



COMMONWEALTH OF PENNSYLVANIA  
PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM

# Real Estate

## Fourth Quarter 2017

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Deputy Chief Investment Officer, Non-Traditional Investments

**October 11, 2018**

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- **Commitments**
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## Commitments Approved and Executed Since October 1, 2017

Fund	Type	Commitment (\$M)	Date Approved	Date Executed
Almanac Realty Securities VIII, LP	Value Added	\$150.0	12/8/17	2/14/18
PSERS YES Holdings, L.P.	Value Added	Range	1/18/18	1/31/18
Cabot Industrial Core Fund II, L.P.	Core	\$100.0	3/9/18	6/18/18
LEM Multifamily Fund V, L.P.	Value Added	\$100.0	5/24/18	7/6/18
AG Realty Value Fund X, L.P.	Value Added	\$150.0	5/24/18	8/24/18

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# Portfolio Snapshot for Real Estate

Real Estate (\$M)	3Q17	4Q17	Change
Active Investments	101	101	0
Capital Committed <sup>(a)</sup>	\$21,616.0	\$21,639.0	\$23.0
Unfunded Commitment	\$2,374.1	\$2,217.4	(\$156.7)
Contributions	\$185.5	\$137.1	(\$48.4)
Distributions	(\$334.1)	(\$703.7)	\$369.6
Market Value <sup>(b)</sup>	\$6,186.0	\$5,709.9	(\$476.1)
Total Value Multiple	1.4x	1.4x	0.0x
Since Inception IRR	8.8%	8.9%	0.1%

<sup>(a)</sup> 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.

<sup>(b)</sup> Includes Gross PTRES Exposure

# RE Performance by Investment Structure – 4Q17

	% of PSERS' Market Value	Quarter <sup>(b)</sup>	Y-T-D <sup>(b)</sup>	1-Year <sup>(c)</sup>	3-Year <sup>(c)</sup>	5-Year <sup>(c)</sup>	10-Year <sup>(c)</sup>	Inception <sup>(a,c)</sup>
Direct Investments	7%	-0.3%	4.1%	4.0%	5.2%	8.4%	5.1%	8.6%
<b><i>NFI-ODCE VW Benchmark<sup>(1)</sup></i></b>		<b>1.8%</b>	<b>6.7%</b>	<b>6.7%</b>	<b>9.4%</b>	<b>10.5%</b>	<b>6.5%</b>	<b>8.6%</b>
Funds (Closed-end)	76%	3.7%	15.7%	15.7%	9.3%	12.8%	2.4%	8.2%
<b><i>Blended Benchmark<sup>(2)</sup></i></b>		<b>4.1%</b>	<b>15.2%</b>	<b>15.2%</b>	<b>10.2%</b>	<b>11.4%</b>	<b>6.5%</b>	<b>9.3%</b>
Funds (Open-end)	4%	1.8%	6.0%	6.0%	8.8%	13.0%	1.7%	3.2%
<b><i>NFI-ODCE VW Benchmark<sup>(1)</sup></i></b>		<b>1.8%</b>	<b>6.7%</b>	<b>6.7%</b>	<b>9.4%</b>	<b>10.5%</b>	<b>6.5%</b>	<b>7.9%</b>
Internal Program	2%	5.6%	14.5%	14.3%	16.1%	N/A	N/A	21.4%
<b><i>Blended Benchmark<sup>(3)</sup></i></b>		<b>3.9%</b>	<b>11.9%</b>	<b>11.9%</b>	<b>10.3%</b>	<b>N/A</b>	<b>N/A</b>	<b>11.8%</b>
PTRES	11%	5.1%	9.8%	9.3%	7.6%	8.7%	-1.8%	10.8%
<b><i>Blended Benchmark<sup>(4)</sup></i></b>		<b>3.6%</b>	<b>7.6%</b>	<b>7.6%</b>	<b>4.2%</b>	<b>5.8%</b>	<b>3.3%</b>	<b>8.3%</b>
<b>Total Portfolio<sup>(d)</sup></b>	<b>100%</b>	<b>3.5%</b>	<b>14.0%</b>	<b>13.9%</b>	<b>9.1%</b>	<b>12.5%</b>	<b>2.2%</b>	<b>8.9%</b>
<b><i>Blended Benchmark<sup>(5)</sup></i></b>		<b>3.7%</b>	<b>12.8%</b>	<b>12.8%</b>	<b>9.6%</b>	<b>11.0%</b>	<b>6.6%</b>	<b>8.8%</b>

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

<sup>(b)</sup> Time-weighted  
<sup>(c)</sup> Dollar-weighted (IRR)  
<sup>(d)</sup> 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.***

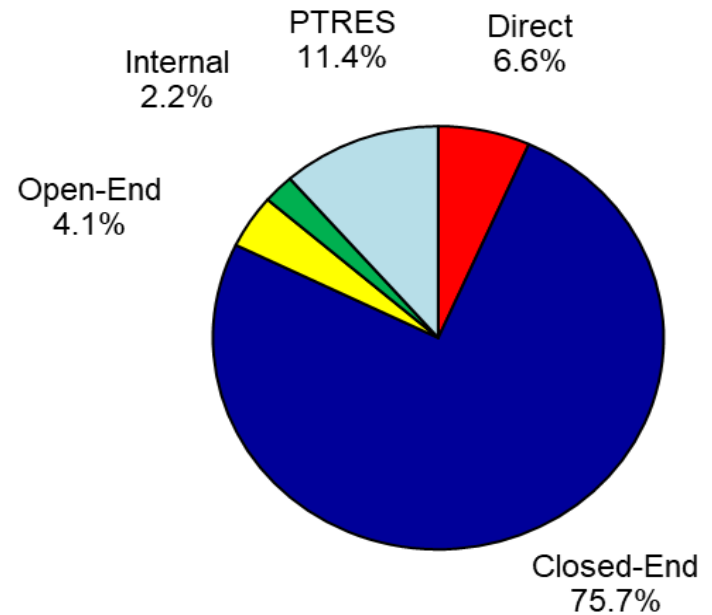
***(3) Effective January 1, 2015, source is Burgiss (Value-added and Opportunistic) and NCREIF-ODCE (Core); Previous benchmarks included NCREIF CEVA for the periods from the 4th quarter of 2013 to the 4th quarter of 2014 and NCREIF/Townsend (Value-added and Opportunistic) since inception.***

***(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 – 4Q17

(\$M)	Market Value	%
Direct	\$376.3	7%
Closed-End	\$4,319.0	76%
Open-End	\$233.8	4%
Internal Program	\$127.4	2%
PTRES <sup>(a,b)</sup>	\$653.4	11%
<b>Total Portfolio</b>	<b>\$5,709.9</b>	<b>100%</b>



<sup>(a)</sup> Publicly Traded Real Estate Securities

<sup>(b)</sup> Includes Gross PTRES Exposure



# RE Performance by Strategic Asset Allocation – 4Q17

	Quarter <sup>(a)</sup>	Y-T-D <sup>(a)</sup>	1-Year <sup>(b)</sup>	3-Year <sup>(b)</sup>	5-Year <sup>(b)</sup>	10-Year <sup>(b)</sup>	Inception <sup>(b)</sup>
Core	3.1%	8.0%	7.9%	7.5%	10.1%	1.6%	8.4%
<b>Benchmark-Blended Return</b>	<b>2.4%</b>	<b>6.9%</b>	<b>6.9%</b>	<b>8.0%</b>	<b>9.3%</b>	<b>6.8%</b>	<b>8.9%</b>
Value Added	5.2%	14.7%	14.4%	14.4%	15.4%	3.0%	9.8%
<b>Benchmark-Blended Return</b>	<b>4.1%</b>	<b>12.3%</b>	<b>12.3%</b>	<b>11.9%</b>	<b>12.1%</b>	<b>7.2%</b>	<b>11.2%</b>
Opportunistic	2.7%	16.5%	16.5%	7.2%	11.9%	2.0%	9.4%
<b>Benchmark-Blended Return</b>	<b>4.1%</b>	<b>16.9%</b>	<b>16.9%</b>	<b>9.7%</b>	<b>11.2%</b>	<b>6.2%</b>	<b>9.0%</b>
<b>Total Portfolio</b>	<b>3.5%</b>	<b>14.0%</b>	<b>13.9%</b>	<b>9.1%</b>	<b>12.5%</b>	<b>2.2%</b>	<b>8.9%</b>
<b>Blended Benchmark<sup>(c)</sup></b>	<b>3.7%</b>	<b>12.8%</b>	<b>12.8%</b>	<b>9.6%</b>	<b>11.0%</b>	<b>6.6%</b>	<b>8.8%</b>

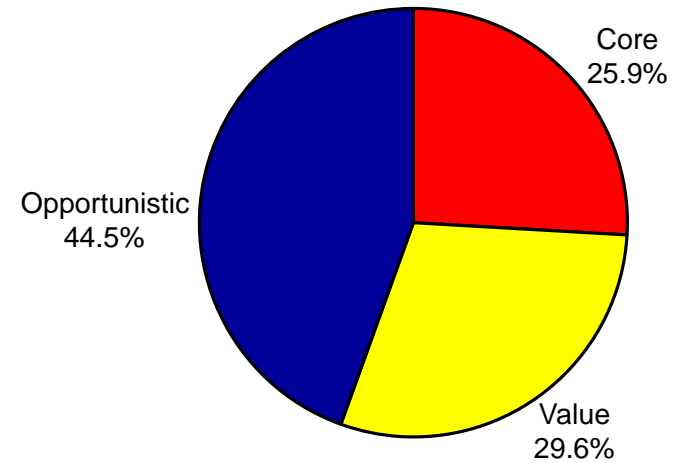
<sup>(a)</sup> Time-weighted

<sup>(b)</sup> Dollar-weighted (IRR)

<sup>(c)</sup> 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 – 4Q17

(\$M)	Target	Market Value	%
Core <sup>(a)</sup>	20%	\$1,479.6	26%
Value	50%	\$1,689.9	30%
Opportunistic	30%	\$2,540.4	44%
<b>Total Portfolio</b>	<b>100%</b>	<b>\$5,709.9</b>	<b>100%</b>



<sup>(a)</sup> Includes Gross PTRES Exposure

# Preliminary Real Estate Performance – 1Q18

	Market Value	Quarter <sup>(a)</sup>
Direct RE	7%	1.64%
Internal Program	2%	3.20%
Funds (Closed-end)	72%	3.24%
Funds (Open-end)	8%	2.47%
PTRES	11%	-9.61%
<b>Total Portfolio</b>	<b>100%</b>	<b>2.05%</b>

<sup>(a)</sup>Time-weighted

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# Cash Flow Activity

Final - 4Q17 (\$M)	New Commitments	Contributions	Distributions	Residual Value <sup>(a)</sup>	Unfunded
Quarter	\$13.4	\$137.1	\$703.7		
Y-T-D	\$505.5	\$617.1	\$1,599.3		
I-T-D	\$21,639.0	\$21,136.7	\$24,092.7	\$5,709.9	\$2,217.4

Prelim - 1Q18 (\$M)	New Commitments	Contributions	Distributions	Residual Value <sup>(a)</sup>	Unfunded
Quarter	\$158.4	\$108.4	\$265.1		
Y-T-D	\$158.4	\$108.4	\$265.1		
I-T-D	\$21,813.5	\$21,245.2	\$24,357.8	\$5,660.7	\$2,287.7

<sup>(a)</sup> Includes Gross PTRES Exposure

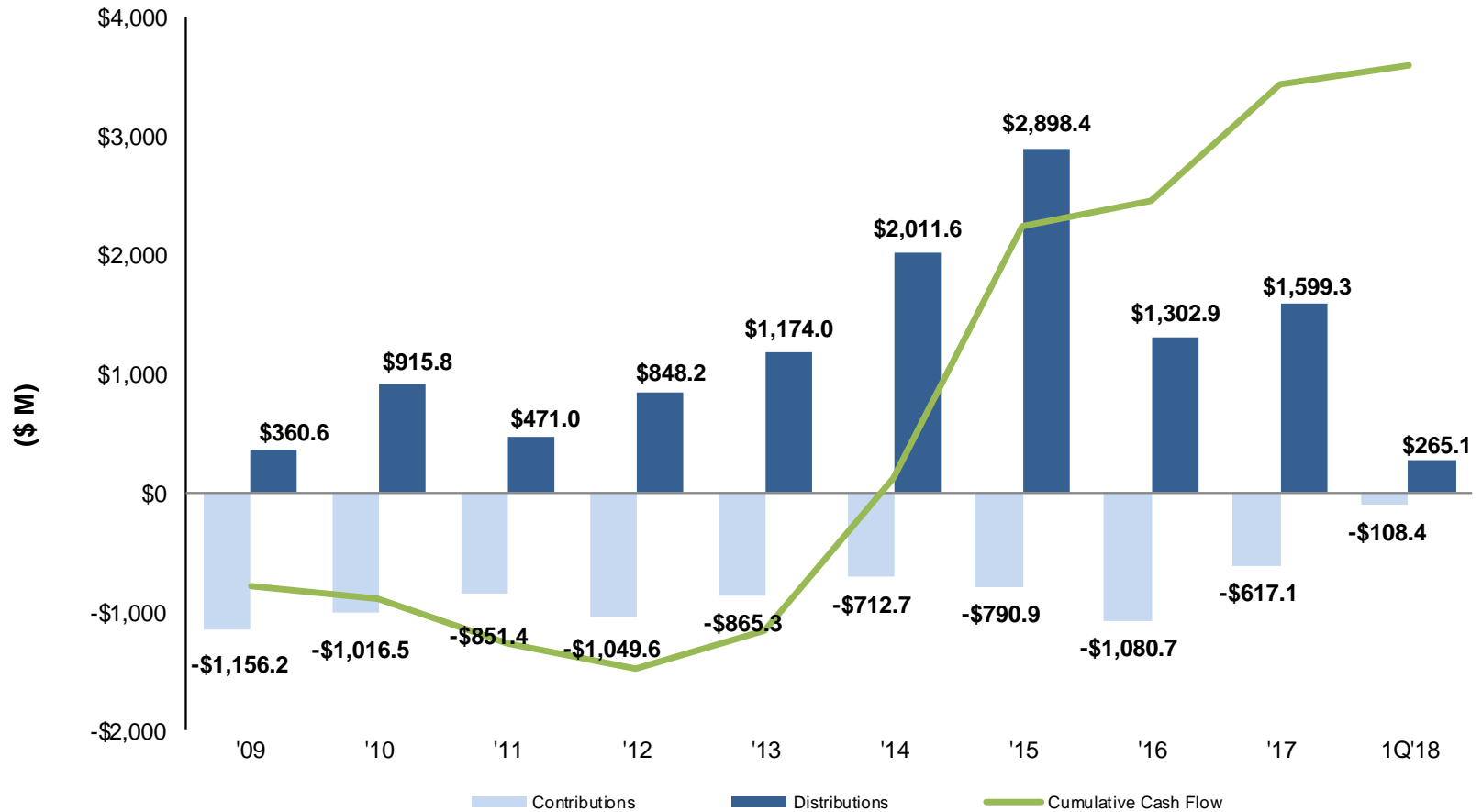
# Portfolio Summary for Real Estate

Real Estate (\$M)	Quarter Ended				Year Ended
	1Q17	2Q17	3Q17	4Q17	4Q17
Beginning Market Value <sup>(a)</sup>	\$5,712.7	\$6,054.6	\$6,125.6	\$6,186.0	\$5,712.7
Contributions	143.0	151.4	185.5	137.1	617.1
Distributions	(289.5)	(272.0)	(334.1)	(703.7)	(1,599.3)
Net Value Changed	488.4	191.6	209.0	90.5	979.4
Ending Market Value <sup>(a)</sup>	\$6,054.6	\$6,125.6	\$6,186.0	\$5,709.9	\$5,709.9
Unfunded Commitment	\$2,175.7	\$2,472.6	\$2,374.1	\$2,217.4	\$2,217.4
Total Exposure <sup>(a)</sup>	\$8,230.3	\$8,598.2	\$8,560.1	\$7,927.3	\$7,927.3
Point-to-Point IRR	2.9%	3.4%	3.7%	3.6%	13.9%
Since Inception IRR	8.8%	8.8%	8.8%	8.9%	8.9%

<sup>(a)</sup> Includes Gross PTRES Exposure

# Portfolio Cash Flow Through March 31, 2018 (Preliminary)

## Real Estate Portfolio Cash Flow



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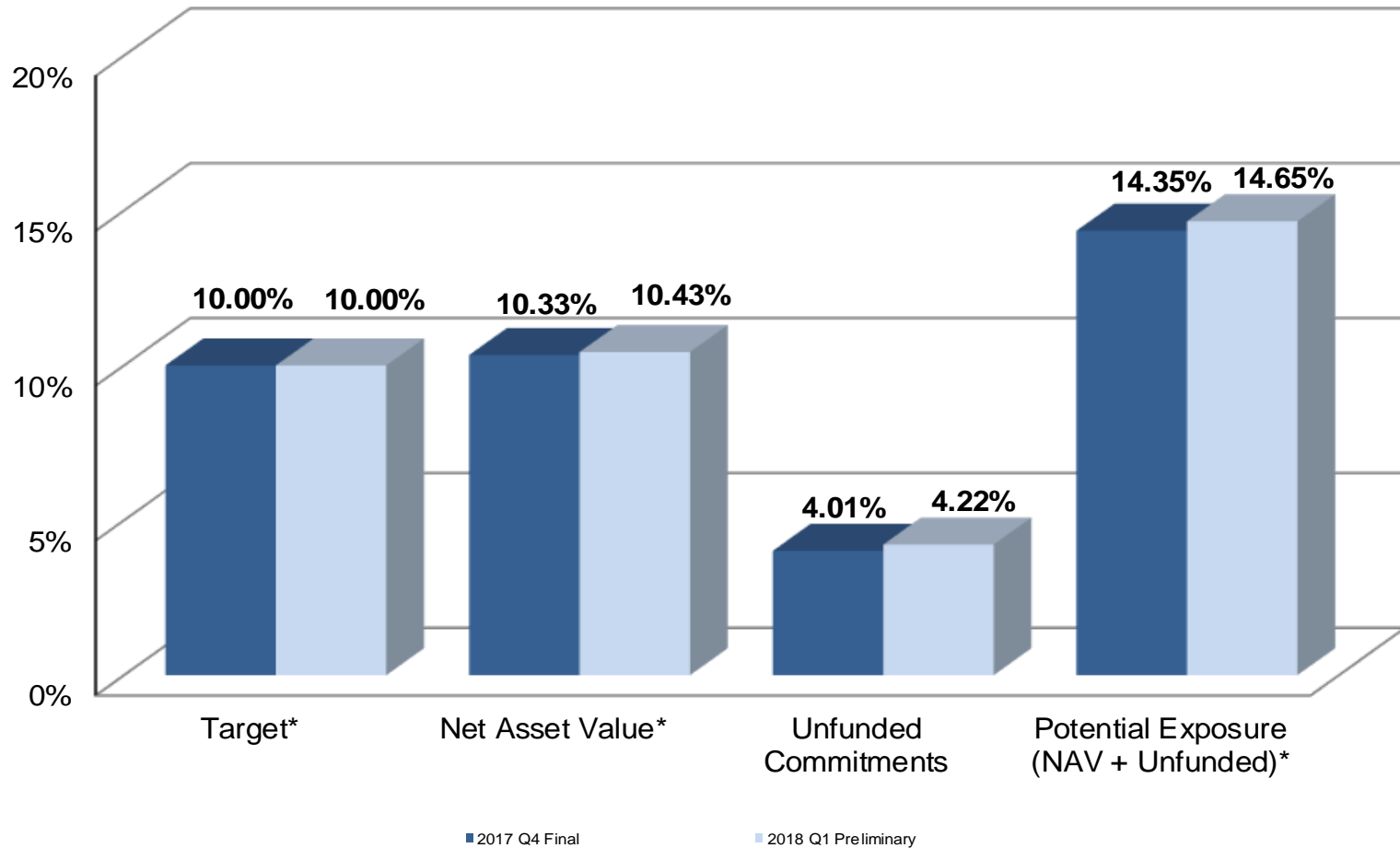
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- **Real Estate Portfolio Detail**



# Real Estate Portfolio Asset Allocation

PSERS' Total Fund \$55.3 B as of 12/31/17  
 PSERS' Total Fund \$54.3 B as of 3/31/18

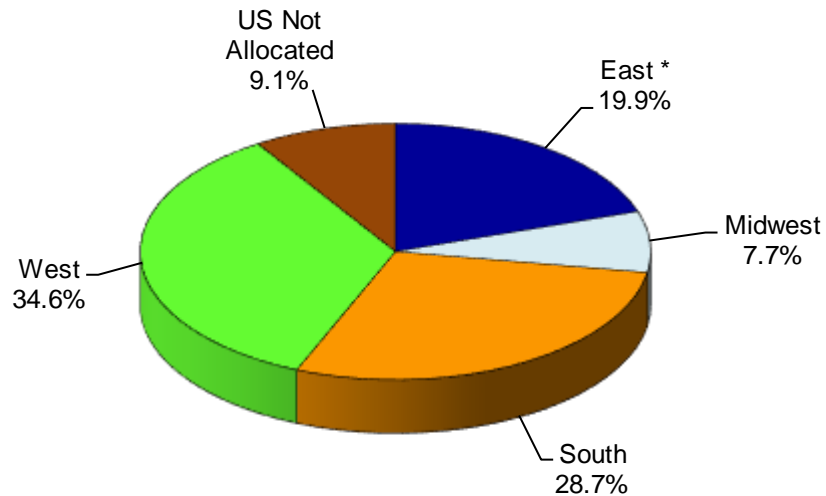
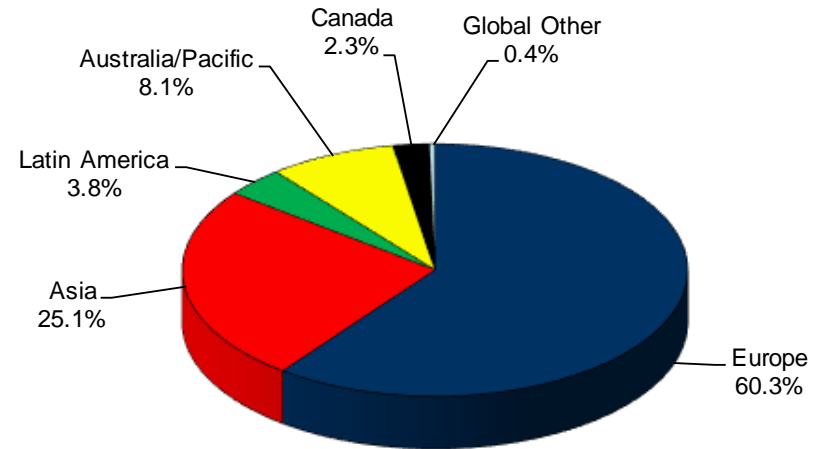
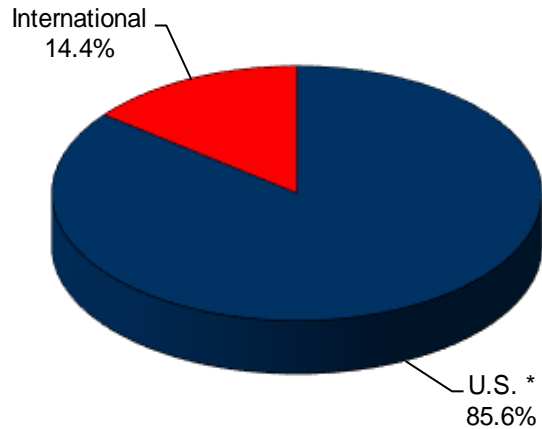


\* Includes Gross PTRES Exposure



# Real Estate – Regional Distribution – 4Q17

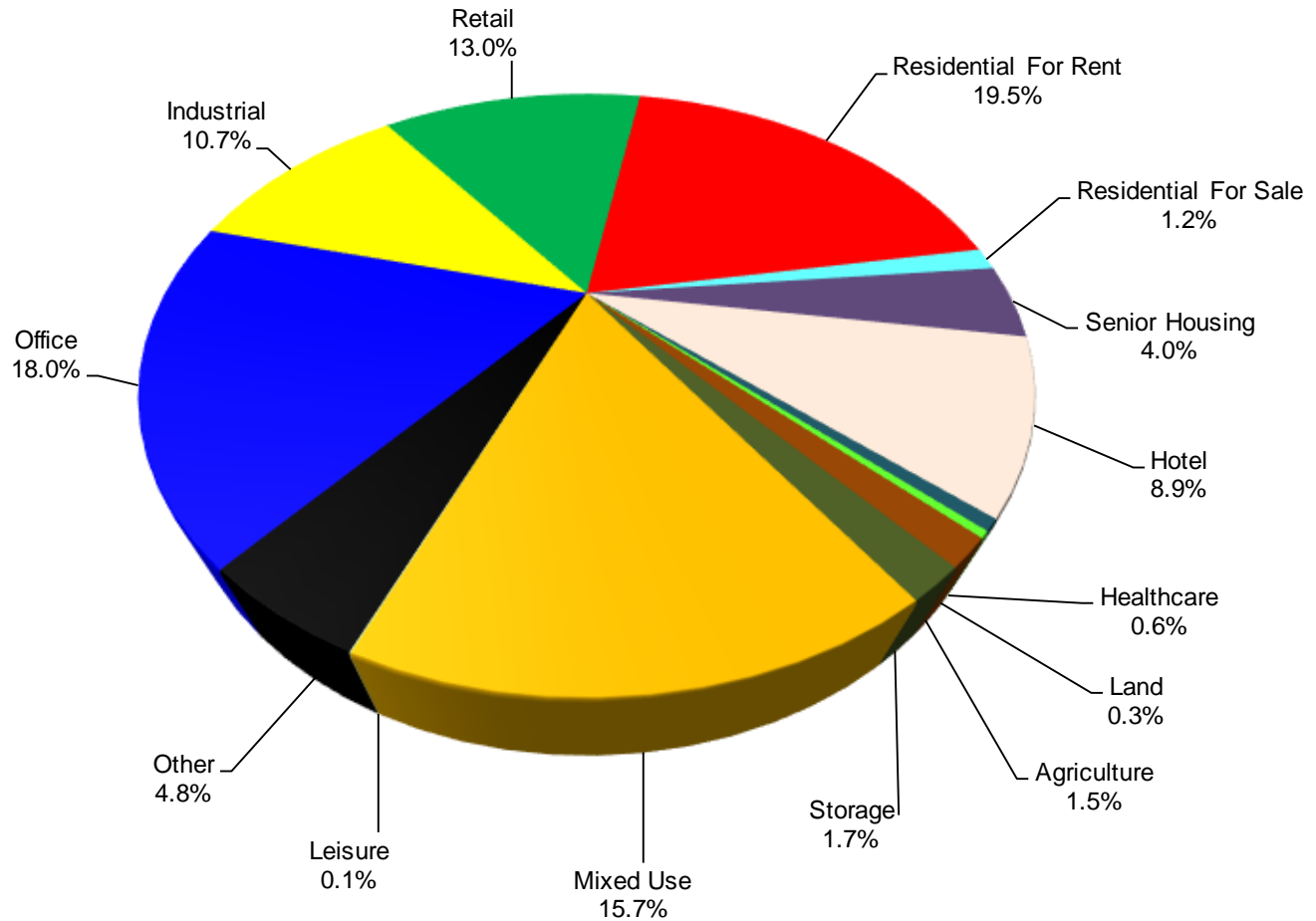
## % By Market Value



\* Pennsylvania represents 6.3% of the East total, 1.3% of the U.S. total, and 1.1% of total assets.

# Real Estate-Asset Type Distribution – 4Q17

## % By Market Value



# Real Estate Portfolio Impact on Pennsylvania

<b>December 31, 2017</b>	<b>Real Estate (\$M)</b>
<b>Funds Headquartered in PA - Market Value</b>	<b>\$239.0</b>
<b>Funds Headquartered in PA - Commitments</b>	<b>\$675.0</b>
<b>Direct Real Estate Investments in PA</b>	<b>\$9.7</b>
<b>PA-based Fund Investments - Total Value</b>	<b>\$1,671.5</b>
<b>PA-based Fund Investments - PSERS' Share</b>	<b>\$73.8</b>
<b>Number of people employed</b>	<b>283</b>
<b>Payroll</b>	<b>\$8.2</b>
<b>Office, retail and warehouse</b>	<b>39.6 million sq. ft.</b>
<b>Apartments, hotel rooms, condo units</b>	<b>11,324</b>



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# Real Estate

## Fourth Quarter 2017

**Charles J. Spiller**  
Deputy Chief Investment Officer, Non-Traditional Investments

**October 11, 2018**