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PUBLIC

Real Assets Portfolio Review

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Agenda

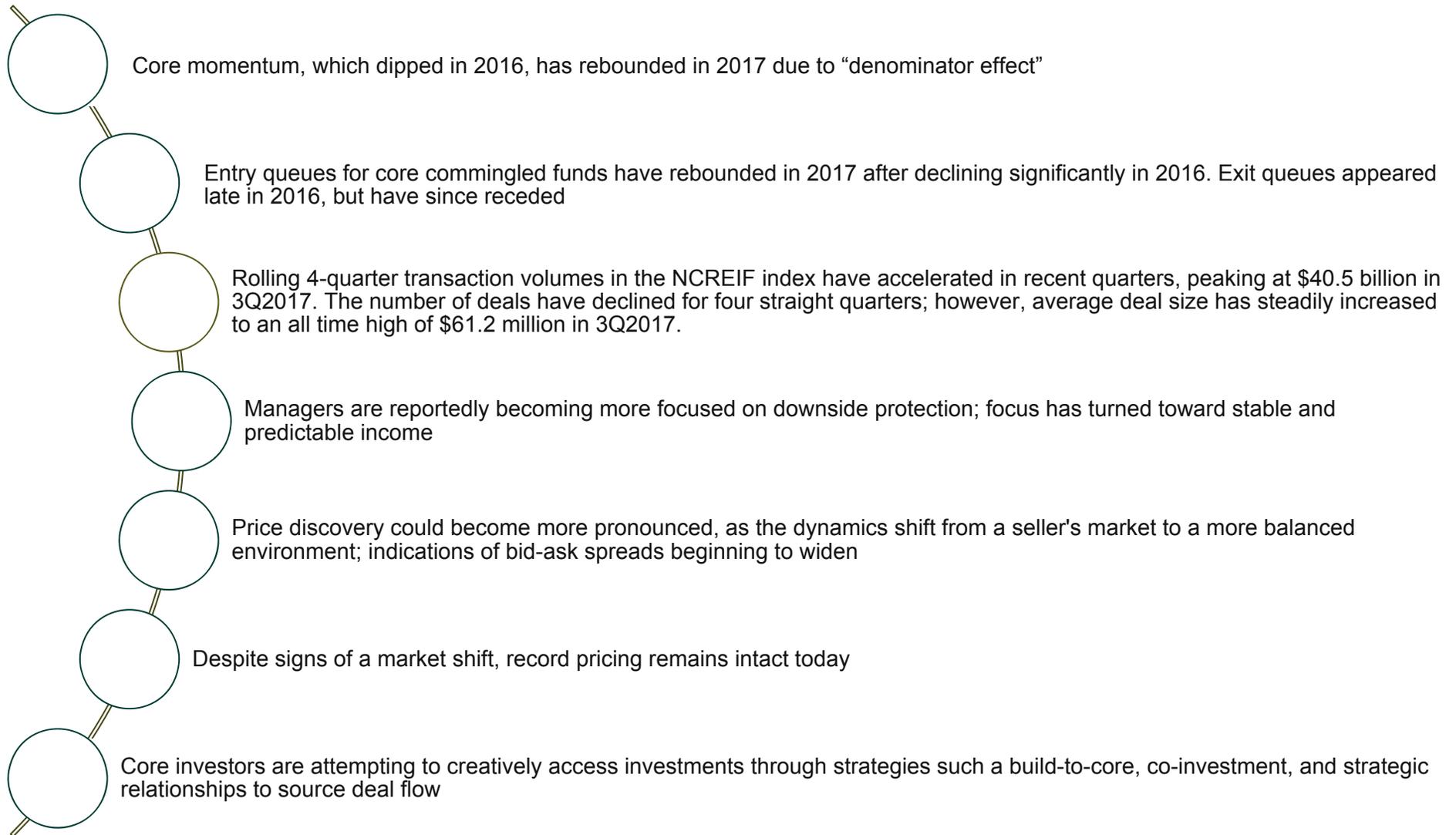
- Real Estate Portfolio Review
 - Market Overview
 - CTPF Portfolio Summary
 - Real Estate Performance Review
- Infrastructure Portfolio Review
 - Market Overview
 - CTPF Portfolio Summary
 - Infrastructure Performance Review
- Appendix
 - Glossary of Terms



Real Estate Market Overview

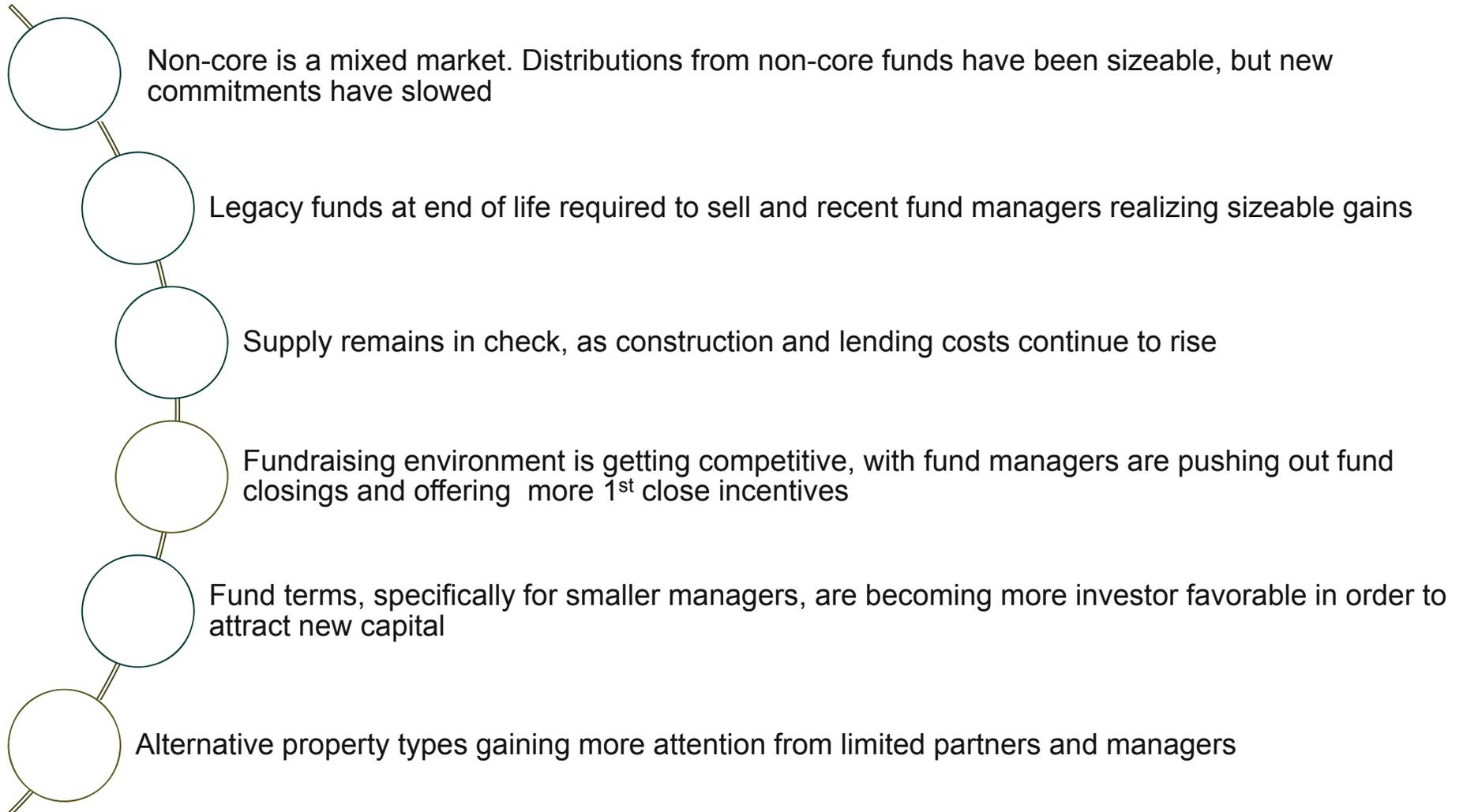
Real Estate Market Overview

Core U.S. Real Estate Market



Real Estate Market Overview

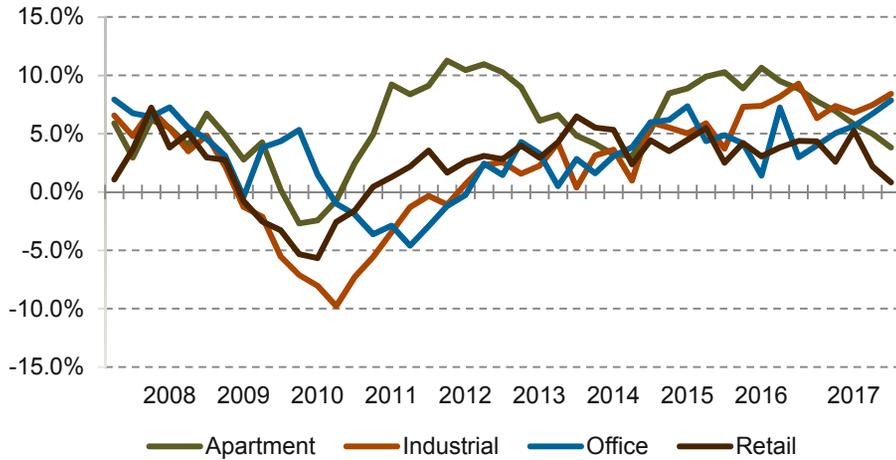
Non-Core Real Estate Market



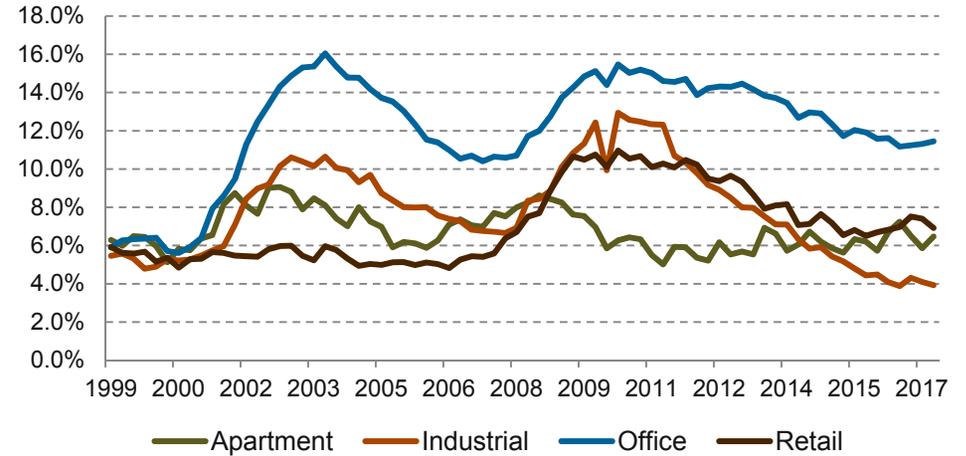
Market Overview

U.S. Market Trends

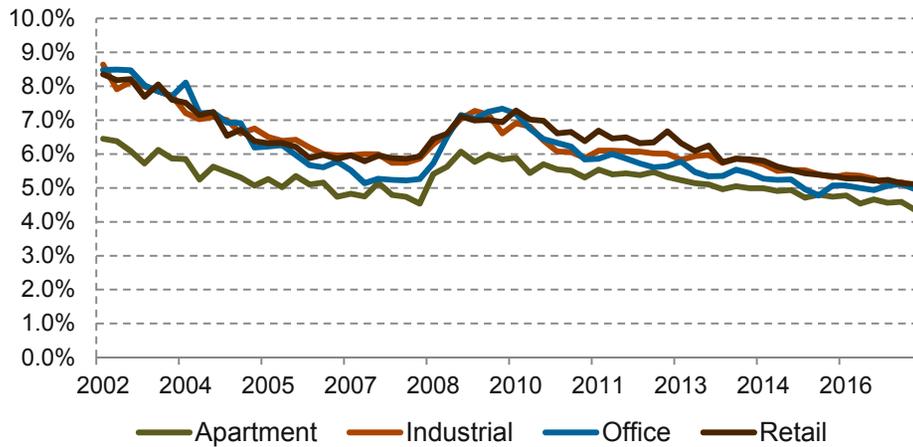
4-Quarter NOI Growth by Property Type



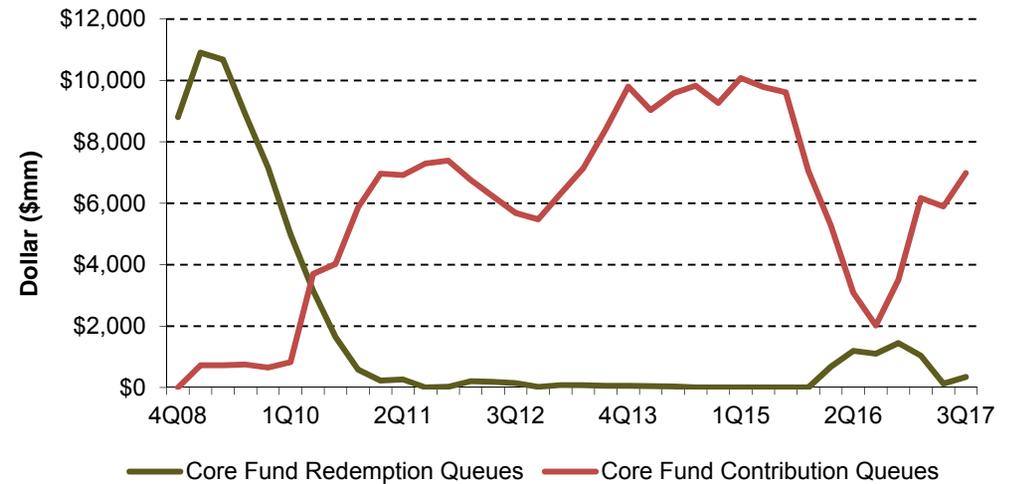
Vacancy by Property Type



Current Value Cap Rates by Property Type



Core Open-End Fund Entry & Exit Queues



Source: NCREIF



Real Estate Performance Review

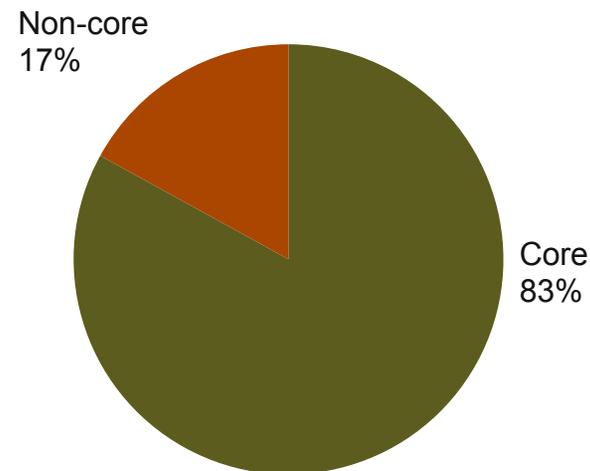
Real Estate Portfolio Summary

September 30, 2017

- Portfolio is below the target allocation.
- Unfunded commitments as of September 30 include commitments to GreenOak US Fund III, Blackstone High Grade Debt Fund, Oak Street Real Estate Capital Fund IV, IC Berkeley, and Newport Capital Partners II.
- Subsequent to quarter end two additional commitments were approved by the Board for \$50 million and are in negotiation
- Portfolio is well positioned with 83% of the portfolio in funds that pursue “Core” strategies with income producing properties.

	\$ Millions	(%)
CTPF Total Plan Assets	\$10,794.06	100.00%
Real Estate Target	\$971.47	9.00%
Plan's Real Estate Market Value	\$746.69	6.92%
Unfunded Commitments	\$94.19	0.87%
Market Value & Unfunded Commitments	\$841.88	7.79%

Real Estate Portfolio Risk

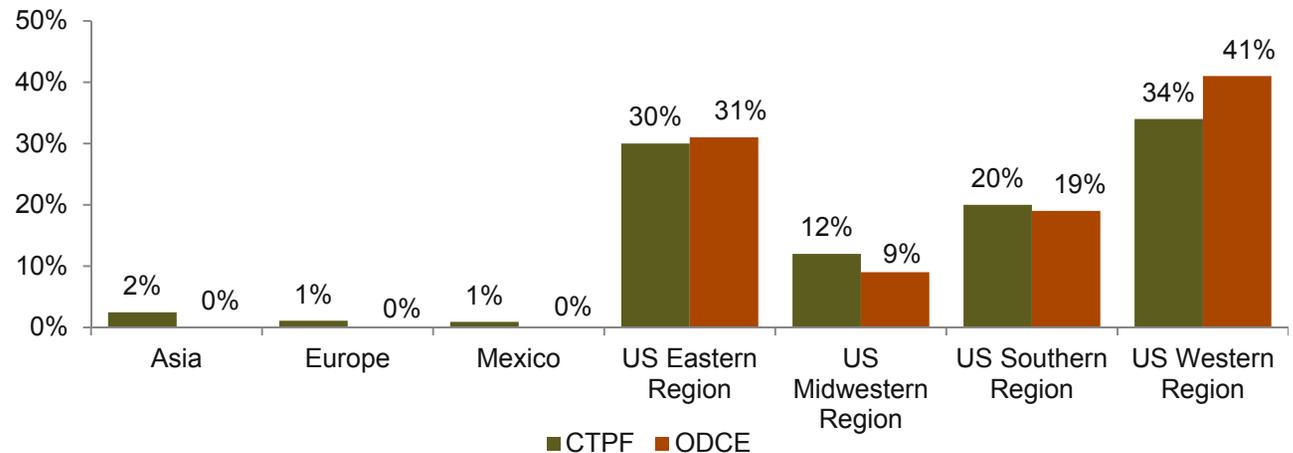


Real Estate Portfolio Diversification

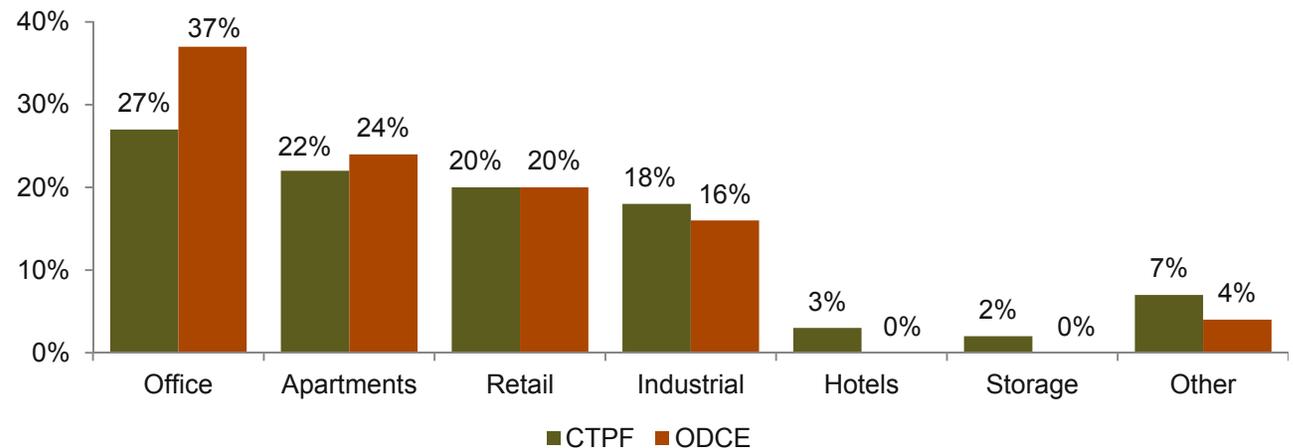
September 30, 2017

- The real estate portfolio is primarily U.S. at 96% with 4% in Non-U.S. markets including Asia, the United Kingdom, Continental Europe and Mexico.
- Four core property types comprise 87% of the portfolio. Hotels, Storage and Other comprise 13%. Property Types in Other include mixed use, medical office, for sale residential, senior housing, land, diversified, and for sale residential. ODCE does not break Storage out from other.

Geographic Diversification



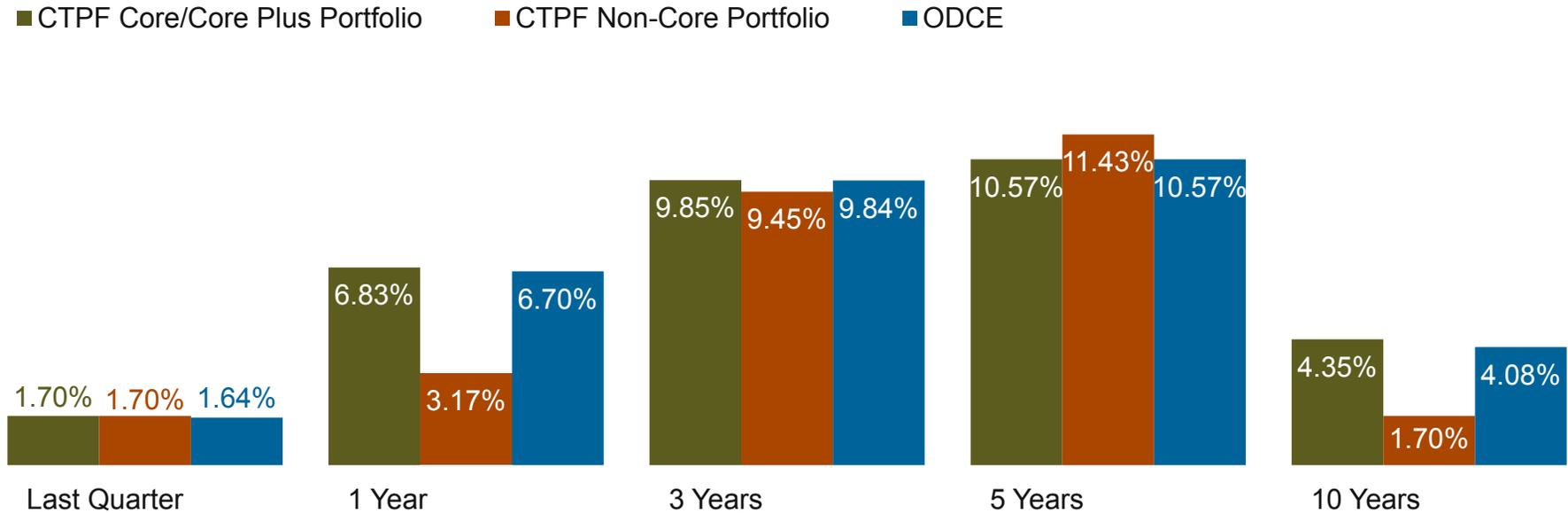
Property Type Diversification



Note: Subtotals reflect actual weights, not the sum of rounded weights shown.

Core/Core Plus and Non Core Real Estate Returns

Periods Ending September 30, 2017



Performance numbers in this presentation are based on quarterly data collected from CTPF investment managers and calculated by Callan Associates beginning in the fourth quarter of 2015. Quarterly performance history prior to the fourth quarter of 2015 was calculated and provided to Callan by the previous consultant, The Townsend Group. ODCE refers to the NFI-ODCE Value-Weight Index is a time-weighted return Index with an inception date of 12/31/1977. The Index is comprised of 33 open-end commingled funds, in which y 23 are still actively investing. Full definition is contained in the Appendix.



Infrastructure Portfolio Review

Agenda

Infrastructure Portfolio Review

- Market Overview
- CTPF Portfolio Summary
- Infrastructure Performance Review



Market Overview

January 2018 Infrastructure Headlines in the U.S.

White House to release \$1 trillion
infrastructure spending plan
this month

Maryland receives 27 responses for
\$9b highway expansion project

**Trump signs 2 orders to expand broadband internet
access in rural America**

**Florida Power & Light
brings 4 new solar plants
online, retires coal facility**

What is the Driver for U.S. Infrastructure Investment Today?

Aging Infrastructure, Renewable Energy Targets and U.S. Energy Discoveries

Sector	Demand driver	Infrastructure Type
Energy	Development of oil and shale resources in the US	Mid-stream energy related transmission and storage
Power	Trend for reduced carbon emissions and non-nuclear power	Wind, solar, hydro, geothermal power
Transportation	Increased demand, historic underinvestment and aging infrastructure	Airports, roads, ports, water utilities, wastewater systems
Communications	Increased demand with new technology	Telecom, fiber optic, cellphone towers
Social	Insufficient municipal budgets	Healthcare, judicial, education facilities Public Private Partnerships (PPP or P3)



Key Characteristics of an Infrastructure Asset

Long-lived assets critical to society

- Tangible assets
- Extended useful lives
- Difficult to replace

Steady, sustainable cash flows with high predictability

- Contractual agreements
- Regulatory frameworks
- Limited commodity exposure
- Long term contracts

Significant barriers to entry

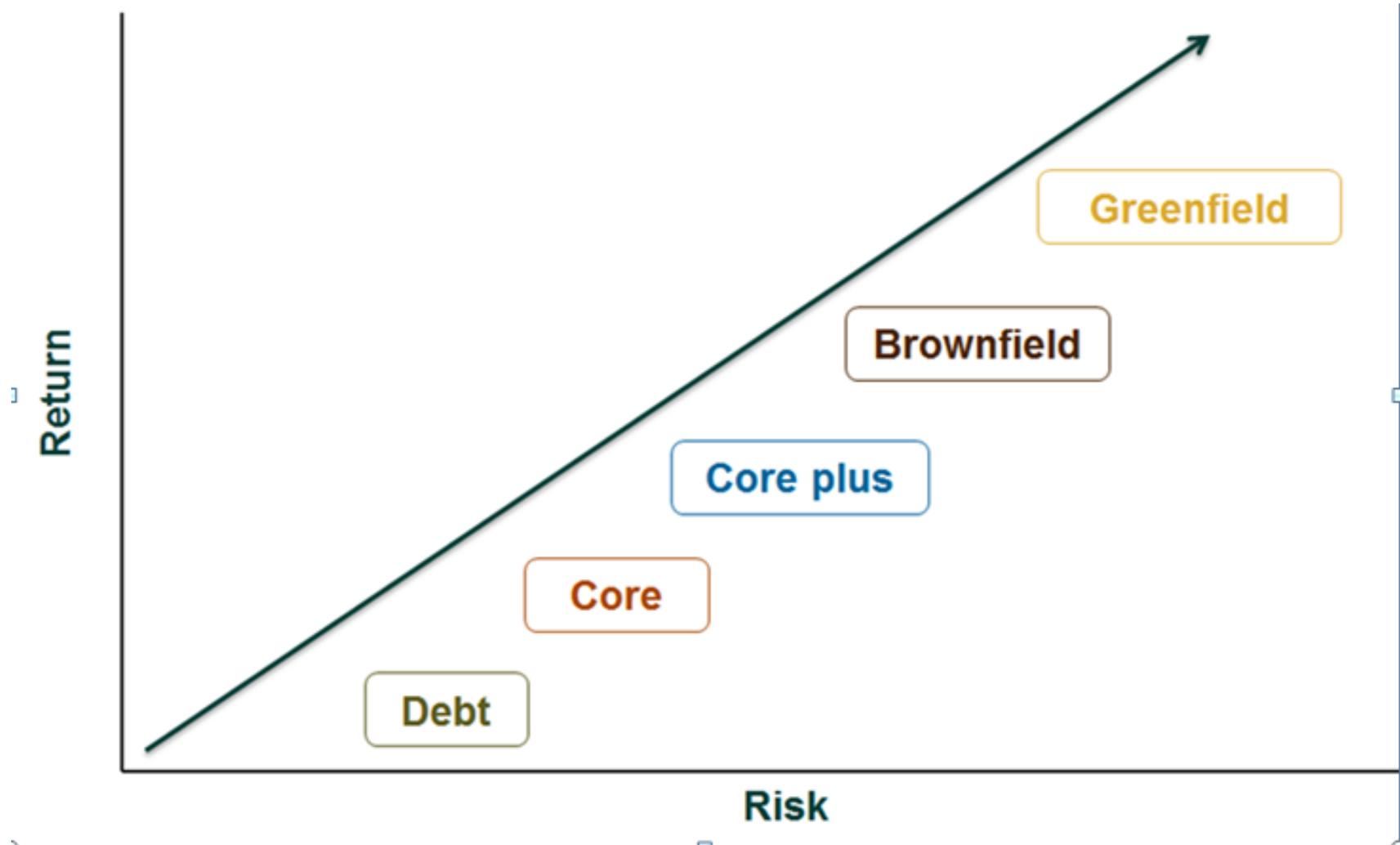
- High upfront costs
- Other obstacles that make it difficult to enter market

Attractive risk-adjusted returns

- High operating margins, not linked to business cycles
- Inflation protections

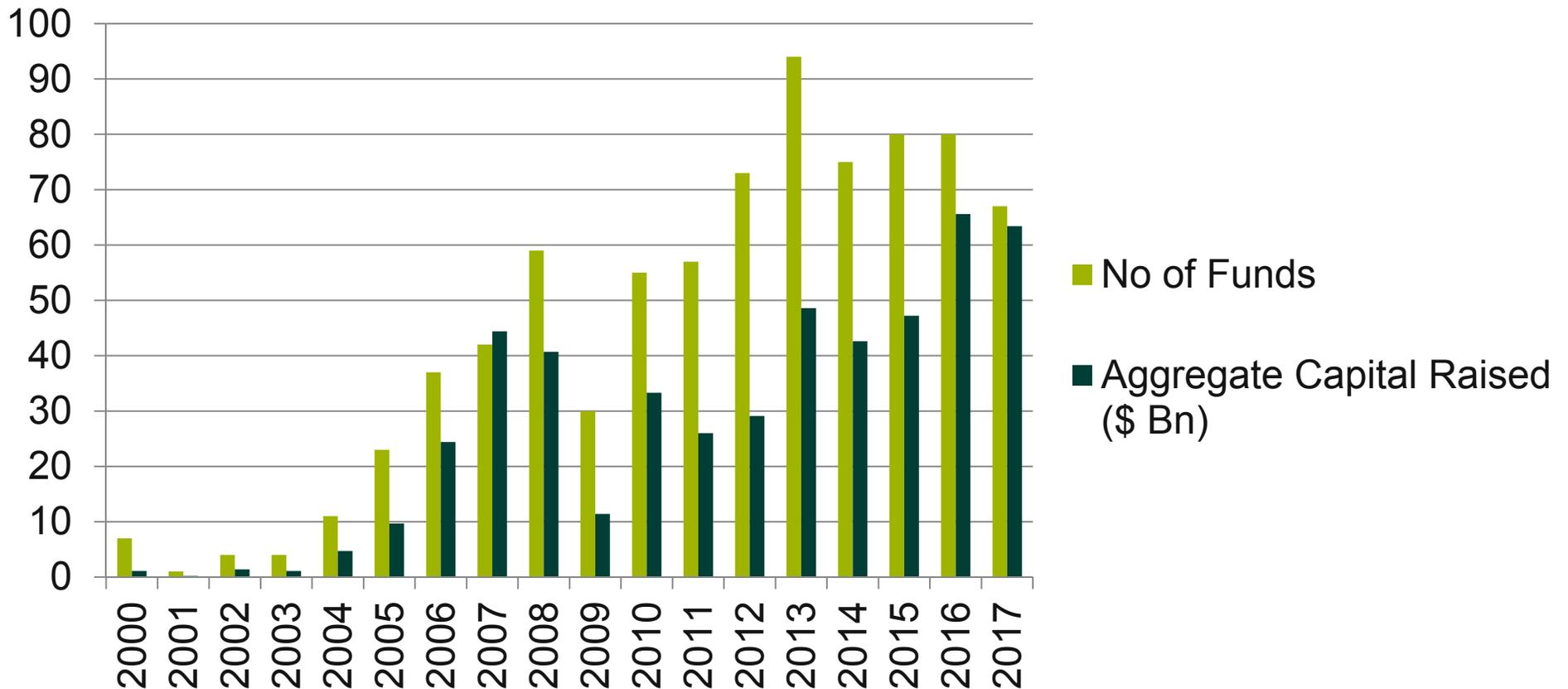
Infrastructure Offers a Range of Risk and Return

Greenfield is like Opportunistic Real Estate, Other Strategies Offer More Income Potential



Infrastructure Fundraising Trends – Over \$60 Billion Raised in Both 2016 and 2017

Mega Funds are Increasingly Large



- In 2016, Brookfield Infrastructure Partners III raised \$14.0 Bn compared to \$7 Bn in 2013 for the prior fund.
- In 2017: Global Infrastructure Partners III raised \$15.8 Bn, compared to \$8.25 Bn in 2012 for the prior fund.

Source: Preqin, January 2018

Infrastructure Investor Sentiment

Infrastructure Investor's Primary Concerns are Similar to Other Asset Classes

2016	%	2017	%
Lack of experienced fund managers	34%	Too much new money entering the sector, affecting future returns	68%
Too much new money entering the sector, affecting future returns	31%	The market feels like we are at or near the top of the cycle	62%
The amount of leverage that has been used by some of my fund managers	28%	The amount of leverage that has been used by some of my fund managers	22%
Standard fee levels on brownfield-focused funds are eating away at my returns	23%	The lack of operational capabilities on many fund managers teams	19%

Source: Probitas, 2017 Infrastructure Investor Survey



Performance Review

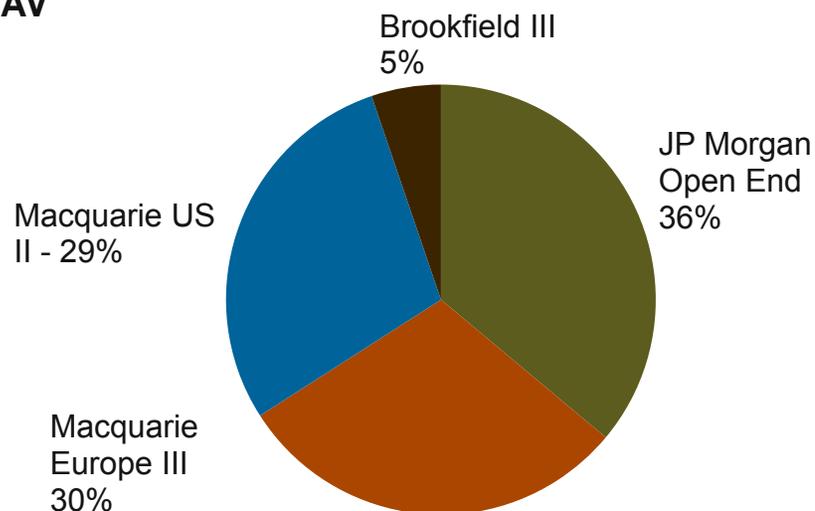
Infrastructure Portfolio Summary

September 30, 2017

- Infrastructure comprised 2.48% of the total portfolio (\$268 M) on a funded basis compared to a target of 2%, and a range of 0-4%.
- CTPF began investing in infrastructure in 2008.
- Brookfield Infrastructure Fund III represents the majority of unfunded commitments. The Fund is actively investing.
- In Q4 2017 - Macquarie Europe III issued a distribution of EUR 44M (\$53M) to CTPF, which reduces the market value for the portfolio.
- The portfolio has limited manager diversification.

	\$ Millions	(%)
CTPF Total Plan Assets	\$10,794.06	100.00%
Infrastructure Target	\$215.88	2.00%
Plan's Infrastructure Market Value	\$268.05	2.48%
Unfunded Commitments	\$40.91	0.38%
Market Value & Unfunded Commitments	\$308.96	2.86%

Fund NAV

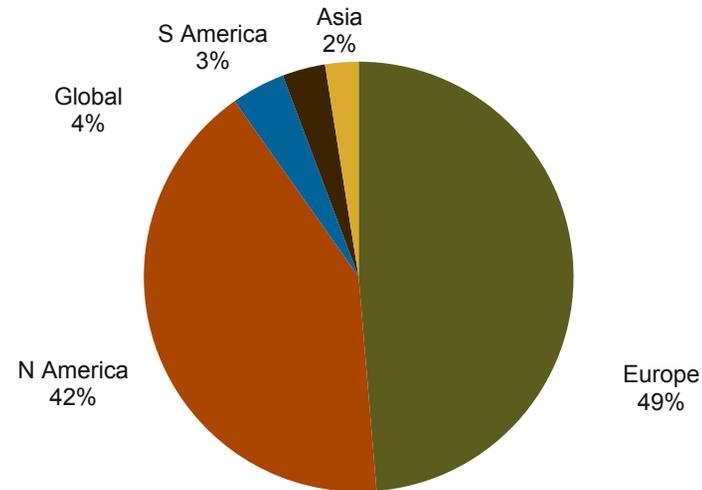


Portfolio Diversification

September 30, 2017

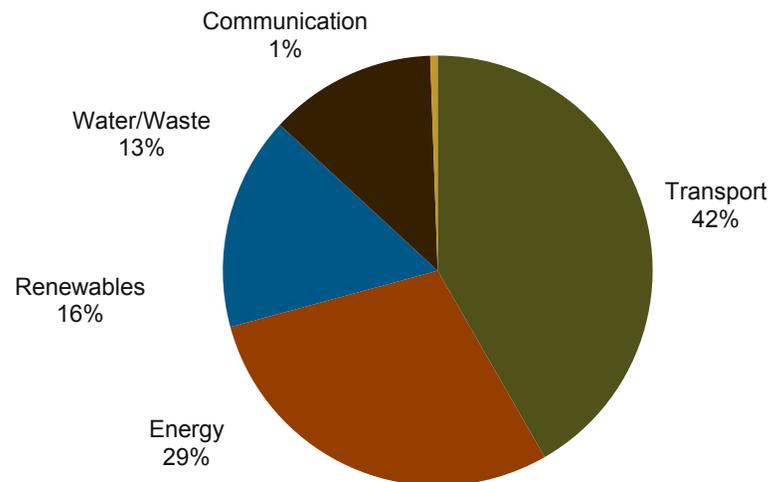
- By geography, the portfolio has the largest exposure in major developed markets.

Geography



- By sector, transportation comprised the largest share, reflecting the airports exposure in the Macquarie Europe fund.

Sector



Infrastructure Performance

As of September 30, 2017

- Total infrastructure investments exceeded 3Q17 benchmark (8% annualized) by 617 bps and one year return by 1044 bps, respectively. This outperformance was driven by:
 - Improved performance of the JP Morgan Fund as the negative impact of currency was reduced.
 - The very strong Macquarie Europe III exit of the Copenhagen airport and associated mark-up of value helped deliver strong returns for 2017. Macquarie claims to be conservative with its valuations.
- On a three year average basis, investments outperformed benchmark slightly, by 10 bps.
- On a five year average basis, investments underperformed benchmark by 105 bps.
- Similar to real estate non core funds, performance of the closed end infrastructure funds should be evaluated over the long term and on an IRR and equity multiple basis and compared to their stated return targets.
 - Both Macquarie funds, vintage 2008, will exceed their initial targeted fund life and have underperformed return targets, in part due to the impact of the GFC.
 - Brookfield Infrastructure III had \$36M of uncalled capital at September 30, 2017 and is likely to be significantly called by late 2018.



Glossary of Terms

Definitions

Style Groups

Total Real Estate DB: The Total Real Estate Funds Database consists of both open and closed-end commingled funds managed by real estate firms that report to the Callan Database.

Open-End Real Estate: The Open-End Real Estate Database consists of all open end real estate funds that report to the Callan Database.

Real Estate Value Added: The Real Estate Value Added Database consists of all real estate funds that manage to a value add strategy and report to the Callan Database.

Real Estate Opportunistic: The Real Estate Opportunistic Database consists of all real estate funds that manage to a value add strategy and report to the Callan Database.

REIT Global DB: The REIT Global Database consists of products investing in global equity real estate through portfolios consisting primarily of equity Real Estate Investment Trusts (REIT). The Database is comprised of returns for both separate account composites and commingled vehicles.

*The above groups are based on time-weighted returns.

Vintage Year Database Groups: The Vintage Year Groups are comprised of all funds that report to the database with the initial drawdown taking place in the labeled year. These groups are based on IRRs derived from the cash flows submitted to the Callan Database.

Indices

Stylized Index: Weights the various style group participants to be comparable to the investor portfolio holdings for each period.

NAREIT Equity Index: This is an index of Equity Real Estate Investment Trust returns reflecting the stock value changes of REIT issues as determined through public market transactions.

The NFI-ODCE Value-Weight Index is a time-weighted return Index with an inception date of 12/31/1977. The Index is comprised of 33 open-end commingled funds, in which 23 are still actively investing. Inclusion within the Index requires (a) minimum of 80% of net fund assets invested in the multifamily, retail, industrial, office, or hotel property type, (b) maximum of 20% of net fund assets invested in real estate debt or private/public company equity, (c) at least 80% of net assets invested in properties with a minimum occupancy of 60%, (d) no more than 70% of real estate net assets invested in a single property type or region, (e) maximum of 40% leverage, and (f) at least 95% of net real estate assets invested within the U.S. market.

Definitions

Terms

Beginning Market Value: Value of real estate, cash and other holdings from prior period end.

Contributions: Cash funded to the investment for acquisition and capital items (i.e., initial investment cost or significant capital improvements).

Distributions: Actual cash returned from the investment, representing distributions of income from operations. **Withdrawals:** Cash returned from the investment, representing returns of capital or net sales proceeds.

Ending Market Value: The value of an investment as determined by actual sales dollars invested and withdrawn plus the effects of appreciation and reinvestment; market value is equal to the ending cumulative balance of the cash flow statement (NAV).

Unfunded Commitments: Capital allocated to managers which remains to be called for investment. Amounts are as reported by managers.

Remaining Allocation: The difference between the ending market value + the unfunded commitments and the target allocation. This figure represents dollars available for allocation.

Core: Direct investments in operating, fully leased, office, retail, industrial, or multifamily properties using little or no leverage (normally less than 30%).

Value-Added: Core returning investments that take on moderate additional risk from one or more of the following sources: leasing, re-development, exposure to non-traditional property types, the use of leverage.

Opportunistic: Investments that take on additional risk in order to achieve a higher return. Typical sources of risks are: development, land investing, operating company investing, international exposure, high leverage, distressed properties.

Non Core: Includes both value added and opportunistic strategies

Vintage Year: Year of first drawdown

Definitions

Performance

Capitalization rate: Commonly known as cap rate, is a rate that helps in evaluating a real estate investment. $\text{Cap rate} = \text{Net operating income} / \text{Current market value (Sales price) of the asset}$.

Net operating income: Commonly known as NOI, is the annual income generated by an income-producing property after taking into account all income collected from operations, and deducting all expenses incurred from operations.

Real Estate Appraisal: The act of estimating the value of property. A real estate appraisal may take into account the quality of the property, values of surrounding properties, and market conditions in the area.

Income Return (“INC”): Net operating income net of debt service before deduction of capital items (e.g., roof replacement, renovations, etc.)

Appreciation Return (“APP”): Increase or decrease in investment's value based on internal or third party appraisal, recognition of capital expenditures which did not add value or uncollectible accrued income, or realized gain or loss from sales.

Total Gross Return: The sum of the income return and appreciation return before adjusting for fees paid to and/or accrued by the manager.

Total Net Return: Total gross return less Advisor fees reported. All fees are requested (asset management, accrued incentives, paid incentives). No fee data is verified.

Inception Returns: The total net return for an investment or portfolio over the period of time the client has funds invested. Total portfolio Inception Returns include returns from investments no longer held in the current portfolio.

Net IRR: IRR after advisory fees, incentive and promote. This includes actual cash flows and a reversion representing the LP Net Assets at market value as of the period end reporting date.

Equity Multiple: The ratio of Total Value to Paid-in-Capital (TVPIC). It represents the Total Return of the investment to the original investment not taking into consideration the time invested. Total Value is computed by adding the Residual Value and Distributions. It is calculated net of all investment advisory and incentive fees and promote.

DPI Multiple: The ratio of distributions paid to the investor divided by the amount of contributions paid by the investor. It is calculated net of all investment advisory and incentive fees and promote.

Sharpe Ratio: Sharpe Ratio is a measure of the risk-adjusted return of a portfolio. The ratio represents the return gained per unit of risk taken. The risk of the portfolio is the Standard Deviation of the portfolio returns.

NCREIF Region Map

Geographic Regions and Divisions



Source: NCREIF

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