

PENNSYLVANIA SERS



**REAL ESTATE SEMI-ANNUAL
PERFORMANCE REVIEW (4Q19)**

June 9, 2020



BOSTON | ATLANTA | CHARLOTTE | CHICAGO | DETROIT | LAS VEGAS | PORTLAND | SAN FRANCISCO

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**1. REAL ESTATE SEMI-ANNUAL
PERFORMANCE REPORT**
AS OF DECEMBER 31, 2019

NEPC, LLC

PORTFOLIO PERFORMANCE SUMMARY

The table below displays trailing time period performance for the Pennsylvania State Employees Retirement System (“PA SERS”) Real Estate Portfolio as of December 31, 2019, along with select benchmarks

- The real estate portfolio had a strong trailing 1-year return, generating a total return of 9.6%, outperforming both the core and non-core benchmarks
- [REDACTED]
- The Plan’s Real Estate Performance is benchmarked against the NCREIF-ODCE Index (pool of open-end core funds) and ThomsonOne Benchmark (pool of closed-end value-add/opportunity funds), the two most widely used indices for real estate benchmarking
- The S&P 500 Index reflects one measure of opportunity cost of investing in real estate versus publicly traded common stocks

Portfolio Performance	YTD	1 Year	3 Year	5 Year	10 Year	Inception
Total Pennsylvania State Employees Retirement System	9.6%	9.6%	3.1%	4.4%	8.5%	7.1%
NFI-ODCE Index¹	4.4%	4.4%	6.1%	8.0%	11.4%	N/A
Thomson-One/Cambridge Real Estate Index²	8.7%	8.7%	10.1%	9.5%	11.1%	N/A
S&P 500 Index	31.5%	31.5%	15.3%	11.7%	13.6%	N/A

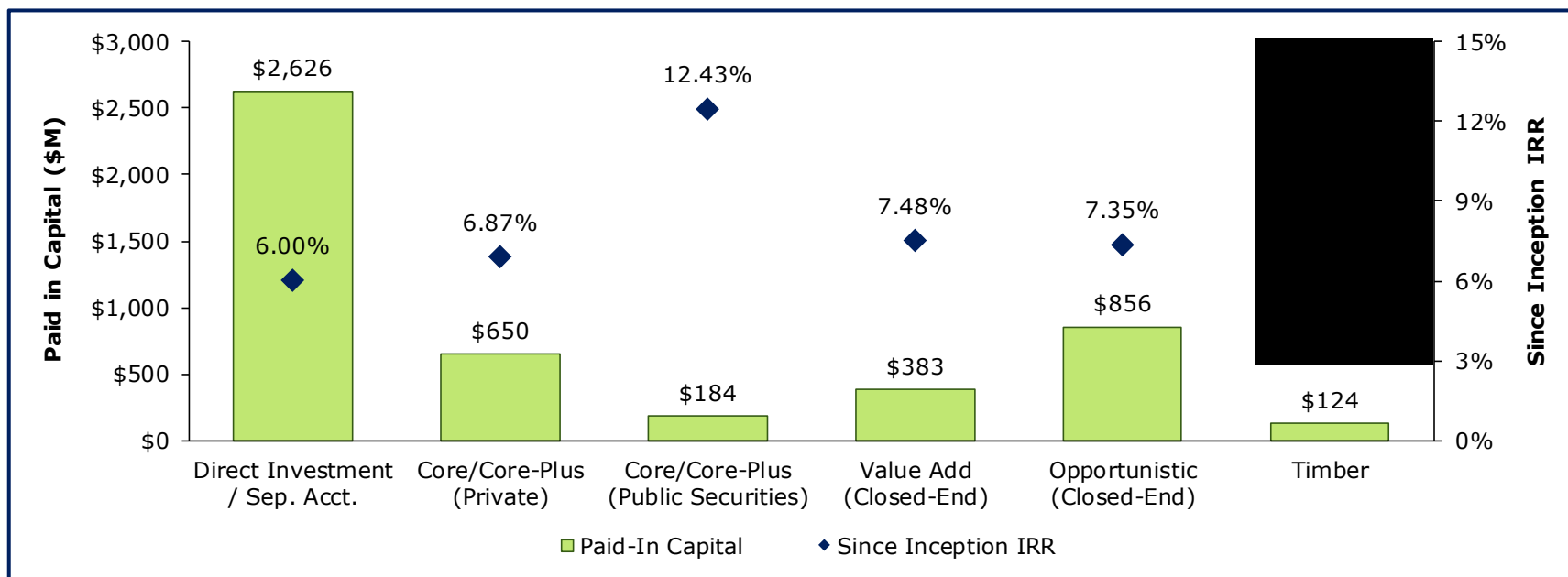
Data as of December 31, 2019. Sources include NCREIF, Thomson-One/Cambridge Associates, Manager data, and NEPC. Additional notes:

1. NFI-ODCE Index represents pooled returns of open-end comingled core funds in the ODCE Index; returns shown are time-weighted, net of fees.
2. Thomson-One/Cambridge Benchmark represents pooled horizon internal rate of return (IRR) calculations, net of fees, across 1,145 real estate funds (including value-add/opportunistic).
3. The timing and magnitude of fund cash flows are integral to the IRR performance. Benchmark indices that are time weighted measures should not be directly compared to dollar-weighted IRR calculations. Index data is continuously updated and is therefore subject to change.
4. Returns shown do not take into account risk/volatility of underlying strategies.



PERFORMANCE BY INVESTMENT STRATEGY

In aggregate, current (active) investments in the portfolio, which are not fully liquidated, can be summarized in the following:



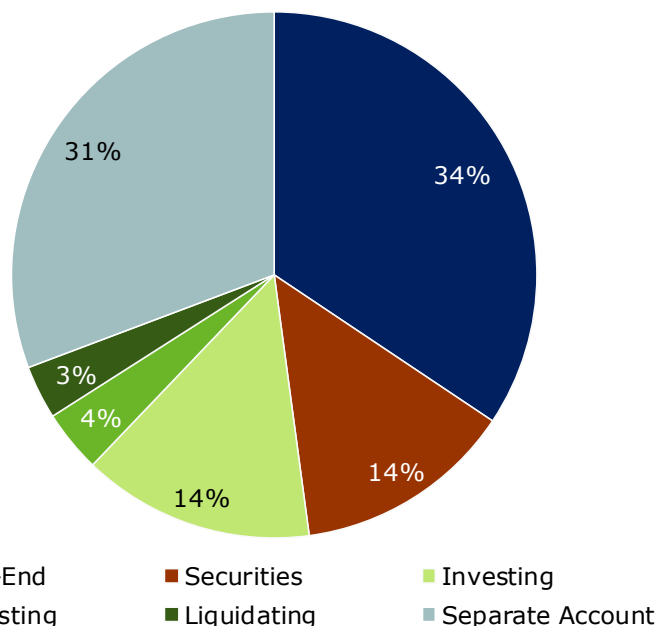
Investment Strategy	Commitment Amount	Paid-In Capital	Capital to be Funded	Cumulative Distributions	Current Valuation	Total Value	Net Gain / (Loss)	Call Ratio	DPI Ratio	TVPI Ratio	IRR (SI)
Direct Investment / Sep. Acct.	2,625,840,320	2,625,840,320	0	3,360,222,358	638,848,526	3,999,070,884	1,368,973,475	100%	1.28	1.52	6.00%
Core/Core-Plus (Private)	1,036,366,955	649,879,713	386,487,242	196,053,735	721,081,403	917,135,138	266,919,832	63%	0.30	1.41	6.87%
Core/Core-Plus (Public Securities)	183,616,773	183,616,773	0	36,168,336	283,340,654	319,508,990	135,892,217	100%	0.20	1.74	12.43%
Value Add (Closed-End)	524,414,747	382,864,824	141,549,923	366,520,292	158,046,008	524,566,300	125,630,231	73%	0.92	1.31	7.48%
Opportunistic (Closed-End)	1,217,580,179	880,634,979	336,945,200	985,998,723	290,347,285	1,276,346,008	379,588,252	72%	1.10	1.42	7.35%
Timber	124,231,969	124,231,969	0	242,667,376				100%			
Total (Active Funds)	5,712,050,943	4,847,068,578	864,982,365	5,187,630,821				85%			



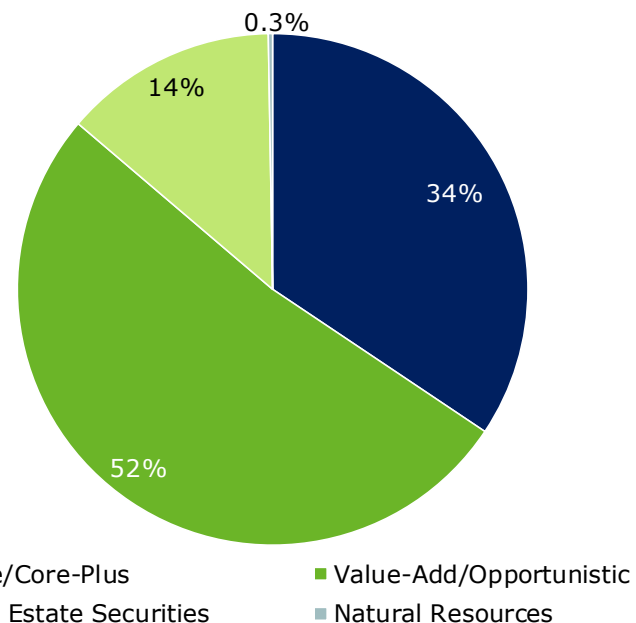
Data as of December 31, 2019. Liquidated investments not shown. Returns shown do not take into account risk/volatility of underlying strategies. Please see the footnote on page 24 pertaining to the remaining "Capital to be Funded."

PORTFOLIO COMPOSITION

Allocation by Structure & Lifecycle



Allocation by Strategy



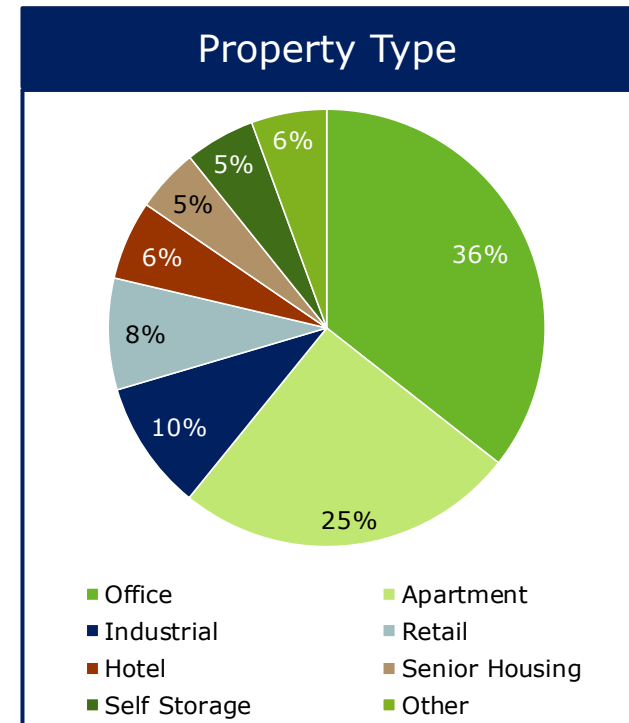
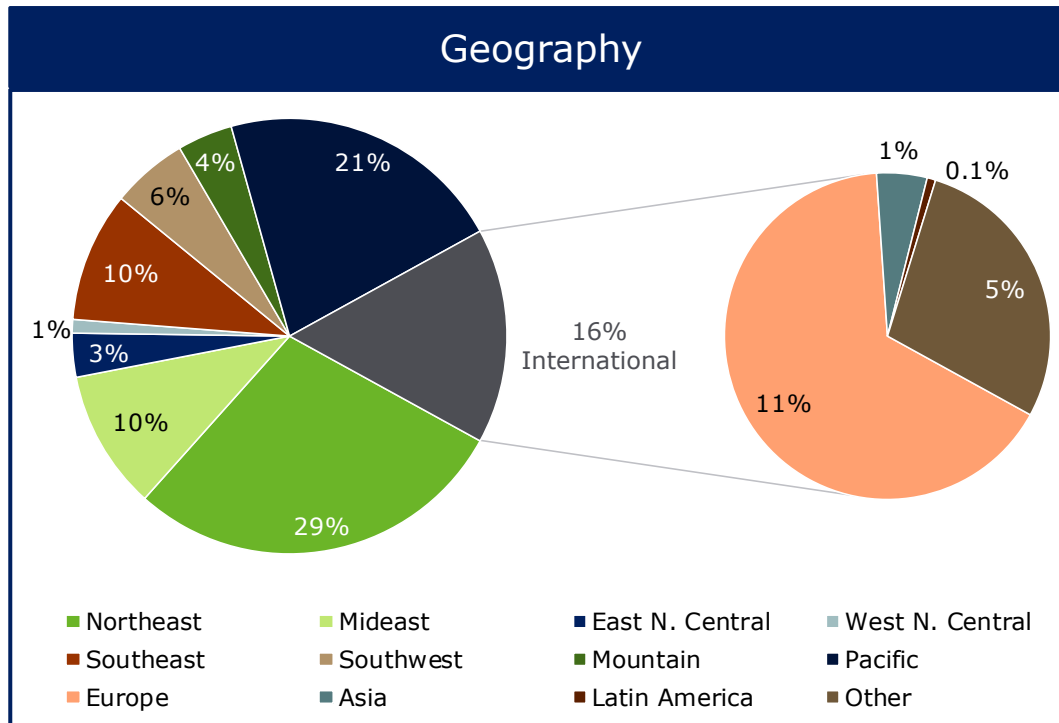
Investment Structure / Lifecycle Stage	Commitment Amount	Paid-In Capital	Capital to be Funded	Cumulative Distributions	Current Valuation	Total Value	Net Gain / (Loss)	Call Ratio	DPI Ratio	TVPI Ratio	IRR (SI)
Open-End	1,036,366,955	649,879,713	386,487,242	196,053,735	721,081,403	917,135,138	266,919,832	63%	0.30	1.41	6.87%
Securities	183,616,773	183,616,773	0	36,168,336	283,340,654	319,508,990	135,892,217	100%	0.20	1.74	12.43%
Investing	711,248,057	272,806,076	438,441,981	15,432,010	298,855,414	314,287,424	36,770,790	38%	0.06	1.13	9.41%
Harvesting	164,663,402	151,290,558	13,372,844	186,542,355	80,379,849	266,922,204	113,926,512	77%	1.22	1.74	15.66%
Liquidating	866,083,467	839,403,169	26,680,298	1,150,544,650				97%	1.33		
Separate Account	2,750,072,289	2,750,072,289	0	3,602,889,734	644,591,278	4,247,481,012	1,493,151,634	100%	1.31	1.54	6.00%
Total (Active Funds)	5,712,050,943	4,847,068,578	864,982,365	5,187,630,820				85%	1.06		



Data as of December 31, 2019. Returns shown do not take into account risk/volatility of underlying strategies. Please see the footnote on page 24 pertaining to the remaining "Capital to be Funded."

PORTFOLIO DIVERSIFICATION

- The Pennsylvania SERS real estate portfolio is broadly diversified by property type and geography within the U.S.
- Staff and NEPC have intentionally grown the portfolio’s international exposure in recent years
 - 16% of the portfolio is now invested outside the US, with the majority in Europe

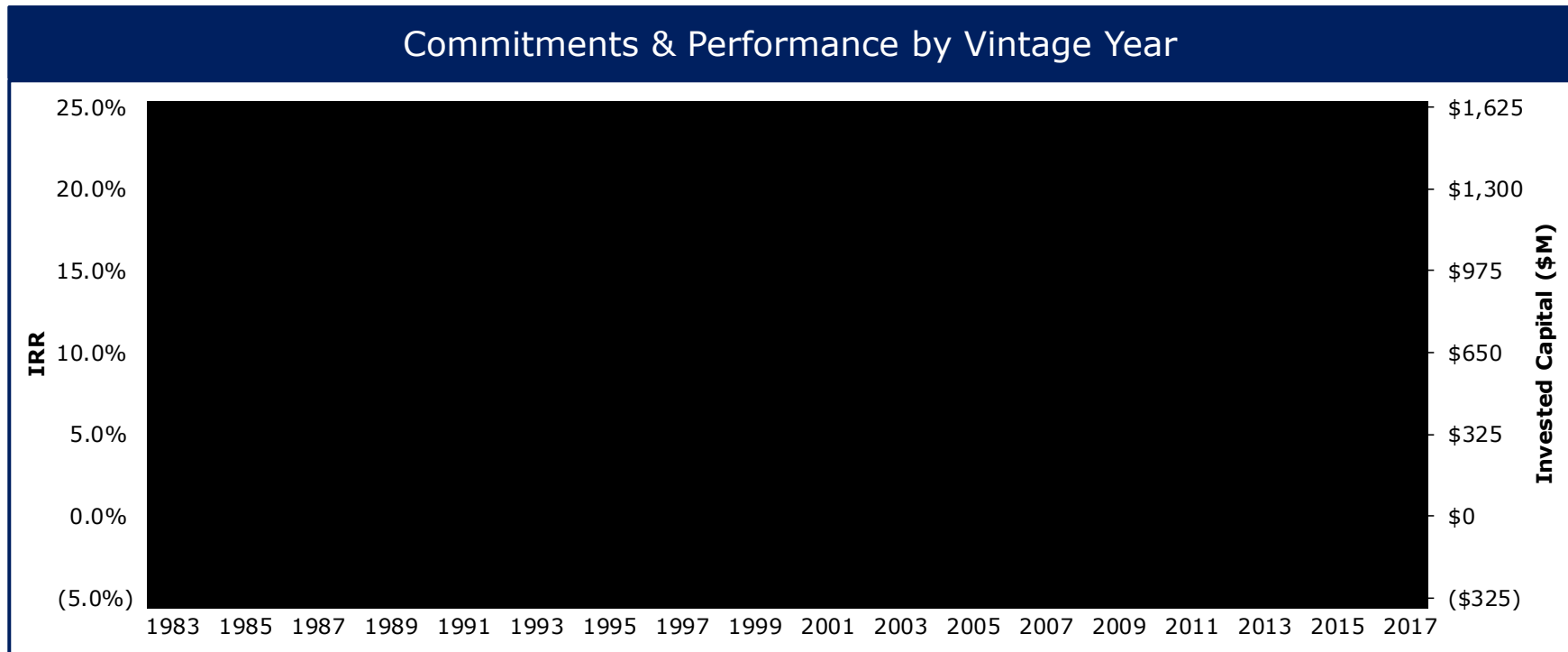


Data as of December 31, 2019. Breakouts provided by Managers.

HISTORICAL PERFORMANCE BY VINTAGE

The following chart illustrates capital invested and inception-to-date performance by vintage year as of December 31, 2019

- Inconsistent pacing has negatively impacted portfolio performance
- Staff and NEPC are focused on maintaining a consistent investment pacing schedule to mitigate the risk of heavy capital investments in poor vintage years



Data as of December 31, 2019. Notes:

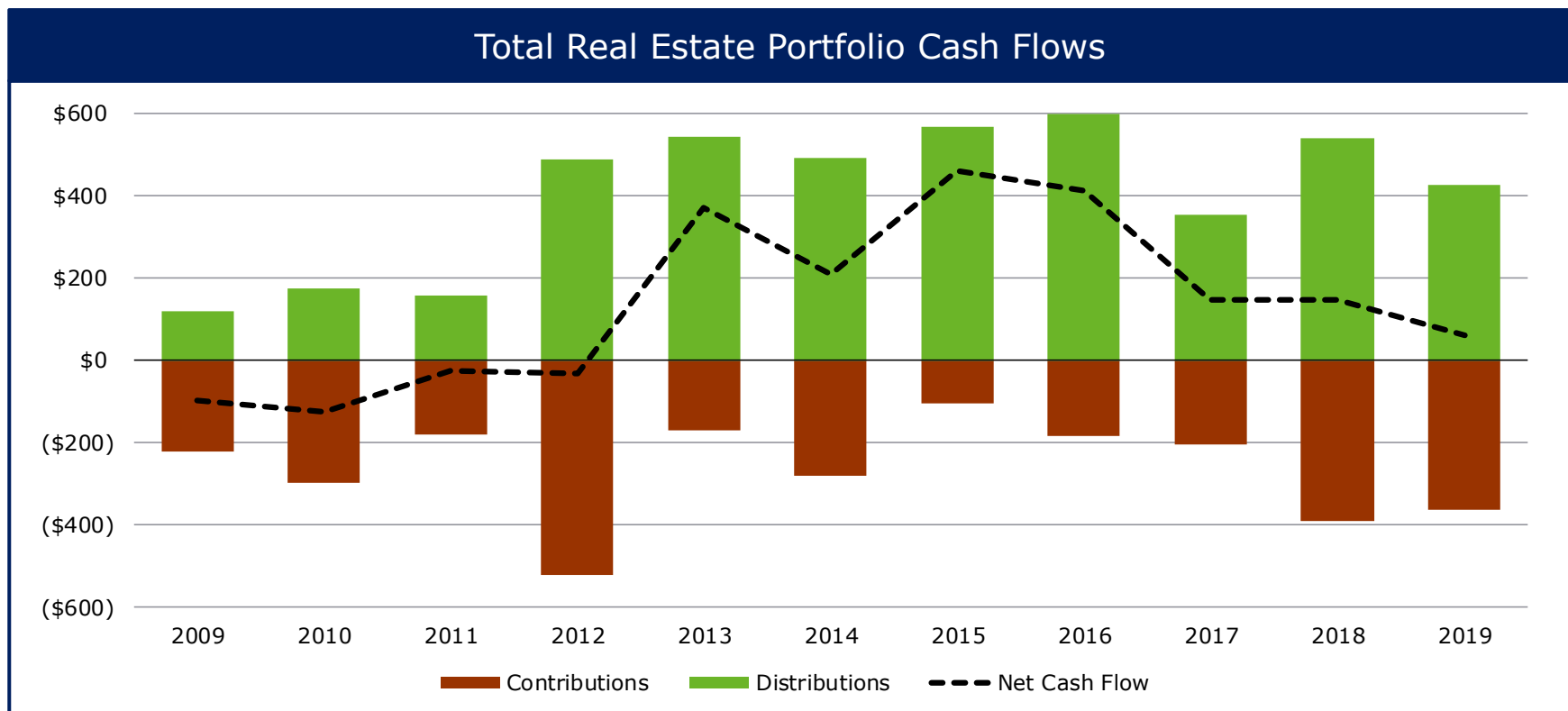
1. Vintage years 2017 and later are excluded as data is less meaningful.
2. For separate accounts, the date of initial commitment or investment is used as the vintage year.



10-YEAR CASH FLOWS

The chart below illustrates the capital invested, distributed, and net cash flows for the real estate portfolio over the past 10 calendar years

- The portfolio has been cash flow positive since 2013
- Drawdowns have increased in recent years, a trend which may continue in the near-term as recent commitments will call capital and the portfolio continues to grow



Data as of December 31, 2019. Offsetting cash flows have been excluded, such as assets that were transferred from one account to another.

2. REAL ESTATE PORTFOLIO CONSTRUCTION UPDATE

NEPC, LLC

2020 REAL ESTATE PORTFOLIO UPDATE

- **During 2019, staff and NEPC continued building the real estate portfolio, following several themes and initiatives:**
 - Focusing on strategic partnerships with high quality managers
 - Expanding the allocation to real estate outside the US
 - Favoring core-plus strategies over core
 - Allocating to attractive niche sectors
- **In late 2019, the target allocation to real estate was decreased to 8%**
 - As a result, the sizing of commitments going forward will be reduced
- **In 2020, Staff and NEPC anticipate most activity being focused on the value-add and opportunistic segments of the portfolio**
- **NEPC and Staff will continue to evaluate both re-ups with existing strategic partners and potential new relationships**
 - The first commitment made in 2020 was to Oak Street Real Estate Capital Fund V, continuing a strategic relationship
 - There may be attractive opportunities resulting from the evolving market environment
- **Exposures to core, core-plus, and REITs will also be monitored and rebalanced (as necessary)**

PORTFOLIO ACTIVITY SUMMARY

Real Assets Portfolio Sub-Strategy	Core/Core Plus	Value-Add/ Opportunistic	Real Estate Securities	Real Assets (Timber, Infrastructure, etc.)
Return Profile	Income Driven	Income + Capital Appreciation	Income + Capital Markets	Various
Current Exposure (NAV) (as of 12/31/19)	34%	52%	14%	< 1%
Current Target Allocation	35% +/- 20%	55% +/- 15%	10% +/- 10%	0-20%
2020 YTD Activity	Maintained allocation Capital calls continue for recent commitments	Oak Street Real Estate Capital Fund V (\$50M)	Maintained allocation	Timber portfolio liquidation continued
Anticipated 2020 Activity	Staff and NEPC will evaluate the current portfolio and consider rebalancing as necessary	Staff and NEPC will continue to evaluate existing strategic relationships and potential new managers	Maintain allocation, rebalance if necessary	Removed from real estate asset class; liquidation continues

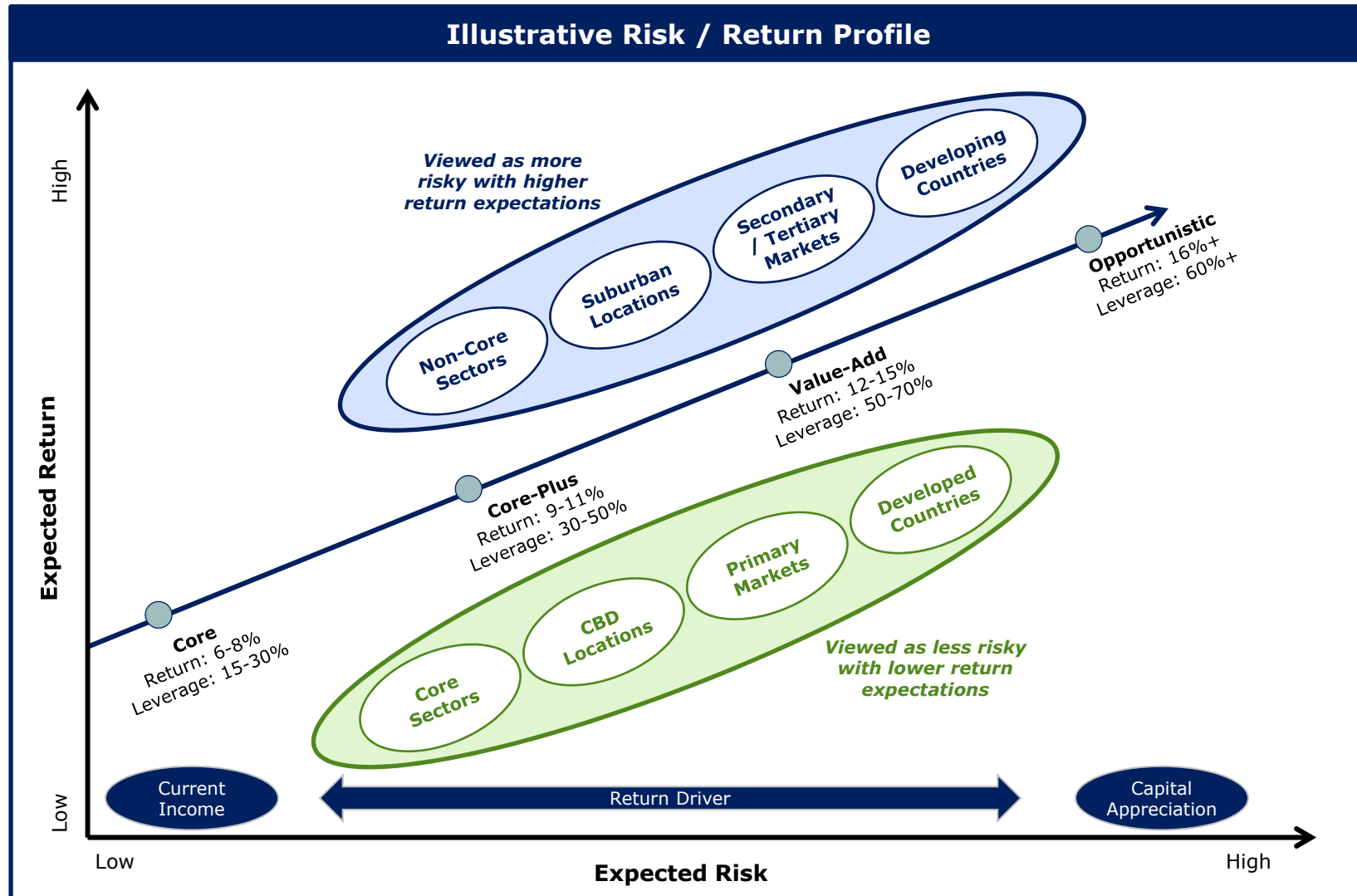


SPECTRUM OF REAL ESTATE INVESTMENT STRATEGIES

	Real Estate Investment Style / Overview	Investment Strategy	Portfolio Role	Considerations
Core Strategies	Core / Core-Plus <ul style="list-style-type: none"> Return driver: income Primary vehicle: open-end funds Historical avg. returns: 7-8% / 8%-10% Leverage: 15-40% / 40%-50% Hold period: long-term 	Stabilized income producing assets	<ul style="list-style-type: none"> Current income Broad exposure to commercial real estate (asset class beta) Inflation protection 	<ul style="list-style-type: none"> Vehicles are semi-liquid (entrance/exit queues) Limited alpha producing opportunities
	RE Securities <ul style="list-style-type: none"> Return driver: income Primary vehicle: REIT funds Historical avg. returns: 7-9% Leverage: 30-50% Hold period: long-term 	Stabilized income producing assets	<ul style="list-style-type: none"> Current income (dividends) Long-term exposure to commercial real estate (beta) Long-term inflation protection 	<ul style="list-style-type: none"> Volatility Equity correlation
Non-Core Strategies	Value-Add <ul style="list-style-type: none"> Return driver: income/appreciation Primary vehicle: varies Historical avg returns: 8-10% Leverage: 40-70% Hold period: 3-5 years 	Properties requiring lease-up, repositioning, renovation or rehabilitation	<ul style="list-style-type: none"> Provides part current income and capital appreciation Some inflation protection 	<ul style="list-style-type: none"> Vehicles are semi-liquid or illiquid Vintage year is important Higher leverage vs core Poor benchmarks
	Opportunistic <ul style="list-style-type: none"> Return driver: appreciation Primary vehicle: closed-end funds Historical avg. returns: 10-12% Leverage: 60%+ Hold period: varies 	Distressed investments, recapitalizations, development, etc.	<ul style="list-style-type: none"> Real estate alpha through capital appreciation with minimal current income 	<ul style="list-style-type: none"> Vehicles are illiquid Vintage year is important High leverage Poor benchmarks



RELATIVE EXPECTED RISK RETURN PROFILE



Notes:

- Debt-related strategies can span the illustrative risk / return spectrum depending on the specific strategy
- Manager-specific risk, operations and leverage can skew expected risk / return profile



3. COVID-19 IMPACT ON REAL ESTATE MARKETS

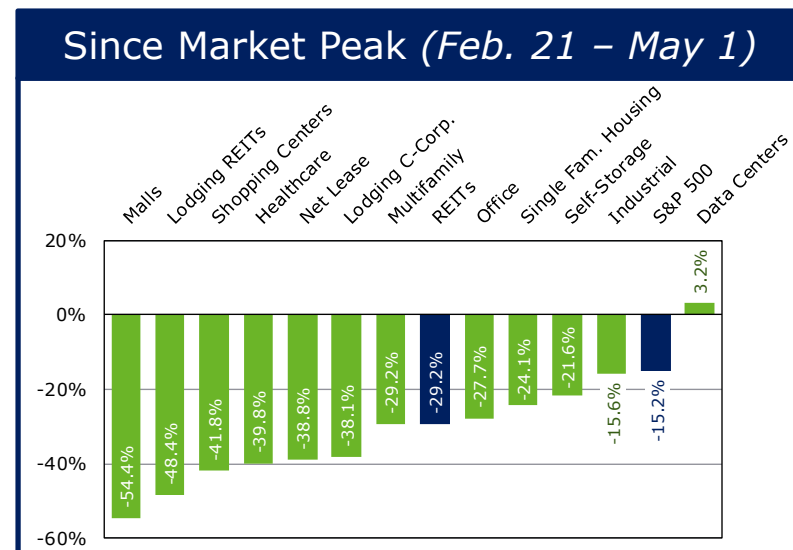
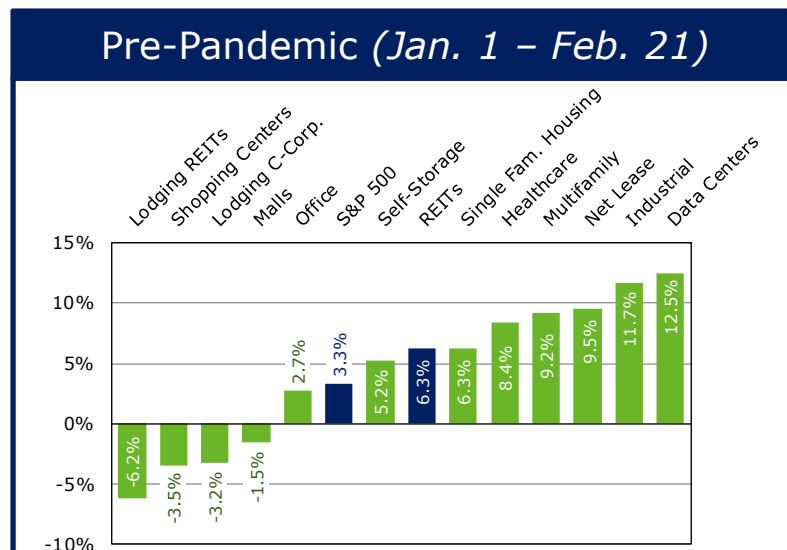
NEPC, LLC

SUMMARY

- **Many recent commitments made by SERS should benefit from the following themes:**
 - Strategies with in-place durable cash flow have held up better so far
 - Demographic-driven sectors should outperform GDP-driven sectors
 - Global diversification should be beneficial, as recovery will likely be staggered by region
- **For existing investments, the impact has varied dramatically by property type**
 - Other factors include occupancy and tenant mix
- **Distress likely to create new opportunities as market evolves over coming quarters**
 - Uncertainty in the market tends to result in opportunities meaning that it should make for an attractive time to deploy new capital in private markets
- **The current market environment is murky**
 - Limited price discovery so far since real estate transaction activity has ground to a near-halt as investors await clarity on economic recovery
 - Construction activity (including value-add improvements) largely delayed or halted; absorption will slow but its still unclear how much and for how long
- **Several “unknowns” remain:**
 - Trajectory of economic recovery
 - Potential changing preferences among users of real estate
 - Fund flows into/out of real estate and the impact on pricing (cap rates up or down?)

REITS SIGNAL SECTOR WINNERS (& LOSERS)

- **REIT (publicly traded real estate) markets highlight the winners and losers among property types:**
 - Malls, lodging, and gaming have performed the worst (for obvious reasons)
 - Healthcare REITs have performed poorly, driven largely by negative sentiment on senior housing, while medical office should hold up better
 - Secular winners are likely to include data centers, self-storage, and industrial assets
 - Apartments, single family housing, and manufactured housing should hold up reasonably well, though some tenants may be unable to pay rent in the near-term
- **It is important to note that the magnitude of losses and volatility seen in REITs are not expected to result in comparable losses in private markets, however**
 - REITs tend to be volatile and correlated with public equities in the short-term



Source: Goldman Sachs, Bloomberg. Data as of May 1, 2020.

BUSINESS IMPACT BY PROPERTY TYPE

Property Type	Impact	Comments
Office	Low	<ul style="list-style-type: none"> Leasing activity has slowed Office tenants largely still paying rent; layoffs or bankruptcies likely to have longer-term impacts Trend towards more remote working or flexible schedules likely to accelerate, may slow demand growth over long-term, may be partially offset by increasing space per employee (from historical lows)
Multifamily	Low	<ul style="list-style-type: none"> “Virtual leasing” taking place; more tenants opting to renew leases vs. moving Tenant make-up is a factor in rent collections; more affluent tenants are more likely to still have income while workforce housing tenants may have more trouble paying rent Many jurisdictions have forbidden evictions due to missed rent
Industrial	Low	<ul style="list-style-type: none"> Assets linked to e-commerce or essential goods likely to see demand growth Assets tied to traditional/discretionary retail will be more challenged Over long-term, demand for industrial likely to remain strong as e-commerce growth continues and some industries may move more manufacturing onshore
Retail	Severe	<ul style="list-style-type: none"> Grocery, pharmacy, and quick-service restaurants holding up well, all other retail are suffering greatly (and in many cases are closed entirely) Malls and other large-format retail centers were already facing challenges; traditional retailer decline will accelerate as a result of COVID-19 E-commerce competition challenges recovery for traditional retailers
Hotel	Severe	<ul style="list-style-type: none"> Hotel occupancy and revenue down 50-90% depending on type and location Many hotels have closed in response; re-opening should be fairly quick process when appropriate, but return to pre-pandemic revenue and profitability likely to take years
Senior Housing	Moderate	<ul style="list-style-type: none"> Senior housing sector under close scrutiny given dense populations of high-risk individuals Restricting non-essential visitors, limiting tenant interactions, and strict cleaning measures have been focus points Leasing vacant space and growing cash flows will be a challenge in the near-term Aging population should continue to fuel demand over long-term, though consumer worries over safety may be a risk

LOOKING FORWARD

- **Real estate recovery will depend on the trajectory of recovery for the broader economy**
- **Vintage years during and following recessions tend to produce strong private market fund returns**
- **Some sectors will hold up better through the pandemic; several “unknowns” remain within real estate:**
 - What will rent collections look like for May, June, and beyond?
 - How will lenders work with borrowers, what does it mean for broader debt markets?
 - How much capital will flow into or out of real estate?
 - Global rates expected to remain low which is likely to stimulate flows into cash flowing assets
 - How will preferences change among users of real estate?
 - Will more office workers work from home?
 - Will high-density urban living become less desirable?
 - Will companies increase inventory volumes on-hand in fear of supply chain disruption?
- **Attractive investment opportunities are expected to emerge**
 - Limited opportunities so far since transaction volume has mostly halted
 - Near-term opportunities may include buying existing debt or public securities
 - Banks and other lenders have shown a willingness (or in some cases have been mandated) to grant loan forbearances and to work with borrowers
 - Depending on the severity and length of economic disruption, the option of “waiting it out” may not be sustainable, resulting in more distressed transactions

APPENDIX 1:
INVESTMENT LEVEL PERFORMANCE
AS OF DECEMBER 31, 2019

NEPC, LLC

ACTIVE INVESTMENTS

Investments			Trailing Period Returns (IRR) %							
Investment Name	Vintage Year	Commitment	(QTD)	(YTD)	(1 Yr)	(3 Yrs)	(5 Yrs)	(7 Yrs)	(10 Yrs)	SI IRR
Activum SG Fund VI L.P.	2019	50,000,000	NM	NM	NM	NM	NM	NM	NM	NM
Activum SG Fund VI Pennsylvania Side-Car L.P.	2019	50,000,000	NM	NM	NM	NM	NM	NM	NM	NM
AG Asia Realty Fund, L.P.	2007	25,000,000								
Apollo Real Estate Investment Fund III, L.P.	1998	50,000,000								
Blackstone Property Partners, L.P.	2017	300,000,000	NM	NM	NM	NM	NM	NM	NM	NM
Blackstone Real Estate Partners IV, L.P.	2003	25,000,000								11.88%
Blackstone Real Estate Partners V, L.P.	2006	50,000,000								10.68%
Blackstone Real Estate Partners VI, L.P.	2007	75,000,000								12.80%
Blackstone Real Estate Partners VII, L.P.	2011	75,000,000								16.32%
Blue Moon Senior Housing II Sidecar L.P.	2019	50,000,000	NM	NM	NM	NM	NM	NM	NM	NM
Blue Moon Senior Housing II, L.P.	2019	50,000,000	NM	NM	NM	NM	NM	NM	NM	NM
BPG Investment Partnership IX, L.P.	2012	25,000,000								
BPG Investment Partnership V, L.P.	1999	25,000,000								
BPG Investment Partnership VI, L.P.	2002	25,000,000								
BPG Investment Partnership VII, L.P.	2005	25,000,000								
BPG Investment Partnership VIII, L.P.	2007	15,588,238								
C-III Recovery Fund III, L.P.	2017	100,000,000	NM	NM	NM	NM	NM	NM	NM	NM
CenterSquare Real Estate Securities	2002	183,616,773	-0.93%	26.68%	26.68%	12.61%	10.86%	12.75%	14.83%	12.43%
Clerestory Small Cap Real Estate Fund I - TE, L.P.	2010	18,000,000								
Colony Investors VIII, L.P.	2007	22,500,000								
Forest Separate Account	1992	124,231,969								
Heitman America Real Estate Trust, L.P.	2007	100,000,000								
Heitman Separate Account	1988	813,635,039								
Henderson Park Enhanced Income Fund, SCSp	2019	300,000,000	NM	NM	NM	NM	NM	NM	NM	NM
HotelAVE Separate Account	2018	59,048,685	NM	NM	NM	NM	NM	NM	NM	NM
LaSalle Separate Account	1994	452,640,455	-1.74%	0.00%	0.00%	7.61%	9.42%	14.21%	15.99%	9.66%
LaSalle Takeover Account	2018	236,217,434	NM	NM	NM	NM	NM	NM	NM	NM
LEM Real Estate High-Yield Debt & Preferred Equity Fund III, L.P.	2013	25,000,000	4.36%	17.75%	17.75%	16.75%	20.06%	24.12%		23.66%
Lowe GTO Separate Account	2012	349,069,212								
Lowe Separate Account	1994	715,229,496								
Lubert-Adler Real Estate Fund VII, L.P.	2014	25,000,000	0.89%	1.99%	1.99%	8.60%	7.40%			6.72%
Mesirov Financial Real Estate Value Fund III, L.P.	2018	25,000,000	NM	NM	NM	NM	NM	NM	NM	NM
Oak Street Real Estate Capital Fund IV, L.P.	2017	100,000,000	NM	NM	NM	NM	NM	NM	NM	NM
Oak Street Real Estate Capital Net Lease Property Fund, L.P.	2018	300,000,000	NM	NM	NM	NM	NM	NM	NM	NM
PLA Residential Fund III, L.P.	2008	29,654,968								
PLA Retail Fund I, L.P.	2006	25,000,000								
Rockpoint Finance Fund I, L.P.	2007	50,000,000								
Rockpoint Real Estate Fund II, L.P.	2005	35,000,000								
Rockpoint Real Estate Fund III, L.P.	2007	50,000,000								
Rockpoint Real Estate Fund V, L.P.	2015	50,000,000								



ACTIVE INVESTMENTS (CONTINUED)

Investments			Trailing Period Returns (IRR) %							
Investment Name	Vintage Year	Commitment	(QTD)	(YTD)	(1 Yr)	(3 Yrs)	(5 Yrs)	(7 Yrs)	(10 Yrs)	SI IRR
Scout Fund I-A, L.P.	2009	75,000,000	3.94%	169.35%	169.35%	2.94%	7.49%	15.87%	19.78%	15.31%
Scout Fund II-A, L.P.	2016	30,000,000	1.24%	11.65%	11.65%	12.00%				7.29%
Senior Housing Partners IV, L.P.	2011	25,000,000								
Senior Housing Partners V, L.P.	2015	50,000,000								
Senior Housing Partners VI, L.P.	2019	100,000,000	NM	NM	NM	NM	NM	NM	NM	NM
SRE Opportunity Fund III Select, L.P.	2018	50,000,000	NM	NM	NM	NM	NM	NM	NM	NM
SRE Opportunity Fund III, L.P.	2018	50,000,000	NM	NM	NM	NM	NM	NM	NM	NM
Starwood Global Opportunity Fund VII-A, L.P.	2006	35,000,000								
Starwood Global Opportunity Fund VIII, L.P.	2009	50,000,000								
Starwood Opportunity Fund VI, L.P.	2001	50,000,000								
Trumbull Property Fund, L.P.	1988	25,558,525	-0.19%	-3.18%	-3.18%	3.82%	6.15%	7.42%	9.53%	6.91%
ValStone Opportunity Fund V, LLC	2014	14,663,402	8.93%	14.60%	14.60%	9.51%	9.65%			9.76%
Westbrook Real Estate Fund V, L.P.	2004	25,000,000	21.50%	41.04%	41.04%	11.55%	19.75%	27.41%	16.85%	43.59%
Westbrook Real Estate Fund VI, L.P.	2006	35,000,000	0.15%	-2.44%	-2.44%	1.37%	-0.32%	15.01%	6.77%	0.24%
Westbrook Real Estate Fund VII, L.P.	2007	50,000,000	-4.84%	-4.63%	-4.63%	-0.67%	3.73%	12.16%	14.06%	2.77%
Westbrook Real Estate Fund VIII, L.P.	2009	50,000,000	-3.88%	-7.04%	-7.04%	1.01%	2.59%	9.18%	11.23%	11.07%
Total										



Data as of December 31, 2019.

NM - Not Meaningful

PERFORMANCE BY STRATEGY

Investments		Commitments		Contributions & Distributions			Valuations			Performance		
Investment Name	Vintage Year	Commitment	Unfunded Commitment	Paid In Capital	Additional Fees	Cumulative Distributions	Valuation	Total Value	Net Benefit	DPI	TVPI	IRR
Core												
Heitman America Real Estate Trust, L.P.	2007	\$100,000,000	\$0	\$100,000,000		\$79,362,861						
Trumbull Property Fund, L.P.	1988	\$25,558,525	\$0	\$25,558,525	\$76,789	\$112,101,075	\$32,677,861	\$144,778,936	\$119,143,622	4.37	5.65	6.91%
Total Core		\$125,558,525	\$0	\$125,558,525		\$191,463,936						
Core Plus												
Blackstone Property Partners, L.P.	2017	\$300,000,000	\$0	\$300,000,000	NM	\$1,744,007	NM	NM	NM	NM	NM	NM
Henderson Park Enhanced Income Fund, GCSp	2019	\$310,808,430	\$121,000,000	\$189,808,430	NM	\$1,773,943	NM	NM	NM	NM	NM	NM
Oak Street Real Estate Capital Net Lease Property Fund, L.P.	2018	\$300,000,000	\$265,487,242	\$34,512,758	NM	\$1,071,850	NM	NM	NM	NM	NM	NM
Total Core Plus		\$910,808,430	\$386,487,242	\$524,321,188		\$4,589,800						
Direct Investment												
Heitman Separate Account	1988	\$813,635,039	\$0	\$813,635,039		\$1,092,759,873						
HotelAVE Separate Account	2018	\$59,048,685	\$0	\$59,048,685	NM	\$19,191,396	NM	NM	NM	NM	NM	NM
LaSalle Separate Account	1994	\$452,640,455	\$0	\$452,640,455		\$778,848,456	\$183,584,962	\$962,433,418	\$506,732,385	1.71	2.11	9.66%
LaSalle Takeover Account	2018	\$236,217,434	\$0	\$236,217,434	NM	\$28,593,427	NM	NM	NM	NM	NM	NM
Lowe GTO Separate Account	2012	\$349,069,212	\$0	\$349,069,212		\$369,841,373						
Lowe Separate Account	1994	\$715,229,496	\$0	\$715,229,496		\$1,070,987,833						
Total Direct Investment		\$2,625,840,320	\$0	\$2,625,840,320		\$3,360,222,358						
REIT												
CenterSquare Real Estate Securities	2002	\$183,616,773	\$0	\$183,616,773		\$36,168,336	\$283,340,654	\$319,508,990	\$135,892,217	0.20	1.74	12.43%
Total REIT		\$183,616,773	\$0	\$183,616,773		\$36,168,336						
Timber												
Forest Separate Account	1992	\$124,231,969	\$0	\$124,231,969		\$242,667,376						
Total Timber		\$124,231,969	\$0	\$124,231,969		\$242,667,376						
Value Add												
Blue Moon Senior Housing II Sidecar L.P.	2019	\$50,000,000	\$50,000,000	\$0	NM	\$0	NM	NM	NM	NM	NM	NM
Blue Moon Senior Housing II, L.P.	2019	\$50,000,000	\$50,000,000	\$0	NM	\$0	NM	NM	NM	NM	NM	NM
BPG Investment Partnership IX, L.P.	2012	\$25,000,000	\$696,591	\$24,303,409		\$36,150,315						
BPG Investment Partnership V, L.P.	1999	\$24,136,964	\$0	\$24,136,964		\$43,947,583						
BPG Investment Partnership VI, L.P.	2002	\$24,543,712	\$0	\$24,543,712		\$41,922,808						
BPG Investment Partnership VII, L.P.	2005	\$25,000,000	\$0	\$25,000,000		\$13,588,892						
BPG Investment Partnership VIII, L.P.	2007	\$15,588,238	\$676,220	\$14,912,018		\$20,049,072						
Lubert-Adler Real Estate Fund VII, L.P.	2014	\$25,000,000	\$2,179,554	\$22,820,446	\$0	\$8,170,946	\$20,801,864	\$28,972,809	\$6,152,363	0.36	1.27	6.72%
Mesirov Financial Real Estate Value Fund III, L.P.	2018	\$25,145,833	\$9,266,814	\$15,879,020	NM	\$467,041	NM	NM	NM	NM	NM	NM
Oak Street Real Estate Capital Fund IV, L.P.	2017	\$100,000,000	\$28,730,744	\$71,269,256	NM	\$3,960,263	NM	NM	NM	NM	NM	NM
Westbrook Real Estate Fund V, L.P.	2004	\$25,000,000	\$0	\$25,000,000	\$2,224,479	\$44,485,779	\$7,782,829	\$52,268,608	\$25,044,129	1.63	1.92	43.59%
Westbrook Real Estate Fund VI, L.P.	2006	\$35,000,000	\$0	\$35,000,000	\$3,550,099	\$37,571,397	\$1,421,949	\$38,993,346	\$443,247	0.97	1.01	0.24%
Westbrook Real Estate Fund VII, L.P.	2007	\$50,000,000	\$0	\$50,000,000	\$6,086,081	\$52,787,877	\$13,358,751	\$66,146,628	\$10,060,547	0.94	1.18	2.77%
Westbrook Real Estate Fund VIII, L.P.	2009	\$50,000,000	\$0	\$50,000,000	\$4,127,364	\$63,418,319	\$9,504,917	\$72,923,236	\$18,795,872	1.17	1.35	11.07%
Total Value Add		\$524,414,747	\$141,549,923	\$382,864,824		\$366,520,292						



Data as of December 31, 2019.

NM - Not Meaningful

PERFORMANCE BY STRATEGY (CONTINUED)

Investments		Commitments		Contributions & Distributions			Valuations			Performance		
Investment Name	Vintage Year	Commitment	Unfunded Commitment	Paid In Capital	Additional Fees	Cumulative Distributions	Valuation	Total Value	Net Benefit	DPI	TVPI	IRR
Opportunistic												
Activum SG Fund VI L.P.	2019	\$56,102,224	\$54,055,347	\$2,046,877	NM	\$0	NM	NM	NM	NM	NM	NM
Activum SG Fund VI Pennsylvania Side-Car L.P.	2019			\$0	NM	\$0	NM	NM	NM	NM	NM	NM
AG Asia Realty Fund, L.P.	2007	\$25,000,000	\$1,500,000	\$23,500,000		\$25,187,500				1.07		
Apollo Real Estate Investment Fund III, L.P.	1998	\$50,000,000	\$0	\$50,000,000		\$74,995,758						
Blackstone Real Estate Partners IV, L.P.	2003	\$25,000,000	\$0	\$25,000,000	\$0	\$39,908,685	\$835,631	\$40,744,316	\$15,744,316	1.60	1.63	11.88%
Blackstone Real Estate Partners V, L.P.	2006	\$50,000,000	\$2,087,026	\$47,912,974	\$0	\$96,893,557	\$2,292,329	\$99,185,886	\$51,272,912	2.02	2.07	10.68%
Blackstone Real Estate Partners VI, L.P.	2007	\$75,000,000	\$3,680,925	\$71,319,075	\$281,339	\$149,580,900	\$5,766,451	\$155,347,351	\$83,746,937	2.09	2.17	12.80%
Blackstone Real Estate Partners VII, L.P.	2011	\$75,000,000	\$10,496,700	\$64,503,300	\$1,818,712	\$91,368,543	\$37,083,332	\$128,451,875	\$62,129,863	1.38	1.94	16.32%
C-III Recovery Fund III, L.P.	2017	\$100,000,000	\$51,031,275	\$48,968,725	NM	\$0	NM	NM	NM	NM	NM	NM
Clerestory Small Cap Real Estate Fund I - TE, L.P.	2010	\$18,000,000	\$2,771,044	\$15,228,956		\$15,131,513						
Colony Investors VIII, L.P.	2007	\$22,500,000	\$844,200	\$21,655,800		\$7,962,017						
LEM Real Estate High-Yield Debt & Preferred Equity Fund III, L.P.	2013	\$25,000,000	\$0 ¹	\$25,000,000	\$0	\$47,522,717	\$31,622	\$47,554,339	\$22,554,339	1.90	1.90	23.66%
PLA Residential Fund III, L.P.	2008	\$29,654,968	\$4,946,219	\$24,708,749		\$13,444,991	\$329,045	\$13,774,036	-\$10,934,713	0.54		
PLA Retail Fund I, L.P.	2006	\$2,271,117	\$0	\$2,271,117		\$8,162,626	\$371,147	\$8,533,773	\$6,262,656	3.59		
Rockpoint Finance Fund I, L.P.	2007	\$2,527,500	\$0	\$2,527,500		\$2,106,094				0.48		
Rockpoint Real Estate Fund II, L.P.	2005	\$34,138,784	\$0	\$34,138,784		\$30,679,156				0.82		
Rockpoint Real Estate Fund III, L.P.	2007	\$50,632,887	\$4,241,165	\$46,391,722		\$67,236,003				1.33		
Rockpoint Real Estate Fund V, L.P.	2015	\$50,000,000	\$13,062,181	\$36,937,819		\$7,232,569				0.18		
Scout Fund I-A, L.P.	2009	\$75,000,000	\$0	\$75,000,000	\$0	\$116,815,057	\$810,309	\$117,625,366	\$42,625,366	1.56	1.57	15.31%
Scout Fund II-A, L.P.	2016	\$30,000,000	\$2,369,921	\$27,630,079	\$0	\$555,504	\$32,368,342	\$32,923,846	\$5,293,767	0.02	1.19	7.29%
Senior Housing Partners IV, L.P.	2011	\$22,089,297	\$1,289,781	\$20,799,516		\$36,939,573	\$1,063,842	\$38,003,414	\$17,203,898	1.78		
Senior Housing Partners V, L.P.	2015	\$50,000,000	\$11,015,513	\$38,984,487		\$3,216,633	\$47,856,972	\$51,073,605	\$12,089,118	0.08		
Senior Housing Partners VI, L.P.	2019	\$100,000,000	\$89,285,185	\$10,714,815	NM	\$0	NM	NM	NM	NM	NM	NM
SRE Opportunity Fund III Select, L.P.	2018	\$50,000,000	\$46,125,000	\$3,875,000	NM	\$0	NM	NM	NM	NM	NM	NM
SRE Opportunity Fund III, L.P.	2018	\$50,000,000	\$33,500,000	\$16,500,000	NM	\$0	NM	NM	NM	NM	NM	NM
Starwood Global Opportunity Fund VII-A, L.P.	2006	\$35,000,000	\$0	\$35,000,000		\$27,295,581						
Starwood Global Opportunity Fund VIII, L.P.	2009	\$50,000,000	\$4,643,719	\$45,356,281		\$68,651,170						
Starwood Opportunity Fund VI, L.P.	2001	\$50,000,000	\$0	\$50,000,000		\$51,782,742						
ValStone Opportunity Fund V, LLC	2014	\$14,663,402	\$0	\$14,663,402	\$375	\$3,329,834	\$18,201,405	\$21,531,239	\$6,867,462	0.23	1.47	9.76%
Total Opportunistic		\$1,217,580,179	\$336,945,200	\$880,634,979		\$985,998,723						
Total		\$5,712,050,943	\$864,982,365	\$4,847,068,578		\$5,187,630,820						

Data as of December 31, 2019.

1 - Certain distributions from the LEM Real Estate High-Yield Debt & Preferred Equity Fund III are considered callable; as a result, SERS has a total potential unfunded commitment obligation to the fund of approximately \$24.4 million as of December 31, 2019. The manager has stated that it does not anticipate any of this capital to be recalled, thus the unfunded commitment shown in this report is \$0 to better reflect this expectation. In prior slides, this fund is included in the aggregated figures for the "Opportunistic (Closed-End)" investment strategy and the "Harvesting" lifecycle stage.



NM - Not Meaningful

APPENDIX 2: DISCLAIMERS & DISCLOSURES

NEPC, LLC

DISCLAIMER

- **Past performance is no guarantee of future results.**
- **The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.**
- **Information used to prepare this report was obtained directly from the investment managers or custodians, and market index data was provided by other external sources. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.**
- **This report may contain confidential or proprietary information and may not be copied or redistributed to any party not legally entitled to receive it.**



ALTERNATIVE INVESTMENT DISCLOSURES

In addition, it is important that investors understand the following characteristics of non-traditional investment strategies including hedge funds, real estate and private equity:

1. Performance can be volatile and investors could lose all or a substantial portion of their investment
2. Leverage and other speculative practices may increase the risk of loss
3. Past performance may be revised due to the revaluation of investments
4. These investments can be illiquid, and investors may be subject to lock-ups or lengthy redemption terms
5. A secondary market may not be available for all funds, and any sales that occur may take place at a discount to value
6. These funds are not subject to the same regulatory requirements as registered investment vehicles
7. Managers may not be required to provide periodic pricing or valuation information to investors
8. These funds may have complex tax structures and delays in distributing important tax information
9. These funds often charge high fees
10. Investment agreements often give the manager authority to trade in securities, markets or currencies that are not within the manager's realm of expertise or contemplated investment strategy