Agenda

- Market Overview
- Real Estate
  - Performance Review
  - Portfolio Summary
- Infrastructure
  - Performance Review
  - Portfolio Summary
  - Pacing Study
- Infrastructure Appendix
- Glossary of Terms
- Disclosures
Market Overview

Real estate supply and demand fundamentals are generally healthy except for traditional malls

• Overall economic environment is positive for real estate

• Vacancy rates are below their 20 year averages in every major sector. Within the NCREIF Property Index, the vacancy rate for U.S. property was 5.7%.

• NOI has been growing annually due to occupancy gains and increases in rent.

• There is dispersion within the property sectors
  - Suburban office has outperformed central business district office
  - Neighborhood retail has been a relative bright spot compared to malls
  - Garden and low rise apartments lead the strong multi family sector while high rise has lagged.
  - Industrial is strong across all sub sectors

• Not all markets are created equal
  - Northeast primary markets have underperformed Southeast and West Coast markets driven by affordability in the Southeast and tech driven growth on the West Coast.

Source: NCREIF (National Council of Real Estate Investment Fiduciaries). Net Operating Income ("NOI")
## Market Overview

### Return Expectation Survey of Institutional Investors Third Quarter 2019

<table>
<thead>
<tr>
<th></th>
<th>ACTUAL</th>
<th>EXPECTED</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NPI Total Return</td>
<td>6.7%</td>
<td>4.7%</td>
<td>6.5%</td>
<td>5.3%</td>
<td>4.5%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Income Return</td>
<td>4.6%</td>
<td>3.3%</td>
<td>4.5%</td>
<td>4.5%</td>
<td>4.6%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Capital Appreciation</td>
<td>2.1%</td>
<td>1.4%</td>
<td>2.0%</td>
<td>0.8%</td>
<td>-0.1%</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

### Appraisal Cap Rates by Property Type 1999- Q3 2019

![Cap Rate Chart]

Source: PREA, NCREIF, AEW Capital Management. Note: Retail definitions in appendix. Cap rate levels chart shows historic range (hi to low) with the average indicated by the diamond and the current cap rates shown as the numeric value. Red indicates cap rates have decreased over last year. Blue indicates cap rates have increased over the past year. The width of band represents the range in cap rates over the last year.
Infrastructure Fundraising Momentum Continues

2019 is expected to be a strong fundraising year with two mega-funds, both in excess of $20 billion.

- Open end funds are raising significant capital and the universe of investible funds continues to increase as the sector matures.
- The closed end fund market continues to expand, with additional offerings in infrastructure debt, emerging markets and sector-specific (e.g. communications and renewables).

Source: Preqin
Real Estate Portfolio Summary

September 30, 2019

- CTPF's market value is slightly below the target allocation. Dividends are being reinvested into core funds and additional capital is being invested into PRISA II, Clarion LIT and LaSalle Property Fund.

- Unfunded commitments include: Basis Investment Group Real Estate Fund I, GreenOak US Fund III, Heitman Value Partners IV, Longpoint Fund I, Long Wharf VI, Oak Street Seeding Fund II, Oak Street Real Estate Capital Fund IV, Newport Capital Partners II and TA Realty XII.

- Portfolio is well positioned with 85% of the market value in funds that pursue “Core” strategies with income producing properties.

<table>
<thead>
<tr>
<th></th>
<th>$ Millions</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTPF Total Plan Assets</td>
<td>$10,737.32</td>
<td>100.00%</td>
</tr>
<tr>
<td>Real Estate Target</td>
<td>$966.36</td>
<td>9.00%</td>
</tr>
<tr>
<td>Plan's Real Estate Market Value</td>
<td>$805.67</td>
<td>7.50%</td>
</tr>
<tr>
<td>Unfunded Commitments*</td>
<td>$186.79</td>
<td>1.74%</td>
</tr>
<tr>
<td>Market Value &amp; Unfunded Commitments*</td>
<td>$992.46</td>
<td>9.24%</td>
</tr>
</tbody>
</table>

*Unfunded commitments is reduced by the UBS NAV of $72 million which is in the redemption queue.
Real Estate Portfolio Diversification

September 30, 2019

- The real estate portfolio is primarily located in the U.S. with only 2% 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, for sale residential, student housing, land, diversified, parking, and health care. ODCE does not break Storage out from Other.

- Diversification will shift as new commitments are called and old funds sell properties.

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, 2019

<table>
<thead>
<tr>
<th>Period</th>
<th>CTPF Core/Core Plus Portfolio</th>
<th>CTPF Non-Core Portfolio</th>
<th>CTPF Total Real Estate Portfolio</th>
<th>Performance Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Quarter</td>
<td>1.25%</td>
<td></td>
<td>0.79%</td>
<td></td>
</tr>
<tr>
<td>1 Year</td>
<td>5.18%</td>
<td>5.12%</td>
<td>4.64%</td>
<td></td>
</tr>
<tr>
<td>3 Years</td>
<td>5.22%</td>
<td>6.72%</td>
<td>6.95%</td>
<td></td>
</tr>
<tr>
<td>5 Years</td>
<td>5.18%</td>
<td>6.52%</td>
<td>6.34%</td>
<td></td>
</tr>
<tr>
<td>10 Years</td>
<td>1.18%</td>
<td>8.56%</td>
<td>9.22%</td>
<td>10.39%</td>
</tr>
</tbody>
</table>

- Five of seven funds in the Core/Core Plus Portfolio outperformed the benchmark in the quarter. Lion Industrial Fund, driven by the outperformance of the industrial sector was the best overall performer. Lion Industrial Trust, PRISA and LaSalle Property Fund all delivered income and appreciation above the benchmark. PRISA II and BREDs High Grade income returns were below the benchmark.

- JP Morgan and UBS underperformed the benchmark in the quarter. CTPF is in the exit queue redeem out of the UBS Fund and has been receiving redemption distributions since October 2018.

- The Non-Core Portfolio performance was driven by strong results from Heitman Value Partners IV and Oak Street Fund IV. Walton Street funds lagged in the Non-Core Portfolio.

Performance numbers in this presentation are based on quarterly data collected from CTPF investment managers and calculated by Callan 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. Benchmark is the NFI-ODCE Value-Weight Index, 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. Full definition is contained in the Appendix.
Infrastructure Portfolio Summary

September 30, 2019

- Infrastructure comprised 2.22% of the total portfolio on a market value basis compared to a target of 2%, and range of 0-4%.

- CTPF made its first infrastructure investments in 2008 and 2009: one core fund and two non-core funds.

- In the past four years, CTPF has made commitments to five additional funds: two core funds and three non-core funds.

- The portfolio will become more core as the two core fund commitments are called.

<table>
<thead>
<tr>
<th></th>
<th>$ Millions</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTPF Total Plan Assets</td>
<td>$10,737.32</td>
<td>100.00%</td>
</tr>
<tr>
<td>Infrastructure Target</td>
<td>$214.75</td>
<td>2.00%</td>
</tr>
<tr>
<td>Plan’s Infrastructure Market Value</td>
<td>$238.20</td>
<td>2.22%</td>
</tr>
<tr>
<td>Unfunded Commitments</td>
<td>$93.85</td>
<td>0.87%</td>
</tr>
<tr>
<td>Market Value &amp; Unfunded Commitments</td>
<td>$332.05</td>
<td>3.09%</td>
</tr>
</tbody>
</table>

**Market Value**

Core 38%

Non-core 62%
Portfolio Diversification Based on Market Value

September 30, 2019

- Majority of the portfolio is in developed markets.

- Non-OECD* exposure includes investments in Brazil (data centers, transport, renewables and utilities), India (renewables) and China (renewables) by the Brookfield funds.

- Other is comprised primarily of Australian investments.

- By sector, transportation comprised the largest share of the portfolio.

- Utilities, renewables and energy together comprised over half of the portfolio.

- Other is comprised primarily of communication investments.

*Organisation for Economic Co-operation and Development ("OECD"): 36 member countries that represent circa 80% of world trade.
Portfolio – Share of Funded and Unfunded Commitments

September 30, 2019

Unfunded Commitments

- $35 million to IFM Infrastructure (open-end, global), which was called in Q4 2019.
- $15 million to Ullico Infrastructure (open end, US focus) which is expected to be called in 2020.
- $34 million to Brookfield Infrastructure Fund III and IV (closed-end, global focus), likely called in the next three years.
- $10 million to JLC Infrastructure I (closed-end, US focus), likely called in the next three years.
JP Morgan, IFM and Ullico are core funds, which continuously make new investments.

Brookfield IV and JLC will be making new investments in the next three years.

Macquarie exposure decreased in Q4 2019 with multiple asset sales.
Infrastructure Portfolio Performance

Periods Ending September 30, 2019

- Infrastructure is a developing asset class and as of today, there is no industry standard benchmark for private infrastructure investors.

- The CTPF infrastructure portfolio outperformed the benchmark during the Three and Five year periods. Brookfield Infrastructure III has delivered strong income performance.

- Three Year performance was strong in-part due to the Macquarie European Infrastructure III exit of the Copenhagen airport at an attractive valuation in Q4 2017.

In the fourth quarter of 2017, the annualized 8% infrastructure benchmark was replaced with the FTSE Developed Core Infrastructure 50/50 Index.
Pacing Study Background

- Diversification across strategies and vintage years is an important risk management tool in infrastructure investing.

- Callan performs an annual pacing study to examine the expected contributions and distributions into and out of CTPF’s infrastructure portfolio.

- The closed end fund portion of the infrastructure portfolio is fairly lumpy due to the size of the underlying infrastructure assets compared to the size of the funds, resulting in large distributions and contributions.

- Pacing in the past has been uneven which impacts the projections.

- Every year the projection model is adjusted to reflect changes in:
  - CTPF’s total plan and total plan growth rate
  - The uncalled commitment balance
  - The infrastructure net asset value
  - Projected returns

- The pacing study forecasts how much additional capital is required annually to keep CTPF invested close to its 2% infrastructure target and within the asset allocation range of 0-4%.
CTPF Infrastructure Commitment History

Infrastructure commitments are becoming more even in size and pace

- CTPF made its first infrastructure investments in 2008: a total of $132M in two non-core Macquarie funds.
- In 2009, CTPF invested $150M in JP Morgan (core).
- In 2016, CTPF committed $50M to Brookfield III (non-core).
- In 2018, CTPF committed to two core funds: IFM ($35M) and Ullico ($15M).
- In 2019, CTPF committed to two non-core funds: Brookfield IV ($25M) and JLC Infrastructure ($10M).
Projection Model Funded-Level Forecast

Projected Annual Commitments

<table>
<thead>
<tr>
<th>Vintage Year</th>
<th>Commitment ('000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>$40,000</td>
</tr>
<tr>
<td>2021</td>
<td>-</td>
</tr>
<tr>
<td>2022</td>
<td>$40,000</td>
</tr>
<tr>
<td>2023</td>
<td>$40,000</td>
</tr>
<tr>
<td>2025</td>
<td>-</td>
</tr>
</tbody>
</table>

- An average annual commitment amount of $24 million over the next five years is forecast; projections past that time period are less reliable. The amounts per year are variable and impacted by distributions and each manager’s fundraising, deployment, and distribution schedule.

- Potential distributions of $25 million in each of the next 3 years based on manager indications. Pacing study is performed annually and commitment pacing for 2020 and beyond may be adjusted based on actual activity.

- With the addition of open-end fund commitments in 2018 and the wind up of the large closed-end commitments to Macquarie US/Europe portfolios, the portfolio pacing is becoming more even.
Infrastructure Portfolio Conclusions and Recommendations

● To maintain the 2% target to infrastructure, new investment will be needed in 2020 and beyond
  – Follow annual pacing strategy to limit vintage year risk
  – Up to $40 million may be allocated to infrastructure funds in 2020
  – Monitor allocation and use open end fund(s) to rebalance portfolio if necessary

● Incorporate any potential allocation changes that result from the ongoing asset-liability study.

● Continue to seek qualified MWDBE managers.

● Consider investment with managers that are additive to the current portfolio mix in terms of strategy and to modestly increase manager diversification in the portfolio.

● 2020 recommendations
  – Conduct an infrastructure search for up to $40 million.
  – Evaluate opportunities to invest in the next fund in the series for existing managers.
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. Cap rate = Net operating income / 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 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

- **West North Central**: Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
- **East North Central**: Illinois, Indiana, Michigan, Ohio, Wisconsin
- **Northeast**: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
- **Mideast**: Delaware, Kentucky, Maryland, North Carolina, South Carolina, Virginia, Washington, DC, West Virginia
- **Pacific**: Alaska, California, Hawaii, Oregon, Washington
- **Mountain**: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
- **Southwest**: Arkansas, Louisiana, Oklahoma, Texas
- **Southeast**: Alabama, Florida, Georgia, Mississippi, Tennessee
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