



COMMONWEALTH OF PENNSYLVANIA
PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM

Real Estate

Second Quarter 2017

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Deputy Chief Investment Officer, Non-Traditional Investments

March 8, 2018

Table of Contents

- **Commitments**
- Performance
- Cash Flow Activity
- Real Estate Portfolio Detail

Commitments Approved and Executed Since April 1, 2017

Fund	Type	Commitment (\$M)	Date Approved	Date Executed
Ares US Real Estate Fund IX, L.P.	Value Added	\$100.0	3/10/17	5/3/17
Carlyle Realty Partners VIII, L.P.	Opportunistic	\$200.0	3/10/17	5/3/17
AG Europe Realty Fund II, L.P.	Value Added	\$100.0	6/16/17	6/19/17
Almanac Realty Securities VIII, LP	Value Added	\$150.0	12/8/17	pending

Table of Contents

- Commitments
- **Performance**
- Cash Flow Activity
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Portfolio Snapshot for Real Estate

Real Estate (\$M)	1Q17	2Q17	Change
Active Partnerships	94	99	5
Capital Committed ⁽¹⁾	\$21,088.1	\$21,546.2	\$458.1
Unfunded Commitment	\$2,175.7	\$2,472.6	\$296.9
Contributions	\$143.0	\$151.5	\$8.5
Distributions	(\$289.5)	(\$272.1)	(\$17.5)
Market Value ^(b)	\$6,054.6	\$6,125.6	\$71.0
Total Value Multiple	1.38x	1.39x	0.01x
Since Inception IRR	8.78%	8.81%	0.02%

(a) The change in capital committed during the period is attributable to fluctuations in exchange rates for non-us denominated funds and new commitments made during the period.

(b) Includes Gross PTRES Exposure

RE Performance by Investment Structure – 2Q17

	% of PSERS' Market Value	Quarter ^(b)	Y-T-D ^(b)	1-Year ^(c)	3-Year ^(c)	5-Year ^(c)	10-Year ^(c)	Inception ^(a,c)
Direct Investments	6%	1.78%	3.50%	-0.92%	8.01%	11.59%	4.94%	8.64%
<i>NFI-ODCE VW Benchmark⁽¹⁾</i>		1.47%	3.04%	6.90%	10.33%	10.76%	6.80%	8.66%
Funds (Closed-end)	71%	3.88%	7.18%	11.53%	10.08%	12.21%	1.65%	8.05%
<i>Blended Benchmark⁽²⁾</i>		0.40%	1.05%	2.84%	5.05%	7.82%	4.83%	8.54%
Funds (Open-end)	4%	1.24%	2.41%	5.91%	11.90%	11.79%	2.08%	3.16%
<i>NFI-ODCE VW Benchmark⁽¹⁾</i>		1.47%	3.04%	6.90%	10.33%	10.76%	6.80%	7.91%
Internal Program	2%	2.95%	5.08%	12.87%	15.87%	N/A	N/A	21.76%
<i>Blended Benchmark⁽³⁾</i>		1.26%	2.09%	5.17%	6.63%	N/A	N/A	8.63%
PTRES	8%	1.05%	2.03%	0.84%	6.50%	7.51%	-3.83%	10.79%
<i>Blended Benchmark⁽⁴⁾</i>		1.91%	2.95%	1.41%	3.64%	7.42%	2.09%	8.23%
Total Portfolio^(d)	91%	3.36%	6.24%	9.55%	9.93%	12.04%	1.32%	8.81%
<i>Blended Benchmark⁽⁵⁾</i>		0.80%	1.62%	3.25%	5.81%	8.26%	5.00%	8.40%

^(a) Inception Dates
 Direct-4Q1980
 Funds (Closed-end)-1Q1993
 Funds (Open-end)-1Q2006
 Internal Program -2Q2013
 PTRES-3Q1995

^(b) Time-weighted
^(c) Dollar-weighted (IRR)
^(d) Includes Private Placement for the 10-year and Inception Periods.

Benchmark Footnotes for Performance Returns

(1) Comprised of NCREIF-ODCE net, value-weighted index (NFI-ODCE VW) since January 1, 2013 (NTFI-ODCE net, VW from April 1, 2010 to December 31, 2012). NCREIF was the benchmark prior to April 2010.

(2) Effective January 1, 2015, source is Burgiss. Previous benchmarks included NCREIF CEVA for the periods from the 4th quarter of 2013 to the 4th quarter of 2014; NCREIF/Townsend (Value-added and Opportunistic) for the periods from the 2nd quarter of 2010 to the 3rd quarter of 2013 and NCREIF NPI since inception.

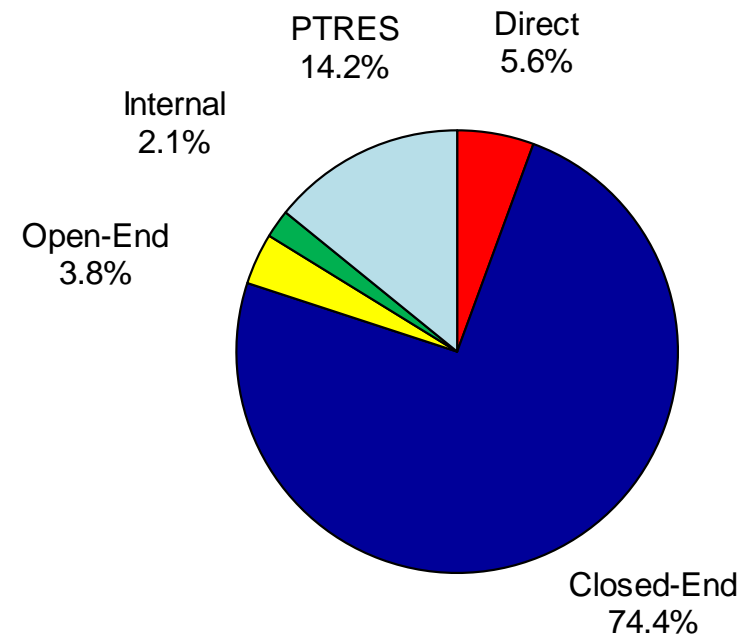
(3) Effective January 1, 2015, source is Burgiss (Value-added and Opportunistic) and NCREIF-ODCE (Core); Previous benchmarks included NCREIF CEVA for the periods from the 4th quarter of 2013 to the 4th quarter of 2014 and NCREIF/Townsend (Value-added and Opportunistic) since inception.

(4) FTSE EPRA/NAREIT Custom Developed 100% Hedged USD (net) effective October 1, 2015; Previous benchmarks includes Wilshire (WRESI, REIT Index) and FTSE EPRA/NAREIT Global RE Index.

(5) The blended benchmark is based on Private vs. Public weights using various private indices (Burgiss for Value-added and Opportunistic; NCREIF-ODCE for Core) and FTSE EPRA/NAREIT Custom Developed 100% Hedged USD (net) for public. Previous period benchmarks consisted of differing weights (Private vs. Public) and benchmarks (NCREIF/NTFI for Private and various public equity benchmarks for Public).

Real Estate By Investment Structure – 2Q17

(\$M)	Market Value	%
Direct	\$344.1	6%
Closed-End	\$4,557.3	74%
Open-End	\$230.1	4%
Internal Program	\$126.3	2%
PTRES ^(a,b)	\$867.8	14%
Total Portfolio	\$6,125.6	100%



^(a) Publicly Traded Real Estate Securities

^(b) Includes Gross PTRES Exposure

RE Performance by Strategic Asset Allocation – 2Q17

	Quarter ^(a)	Y-T-D ^(a)	1-Year ^(b)	3-Year ^(b)	5-Year ^(b)	10-Year ^(b)	Inception ^(b)
Core	1.58%	2.90%	2.29%	8.52%	10.34%	0.62%	8.37%
Benchmark-Blended Return	1.65%	3.00%	4.51%	8.54%	9.90%	6.27%	8.85%
Value Added	3.35%	5.64%	13.51%	15.66%	13.90%	1.65%	9.65%
Benchmark-Blended Return	1.27%	2.02%	5.18%	8.13%	9.22%	5.77%	10.46%
Opportunistic	4.19%	8.17%	10.42%	8.00%	11.65%	1.37%	9.31%
Benchmark-Blended Return	-0.11%	0.48%	1.52%	3.74%	7.19%	4.37%	8.35%
Total Portfolio	3.36%	6.24%	9.55%	9.93%	12.04%	1.32%	8.81%
Blended Return^(c)	0.80%	1.62%	3.25%	5.81%	8.26%	5.00%	8.40%

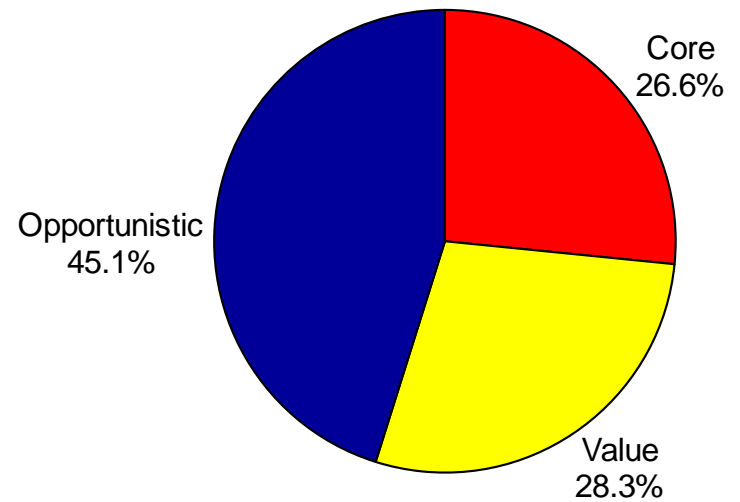
^(a) Time-weighted

^(b) Dollar-weighted (IRR)

^(c) The blended benchmark is based on Private vs. Public weights using various private indices (Burgiss for Value-added and Opportunistic; NCREIF-ODCE for Core) and FTSE EPRA/NAREIT Custom Developed 100% Hedged USD (net) for public. Previous period benchmarks consisted of differing weights (Private vs. Public) and benchmarks (NCREIF/NTFI for Private and various public equity benchmarks for Public).

Real Estate by Strategic Asset Allocation – 2Q17

(\$M)	Target	Market Value	%
Core ^(a)	20%	\$1,628.3	27%
Value	50%	\$1,731.9	28%
Opportunistic	30%	\$2,765.5	45%
Total Portfolio	100%	\$6,125.6	100%



^(a) Includes Gross PTRES Exposure

Preliminary Real Estate Performance – 3Q17

	Market Value	Quarter ^(a)
Direct RE	6%	0.82%
Internal Program	2%	3.19%
Funds (Closed-end)	78%	4.11%
Funds (Open-end)	4%	1.66%
PTRES	10%	2.36%
Total Portfolio	100%	3.63%

^(a) Time-weighted

Table of Contents

- Commitments
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- **Cash Flow Activity**
- Real Estate Portfolio Detail

Cash Flow Activity

Final - 2Q17 (\$M)	New Commitments	Contributions	Distributions	Residual Value ^(a)	Unfunded
Quarter	\$425.9	\$151.5	\$272.1		
Y-T-D	\$440.9	\$294.5	\$561.6		
I-T-D	\$21,546.2	\$20,814.1	\$23,055.0	\$6,125.6	\$2,472.6

Prelim - 3Q17 (\$M)	New Commitments	Contributions	Distributions	Residual Value ^(a)	Unfunded
Quarter	\$51.2	\$185.6	\$334.2		
Y-T-D	\$492.2	\$480.1	\$895.8		
I-T-D	\$21,616.0	\$20,999.8	\$23,389.2	\$6,186.0	\$2,374.1

^(a) Includes Gross PTRES Exposure

Portfolio Summary for Real Estate

Real Estate (\$M)	Quarter Ended				Year Ended
	3Q16	4Q16	1Q17	2Q17	2Q17
Beginning Market Value ^(a)	\$5,610.2	\$5,774.9	\$6,041.7	\$6,054.6	\$5,610.2
Contributions	371.9	330.1	143.0	151.5	996.4
Distributions	(515.1)	(259.3)	(289.5)	(272.1)	(1,335.9)
Net Value Changed	307.8	196.0	159.4	191.6	854.9
Ending Market Value ^(a)	\$5,774.9	\$6,041.7	\$6,054.6	\$6,125.6	\$6,125.6
Unfunded Commitment	\$2,113.8	\$2,277.5	\$2,175.7	\$2,472.6	\$2,472.6
Total Exposure ^(a)	\$7,888.7	\$8,319.2	\$8,230.3	\$8,598.2	\$8,598.2
Point-to-Point IRR	1.94%	1.20%	2.78%	3.36%	6.23%
Since Inception IRR	8.78%	8.77%	8.78%	8.81%	8.81%

^(a) Includes Gross PTRES Exposure

Portfolio Cash Flow Through September 30, 2017 (Preliminary)

Real Estate Portfolio Cash Flow

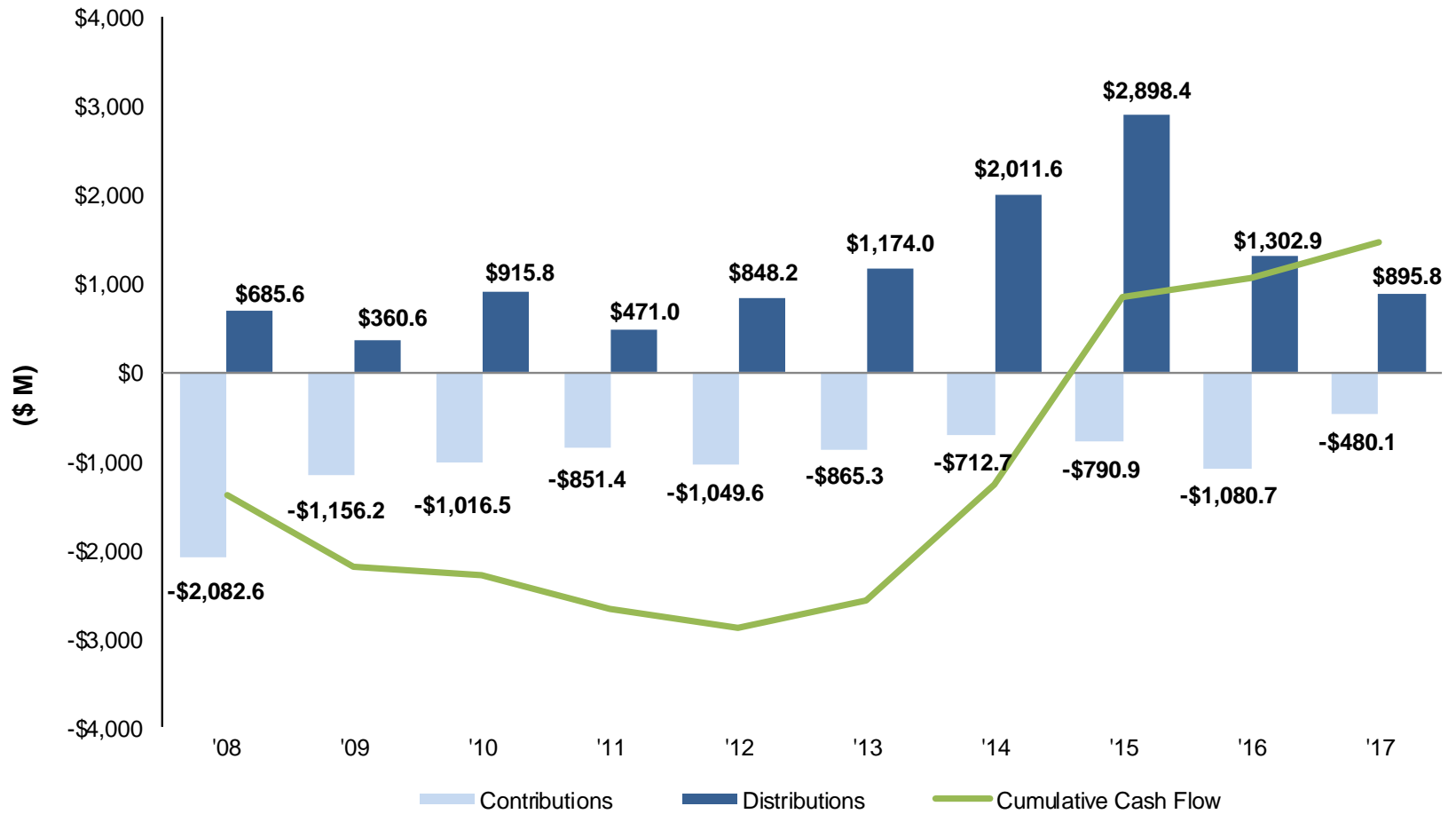
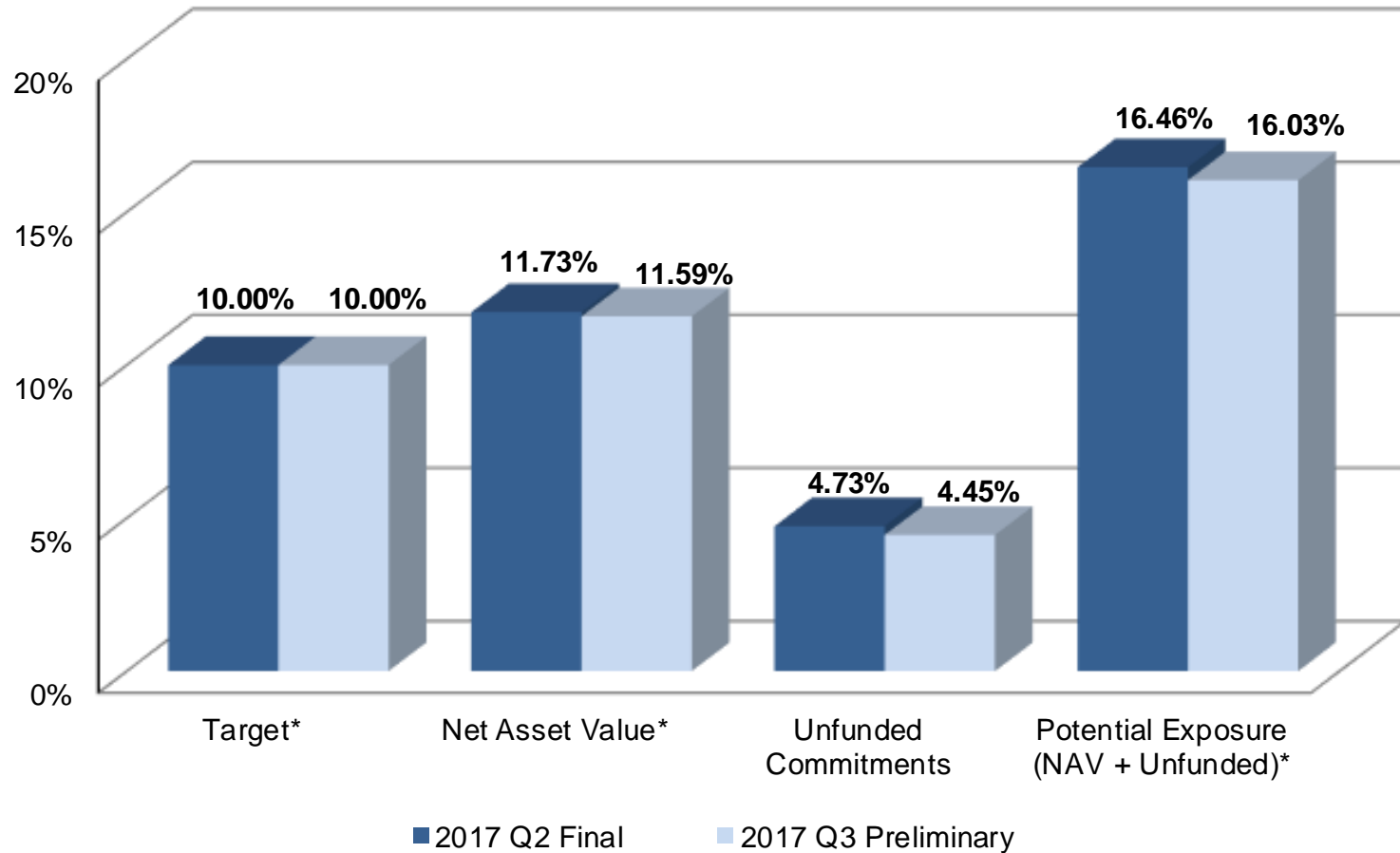


Table of Contents

- Commitments
- Performance
- Cash Flow Activity
- **Real Estate Portfolio Detail**

Real Estate Portfolio Asset Allocation

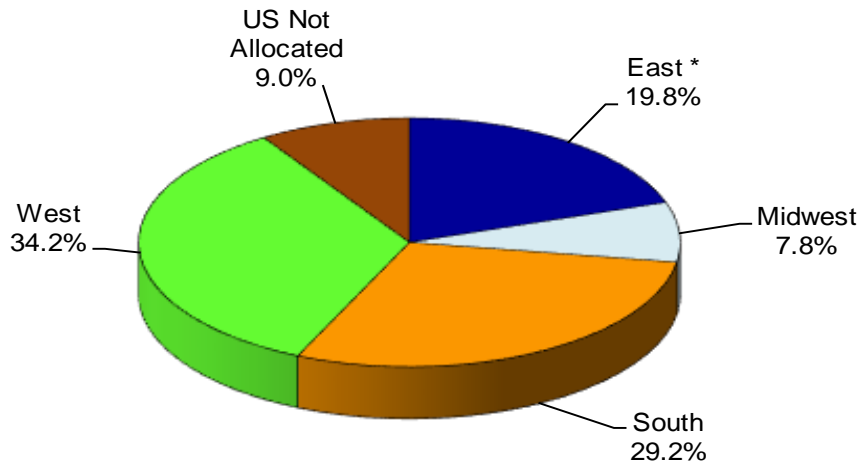
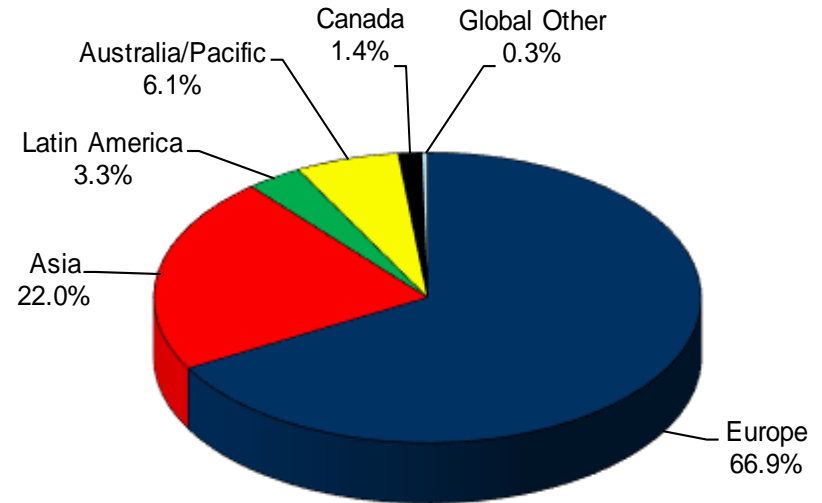
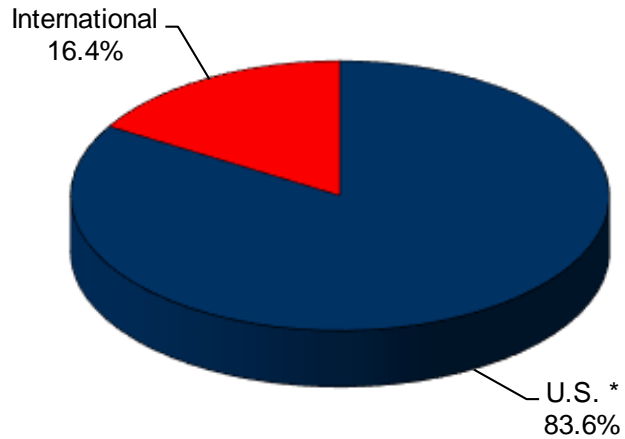
PSERS' Total Fund \$52.2 B as of 6/30/17
 PSERS' Total Fund \$53.4 B as of 9/30/17



* Includes Gross PTRES Exposure

Real Estate – Regional Distribution – 2Q17

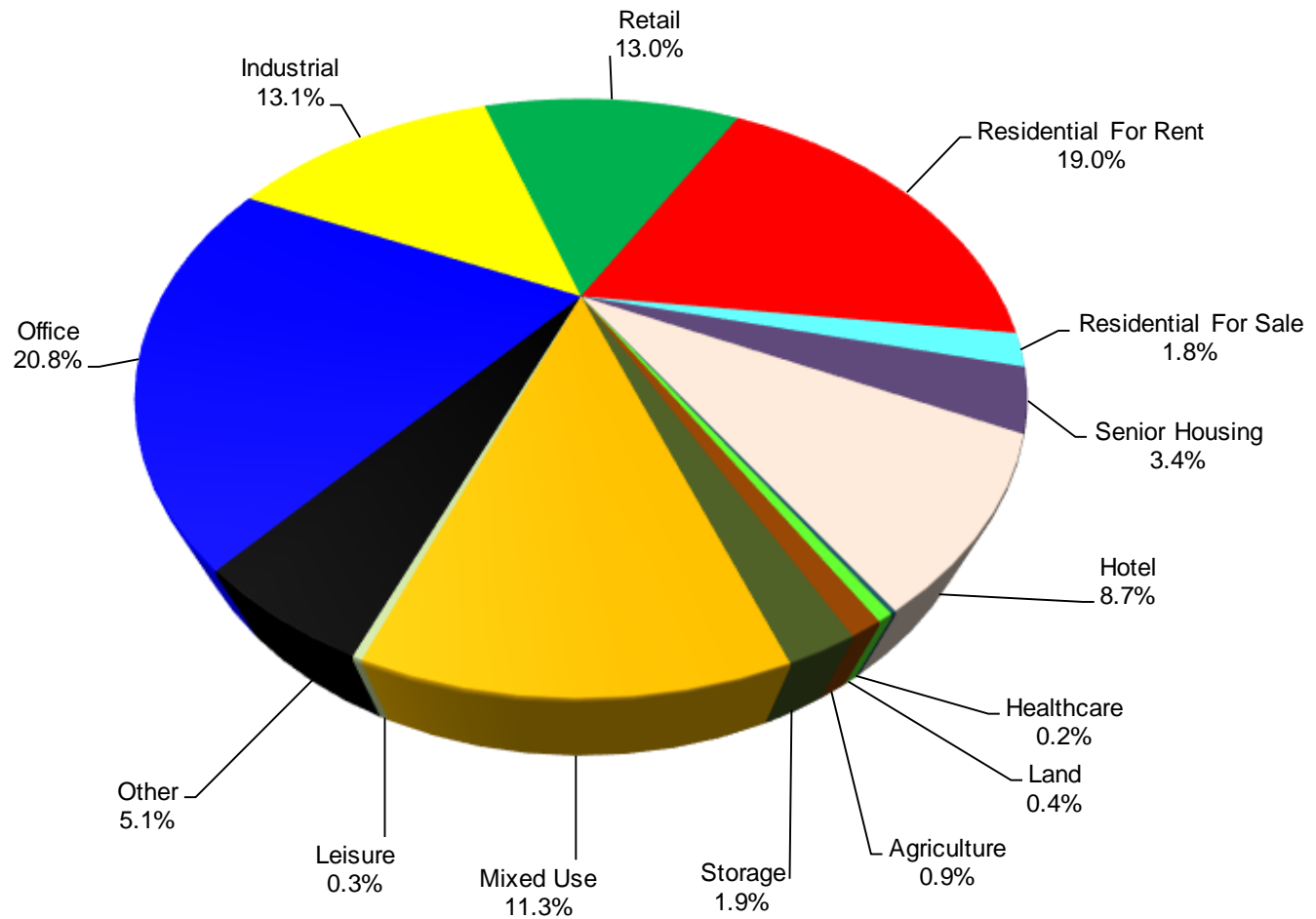
% By Market Value



* Pennsylvania represents 5.8% of the East total, 1.2% of the U.S. total, and 1% of total assets.

Real Estate-Asset Type Distribution – 2Q17

% By Market Value



Real Estate Portfolio Impact on Pennsylvania

June 30, 2017	Real Estate (\$M)
Funds Headquartered in PA - Market Value	\$255.9
Funds Headquartered in PA - Commitments	\$675.0
Direct Real Estate Investments in PA	\$7.9
PA-based Fund Investments - Total Value	\$1,469.0
PA-based Fund Investments - PSERS' Share	\$57.3
Number of people employed	370
Payroll	\$8.8
Office, retail and warehouse	28.2 million sq. ft.
Apartments, hotel rooms, condo units	24,157



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