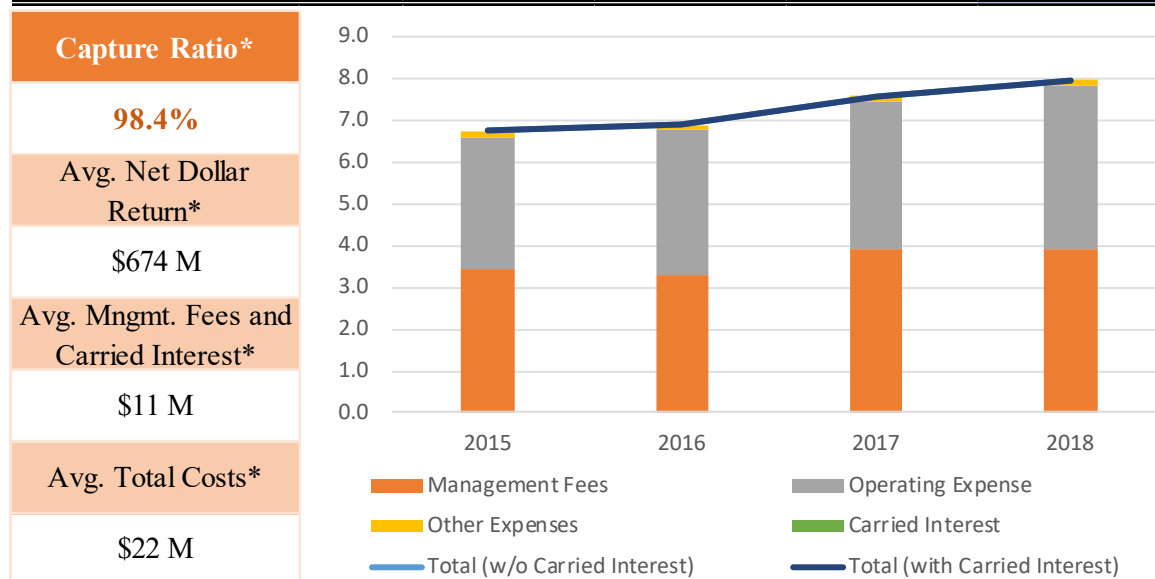
* Calculated using a 4-year average. The Capture Ratio uses the industry standard for measuring costs; which is management fees and carried interest. Partnership expenses and internal administrative costs are captured in Total Costs.

⁺ Net Asset Value is a quarterly average over the year.

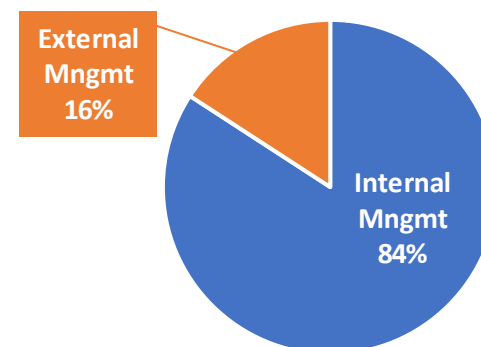
Fixed Income

Net Asset Value⁺ (\$ Billions)				
12% Allocation as of 12/31/18	30.31	31.21	29.95	27.74

BPS	2015	2016	2017	2018
Management Fees	3.4	3.3	3.9	3.9
Operating Expense	3.1	3.4	3.5	3.9
Other Expenses	0.1	0.1	0.1	0.1
Total (w/o Carried Interest)	6.7	6.9	7.6	8.0
Carried Interest	0.0	0.0	0.0	0.0
Total (with Carried Interest)	6.7	6.9	7.6	8.0



Market Value Allocation



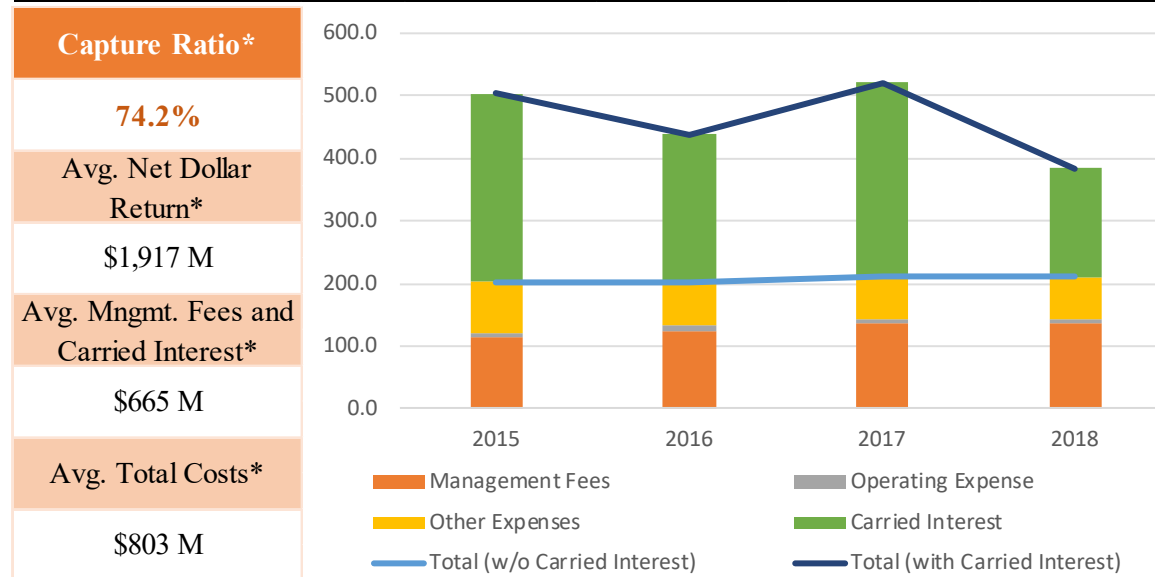
- ▶ **Management fees stayed flat** from 2017 to 2018.
- ▶ **Operating expenses rose slightly** year over year, attributed to an increase in the **cost of research** and services that our data providers charge.
- ▶ As the Fixed Income allocation has declined, so has AUM. As a result, Fixed Income does not garner the same leverage with vendors in price negotiations.

* Calculated using a 4-year average. The Capture Ratio uses the industry standard for measuring costs; which is management fees and carried interest. Partnership expenses and internal administrative costs are captured in Total Costs.

+ Net Asset Value is a quarterly average over the year.

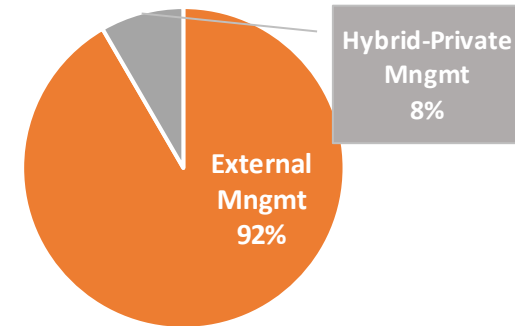
Private Equity

Net Asset Value ⁺ (\$ Billions)				
8% Allocation as of 12/31/18	17.18	16.54	17.11	19.06
BPS	2015	2016	2017	2018
Management Fees	113.9	124.4	136.6	136.2
Operating Expense	7.1	7.5	7.9	7.4
Other Expenses	81.0	70.1	68.1	66.6
Total (w/o Carried Interest)	202.0	202.0	212.6	210.3
Carried Interest	300.6	235.5	308.4	173.7
Total (with Carried Interest)	502.6	437.5	521.0	384.0



* Calculated using a 4-year average. The Capture Ratio uses the industry standard for measuring costs; which is management fees and carried interest. Partnership expenses and internal administrative costs are captured in Total Costs.
⁺ Net Asset Value is a quarterly average over the year.

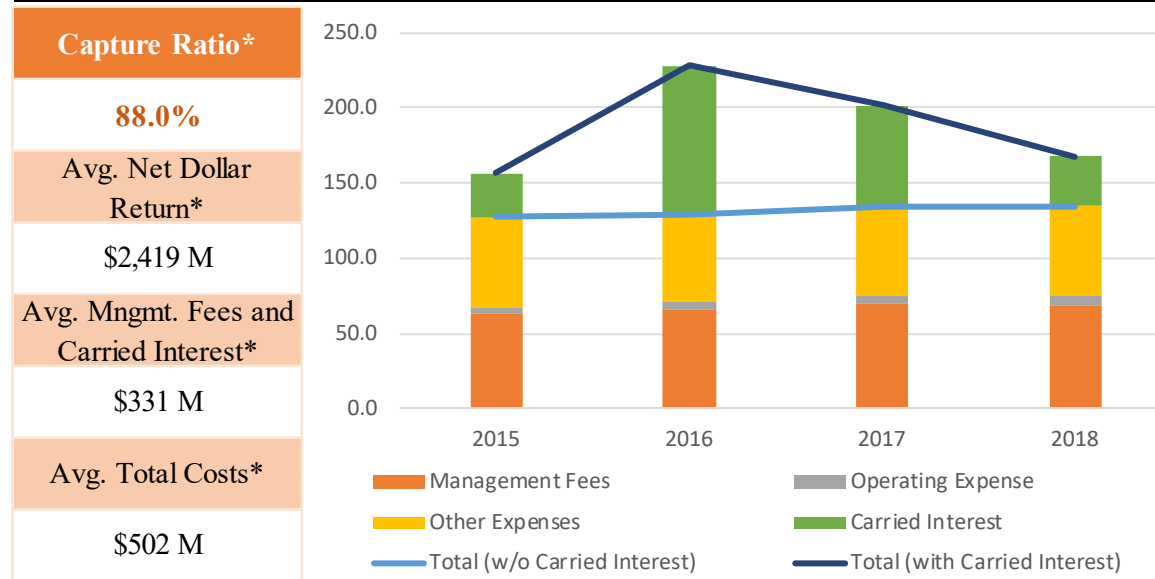
Market Value Allocation



- ▶ A 4-year period is a limited view for private equity investments, which are generally 10 to 15-year investments.
- ▶ The Private Equity portfolio **increased the commitment pace** over the last few years, which generally leads to higher relative costs due to the **J-curve effect**.
- ▶ **Management fees remained flat** from year to year.
- ▶ **Carried Interest decreased** indicating a slowdown in realized profits from private investments made over the last several years.

Real Estate

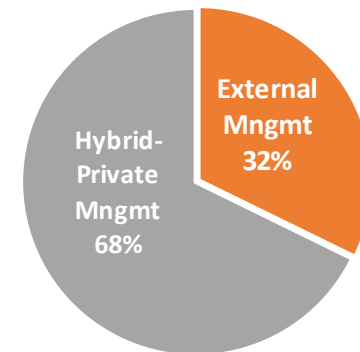
Net Asset Value ⁺ (\$ Billions)				
13% Allocation as of 12/31/18	25.79	25.80	25.99	29.37
BPS	2015	2016	2017	2018
Management Fees	63.0	66.7	69.9	69.4
Operating Expense	4.6	5.3	5.9	6.2
Other Expenses	59.7	56.6	58.2	59.1
Total (w/o Carried Interest)	127.4	128.6	134.0	134.6
Carried Interest	29.1	99.7	67.5	33.0
Total (with Carried Interest)	156.5	228.3	201.5	167.6



* Calculated using a 4-year average. The Capture Ratio uses the industry standard for measuring costs; which is management fees and carried interest. Partnership expenses and internal administrative costs are captured in Total Costs.

+ Net Asset Value is a quarterly average over the year.

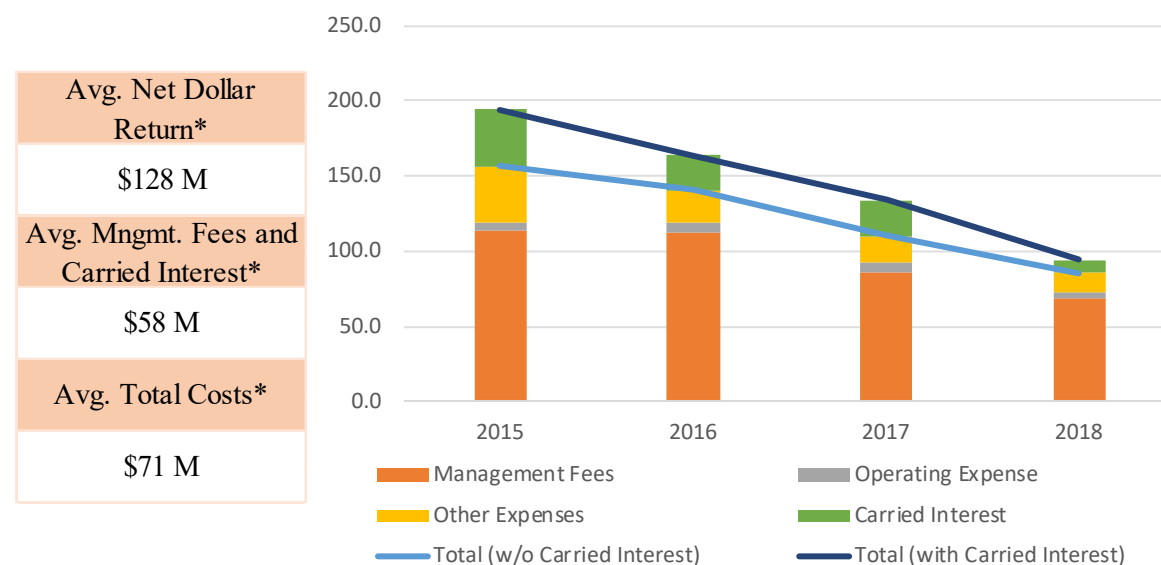
Market Value Allocation



- ▶ A 4-year period is a limited view for real estate investments, which are generally extend beyond this timeframe.
- ▶ Hybrid includes investments where CalSTRS has significant **ownership and control**, leading to a **lower cost structure** relative to other real estate investments.
- ▶ **Management fees remained flat** from year to year.
- ▶ **Carried Interest decreased** indicating a slowdown in realized profits from private investments made over the last several years.

Sustainable Investment & Stewardship Strategies (SISS)

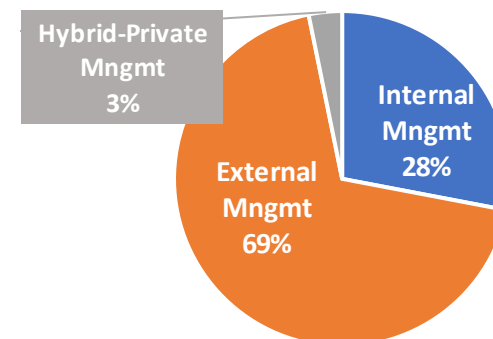
Net Asset Value ⁺ (\$ Billions)				
3% Allocation as of 12/31/18	4.34	4.07	5.70	6.07
BPS	2015	2016	2017	2018
Management Fees	113.7	112.4	85.6	68.6
Operating Expense	5.5	6.9	6.6	4.7
Other Expenses	37.2	21.3	18.4	12.2
Total (w/o Carried Interest)	156.3	140.7	110.6	85.4
Carried Interest	38.0	23.0	23.6	9.0
Total (with Carried Interest)	194.3	163.6	134.2	94.4



* Calculated using a 4year average. Management fees and carried interest are the industry standard for measuring costs. Partnership expenses and internal administrative costs are captured in Total Costs.

⁺ Net Asset Value is a quarterly average over the year.

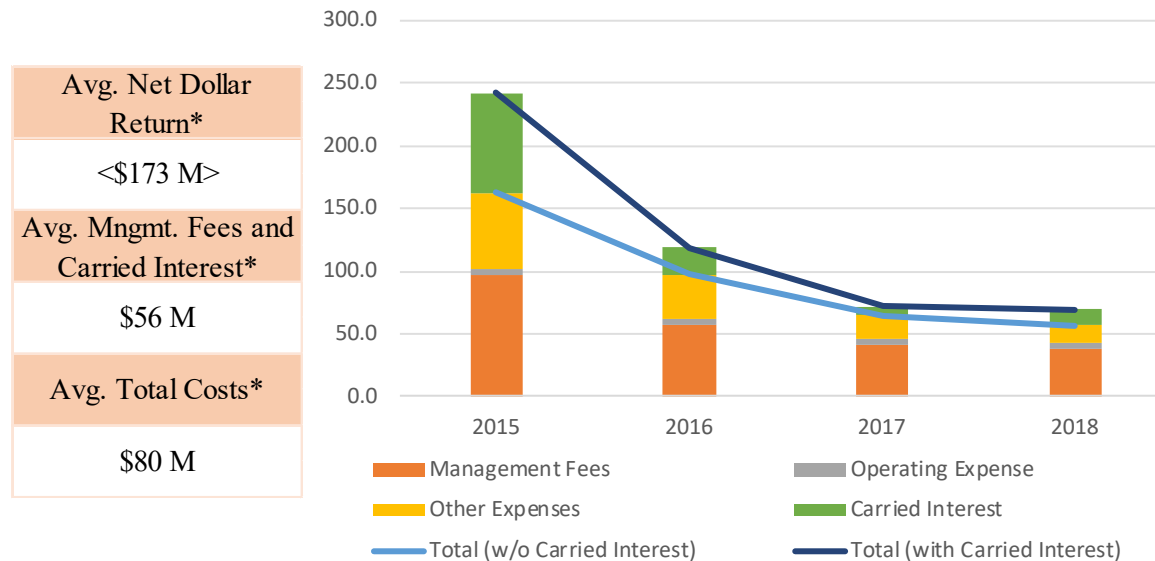
Market Value Allocation



- ▶ SISS currently invests in public market securities across **activist managers** and **sustainability-focused managers**. The activist portfolios are held in limited partnership vehicles, much like private assets.
- ▶ Management fees and **costs decreased significantly for the 3rd straight year**; partly due to an increased allocation to sustainability managers, which have lower fees than activist managers.
- ▶ A 4-year period is a limited view for SISS investments; most managers have investment time horizons and holding periods that extend beyond this timeframe.

Risk Mitigating Strategies

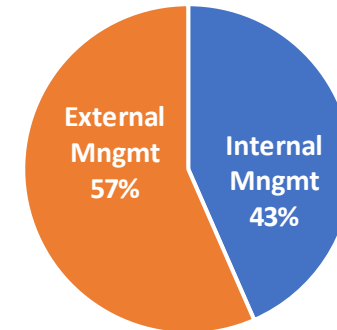
Net Asset Value⁺ (\$ Billions)				
9% Allocation as of 12/31/18				
		1.85	3.77	12.32
				20.64
BPS	2015	2016	2017	2018
Management Fees	97.5	56.8	41.1	37.9
Operating Expense	4.7	5.6	4.7	4.2
Other Expenses	60.4	35.3	19.3	14.7
Total (w/o Carried Interest)	162.6	97.7	65.1	56.8
Carried Interest	79.7	21.3	6.6	12.7
Total (with Carried Interest)	242.3	118.9	71.7	69.6



* Calculated using a 4year average. Management fees and carried interest are the industry standard for measuring costs. Partnership expenses and internal administrative costs are captured in Total Costs.

⁺ Net Asset Value is a quarterly average over the year.

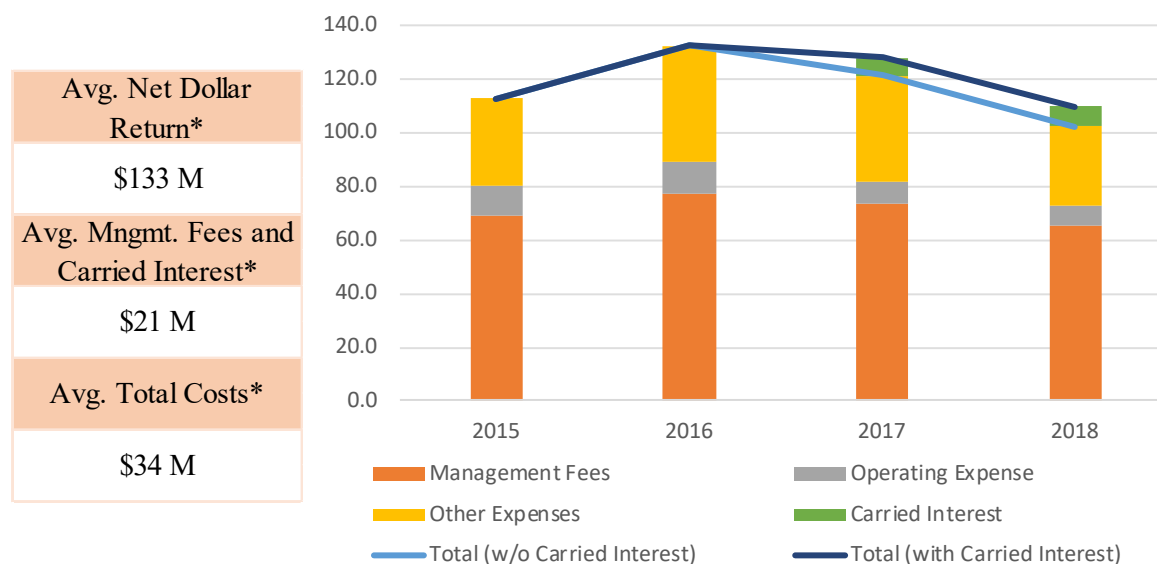
Market Value Allocation



- ▶ The RMS objective is to construct a portfolio that **provides protection to the total plan** during deep and extended equity market downturns.
- ▶ The RMS **allocation has significantly increased** over the last 4 years. As a result, total dollar costs have risen. However, when expressed as a percent of total assets (basis points), costs have stabilized.
- ▶ RMS’ effectiveness and cost-efficiency are best evaluated over a **full market cycle, which typically extends well beyond the 4-year** timeframe depicted here.

Inflation Sensitive

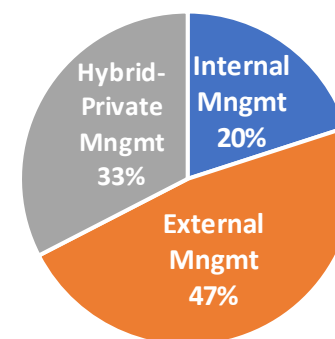
Net Asset Value ⁺ (\$ Billions)				
2% Allocation as of 12/31/18	1.66	1.92	3.29	4.48
BPS	2015	2016	2017	2018
Management Fees	68.9	77.0	73.5	65.3
Operating Expense	11.1	12.0	7.8	7.6
Other Expenses	32.7	43.4	39.9	29.1
Total (w/o Carried Interest)	112.7	132.4	121.2	102.1
Carried Interest	0.0	0.0	6.6	7.5
Total (with Carried Interest)	112.7	132.4	127.8	109.5



* Calculated using a 4year average. Management fees and carried interest are the industry standard for measuring costs. Partnership expenses and internal administrative costs are captured in Total Costs.

+ Net Asset Value is a quarterly average over the year.

Market Value Allocation

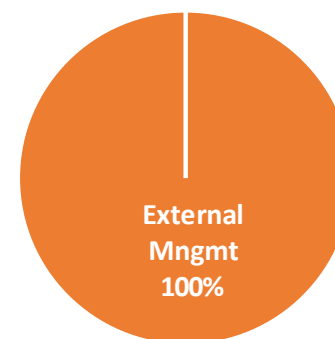


- ▶ **Carried interest increased slightly** from 2017 as managers continued to earn performance incentives.
- ▶ The **allocation increased** from 2017 to 2018 bringing down the cost basis points per NAV

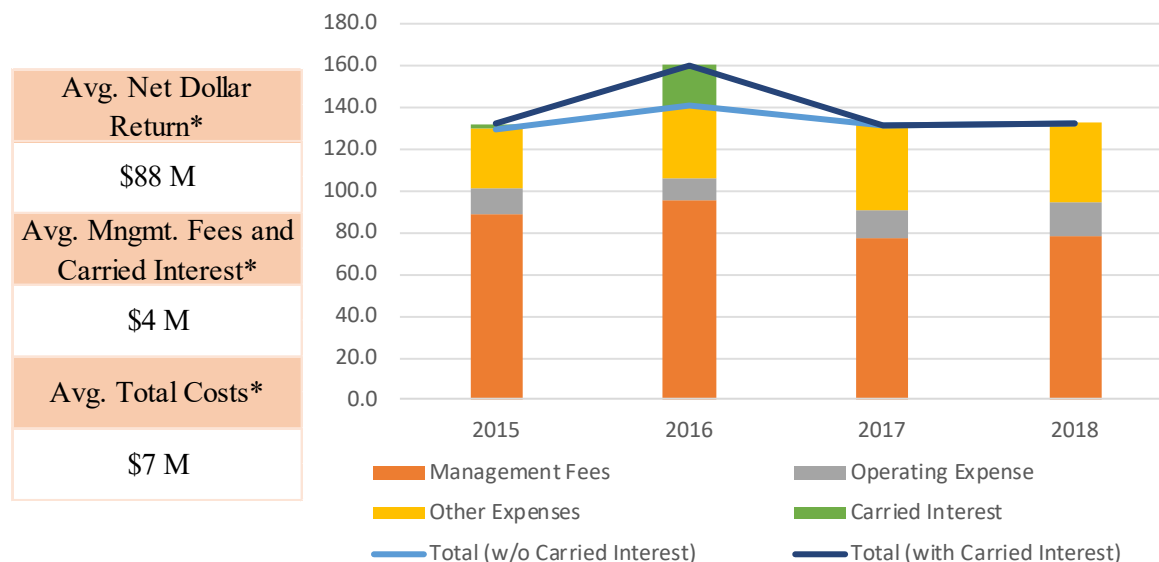
Innovative Strategies

Net Asset Value ⁺ (\$ Billions)				
~0% Allocation as of 12/31/18				
	0.45	0.50	0.44	0.51
BPS	2015	2016	2017	2018
Management Fees	88.5	95.1	76.8	77.8
Operating Expense	12.8	11.2	13.9	16.4
Other Expenses	28.1	33.9	40.8	38.0
Total (w/o Carried Interest)	129.4	140.2	131.5	132.2
Carried Interest	2.2	19.9	0.0	0.0
Total (with Carried Interest)	131.6	160.1	131.5	132.2

Market Value Allocation



- ▶ Costs remained stable from last year, but can fluctuate over time relative to the types of strategies that make up the portfolio



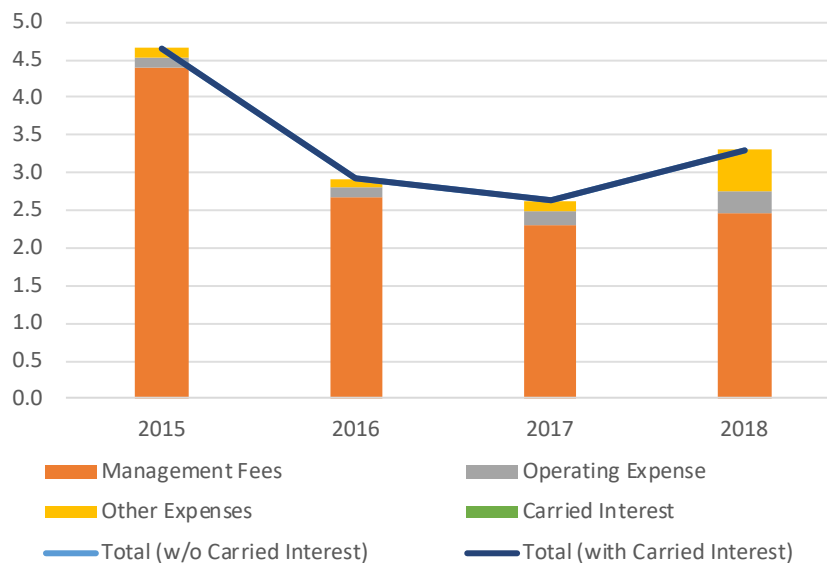
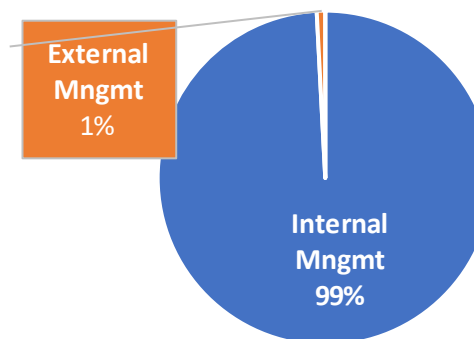
* Calculated using a 4year average. Management fees and carried interest are the industry standard for measuring costs. Partnership expenses and internal administrative costs are captured in Total Costs.

+ Net Asset Value is a quarterly average over the year.

Strategic Overlay

Net Asset Value ⁺ (\$ Billions)				
~0% Allocation as of 12/31/18				
	0.16	0.09	0.44	0.99
BPS	2015	2016	2017	2018
Management Fees	4.4	2.7	2.3	2.5
Operating Expense	0.1	0.1	0.2	0.3
Other Expenses	0.1	0.1	0.2	0.6
Total (w/o Carried Interest)	4.7	2.9	2.6	3.3
Carried Interest	0.0	0.0	0.0	0.0
Total (with Carried Interest)	4.7	2.9	2.6	3.3

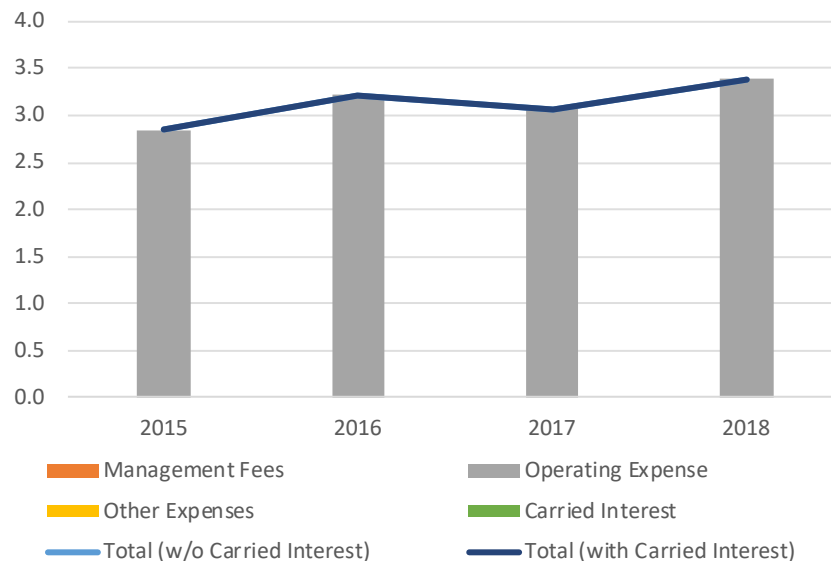
Market Value Allocation



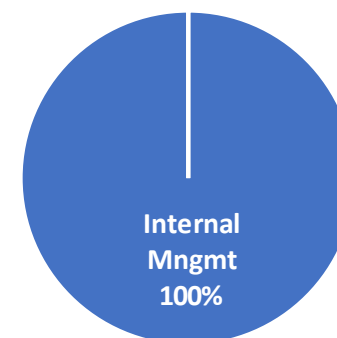
⁺ Net Asset Value is a quarterly average over the year.

Cash / Liquidity

Net Asset Value ⁺ (\$ Billions)				
2% Allocation as of 12/31/18				
	4.23	4.77	4.15	3.83
BPS	2015	2016	2017	2018
Management Fees	0.0	0.0	0.0	0.0
Operating Expense	2.8	3.2	3.1	3.4
Other Expenses	0.0	0.0	0.0	0.0
Total (w/o Carried Interest)	2.8	3.2	3.1	3.4
Carried Interest	0.0	0.0	0.0	0.0
Total (with Carried Interest)	2.8	3.2	3.1	3.4



Market Value Allocation

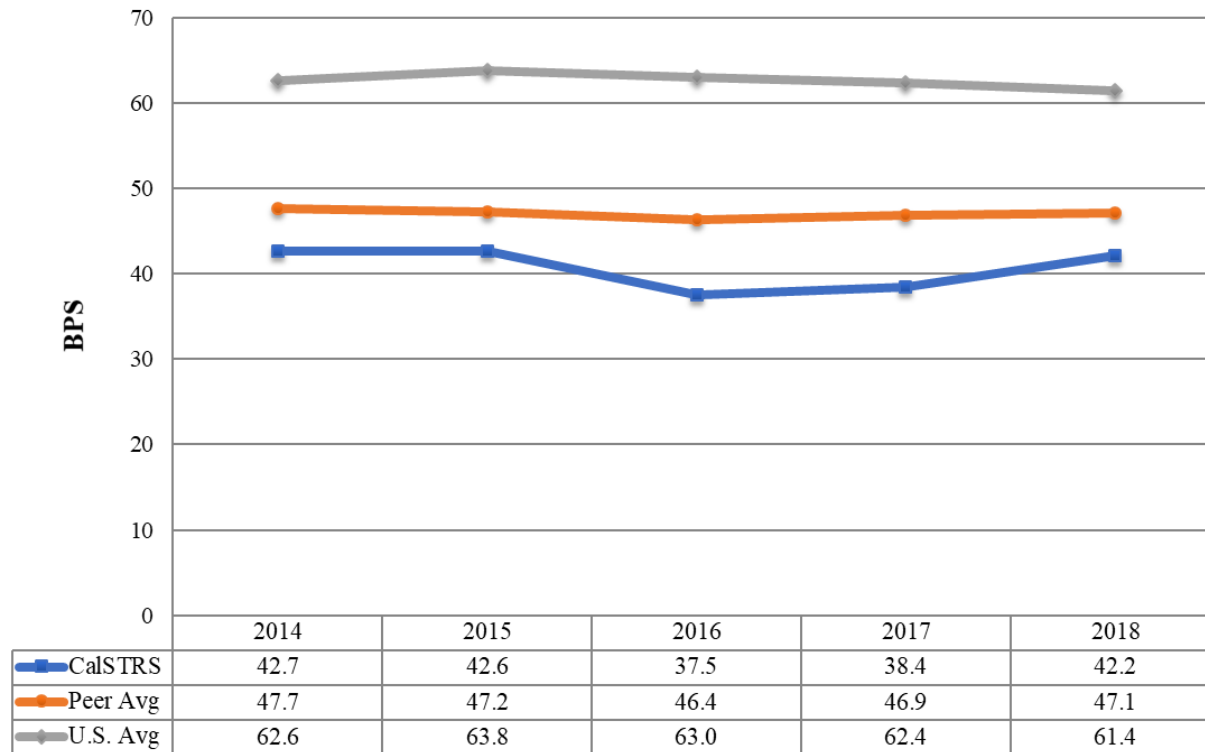


⁺ Net Asset Value is a quarterly average over the year.

Peer Comparison (Developed by third party cost measurement service provider¹)

Trend in Total Investment Cost²

Investment costs, excluding transaction costs and carried interest, increased relative to the previous two years due to public market strategy changes and increasing allocations toward private assets. Trend analysis includes 48 U.S. Public Funds and 15 global peer funds with 5 or more consecutive years of data.



¹ Data collected and compiled by CEM Benchmarking, Inc. for calendar year 2018.

² For data prior to 2016, underlying fund of fund fees based on peer median data with a default rate applied to CalSTRS. To the extent that peers adjust prior years' data and/or there is a change in peer group, CalSTRS prior years' costs may be different from what was previously reported by CEM.

Internal / External Management Costs & Private / Public Market Costs (\$ in millions)

Internal Management Costs

Asset Class/ Investment Strategy	Net Asset Value	Ending Market Allocation	Manager Fee	Operating Expense	Other Expenses	Total Expense	2018 Basis Points	2017 Basis Points
Public Market Costs								
Global Equity	59,116	26%	0	17	0	17	2.9	2.8
Fixed Income	23,348	10%	0	9	0	9	3.9	3.5
Inflation Sensitive	896	0%	0	1	0	1	6.8	6.2
Risk Mitigating Strategies	8,969	4%	0	3	0	3	3.3	3.2
Strategic Overlay ¹	978	0%	0	1	2	3	0.9	0.4
SISS	1,699	1%	0	1	0	1	4.1	5.5
Cash/Liquidity	3,830	2%	0	1	0	1	0.9	3.1
Total	\$ 98,837	44%	\$ -	\$ 32	\$ 2	\$ 35	3.5	3.2
Total Internal Mgt.	\$ 98,837	44%	\$ -	\$ 32	\$ 2	\$ 35	3.5	3.2

Hybrid-Private Management Costs

Asset Class/ Investment Strategy	Net Asset Value	Ending Market Allocation	Manager Fee	Operating Expense	Other Expenses	Total Expense	2018 Basis Points	2017 Basis Points
Private Market Costs								
Real Estate	19,900	9%	110	12	103	226	113.3	126.1
Private Equity	1,594	1%	1	1	1	4	23.5	26.3
Inflation Sensitive	1,459	1%	7	1	4	12	82.9	72.2
SISS	194	0%	0	0	0	0	17.9	56.6
Total	\$ 23,148	10%	\$ 118	\$ 15	\$ 109	\$ 242	104.4	115.3
Total Hybrid-Private Mgt.	\$ 23,148	10%	\$ 118	\$ 15	\$ 109	\$ 242	104.4	115.3

External Management Costs								
Asset Class/ Investment Strategy	Net Asset Value	Ending Market Allocation	Management Fee	Operating Expense	Other Expenses	Total Expense	2018 Basis Points	2017 Basis Points
Public Market Costs								
Global Equity	53,901	24%	152	17	22	191	35.4	25.6
Fixed Income	4,390	2%	11	2	0	13	29.4	28.5
Inflation Sensitive	250	0%	1	0	0	1	52.1	
Strategic Overlay ¹	8	0%	8	0	0	8	22.5	17.5
Total	\$ 58,549	26%	\$ 171	\$ 19	\$ 23	\$ 213	36.3	25.8
Private Market Costs								
Real Estate	9,474	4%	94	6	70	170	179.3	148.1
Private Equity	17,464	8%	258	13	126	397	227.3	228.9
Inflation Sensitive	1,873	1%	21	1	9	32	169.2	206.0
Risk Mitigating Strategies	11,675	5%	78	6	30	114	97.9	107.7
Innovative Strategies	508	0%	4	1	2	7	132.2	131.5
SISS ²	4,175	2%	42	2	7	51	121.7	147.7
Total	\$ 45,169	20%	\$ 497	\$ 29	\$ 244	\$ 770	170.6	175.5
Total External Mgt.	\$ 103,718	46%	\$ 669	\$ 47	\$ 267	\$ 983	94.8	201.3
Total Public Market	\$ 157,386	70%	\$ 171	\$ 51	\$ 25	\$ 247	15.7	29.0
Total Private Market	\$ 68,317	30%	\$ 616	\$ 44	\$ 353	\$ 1,012	148.2	290.8
Grand Total	\$ 225,703	100%	\$ 787	\$94	\$ 378	\$ 1,260	55.8	319.8

¹ Net Asset Value reflects gains / (losses) on notional values and uses notional values for calculating basis points for currency management

² Includes approximately \$1 billion in Sustainability Managers