

Public Agenda #6

Call Meeting of the Board of Trustees to Order

May 20, 2020

Public Agenda #7

Call Meeting of the Investment Advisory Committee to Order

May 20, 2020

Public Agenda #8

*Review and Approval of the Minutes to the March 11, 2020
Joint Meeting of the Board of Trustees and Investment
Advisory Committee – (Action)*

May 20, 2020

Questions?
Action Item

Public Agenda Item #9

Review and Consideration of Reappointment of Investment Advisory Committee Member – (Action – BOT)

May 20, 2020

Tom Tull, CFA, Chief Investment Officer

IAC Skills Assessment

	Term Expiration	Investment Experience	Global Equity	Fixed Income	Private Equity	Real Estate	Hedge Funds	Infrastructure	Derivatives
IAC Chair, Bob Alley, CFA Retired from AIM Advisors, Inc. as Chief Fixed Income Officer	8/31/2021	43 years	X	X	X				
IAC Vice-Chair, Gene L. Needles, Jr. Chairman and CEO Resolute Investment Management	5/31/2020	39 years	X	X	X	X	X		X
Caroline Cooley Managing Partner – Hedge Funds Crestline Investors, Inc.	12/31/2022	34 years		X			X		X
James Hille, CFA, CAIA CIO Texas Christian University Endowment	8/31/2020	27 years	X	X	X	X	X		
Ken Mindell Sr. VP, Treasurer & Director of Investments Rosewood Management Corporation	5/31/2022	38 years	X	X	X	X	X	X	X
Laurie Dotter Retired from Transwestern Corporation Properties as President	5/31/2022	35 years				X		X	
Didi Weinblatt, Ph.D., CFA Retired from USAA Investment Mgmt. Co as Vice President, Mutual Fund Portfolios	8/31/2020	38 years	X	X					
Milton Hixson, CPA, CFP CEO FMP Wealth Advisors	3/31/2023	46 years	X	X	X	X	X	X	

Questions?
Action Item - BOT

Public Agenda Item #10

Review, Discussion and Recommendation of Asset Allocation and Return Assumption – (*Action – IAC*)

May 20, 2020

Tom Tull, CFA, Chief Investment Officer
Sam Austin and Michael Malchenko, NEPC

NEPC 2020 INVESTMENT OUTLOOK

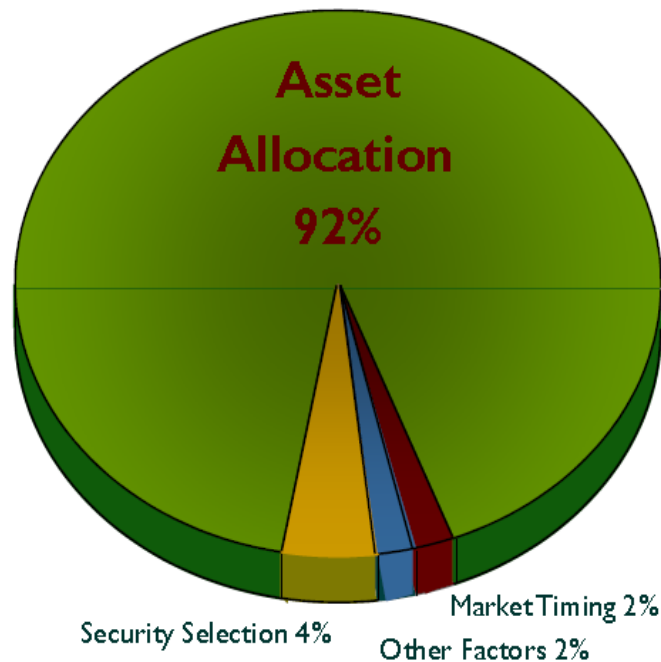
EMPLOYEES RETIREMENT SYSTEM OF TEXAS



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

ASSET ALLOCATION: THE KEY INVESTMENT DECISION

Determinants of Portfolio Performance



Source: *Determinants of Portfolio Performance II: An Update*, Brinson, et al, *Financial Analysts Journal*, May/June 1991, pp 40-48.

CURRENT ASSET ALLOCATION POLICY & RANGES

	Long-Term Target	Current Actual Allocation 12/31/2019	Long-Term Target Range	Benchmark
Return Seeking Assets				
Public Equity	37.0%	39.0%	27.0% - 47.0%	MSCI ACWI IMI
Private Equity	13.0%	14.7%	8.0% - 18.0%	Wilshire TUCS Public: Plans > \$5 Billion
Global Credit	11.0%	9.6%	1.0% - 21.0%	Barclays US HY 2%
Private Real Estate	9.0%	7.6%	4.0% - 14.0%	NCREIF – ODCE
Public Real Estate	3.0%	3.2%	0.0% - 13.0%	FTSE EPRA / NAREIT
Private Infrastructure	7.0%	3.0%	2.0% - 12.0%	CPI + 400 bps
Opportunistic Credit	3.0%	-	0.0% - 8.0%	S&P LSTA Leveraged Loan Index + 1.5%
Risk Assets: Reduction/Liquidity				
Total Rates	11.0%	17.1%	--	Barclays Intermediate Treasury
Absolute Return	5.0%	3.6%	0.0% - 10.0%	3-Month T-bill + 3.5%
Cash	1.0%	1.9%	0.0% - 1.0%	91 Day Treasury bill

CAPITAL MARKET FORECAST COMPARISON

	Asset Class	Policy Asset Allocation	2019 (5-7 Yr)		2020 (10 Yr) as of 11/30/2019		2020 (10 Yr) as of 3/31/2020	
			Return	Risk	Return	Risk	Return	Risk
Risk Seeking: 79%	Global Equity	37	7.00%	17.60%	6.21%	17.79%	7.72%	17.75%
	Private Equity	13	8.80%	19.60%	8.11%	19.66%	9.69%	19.66%
	Total Global Equity	50	7.50%	17.80%	6.67%	17.98%	8.28%	17.95%
	Global Credit	11	5.50%	11.80%	4.45%	11.89%	5.77%	11.89%
	Opportunistic Credit	3	6.80%	8.70%	6.04%	9.26%	6.47%	9.26%
	REITs	3	6.80%	20.00%	5.42%	20.00%	7.00%	20.00%
	Private Real Assets - Infrastructure/Land	7	6.30%	12.00%	5.91%	12.00%	6.20%	12.00%
	Private Real Estate	9	6.70%	14.50%	6.05%	15.87%	5.16%	15.87%
	Real Assets	19	6.80%	12.30%	6.19%	12.77%	6.14%	12.77%
Risk Reduction/ Liquidity Assets: 21%	Fixed Income - Rates	11	2.50%	4.70%	1.97%	4.65%	0.69%	4.65%
	Absolute Return**	5	6.50%	3.60%	6.50%	3.41%	6.50%	3.41%
	Cash	1	2.50%	1.00%	1.81%	1.00%	0.70%	1.00%

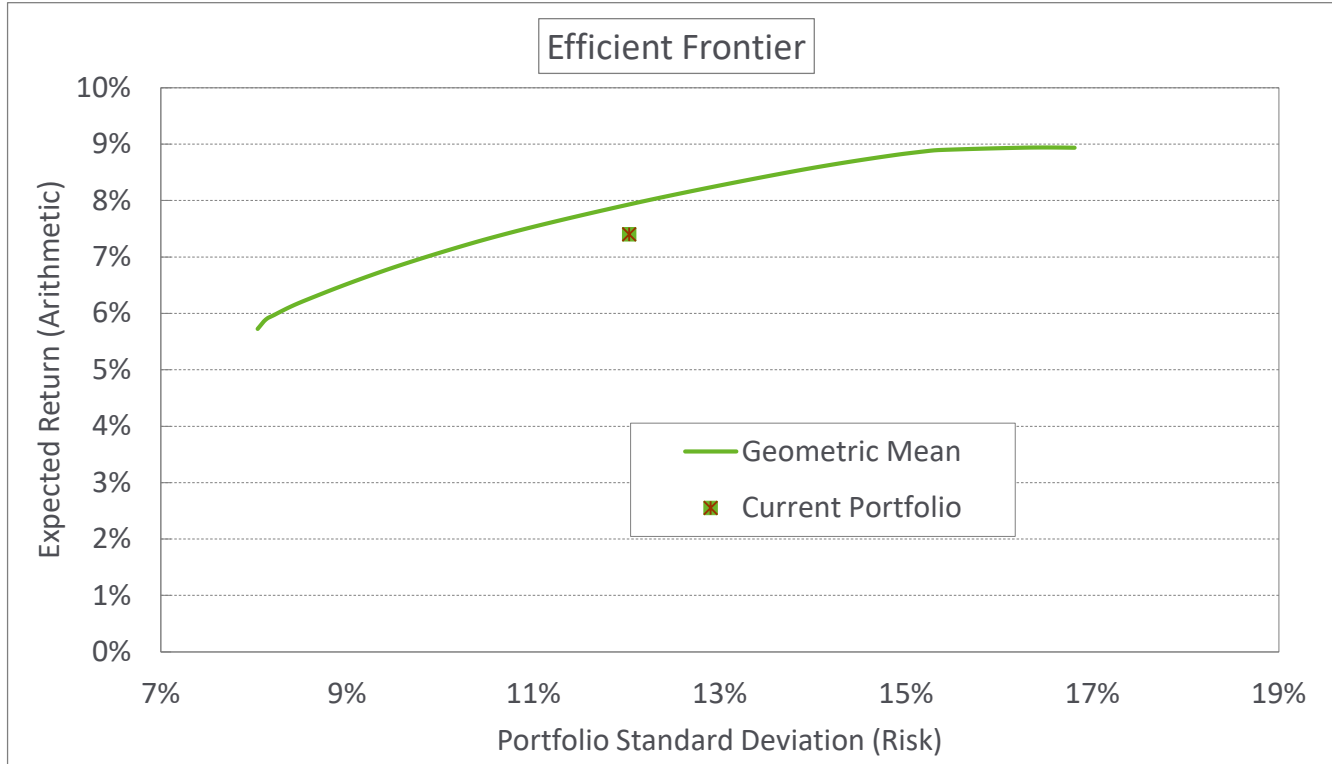
** Sourced from ERS Texas

EXPECTED RETURN COMPARISON 2019 VS 2020

	2019 Expectations as of 12/31/2018	2020 Expectations as of 11/30/2019	2020 Expectations as of 3/31/2020
5-7 Year Expected Return	6.68%	-	-
10 Year Expected Return	-	6.06%	6.82%
Standard Deviation (Asset)	12.00%	12.04%	12.03%
Sharpe Ratio	0.35	0.35	0.51
20 Year Expected Return	7.51%	6.41%	6.80%
30 Year Expected Return	7.75%	7.14%	7.40%

Return Probability			
10-Year Return Under 7.0%	-	59.79%	51.87%
20-Year Return Under 7.0%	42.4%	58.7%	53.0%
30-Year Return Under 7.0%	36.6%	47.45%	42.81%
10-Year Return Under 7.5%	56.65%	64.7%	57.08%
20-Year Return Under 7.5%	49.8%	65.7%	60.3%
30-Year Return Under 7.5%	45.45%	56.49%	51.85%

EFFICIENT FRONTIER 30 YR



Constraints:

Constrain Global Equity (US and International Equity to market weights)
Global Equity Min 30% max 60%
Private Equity Min 5% max 20%
Credit Min 1% max 21%
Opp Credit = 7%
Private Infrastructure Min 2% max 12%
Treasuries (5 Yr Duration) Min 7% max 20%
Hedge Funds Min 0% max 10%
Max total Private RE (Core + Non Core) = 15%
REITs = 3%

- Current portfolio is very close to the efficient frontier. The efficient frontier allows for an expanded opportunity set in private markets and therefore is less liquid than the current portfolio.

30 YEAR ASSET MIX OPTIMIZATION

	Asset Class	Policy Asset Allocation	Mix A	Mix B	Mix C	Mix D
Risk Seeking	Global Equity	37	30	30	30	30
	Private Equity	13	12.2	8.8	10	13.9
	Total Global Equity	50	42.2	38.8	40	43.9
	Global Credit	11	7.7	8.2	9.2	6
	Opportunistic Credit	3	7	7	7	7
	REITs	3	3	3	3	3
	Infrastructure	7	12	12	12	12
	Private Real Estate	9	11	7.9	9.9	11
	Real Assets	19	26	22.9	24.9	26
Risk Reduction/ Liquidity Assets	Fixed Income - Rates	11	7.1	13.1	8.9	7.1
	Absolute Return * *	5	10	10	10	10
	Cash	1	0	0	0	0

Expected Return (30 Yr)	7.40%	7.41%	7.03%	7.25%	7.52%
Standard Deviation	12.03%	10.69%	9.90%	10.34%	10.96%
Sharpe Ratio (30 Yr)	0.47	0.53	0.53	0.53	0.52
Probability of 30-Year Return Under 7%	42.8%	41.8%	49.3%	44.8%	39.7%
Probability of 30-Year Return Under 7.25%	47.3%	46.8%	54.8%	50.1%	44.6%
Probability of 30-Year Return Under 7.5%	51.9%	51.9%	60.3%	55.3%	49.6%

The following mixes are extracted from the efficient frontier

Mix A: Attempts to answer the question: Can we achieve the same rate of return at a lower level of risk? We can by increasing allocation to private markets. This mix captures less of the downside, less of the upside.

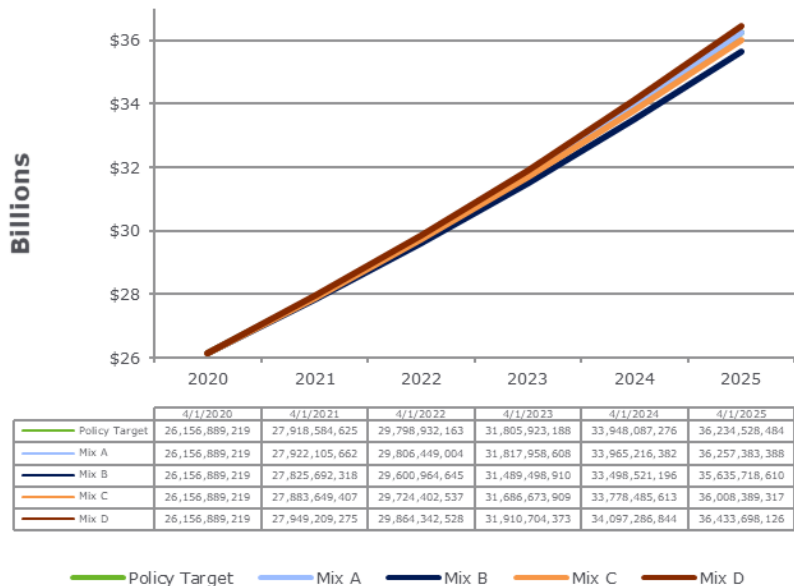
Mix B: 7.0% return target optimization.

Mix C: 7.25% return target optimization.

Mix D: 7.5% return target optimization; can achieve a 7.5% return with lower volatility than current policy allocation through taking on illiquidity/ increasing allocation to private markets. Taking on illiquidity risk is expected to result in a higher Sharpe Ratio vs current policy.

SCENARIO ANALYSIS

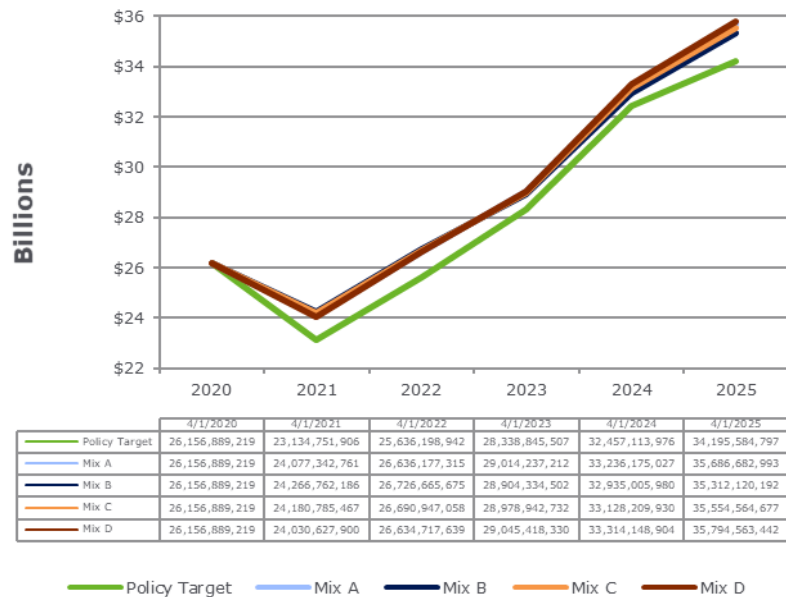
Base Case



Base Case

- Asset returns over 5-year period in line with NEPC 2020 Expectations
- No external shock to volatility

Stagflation

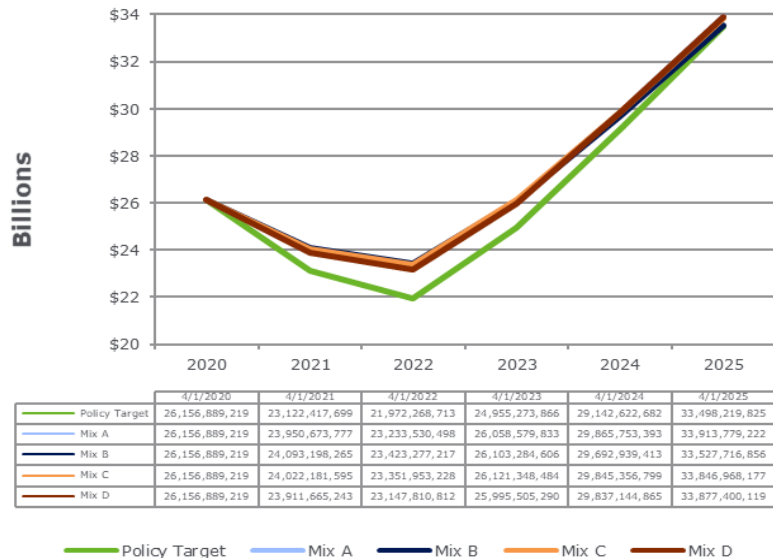


Stagflation

- Two problems – (1) the economy is not growing, (2) inflation has skyrocketed
 - Inflation is sticky – once it gets high, it stays high for several years
 - Fed has limited options to kick-start economy because easing only promotes further inflation
- Equities sag; bonds lose real value; real assets such as TIPS perform well on a relative basis because they are linked to inflation
- Historical example: flat stock market and double digit inflation of the mid-1970s

SCENARIO ANALYSIS

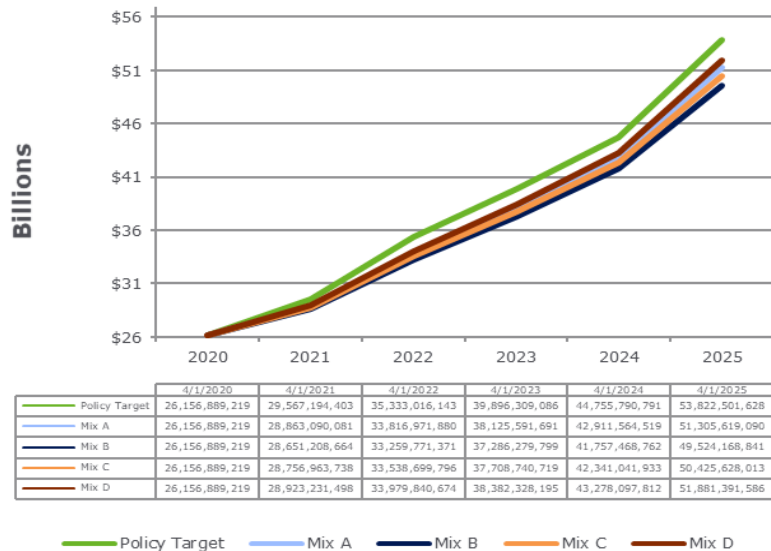
Recession



Recession

- Economy stalls – there is a flight to quality as investors lose confidence
 - Equity markets fall
 - Bond yields fall
- Interest-sensitive securities (bonds, especially long duration bonds) will perform well in this environment
- Historical example: early 1990s

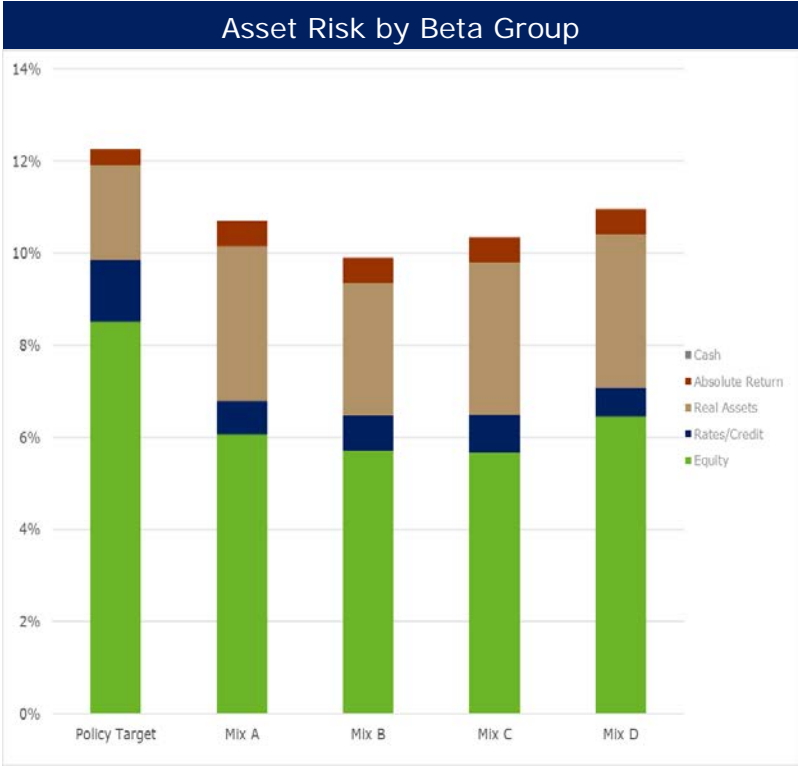
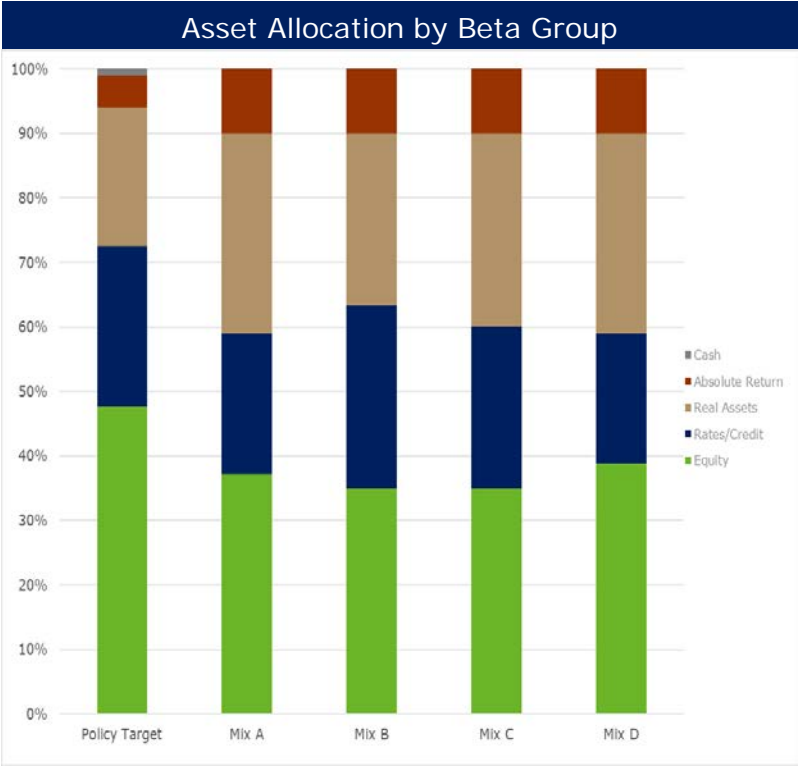
Expansion



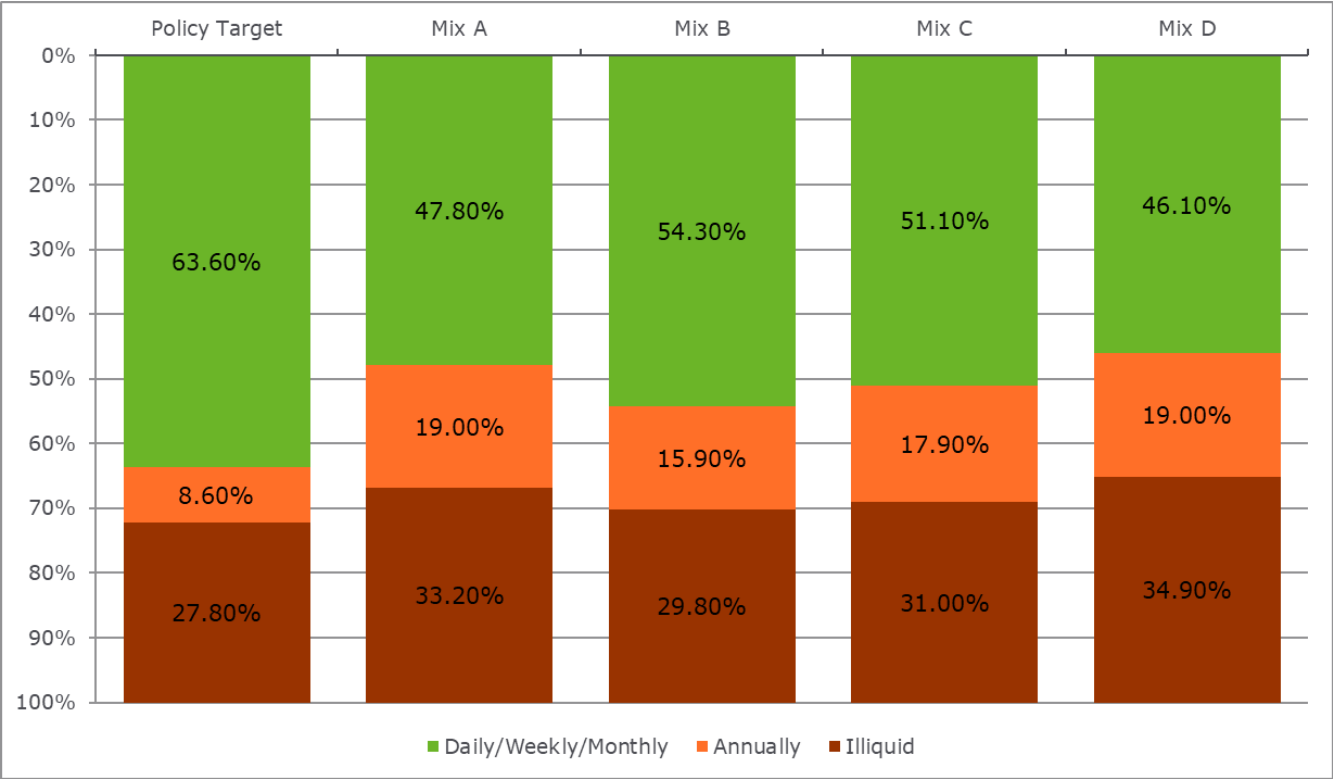
Expansion

- Economy is growing by a strong, but seemingly sustainable level
- Bond yields are stable, inflation is manageable, equities and other high volatility asset classes perform quite well in this environment
- Historical example: 2004-2006

ACTIVE RISK BUDGET



LIQUIDITY PROFILE



MODELING ASSUMPTIONS

- Global Equity is modeled using NEPC Global Equity assumption; uses MSCI ACWI IMI Weights
- Private Equity is modeled using 13% VC, 46% Buyouts, 7% Distressed Debt, 3% Mezzanine, 8% Natural Resources (Infrastructure), 23% Secondaries
- Global Credit is modeled using 7% High Yield, 4% EMD
- Opportunistic Credit is modeled using 1.5% Direct Lending + 1.5% Real Estate Debt
- Private Real Estate is modeled using 42.8% Core RE + 57.2% Non-Core RE. This is derived from the 30/40/30 Core, Non-Core/REIT assumption
- Fixed Income- Rates is modeled using a 5 yr Duration Treasuries assumption
- 2020 Absolute Return uses ERS Texas Absolute Return capital market assumption.
- Unless otherwise stated, the underlying capital market assumption source is constructed using NEPC's 2020 capital market assumptions

EMPLOYEES RETIREMENT SYSTEM OF TEXAS

LIQUIDITY ANALYSIS

May 2020

NEPC Research



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LIQUIDITY ANALYSIS BACKGROUND

- **Investment programs can benefit from a portion of assets in illiquid investments**
 - Capital calls on illiquid investments can be the foundation for future outperformance
 - Correlations can be low to publicly traded assets
- **Investing in illiquid assets, however, adds another dimension to liquidity management**
 - Will there be enough liquidity to manage future cash flows?
 - Will asset losses decrease total asset base to the extent that there is a liquidity problem?
 - What if capital is called more rapidly in the illiquid program?
 - Will there need to be forced sales of distressed assets?
 - Will assets believed to be liquid be less so when liquidity is most needed?
- **Liquidity analysis attempts to imagine a stressed scenario to see how the investment program would respond**

ASSUMPTIONS

- **Base Case**

- Returns: Actuarial assumptions and client's expected returns used
- Benefit Payments and Expenses: based on actuarial projections, averaging \$2,910M per year
- Contributions*: based on actuarial projections using current 19.5% contribution rate, averaging \$1,427M per year
- Commitments: based on client's pacing plan
 - Private Equity: averaging \$980M per year for the next five years
 - Private Debt: \$100M and \$150M in the year 2020 and 2021, respectively
 - Private Real Estate: averaging \$430M per year for the next five years
 - Private Real Assets: averaging \$446M per year for the next five years
- Capital Calls and Distributions: based on client projections

* Contribution percent is a percent of payroll; members contribute 9.5%, State contributes 9.5% and State agencies contribute 0.5%

ASSUMPTIONS

- **Stressed Case**

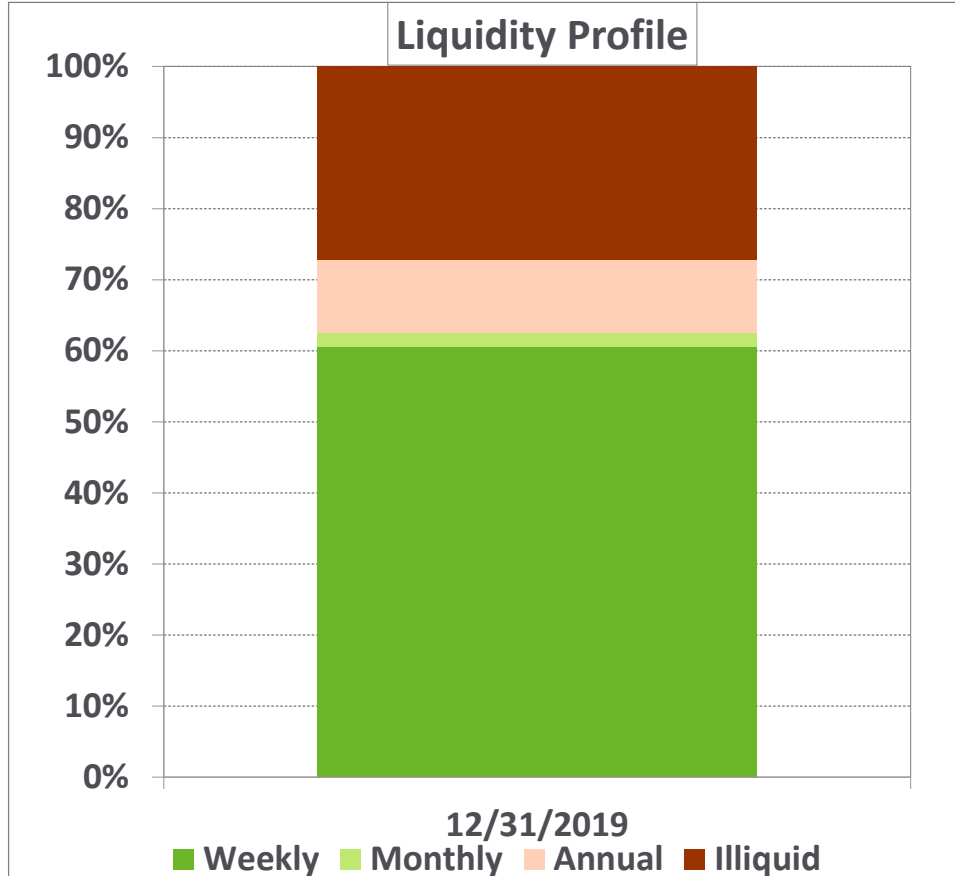
- Returns: 0.0% in Year 1, -16.6% in Year 2 (-2 standard deviations), -4.5% in Year 3 (-1 standard deviation), 7.5% in Year 4 (expected return), and -4.5% in Year 5 (-1 standard deviation)
- Benefit Payments: Same as base case
- Contributions: Same as base case
- Commitments: Same as base case
- Capital Calls and Distributions: Same as base case except capital calls are doubled in Year 2 and distributions are halved in Year 2 and Year 3

- **Favorable Case**

- Returns: Same as base case
- Benefit Payments: Same as base case
- Contributions*: based on Actuarially Sound Contribution (ASC); projected contribution rate averaging 23.7%, averaging \$1,786M per year
- Commitments: Same as base case
- Capital Calls and Distributions: Same as base case

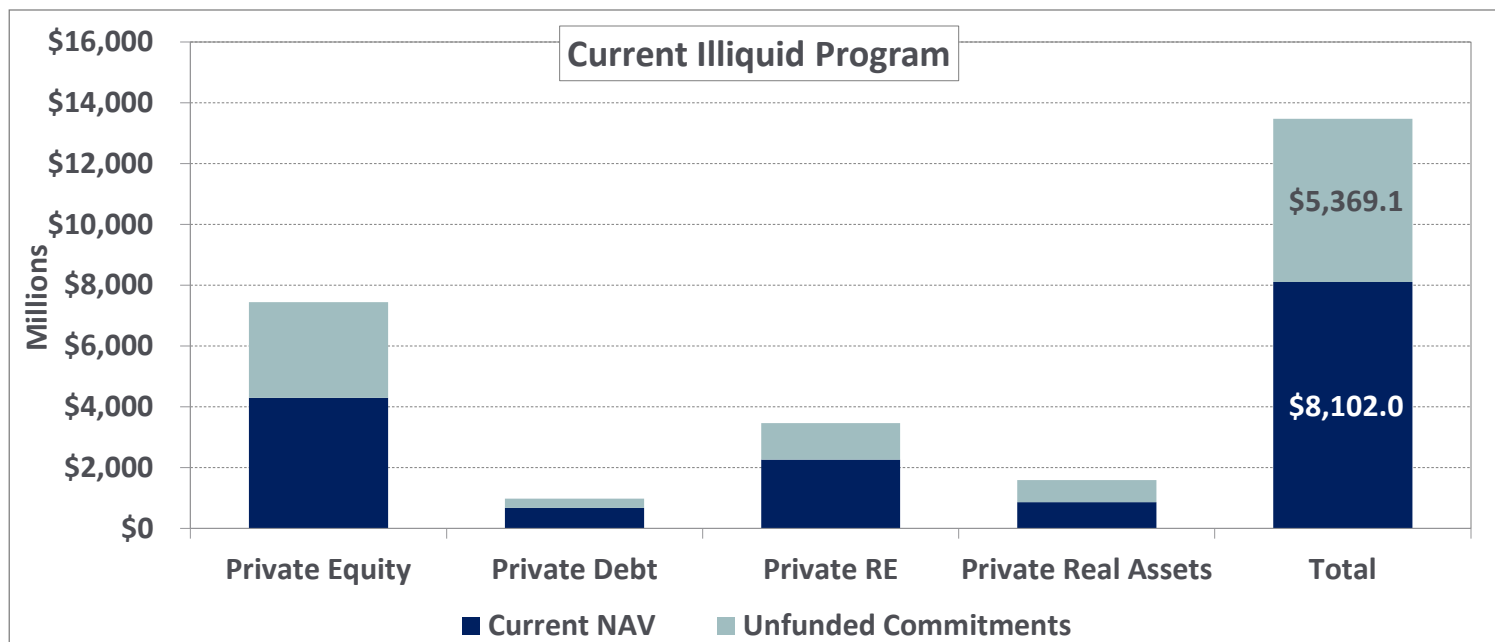
* ASC is the contribution rate that funds the sum of the normal cost and the amount necessary to amortize any unfunded actuarial accrued liability over a period that does not exceed 30 years by one or more years. Section 811.006 of the Texas Government Code limits the modifications to ERS that would, essentially, increase benefits or lower contributions to the trust unless the current level of benefits and contributions are expected to amortize any unfunded actuarial accrued liability over a period that does not exceed 30 years by one or more years. In this context, the Actuarially Sound Contribution (ASC) rate is the contribution rate that meets this standard.

EXISTING LIQUIDITY PROFILE



- **62.5% of total assets are available on at least a monthly basis to meet regular liquidity needs**
 - Benefit payments and expenses
 - Rebalancing
 - Capital calls
- **Additional 10.2% of assets available on at least an annual basis**
 - Can be part of planned rebalancing but much less reliable for regular liquidity needs
- **Remaining 27.2% of assets are relatively illiquid**
 - Intermittent distributions - hard to plan around
 - Could be sold in secondary markets, but likely at steep discount

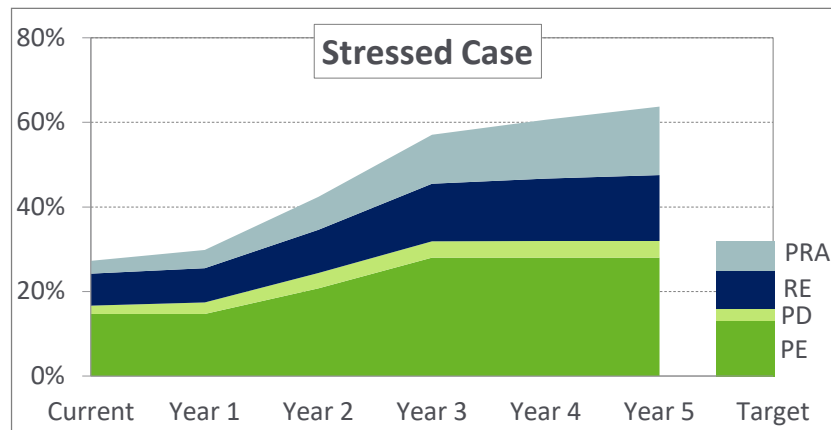
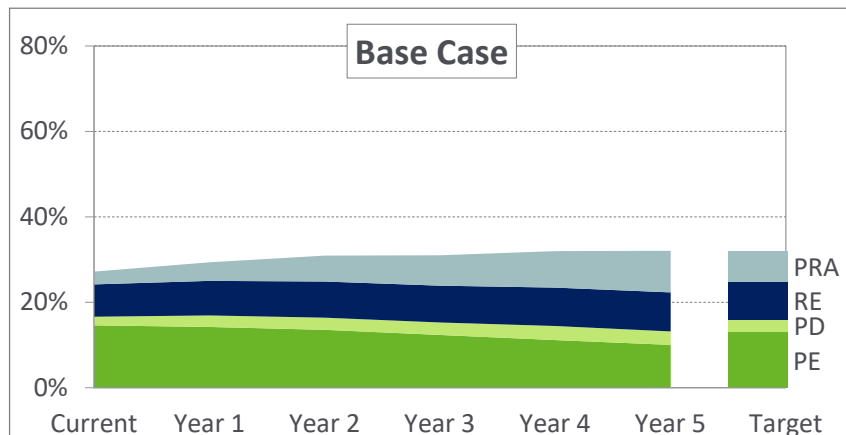
ILLIQUID PROGRAM SNAPSHOT



Based on data provided by client as of 9/30/2019
Private Real Assets = Infrastructure

- **Because of uncalled capital commitments the allocation to illiquid investments can rise even without any additional commitments**
 - Currently ≈\$5.8B in uncalled private market commitments

ILLIQUID ALLOCATION

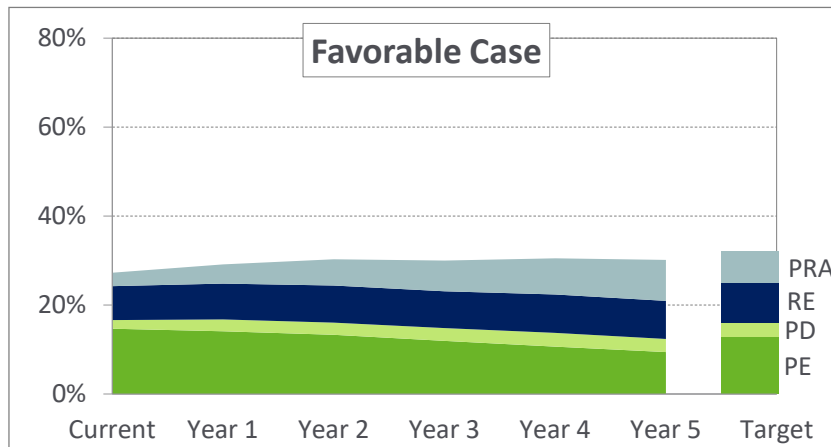


PRA = Infrastructure

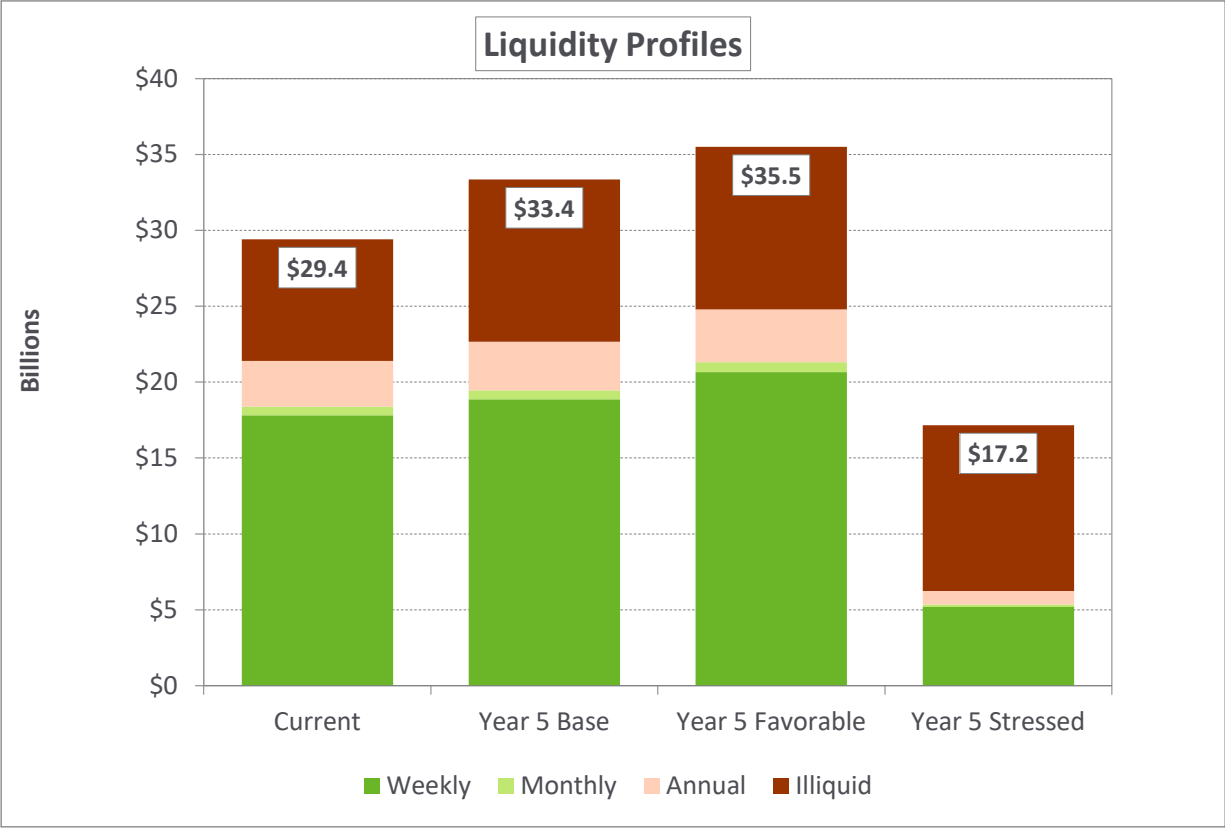
Base Case: Allocation to illiquid assets is expected to increase in the base case as the fund makes an average of \$1.9B commitments per year

Stressed Case: Increase in capital calls and a reduction in distributions combine with negative asset returns (denominator effect) raise allocations to private markets above targets in the stressed case

Favorable: Allocation to illiquid assets is expected to increase as the fund makes an average of \$1.9B commitments per year



CHANGE IN LIQUIDITY PROFILE



SUMMARY

- **The fund is projected to run net negative cash flows averaging \$1.5B per year in the base case**
 - Returns are expected to offset this imbalance, affording some flexibility
 - Private investments are expected to provide returns in excess of public markets
 - Illiquid investments have an attractive diversification profile with a low correlation to other public asset classes
- **While true that some liquid assets must be sold in a stressed environment...**
 - The fund currently has 60.6% of assets with weekly or better liquidity
 - Mature illiquid programs can provide distributions that are additive to liquidity
- **In the base and favorable scenarios, the fund may benefit from maintaining a diversified allocation to illiquid assets but should exercise caution with future illiquid commitments that may cause liquidity issues in a stressed environment**

Questions?

Action Item – IAC

*Public Agenda Item #11

*Review, Discussion and Consideration of the ERS Pension Experience Study, including Actuarial Assumptions and Methods, the Return Assumption and Asset Allocation (**Action – BOT**)

May 20, 2020

Ariana Whaley, Pension Policy Analyst
Ryan Falls, Senior Consultant, Gabriel Roeder & Smith
Joe Newton, Pension Practice Leader, Gabriel Roeder & Smith

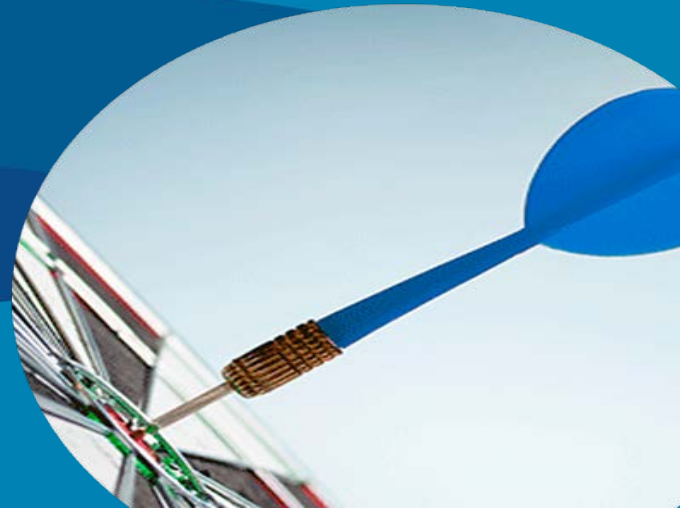


ERS of Texas Experience Study Final Recommendations

May 20, 2020

Ryan Falls, FSA, EA, MAAA

Joseph Newton, FSA, EA, MAAA



Agenda

- Review of Purpose
- Summary of Recommendations
- Analyze Financial Impact
- Discussion

Reminder

- The *primary* purpose of the annual actuarial valuation is to either (1) set or (2) assess the adequacy of the contribution policy
 - “Funding” or “contribution allocation procedure”
- For ERS, the historical funding policy has been a level “fixed rate” from the employer, and so the valuation is assessing the appropriateness of the current fixed rate

How assumptions factor in...

- Over time, the true cost of benefits will be borne out in actual experience
 - Ultimate benefits paid are NOT affected by actuarial assumptions or methods
 - Determined by actual participant behavior (termination, retirement), plan provisions, and actual investment returns
- Assumptions help us develop a reasonable starting point for decision making today

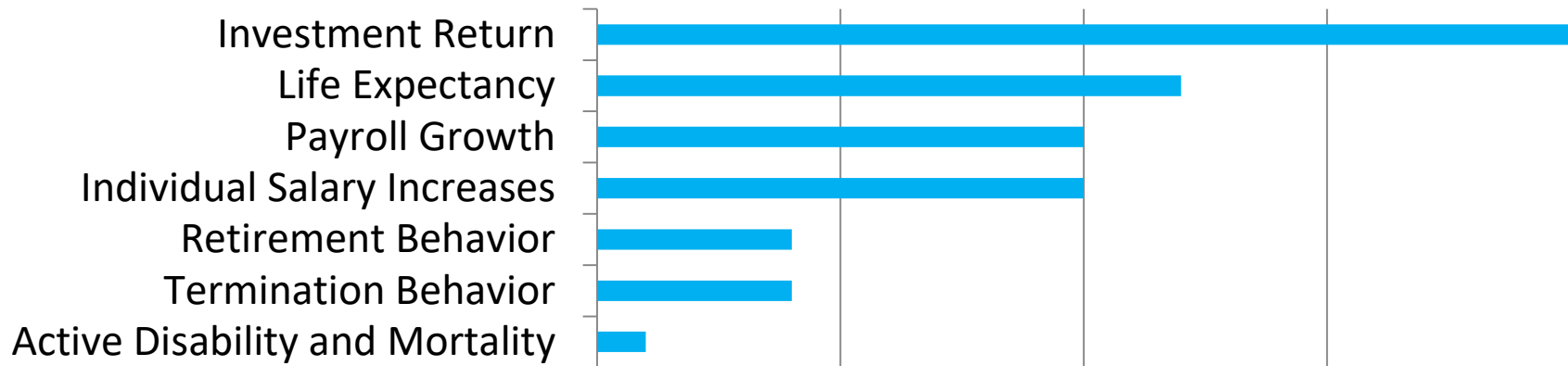
“Projections are difficult, especially ones about the future”

Purpose of Experience Study

- Assumptions should occasionally change to reflect
 - New information and changing knowledge
 - Changing patterns of retirements, terminations, mortality, etc.
- Experience study is a regularly scheduled review of the assumptions and methods
 - GFOA recommends at least once every five years
 - ERS will conduct studies at least every four years based on current statute
- General process for setting assumptions and methods
 - Actuary makes recommendations
 - Board considers actuary's recommendation and makes the final decision for the system

Magnitude of Individual Assumptions

Impact on Determination of Funding Period



- *Each individual assumption must satisfy the Actuarial Standards*
- *Assumption set should be internally consistent*

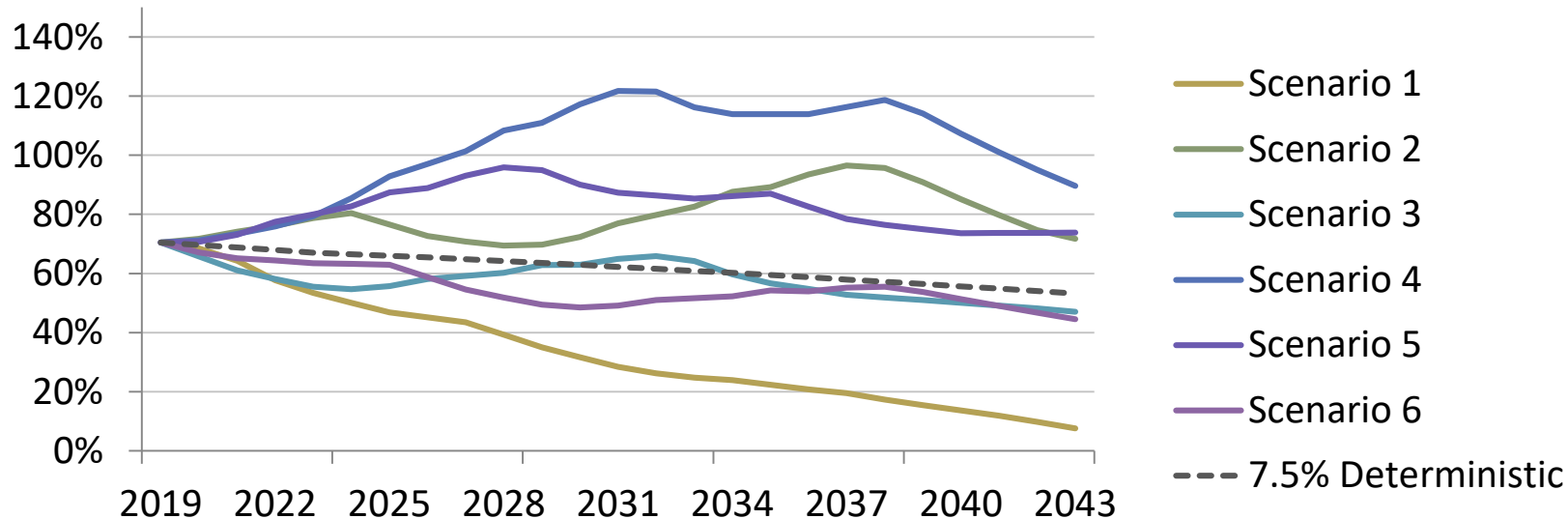
Range of Expected Returns

	2019	2020 (Q1)	2020 (Q2)	Comment
NEPC – Short Term	6.68%	6.06%	6.82%	<i>5-7 years in 2019, 10 years in 2020</i>
NEPC – Intermediate Term	N/A	6.41%	6.80%	<i>20 years</i>
NEPC – Longer Term	7.75%	7.14%	7.40%	<i>30 years</i>
GRS Survey Results – Short Term	6.57%	<i>Not yet available</i>	<i>Not yet available</i>	<i>Generally, 7 to 10 year horizon</i>
GRS Survey Results – Longer Term	7.37%	<i>Not yet available</i>	<i>Not yet available</i>	<i>Generally, 20 to 30 year horizon</i>

Projection Scenarios Based on Historical Volatility Patterns

All scenarios generate 7.5% compound return over 20 years

Funded Ratio



The above scenarios all achieve an 7.5% compound return over a 20 year period. All scenarios have the same annual returns, just in a different order.

Summary of Final Recommendations

- Notable Recommendations

- Reduce inflation assumption from 2.50% to 2.30%
- Reduce nominal investment return assumption from 7.50% to 7.00%
 - Board may want to consider something lower in response to the impact of volatility and to increase the likelihood the assumption is met

- Minor Findings

- In addition to recommended change to inflation assumption, lower expectations for future salary growth to better align with ERS experience
- Lower assumed rates of turnover (pre-retirement) for LECOs
- Make small modifications to assumed retirement patterns for LECOs in Groups 2 and 3

- Confirmation of Current Assumptions

- Mortality and retirement experience remains in line with assumptions adopted in 2017

Impact

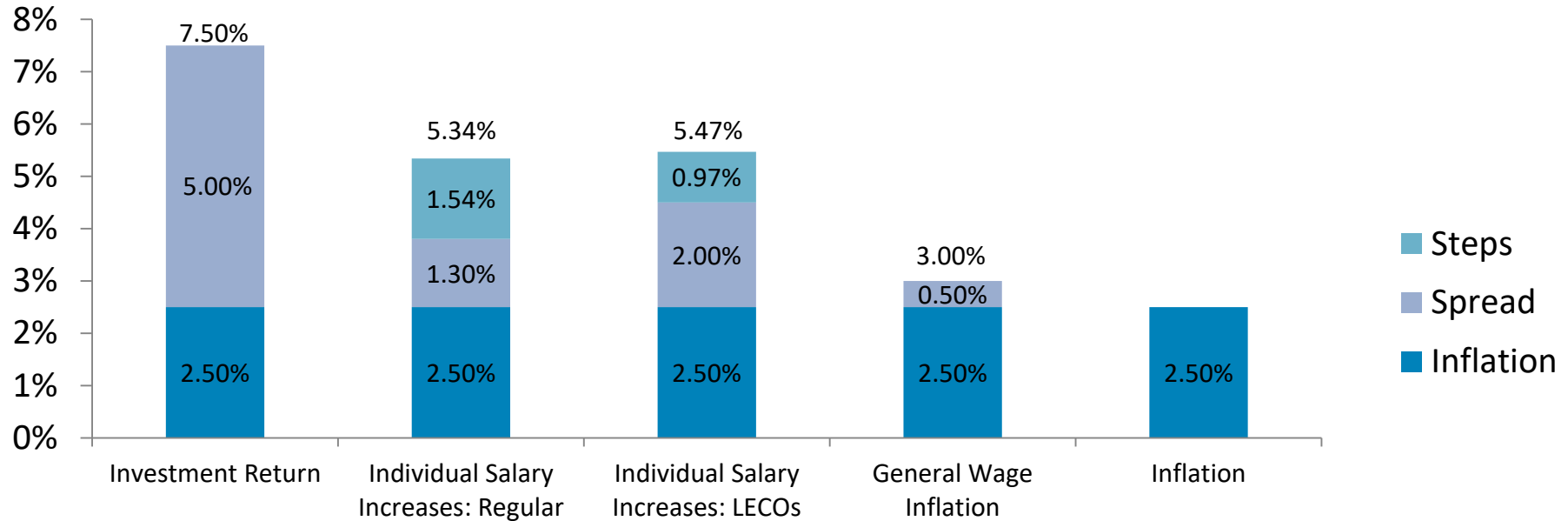
- Proposed assumptions will increase actuarially determined contribution levels by a little more than 2% of pay
 - Based on current 19.50% contribution rate, additional 6% of pay needed to meet 31-year ASC

As of August 31, 2019 For FY 2020	Current Assumptions	Proposed Assumptions
Normal Cost Rate*	13.76%	14.24%
31 Year ASC - % of payroll	23.26%	25.33%
25 Year ASC - % of payroll	24.51%	26.79%
Unfunded UAAL (billions)	\$11.7	\$13.6
Funded Ratio	70.5%	67.3%

* Average normal cost rate for all groups, includes administrative expenses

Impact does not reflect the recent and still developing impact of COVID-19.

Inflation is the first building block for other economic assumptions



Current Assumption Set for ERS

"Steps" refer to pay increases associated with merit, promotion and longevity.

Sources (Inflation)

- NEPC Expectation (2020): 2.30% (10 year) and 2.50% (30 year)
- GRS Survey of Investment Firms: 1.70% - 2.50%, 2.18% average
- Social Security Trustee's Report: 2.60% (intermediate)
- TIPs vs. Nominal US Treasuries: 1.85% (20 year)
- Professional Forecasters: 2.20% (10 year)
- Horizon Survey (Summer 2019): 2.21% (10 year) to 2.29% (20 year)

Wage Assumptions

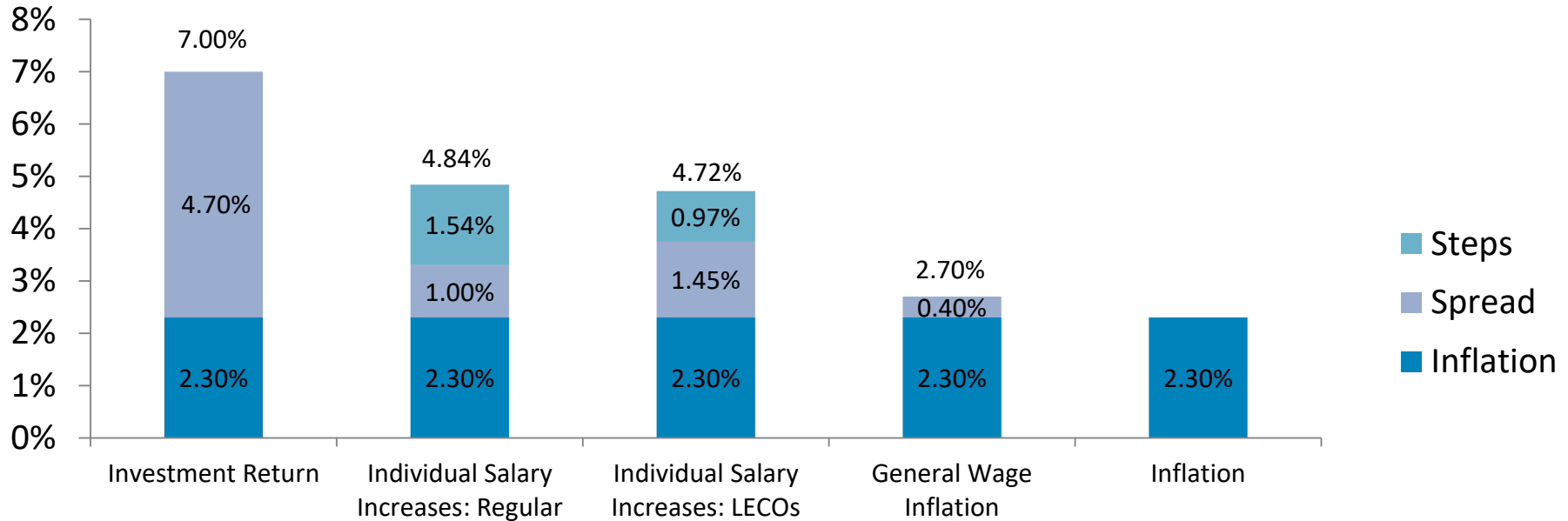
FY 2012-2019 (actual inflation has been 1.57% during this period)

Annualized Assumption	Current Assumed	Actual	Preliminary Recommendation**
Overall Active Membership Growth	0.00%	-0.24%*	0.00%
Overall Payroll Growth (Based on Open Group Projection)	3.06%	2.36%	2.70%
Growth in Average Salary	3.00%	2.12%	2.70%
Year over Year Entrant Level Salary Growth	3.00%	2.90%	2.70%
Non-Step related Salary increases: Regular	3.80%	2.91%	3.30%
Non-Step related Salary increases: LECOs	4.50%	2.82%	3.75%

* Net of removal of 90 day wait in 2015

** Preliminary recommendation includes an inflation change from 2.50% to 2.30%. Additional change in the recommendation is based on actual experience of ERS.

Illustrated Package of Economic Assumptions



Assumption Set for ERS reflecting preliminary recommendations

Actuary's Qualifications

- We believe the recommended set of actuarial assumptions should present a more accurate portrayal of ERS's financial condition and should reduce the magnitude of future experience gains and losses.
- The study was conducted in accordance with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board
- Ryan and Joe meet the Qualification Standards of the American Academy of Actuaries

Questions?
Action Item – BOT

*Public Agenda Item #12

Review of the Investment Performance for First Calendar Quarter of 2020 and Risk Update

May 20, 2020

Tom Tull, CFA, Chief Investment Officer

Carlos Chujoy, CFA, Risk Officer, Risk Management and Applied Research

Sam Austin and Michael Malchenko, NEPC

QUARTERLY PERFORMANCE REPORT

EMPLOYEES RETIREMENT SYSTEM OF TEXAS

May 20, 2020

Sam Austin, Partner

Mike Malchenko, Sr. Client Specialist



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

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Total Fund Performance Summary	2
Appendix and Disclosures	3

EXECUTIVE SUMMARY

ERS TRUST DASHBOARD

	CYTD	FYTD
Fund Performance	-9.9%	-5.7%
Policy Benchmark	-9.6%	-4.9%
Excess Return	-0.3%	-0.8%

3 Yr Tracking Error 1.63%

5 Yr Sharpe Ratio 0.50

5 Yr Sortino Ratio 0.54

Largest Contributors (Quarter)

Private Equity contributed +0.2% versus the policy benchmark

Largest Detractors (Quarter)

Global Credit underperformed and detracted -0.2% versus the policy benchmark

Profile

Market Value at 9/30/2019:

\$26.16 Billion

Actuarial Accrued Liability 8/31/19:

\$39.8 Billion

Actuarial Assumed Rate of Return:

7.50%

Retirees and Beneficiaries 8/31/2019:

115,155

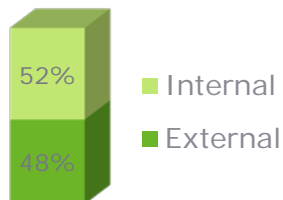
Retirement Payments Year Ended 8/31/2019:

\$2.62 Billion

ERS Trust Funding Ratio 8/31/2019

70.5%

Management



Allocation



Liquidity



TOTAL FUND PERFORMANCE DETAIL (NET OF FEES)

	Market Value(\$)	3 Mo(%)	Fiscal YTD(%)	1 Yr(%)	3 Yrs(%)	5 Yrs(%)	10 Yrs(%)
Total Fund	26,156,889,219	-9.9	-5.7	-3.1	4.2	4.4	6.5
<i>Total Fund Policy Index</i>		-9.6	-4.9	-2.6	3.6	4.4	6.3
<i>Long Term Public Index</i>		-16.5	-9.4	-7.3	2.1	2.9	5.6

- One-year ended March 31, 2020, the Fund underperformed the policy benchmark by 0.5%.
- The Fund's assets decreased to \$26.16 billion from \$28.29 billion in the last calendar year which includes an investment loss of \$1.57 billion for the year.



Note: Long Term Public Index is comprised of 79% MSCI ACW IMI and 21% Barclays Intermediate Treasury Index. Index Definitions can be found in the appendix.

1st Quarter 2020

TOTAL FUND PERFORMANCE DETAIL (NET OF FEES)

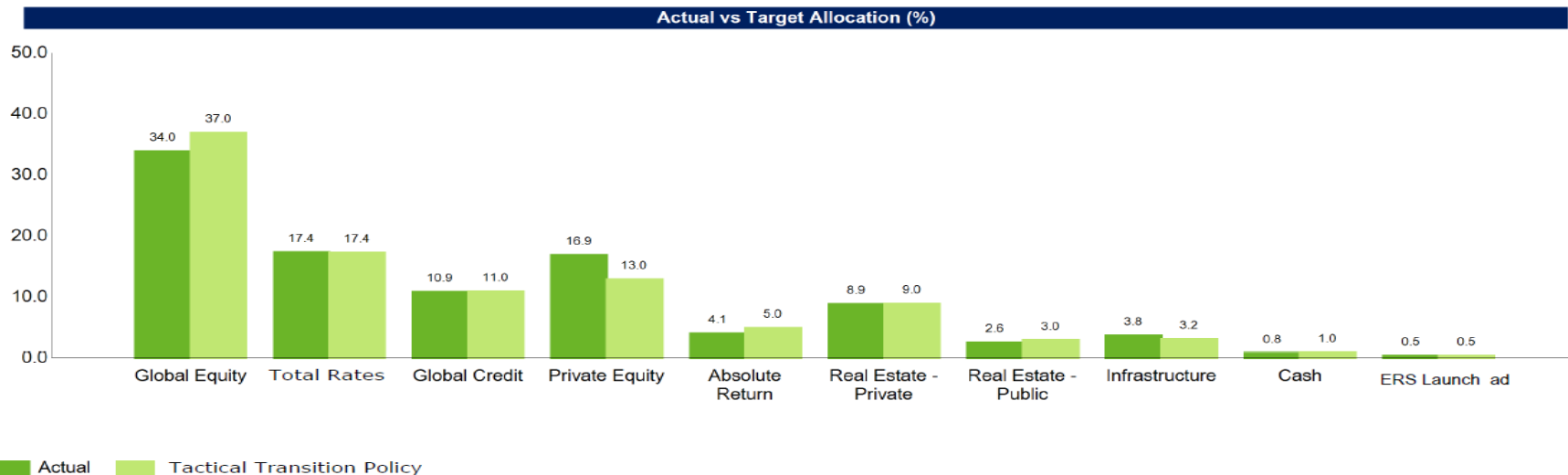
3 Years Ending March 31, 2020				
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio RF
Total Fund	4.22%	7.06%	0.35	0.34
Total Fund Policy Index	3.61%	7.94%	0.24	0.25

5 Years Ending March 31, 2020				
	Anlzd Return	Anlzd Standard Deviation	Sharpe Ratio	Sortino Ratio RF
Total Fund	4.43%	6.56%	0.50	0.54
Total Fund Policy Index	4.36%	7.59%	0.43	0.52

- **Three-year period ended March 31, 2020, the return of 4.22% outperformed the benchmark by 0.61%. On a risk-adjusted basis, the Sharpe and Sortino Ratios over this period indicate active management benefited the Plan.**
- **Five-year period ended March 31, 2020, the Fund returned 4.43% and outperformed the policy benchmark by 0.07%. On a risk-adjusted basis, the Fund's Sharpe Ratio (0.50 vs. 0.43) and Sortino Ratio (0.54 vs. 0.52) indicate strong returns per unit of risk taken and returns per unit of downside risk experienced relative to the policy benchmark.**



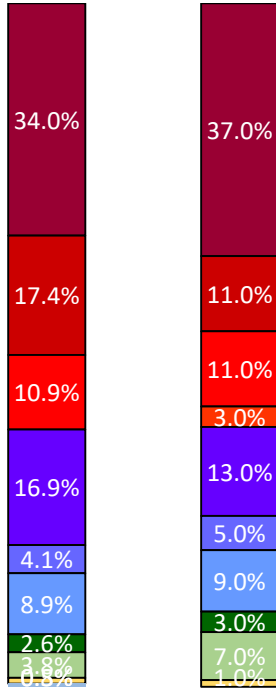
TOTAL FUND ASSET GROWTH SUMMARY



	Summary of Cash Flows				
	Last Three Months	Fiscal Year-To-Date	One Year	Three Years	Five Years
Beginning Market Value	\$29,406,588,242	\$28,518,729,026	\$28,285,241,189	\$26,286,847,867	\$25,886,213,890
Contributions	\$2,476,041,042	\$9,327,465,597	\$12,892,899,364	\$31,340,693,738	\$45,660,842,726
Withdrawals	-\$2,643,647,242	-\$9,634,152,753	-\$13,448,867,387	-\$34,034,590,155	-\$50,333,242,540
Net Cash Flow	-\$167,606,200	-\$306,687,156	-\$555,968,023	-\$2,647,162,116	-\$4,625,665,513
Net Investment Change	-\$3,082,092,823	-\$2,055,152,652	-\$1,572,383,948	\$2,517,203,467	\$4,896,340,842
Ending Market Value	\$26,156,889,219	\$26,156,889,219	\$26,156,889,219	\$26,156,889,219	\$26,156,889,219



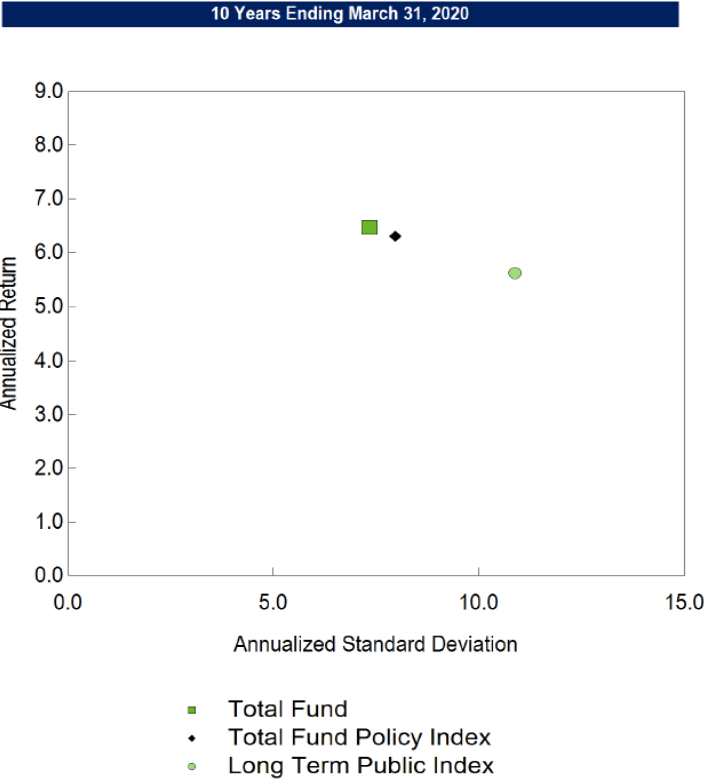
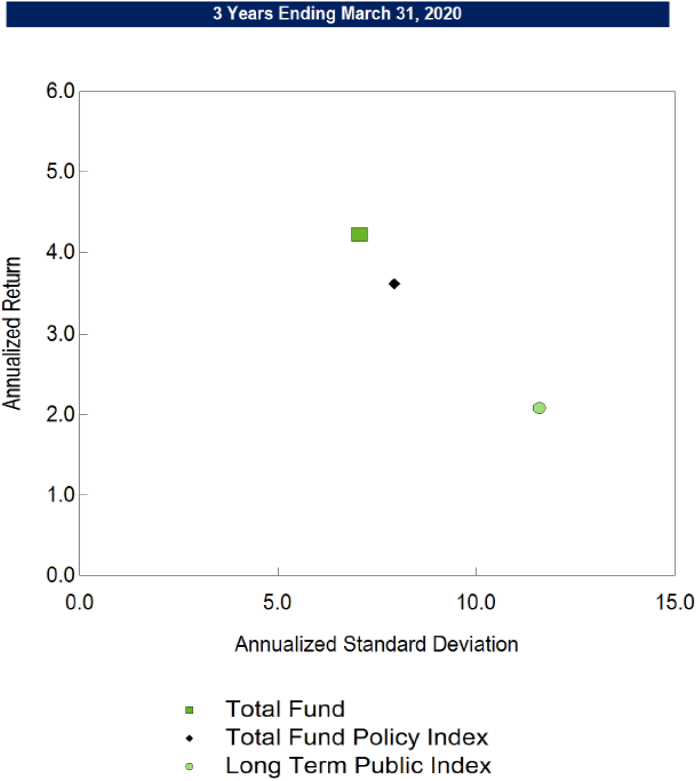
FUND ASSET ALLOCATION VS. POLICY TARGETS



	Current	Current	Long-Term Target	Long-Term Target Range
Public Equity	\$8,892,019,192	34.0%	37.0%	27.0% - 47.0%
Total Rates	\$4,561,746,989	17.4%	11.0%	
Global Credit	\$2,857,439,526	10.9%	11.0%	1.0% - 21.0%
Opportunistic Credit	-	-	3.0%	0.0% - 8.0%
Private Equity	\$4,425,353,582	16.9%	13.0%	8.0% - 18.0%
Absolute Return	\$1,077,517,234	4.1%	5.0%	0.0% - 10.0%
Real Estate - Private	\$2,330,223,165	8.9%	9.0%	4.0% - 14.0%
Real Estate - Public	\$684,980,881	2.6%	3.0%	0.0% - 13.0%
Infrastructure	\$983,494,079	3.8%	7.0%	2.0% - 12.0%
Cash	\$221,456,487	0.8%	1.0%	0.0% - 1.0%
ERS Launchpad	\$122,658,085	0.5%		0.0% - 5.0%
Total	\$26,156,889,219	100.0%	100.0%	

Employees Retirement System of Texas

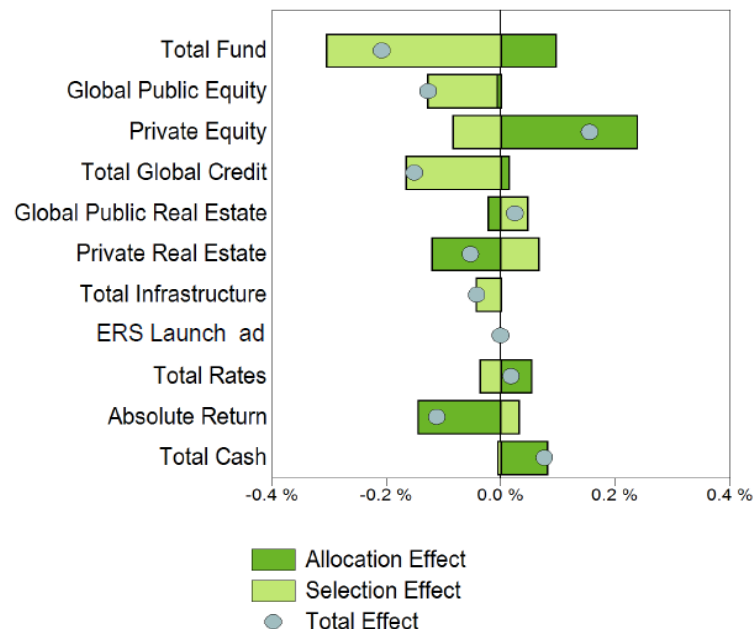
TOTAL FUND RISK/ RETURN



Note: Long Term Public Index is comprised of 79% MSCI ACW IMI and 21% Barclays Intermediate Treasury Index.
Index Definitions can be found in the appendix.

TOTAL FUND ATTRIBUTION ANALYSIS

Attribution Effects
3 Months Ending March 31, 2020



Attribution Summary
3 Months Ending March 31, 2020

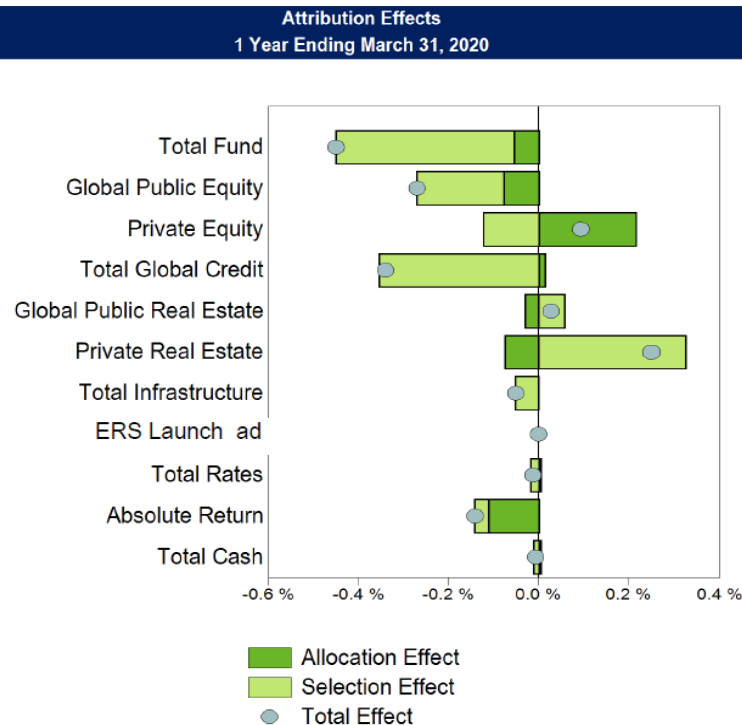
	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Total Effects
Global Public Equity	-22.7%	-22.4%	-0.4%	-0.1%	0.0%	-0.1%
Private Equity	1.5%	2.1%	-0.6%	-0.1%	0.2%	0.2%
Total Global Credit	-14.4%	-12.7%	-1.7%	-0.2%	0.0%	-0.2%
Global Public Real Estate	-26.9%	-28.4%	1.5%	0.0%	0.0%	0.0%
Private Real Estate	2.2%	1.3%	0.9%	0.1%	-0.1%	-0.1%
Total Infrastructure	0.1%	1.6%	-1.5%	0.0%	0.0%	0.0%
ERS Launchpad	--	--	--	--	--	--
Total Rates	5.0%	5.3%	-0.2%	0.0%	0.1%	0.0%
Absolute Return	2.3%	1.3%	1.0%	0.0%	-0.1%	-0.1%
Total Cash	0.3%	0.6%	-0.3%	0.0%	0.1%	0.1%
Total	-9.8%	-9.6%	-0.2%	-0.3%	0.1%	-0.2%

Note: Not all assets valued through March 31, 2020 within Private Equity, Total Global Credit, Private Real Estate, Total Infrastructure and Absolute Return.

* Total Fund Attribution Analysis uses policy weights.



TOTAL FUND ATTRIBUTION ANALYSIS



Attribution Summary						
1 Year Ending March 31, 2020						
	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Total Effects
Global Public Equity	-13.0%	-12.4%	-0.6%	-0.2%	-0.1%	-0.3%
Private Equity	5.4%	5.8%	-0.4%	-0.1%	0.2%	0.1%
Total Global Credit	-10.3%	-6.9%	-3.4%	-0.4%	0.0%	-0.3%
Global Public Real Estate	-21.7%	-23.5%	1.8%	0.1%	0.0%	0.0%
Private Real Estate	8.9%	4.4%	4.6%	0.3%	-0.1%	0.2%
Total Infrastructure	8.5%	10.4%	-1.9%	-0.1%	0.0%	-0.1%
ERS Launchpad	--	--	--	--	--	--
Total Rates	8.9%	9.0%	-0.1%	0.0%	0.0%	0.0%
Absolute Return	5.0%	6.0%	-1.0%	0.0%	-0.1%	-0.1%
Total Cash	1.8%	2.3%	-0.5%	0.0%	0.0%	0.0%
Total	-3.1%	-2.6%	-0.5%	-0.4%	-0.1%	-0.5%

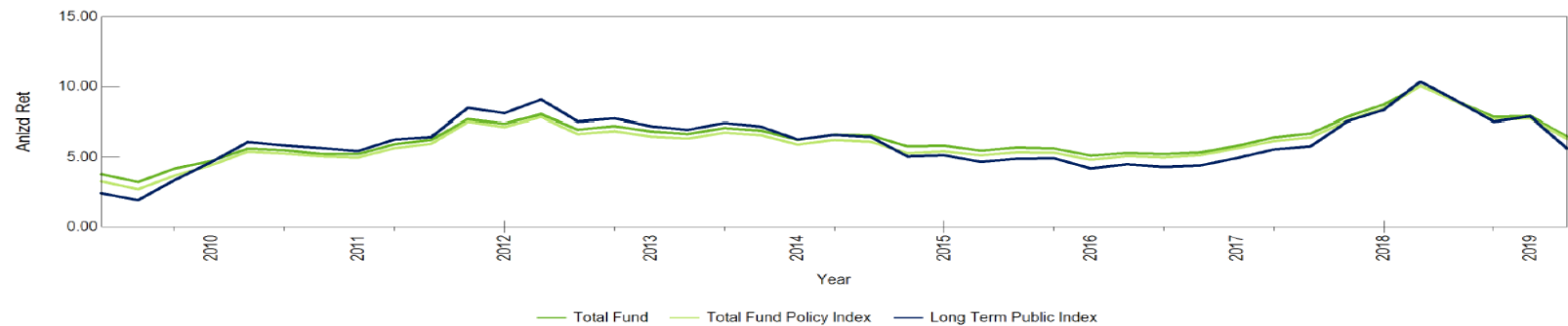
Note: Not all assets valued through March 31, 2020 within Private Equity, Total Global Credit, Private Real Estate, Total Infrastructure and Absolute Return.

* Total Fund Attribution Analysis uses policy weights.

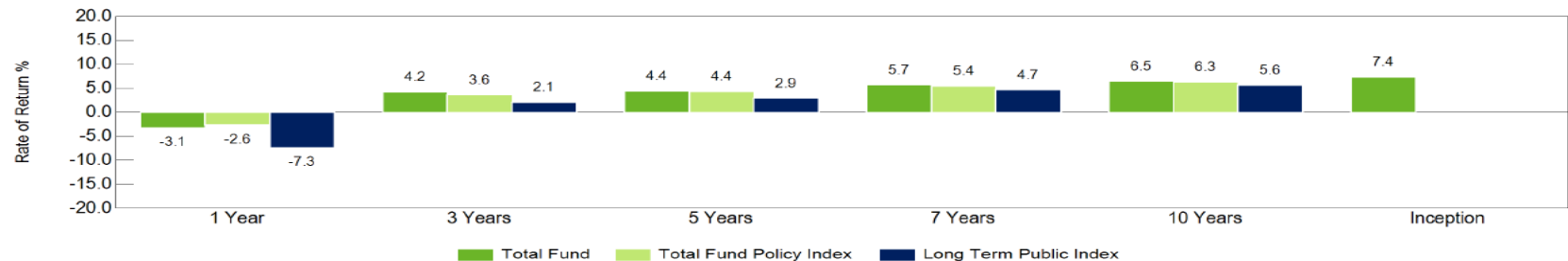


LONG TERM INVESTMENT RESULTS

Rolling 10 Year Annualized Return (%)



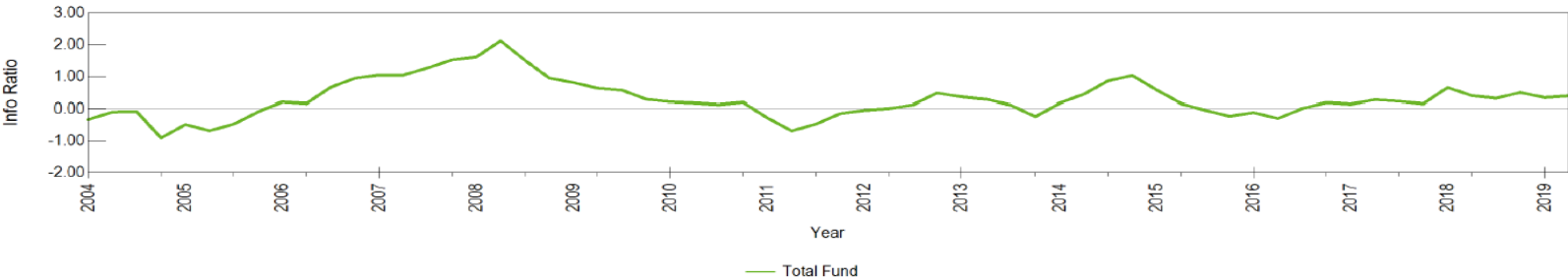
Return Summary
Ending March 31, 2020



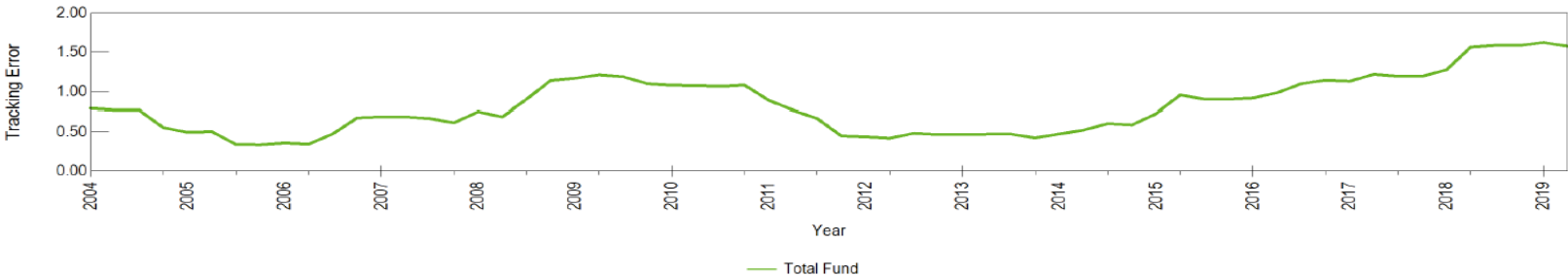
Note: Long Term Public Index is comprised of 79% MSCI ACW IMI and 21% Barclays Intermediate Treasury Index.
Index Definitions can be found in the appendix.

ROLLING INFORMATION RATIO AND TRACKING ERROR

Rolling 3 Year Information Ratio



Rolling 3 Year Tracking Error



SUMMARY PERFORMANCE COMMENTARY

- **Over the past 10 years, Total Fund returns outperformed the policy benchmark by 0.2% underperforming the Fund's actuarial rate of return.**
- **In the one-year ended March 31,2020 the Fund underperformed (-0.5%) the policy benchmark.**
 - Global Public Equity detracted -0.3% and Global Credit detracted -0.3% from Fund returns vs. the policy benchmark
 - Private Real Estate (+0.2%) and Private Equity (+0.1%) contributed positively to returns vs. the policy benchmark
- **In the past one-year, portfolio positioning at the asset class level detracted -0.1% from Total Fund returns vs. policy benchmark.**
 - An under-weight position to Absolute Return and Private Real Estate contributed negatively (-0.2%) to Fund returns versus the policy benchmark.
 - An over-weight position to Private Equity contributed positively (+0.2%) to total fund returns vs. the policy benchmark.
 - An over-weight position to Global Public Equity contributed negatively (-0.1%) to Fund returns versus the policy benchmark.



Risk Management & Applied Research

Risk Update

May 20, 2020

Carlos Chujoy, CFA, Risk Officer, Risk Management & Applied Research

Risk Update

1Q2020 Update



Headwinds

- Health Crisis
- Financial Crisis
- Economic Crisis and
- Social Impact

Tailwinds

- Strong Global Central Bank intervention
- China making a gradual comeback
- Is the worst getting closer for financial markets?

Health Crisis

COVID-19

Negatives

- Case containment uncertainty in the US and worldwide ex-Asia
- No vaccine short-term
- Shortages of medical equipment
- Health Care professionals and people working in the front line exhausted and getting sick

Unknown

- Duration of the pandemic
- Vaccine development a work-in-progress
- Impact on societal behavior



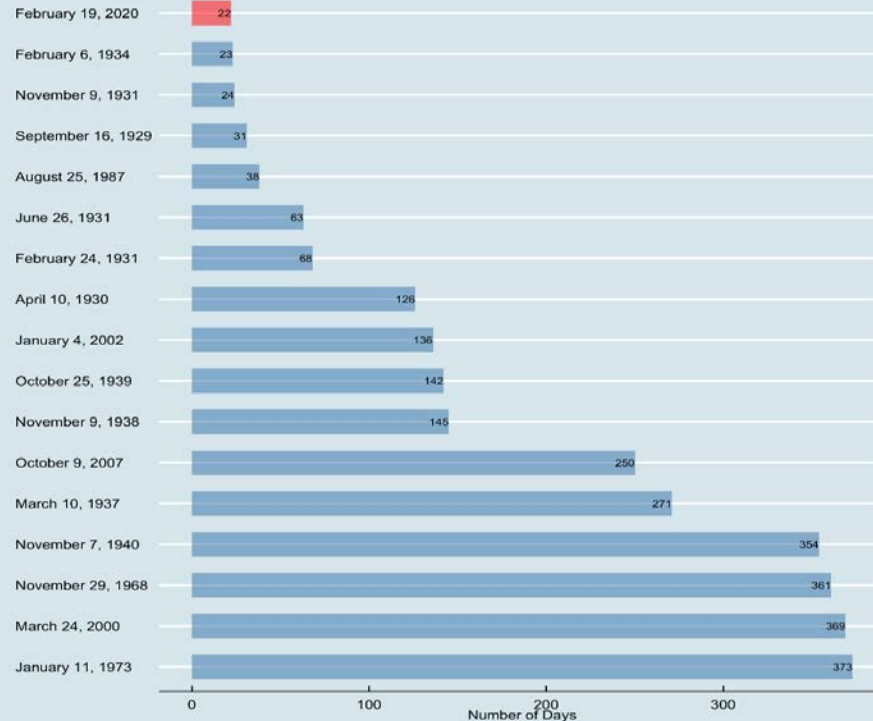
Source: ERS, Tencent-SARS-COV2, NHCCPRC, Wuhan-2019 depository

Financial Crisis

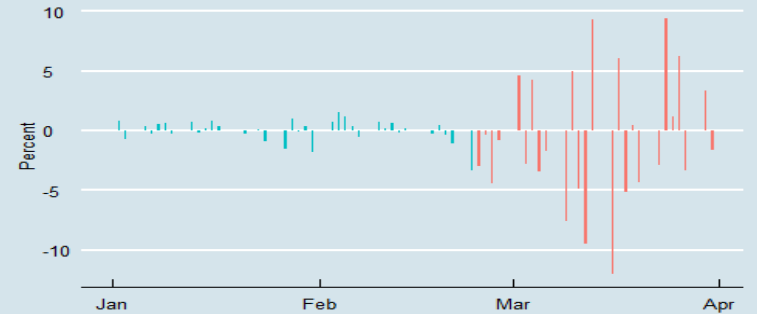
Fastest Market Correction, Sky High Risk Levels and Large Volatility



Fastest 30% Market Drop On Record Since The Great Depression



S&P500 Daily Returns



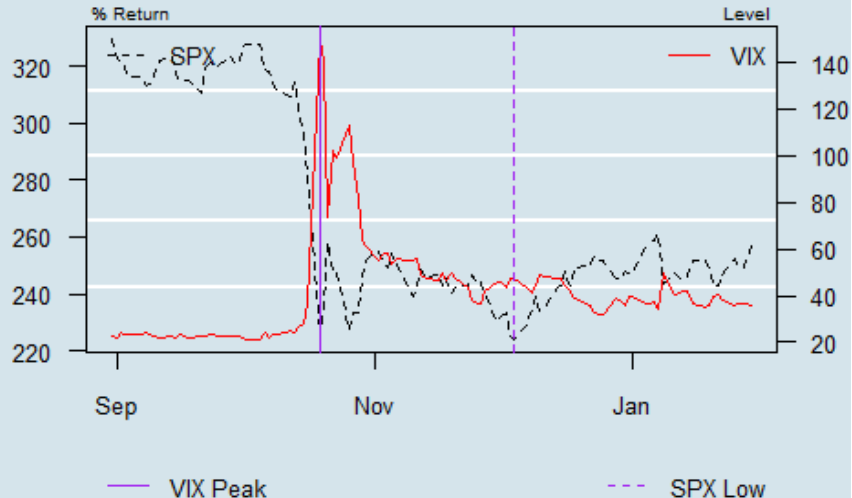
HYG Daily Returns



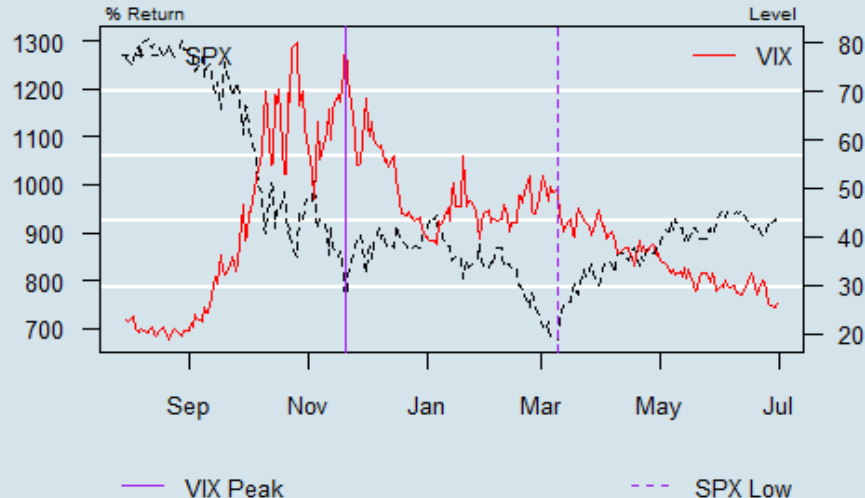
Financial Crisis

Markets tend to retest a low long after market the VIX has hit a peak

S&P500 vs. VIX during the 1987 Market Crash
1.5m lag and 0.4% SPX downside



S&P500 vs VIX during the Great Financial Crisis (2008)
3.5m lag and 10.1% S&P downside



Source: ERS, Bloomberg

Financial Crisis

Wide Range Of Market Outcomes Given Unprecedented Uncertainty

Drivers

- Economic activity impacted by the current pandemic crisis
- Unprecedented levels of uncertainty
- Active response by policy makers

Impact

- Earnings estimate revisions
- Expected growth rates
- Risk aversion levels

Implied Market Price							
Earnings Per Share							
P/E	130	137.5	145	152.5	160	167.5	175
16.2	2,106.0	2,227.5	2,349.0	2,470.5	2,592.0	2,713.5	2,835.0
15.4	2,002.0	2,117.5	2,233.0	2,348.5	2,464.0	2,579.5	2,695.0
14.6	1,898.0	2,007.5	2,117.0	2,226.5	2,336.0	2,445.5	2,555.0
13.8	1,794.0	1,897.5	2,001.0	2,104.5	2,208.0	2,311.5	2,415.0
13.0	1,690.0	1,787.5	1,885.0	1,982.5	2,080.0	2,177.5	2,275.0
12.2	1,586.0	1,677.5	1,769.0	1,860.5	1,952.0	2,043.5	2,135.0
11.4	1,482.0	1,567.5	1,653.0	1,738.5	1,824.0	1,909.5	1,995.0
10.6	1,378.0	1,457.5	1,537.0	1,616.5	1,696.0	1,775.5	1,855.0
9.8	1,274.0	1,347.5	1,421.0	1,494.5	1,568.0	1,641.5	1,715.0
9.0	1,170.0	1,237.5	1,305.0	1,372.5	1,440.0	1,507.5	1,575.0
8.2	1,066.0	1,127.5	1,189.0	1,250.5	1,312.0	1,373.5	1,435.0
7.4	962.0	1,017.5	1,073.0	1,128.5	1,184.0	1,239.5	1,295.0
6.6	858.0	907.5	957.0	1,006.5	1,056.0	1,105.5	1,155.0
5.8	754.0	797.5	841.0	884.5	928.0	971.5	1,015.0
5.0	650.0	687.5	725.0	762.5	800.0	837.5	875.0

Source: ERS, Bloomberg

Alternatives

Business Risk

- Distinction between essential vs. non essential businesses
- Market conditions(supply chain, logistics, duration of disruptions, commercial partners.)

Operational Risk

- Staff lay-offs, furloughs, morale
- Areas compromised by virus and quarantine of facilities

Investment Risk

- Liquidity needs (cash burn)
- Restructuring
- Financial Distress Condition
- Access to liquid markets
- Covenant breaches
- Redemptions
- Leverage
- Stress Test models
- Diversification (geography, sector, vintage, manager, etc.)

- Global pandemic of unprecedented proportions,
 - Major disruptions to the world economy, how society interacts and posed challenges to financial markets
 - A vaccine is still months away
- The US is in a technical recession with unemployment claims soaring. FED and policy decision makers have approved a large scale economic package to provide economic stability and avoid a more sustained and long drawn out damage to the economy.
- Risk-on assets suffered large drawdowns and economic estimates have come down.
- The diversified nature of ERS' portfolio allowed it to lessen the risk of a dramatic drawdown.
- On-going risk assessment of Alternative assets.

Questions?

Public Agenda Item #13

Real Estate Market Update and Program Overview



May 20, 2020

Robert Sessa, CFA, Director of Real Estate

Market Update & Program Overview

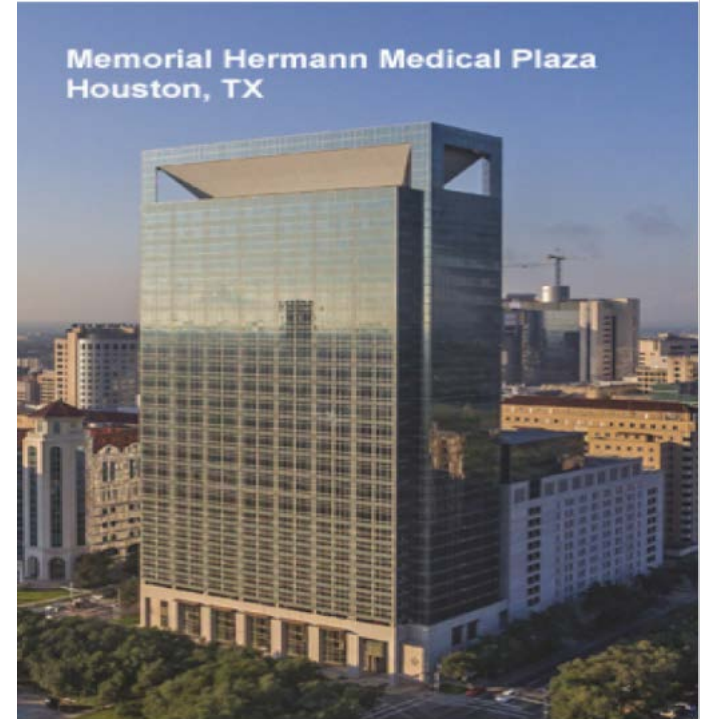
Agenda



- Real Estate Overview
- Staffing
- Listed Securities as of March 31, 2020
- Private Real Estate
- Pandemic Thoughts
- Accomplishments
- Initiatives



"As first offers are usually unrealistic I would prefer it if you submit the second offer first."



Market Update & Program Overview

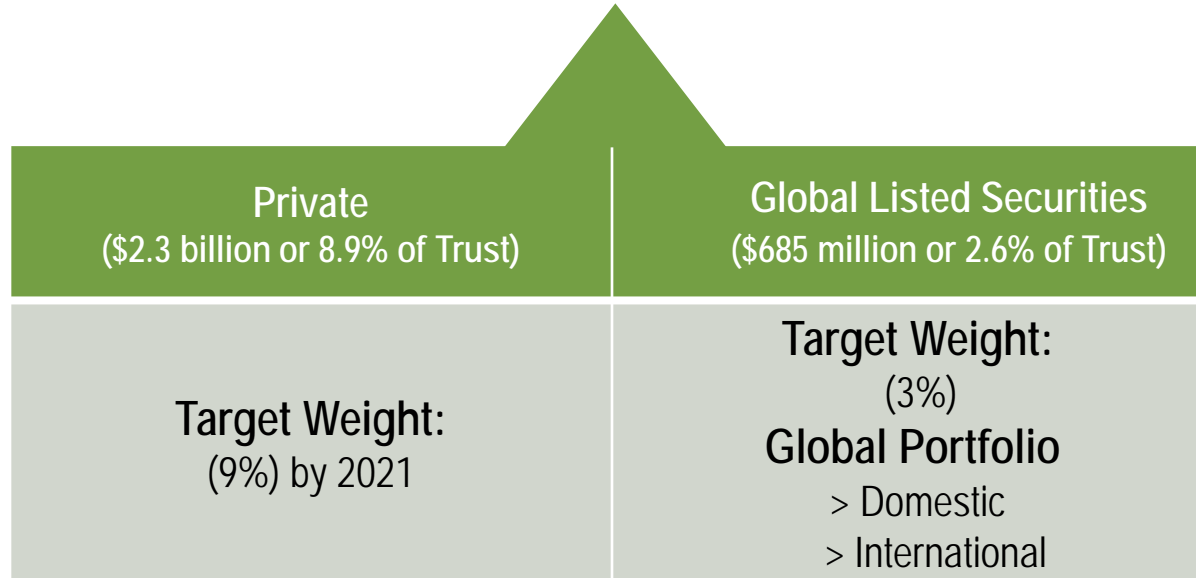


Overview

Target Weights:

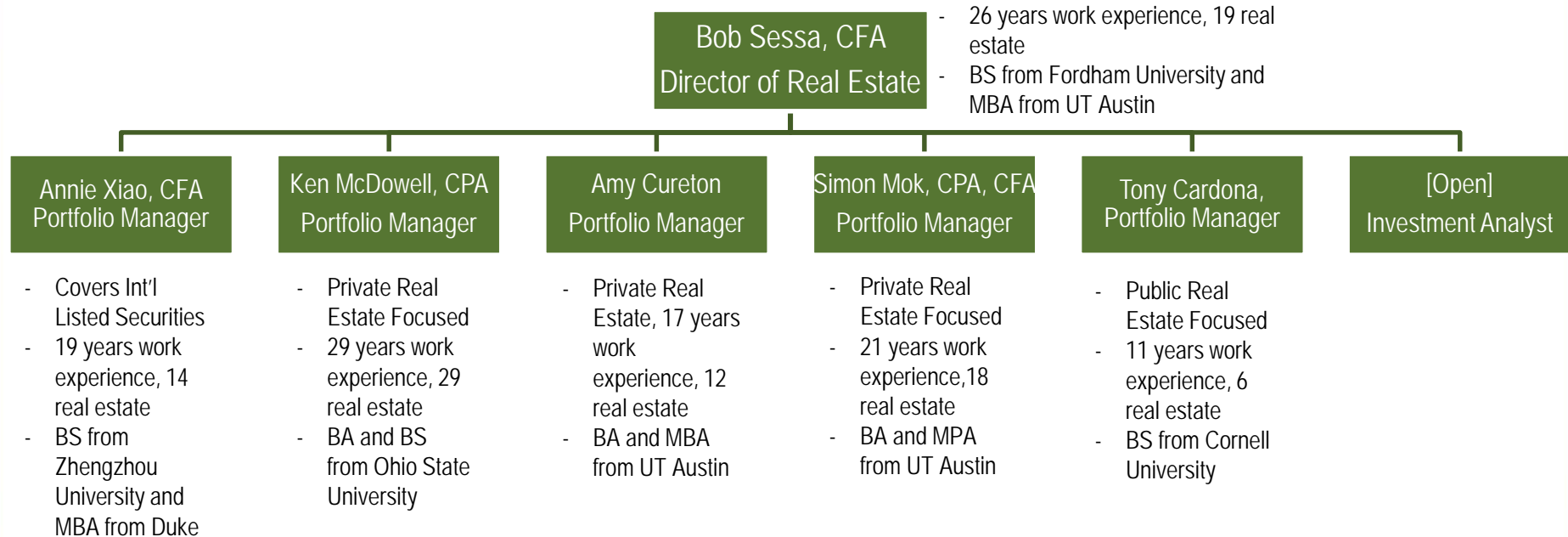
12% of Pension Fund

Current weight 11.5% or
\$3.0 billion as of March 31



Market Update & Program Overview

Staffing

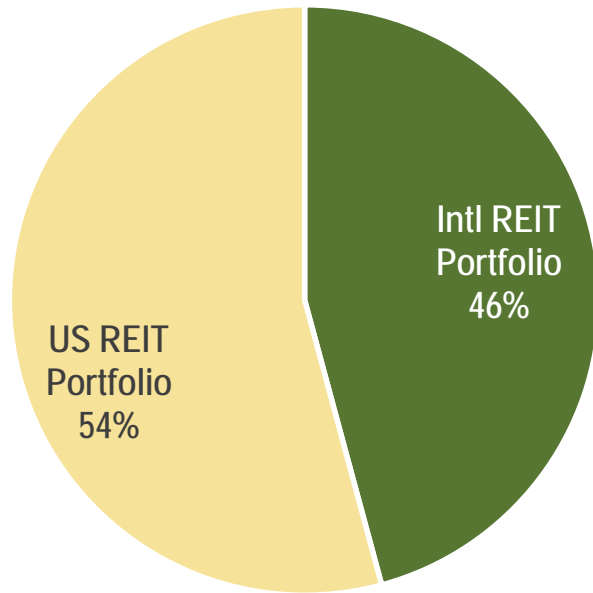


Market Update & Program Overview

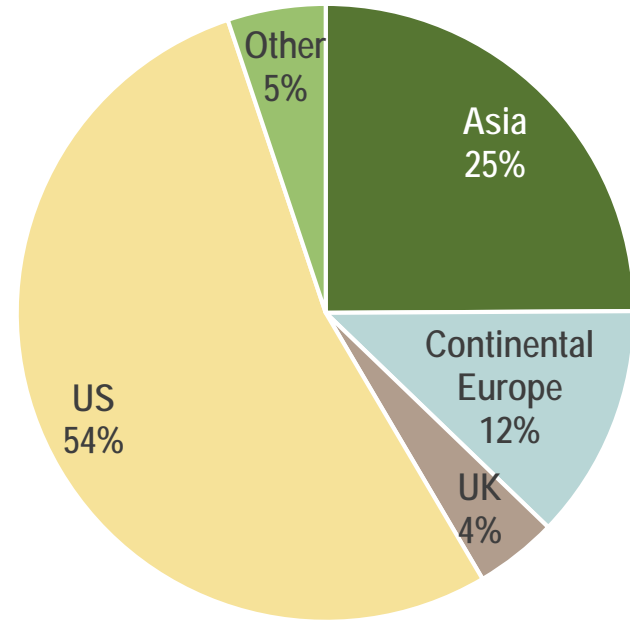
Listed Securities as of March 31, 2020



Total Portfolio: \$685 million



Total Portfolio: Geography



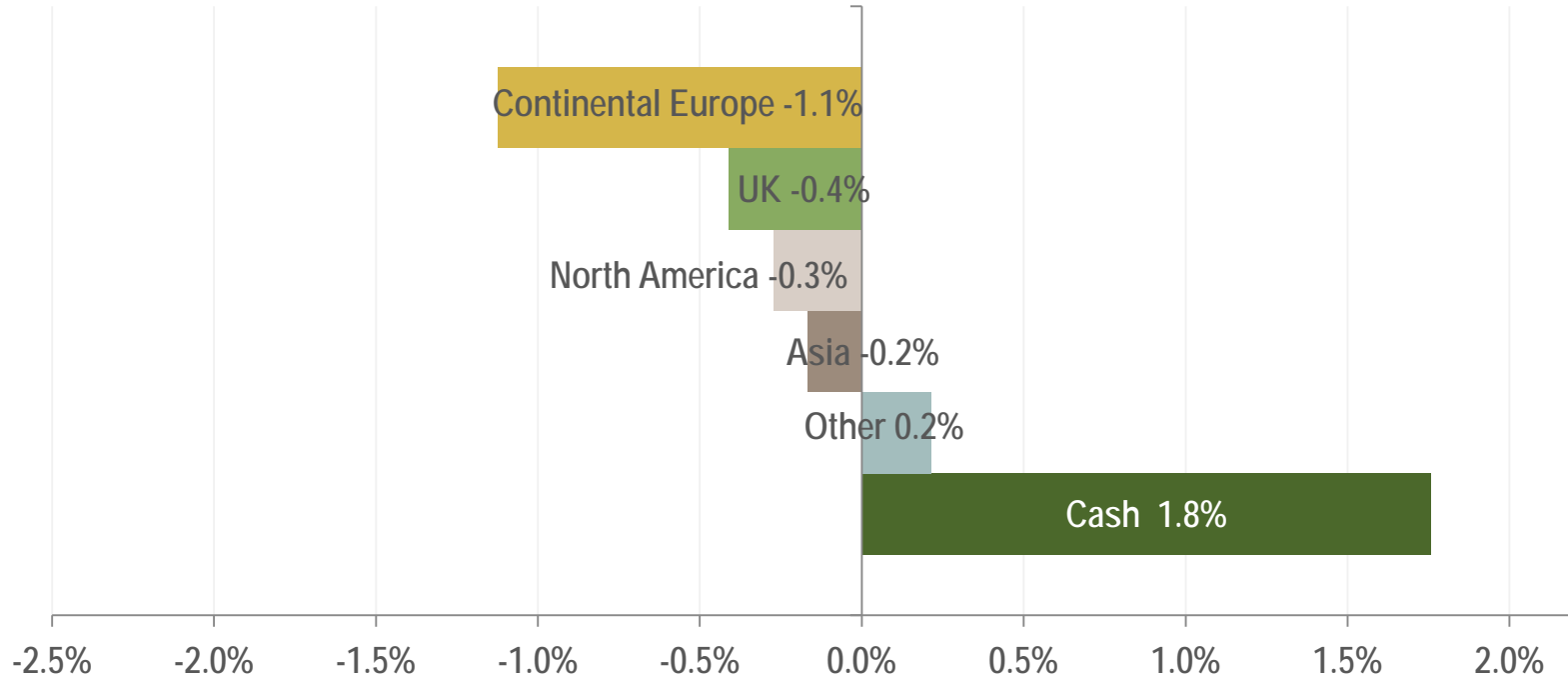
Note: Other includes Canada, Middle East and Cash

Market Update & Program Overview

Listed Securities as of March 31, 2020



Portfolio Over/Underweight

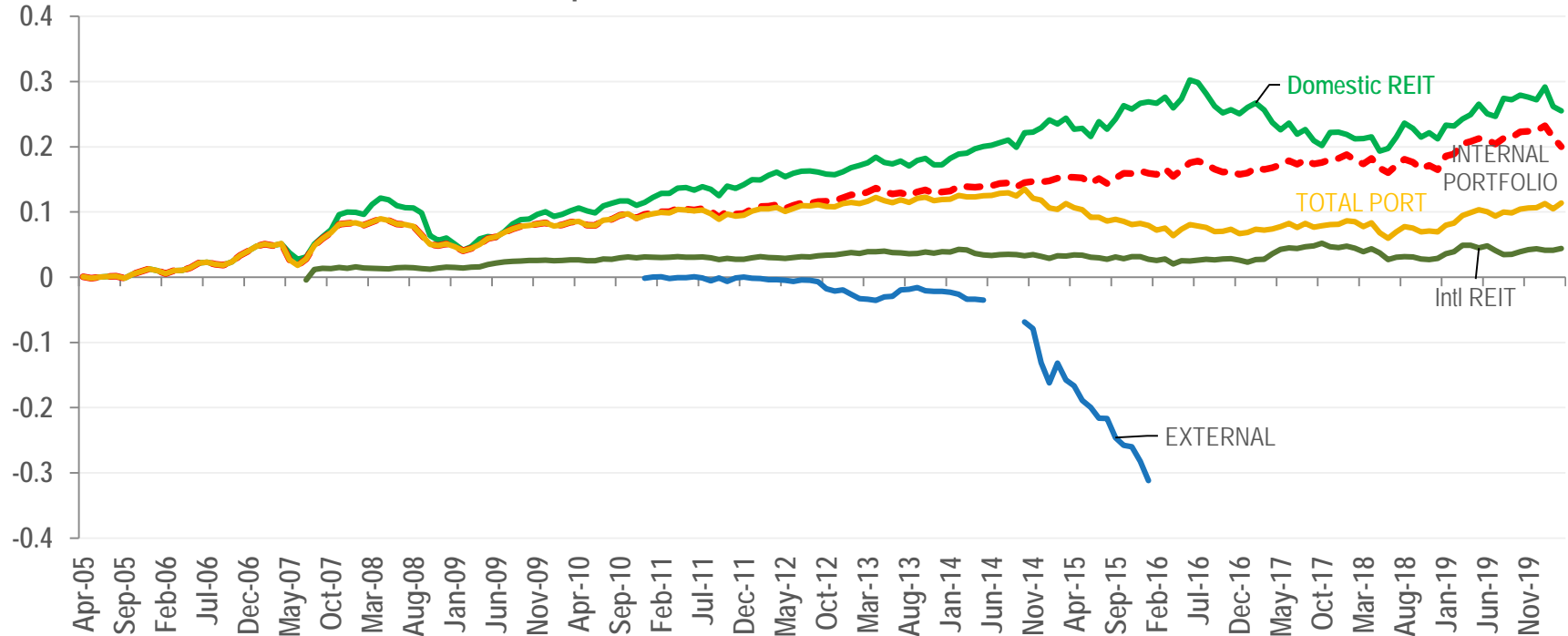


Market Update & Program Overview

Excess Total Return as of March 31, 2020



Since Inception Cumulative Excess Total Return

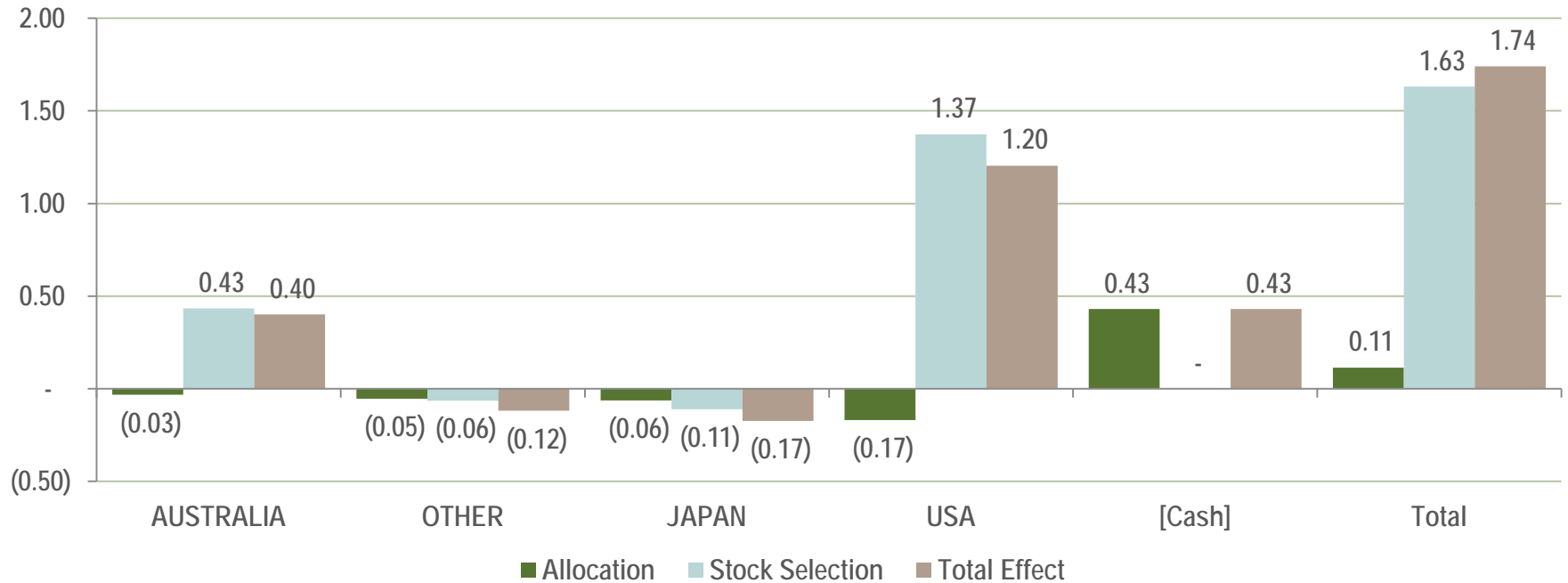


Market Update & Program Overview

Attribution as of March 31, 2020 – One Year



Attribution - 1 Year

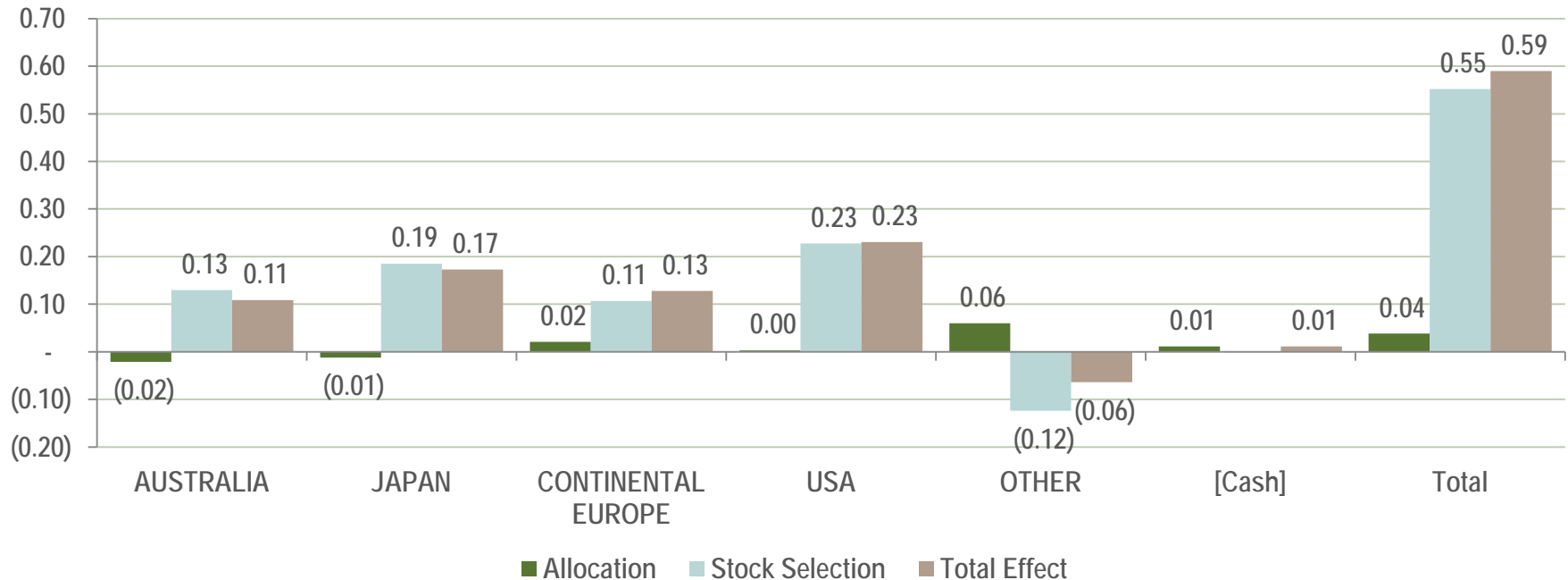


Market Update & Program Overview

Attribution as of March 31, 2020 – Five Years



Attribution - 5 Years



Note: Internal portfolios only

Market Update & Program Overview

Private Real Estate as of March 31, 2020



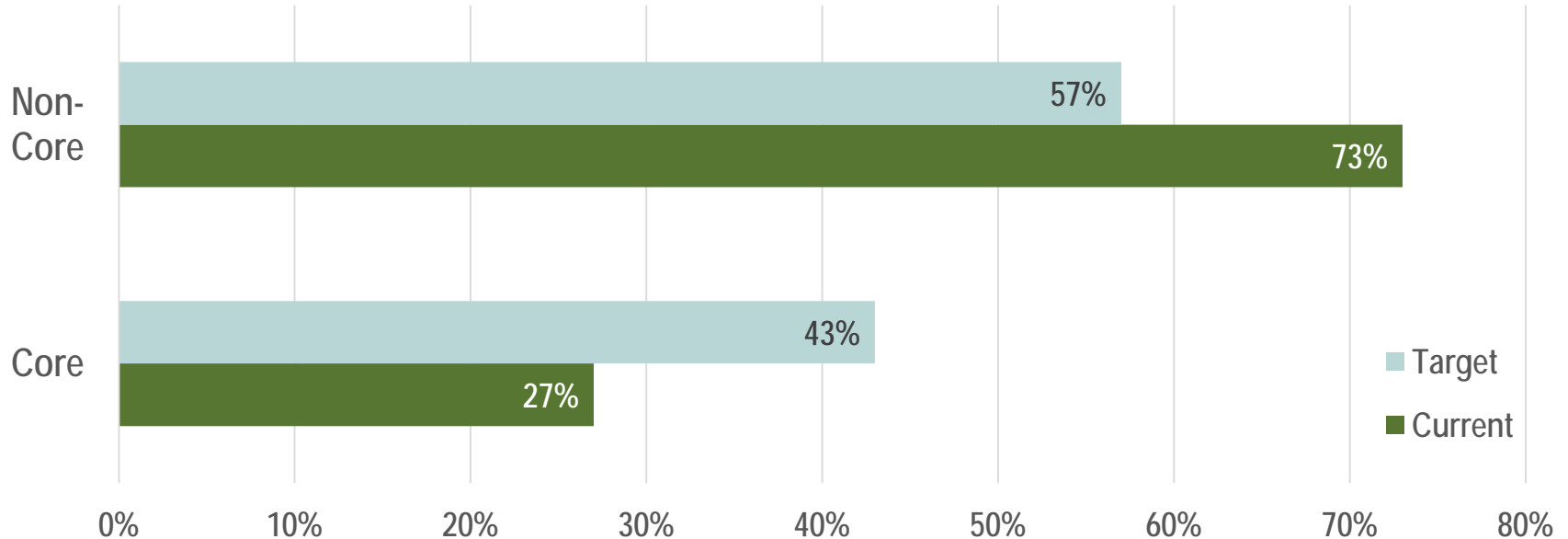
- **PORTFOLIO NET ASSET VALUE:** \$2.3 billion
- **INVESTMENT TYPE:** Equity 91%; Debt 9%
- **OVERALL LOAN TO VALUE RATIO:** 53%
- **COMMITMENTS:**
 - Total Portfolio (since inception) \$5.0 billion with 78 Investments and 31 managers
 - FY20 Committed \$557 million to 10 deals
- **PROGRAM AVERAGE ECONOMICS:**
 - Management Fee: 112 bps
 - Carry: 16.90%
- **CAPITAL CALLED:**
 - Since Inception \approx \$3.7 billion
 - FY20 \$317 million
- **DISTRIBUTIONS:**
 - Since Inception \approx \$2.9 billion
 - FY20 \$226 Million

Market Update & Program Overview

Asset Allocation vs. Target as of March 31, 2020



Current Allocation vs Target Allocation



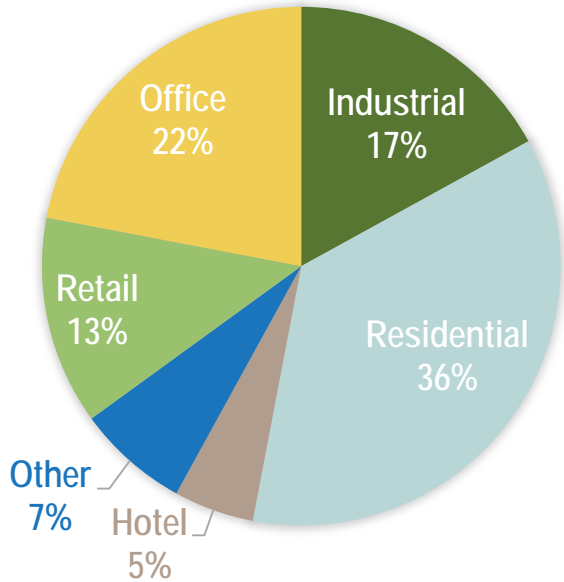
Note: Current allocation based on current NAV

Market Update & Program Overview

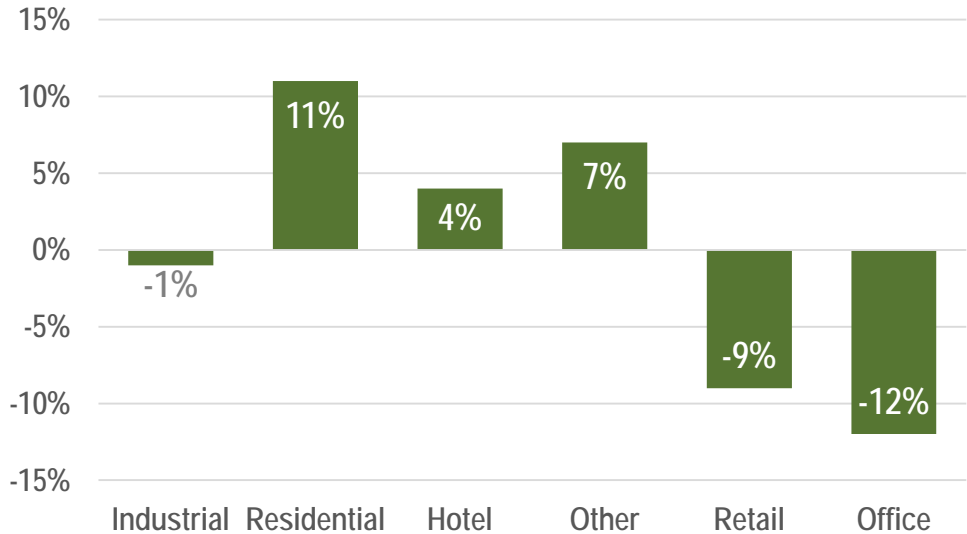
Property Type Weights as of December 31, 2019



ERS Portfolio by Property Type
Based on ERS' NAV, US Only



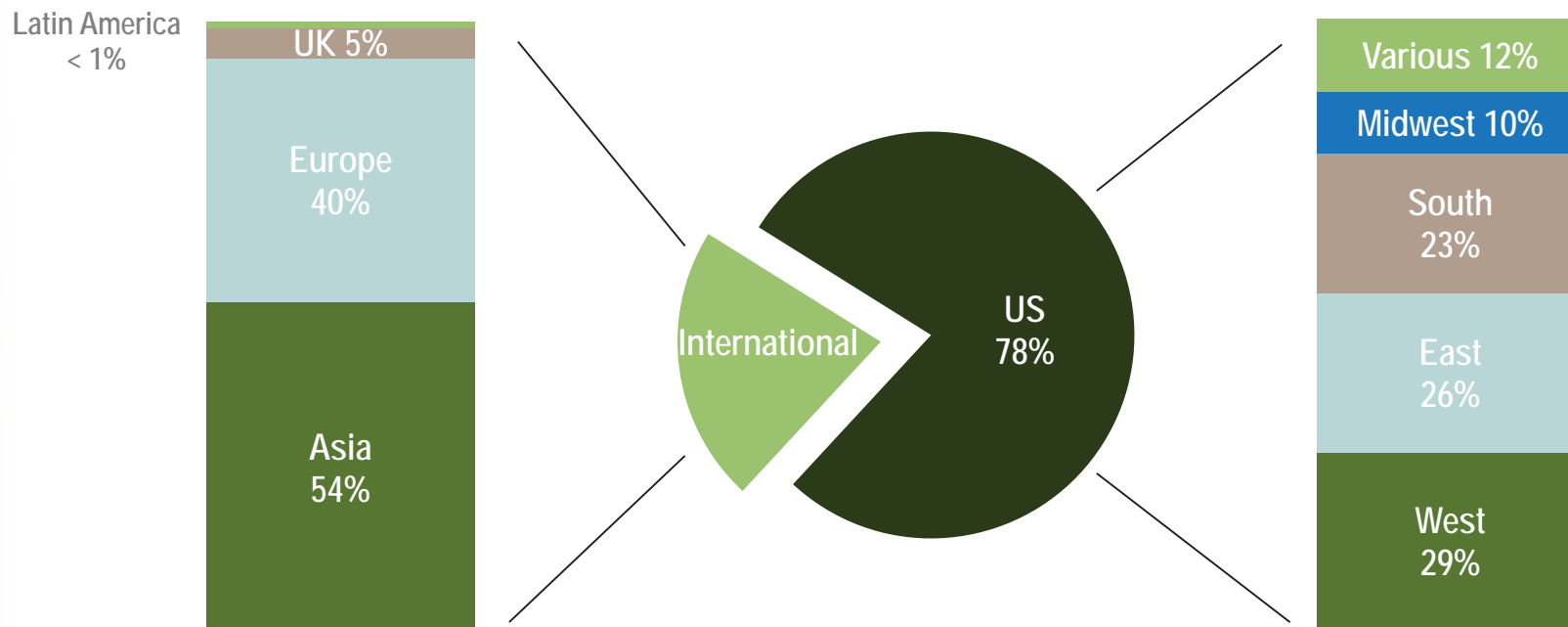
ERS Portfolio Compared to NCREIF Property
Index Benchmark, US Only



Note: Residential includes niche segments (e.g. Student Housing, Senior Housing and Manu Housing, etc.) and Office includes medical office

Market Update & Program Overview

Geographic Weights Based on ERS' NAV as of Dec.31, 2019





Pandemic Thoughts

Impact on Real Estate



- Hotels and Retail bearing the brunt but all property types impacted
- Transactions halted or postponed effecting price discovery
- Work, Live, Travel differently post Covid-19??
- Acceleration of existing trends
 - eCommerce (especially grocery sales)
 - Supply chain reconfiguration
 - Cloud computing adoption
- Government Intervention in Real Estate
- Global Monetary and Fiscal Response
 - Short and Long Term Impacts
 - Inflationary ??



Market Update & Program Overview

FY20 Accomplishments



- Both Internal REIT and Private Real Estate portfolios have outperformed the benchmark for the 1,3,5 years and since inception period
- Committed to our first PropTech fund (\$10 million to main fund and \$7 million to co-invest vehicle)
- Negotiated an estimated \$130 million in savings since inception plus non-economic terms to improve corporate governance
- Option strategies continue to be used in listed real estate portfolios
- Co-Hosted the 5th Bi-Annual REEM conference (emerging manager)
- In compliance with the Real Estate Guidelines – one manager approaching 15% manager concentration limit

Market Update & Program Overview

FY21 Initiatives



- Triage Private Real Estate portfolio and commit new capital on a selective basis
- Understand the Post Covid-19 environment
- Targeting \$300 million in commitments with a range of \$200 million to \$600 million and 3 to 8 new commitments
- Continue to improve upon the REIT investment process and performance
- Hire an Analyst

Questions?



"IT MUST BE NICE HAVING A JOB
WHERE YOU CAN WORK AT HOME."

Mother HUMOR



Public Agenda Item #14

Real Estate Program

*Review and Approval of Proposed Real Estate Annual Tactical Plan
for Fiscal Year 2021 – (Action)*

May 20, 2020

Robert Sessa, CFA, Director of Real Estate

Proposed FY21 Tactical Plan

Overview



- Private Real Estate Annual Tactical Plan is a guideline for investing
- Current value of Private Real Estate is \$2.3 billion
- Currently at 8.9% of the total ERS portfolio (target allocation is 9%)
- Commitments will target \$300 million for FY21, with a range of \$200 million to \$600 million
- \$50 million - \$100 million commitment sizes, but may be smaller or larger for niche or special situations



Proposed FY21 Tactical Plan

Fiscal Year 2020 in Review



FY20 Tactical Plan			FY20 Actual (as of March 31, 2020)	
Category	Number of new Investments	New Commitment in millions (range)	Number of New Commitments	Commitment Amount
Core	0 – 2	\$100 (\$0 - \$150)	1	\$100
Non-Core	4 – 12	\$550 (\$275 - \$825)	9	\$457
Total	5 – 12	\$650 (\$325 - \$975)	10	\$557

Proposed FY21 Tactical Plan



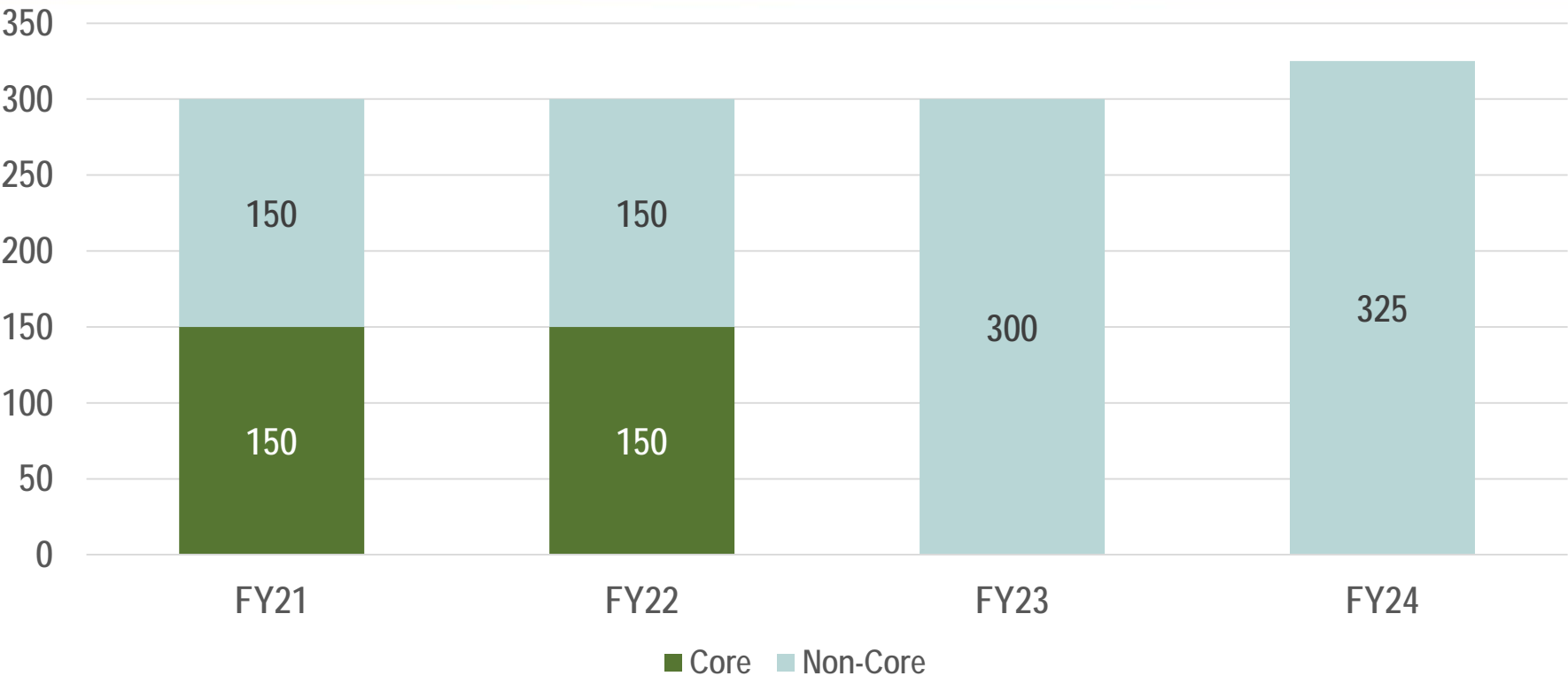
FY21 Proposed Tactical Plan

Category	Number of new Investments	New Commitment in millions (range)
Core	0 – 2	\$150 (\$0 - \$300)
Non-Core	3 – 6	\$150 (\$0 - \$300)
Total	3 – 8	\$300 (\$200 - \$600)



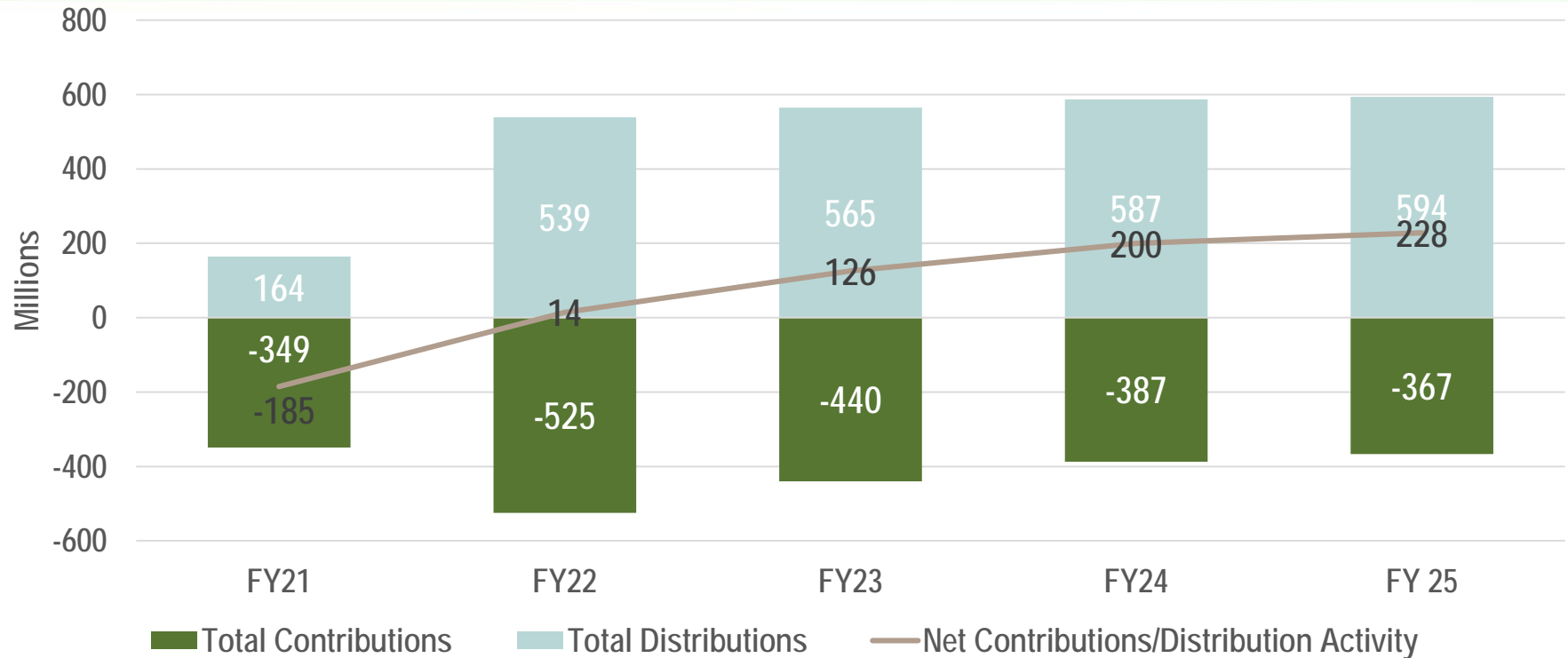
Proposed FY21 Tactical Plan

Targeted New Commitments Through Fiscal Year 2024



Proposed FY20 Tactical Plan

Projected Cash Flows Through FY24



Proposed FY21 Tactical Plan

Near Term Strategy



- Understand post pandemic world and potential opportunities
- Build relationships of scale with strong partners and small groups of investors
- Niche type funds or other strategies that will diversify the existing portfolio (medical office, self-storage and manufactured housing and debt funds)
- Co-Investments and separate accounts to leverage strategic partnerships
- Explore long term holds for select investments, including core
- Selective international investments – Asia and possibly Europe

Questions?
Action Item

*Public Agenda Item #15

Infrastructure Market Update and Program Overview

May 20, 2020

Pablo De la Sierra Perez, Director of Private Infrastructure



Private Infrastructure Program Overview

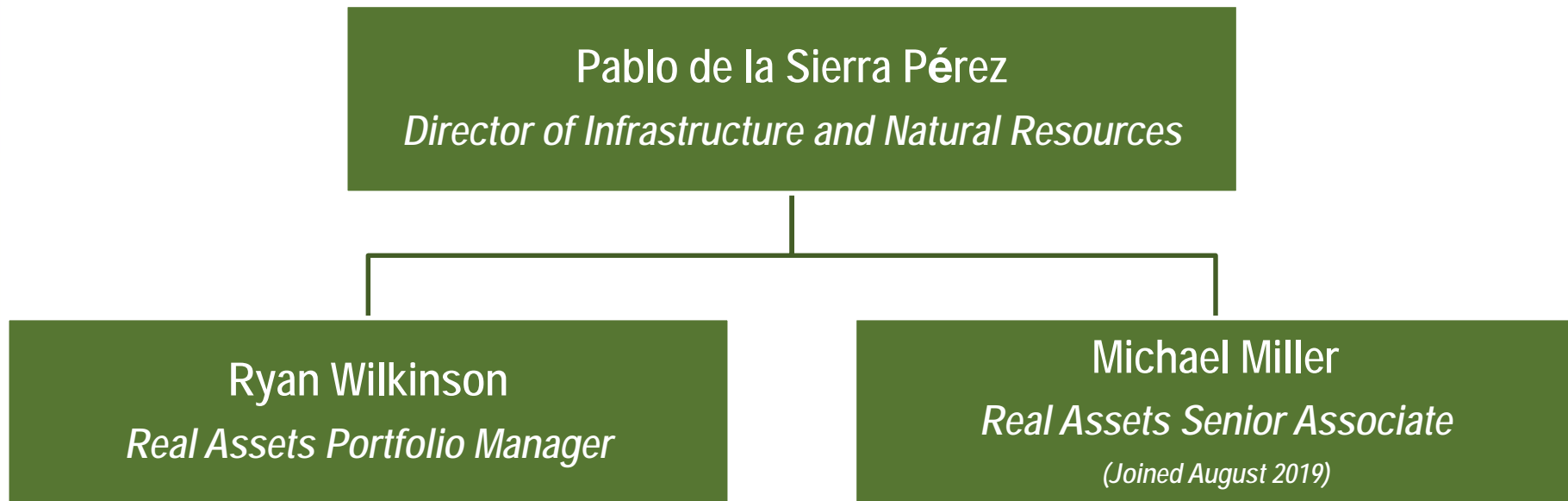


Agenda – Key Topics

- Team Update
- Portfolio Update as of March 31, 2020
- Market Update
- Goals and Objectives
- Infrastructure Consultant

Private Infrastructure Program Overview

Team Update



Private Infrastructure Program Overview

*Portfolio Update as of March 31, 2020**



- Inception through March 31, 2020*: 16 Funds, 21 co-investments, **\$1.8 billion committed**
- **Net Asset Value (“NAV”) of \$1,007 million or 3.9% of system assets****
 - Includes 3 legacy Special-Situation investments
 - 1.08x TVPI***, 0.31x DPI***, 2.97 % IRR
 - \$685 million Unfunded Commitments
- Policy Benchmark: CPI+400
- FY2019: committed \$285 million vs a \$450 million target
- FY2020: targeting \$450 million in commitments
 - \$165 million already committed (March 31, 2020)
 - Additional \$200 - \$350 million expected

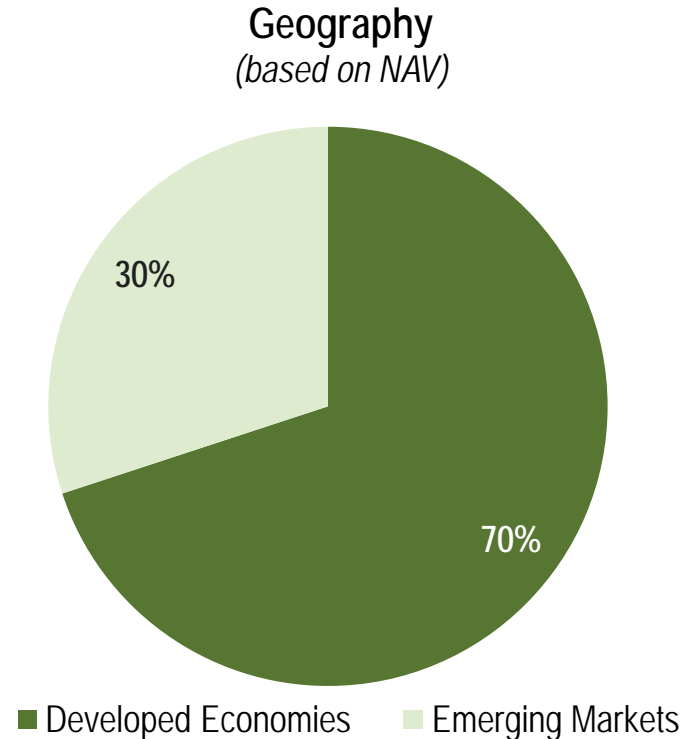
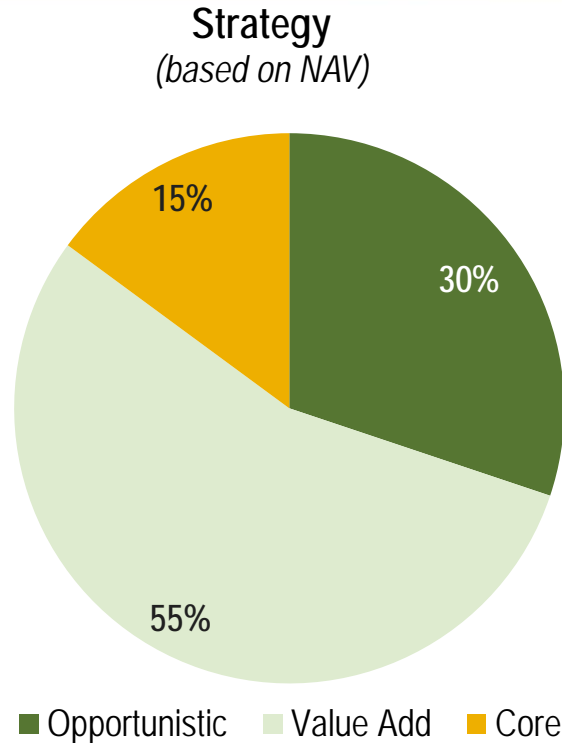
*. Values are based on December 31, 2019 (or September 30, 2019) valuations rolled forward to March 31, 2020. The impact of COVID-19 is not reflected in these metrics

** . The portfolio is about \$900 million below target allocation On an NAV basis (7% target allocation ≈ \$1.9 billion at current Trust's value)

***. TVPI, or Total Value to Paid in Capital, is equal to (NAV + Distributions) / Paid in Capital; DPI, or Distributed to Paid in Capital, is equal to Distributions / Paid in Capital

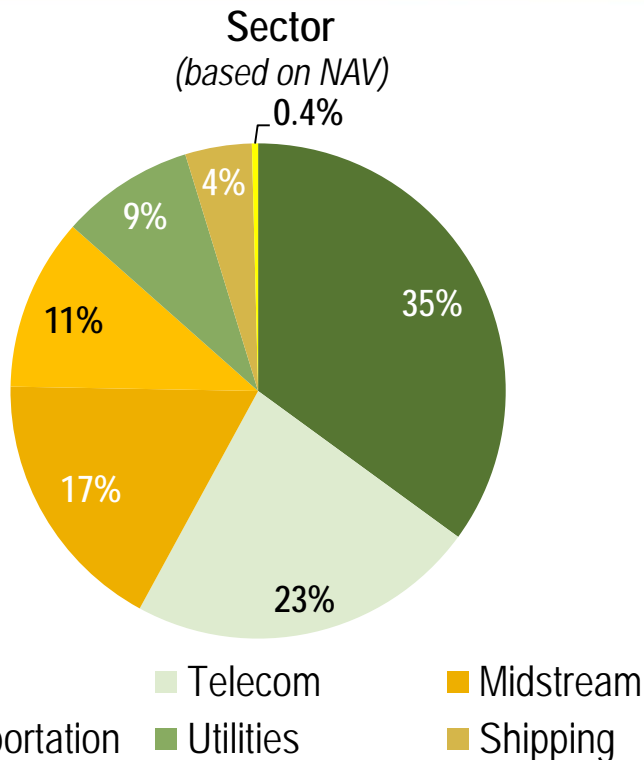
Private Infrastructure Program Overview

Portfolio Update as of March 31, 2020

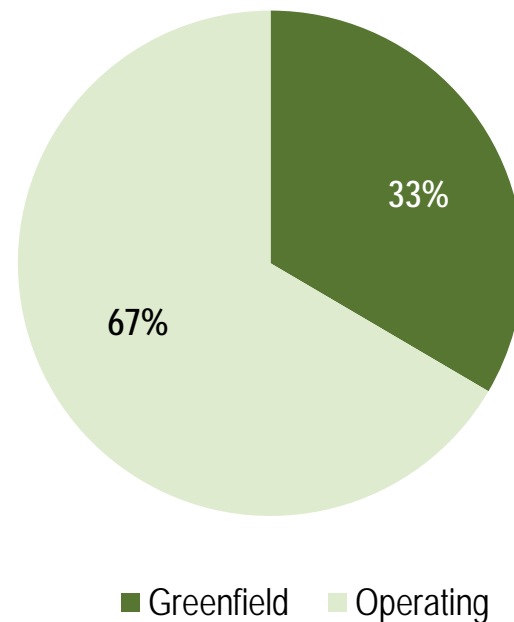


Private Infrastructure Program Overview

Portfolio Update as of March 31, 2020



New Construction vs. Operating
(based on committed capital)



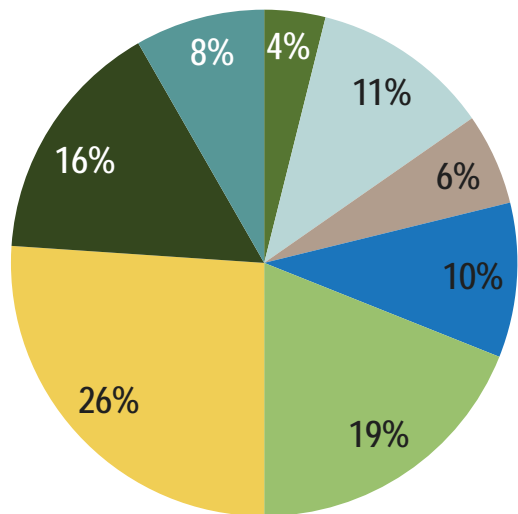
Greenfield: new construction

Private Infrastructure Program Overview

Portfolio Update as of March 31, 2020

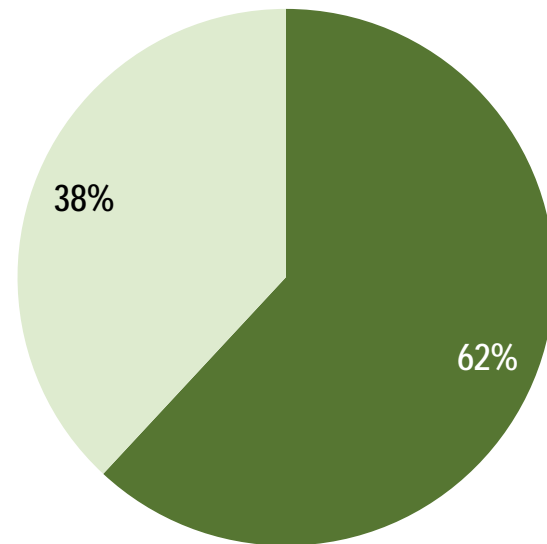


Vintage
(based on committed capital)



■ FY 2012 ■ FY 2013 ■ FY 2015 ■ FY 2016
■ FY 2017 ■ FY 2018 ■ FY 2019 ■ FY 2020

Vehicle
(based on committed capital)



■ Funds ■ Co-investment/ Direct

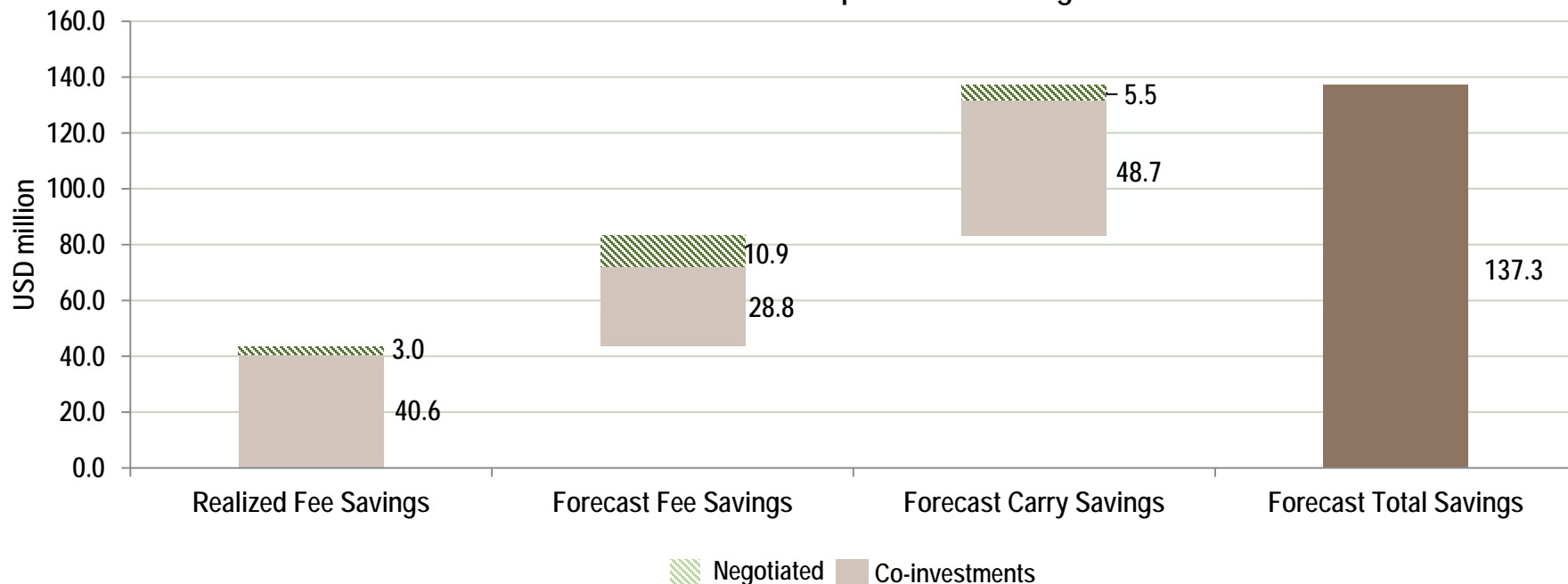
Private Infrastructure Program Overview

Portfolio Update – Average Portfolio Economics and Fee Savings



- March 31, 2020, portfolio's averages: Management Fee 0.85%; Carry: 11.62%

Estimated Infrastructure portfolio's savings

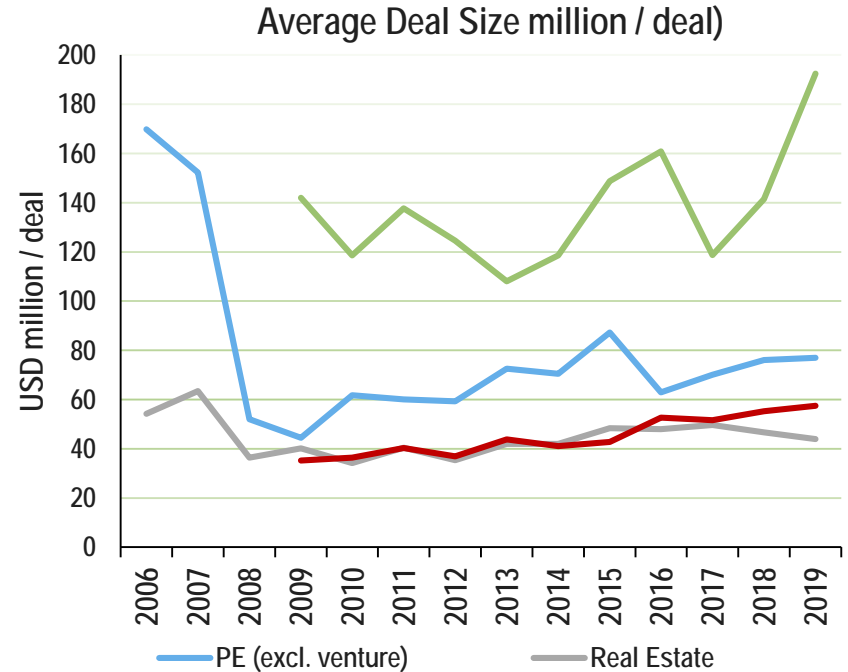
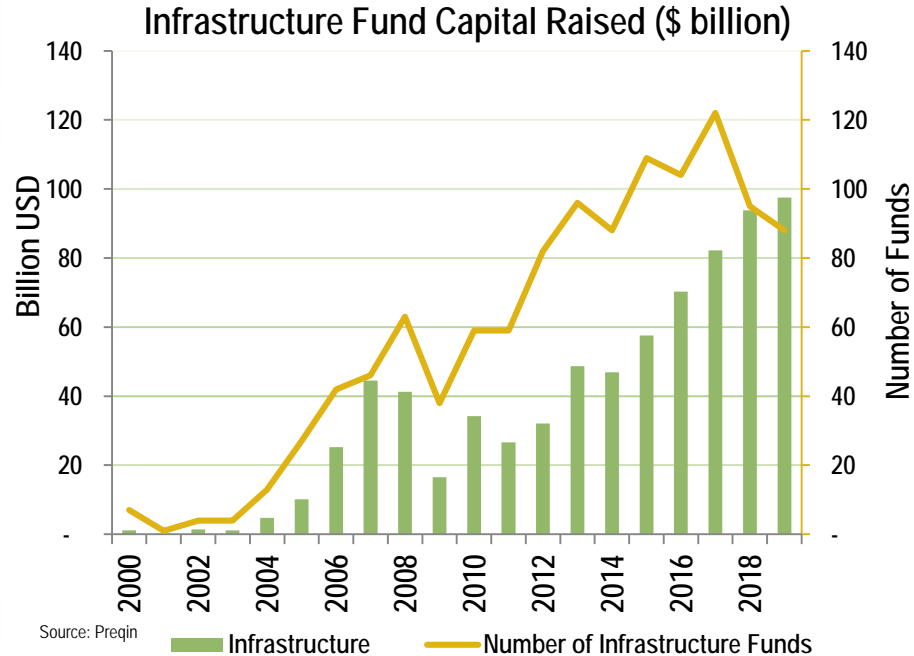


Private Infrastructure Program Overview

Market Update



- Fundraising level continues to be strong



Private Infrastructure Program Overview

Market Update and Outlook



- Energy, Power and Utilities: largest
 - Digital infrastructure growing
 - Strong fundraising activity
 - Concentrated GP market
 - Increase in fund size
 - Expanding infrastructure universe / Infratech Innovation
 - Direct investments / co-investments
- Need for infrastructure investment
 - Developing asset class
 - Data Processing
 - Emerging Markets
 - Political environment
 - Climate Change and Sustainability
 - Oil prices
 - COVID-19
 - (price and risk discovery)

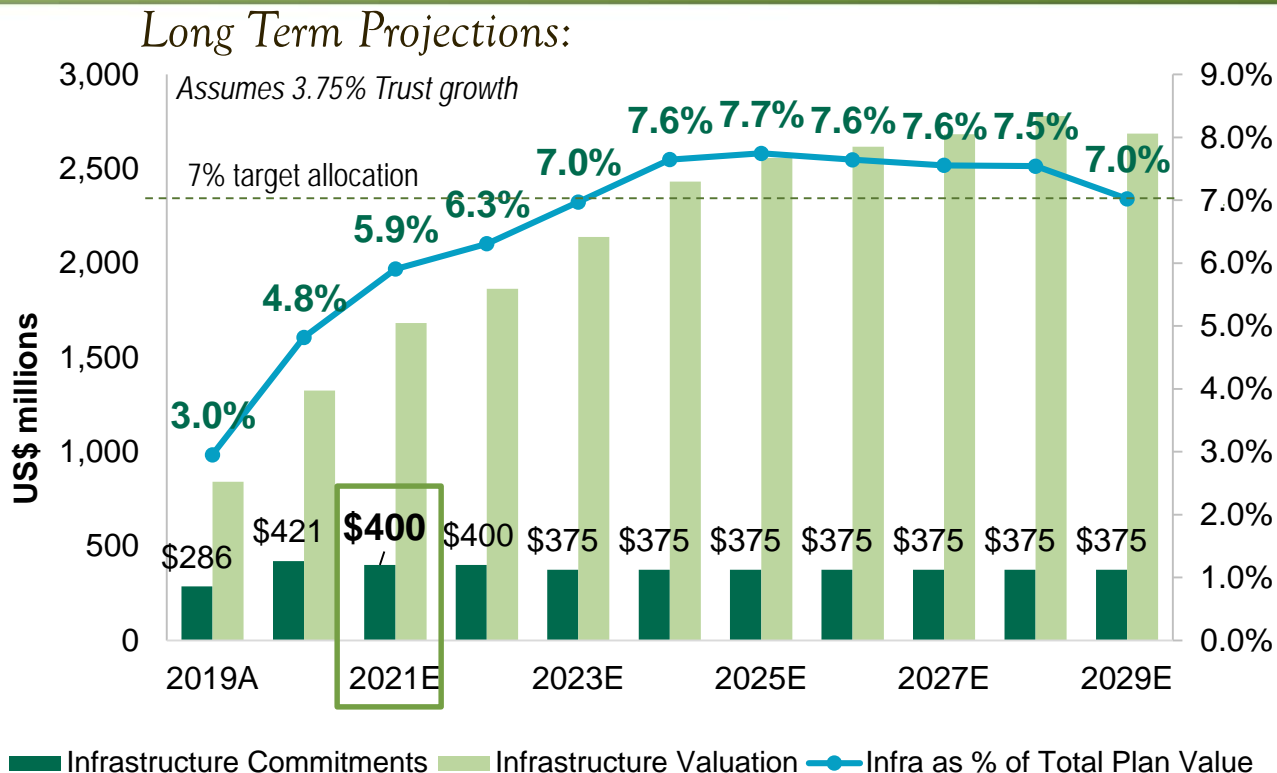
Private Infrastructure Program Overview

Goals and Objectives



FY21:

- Execute Tactical Plan
- Continue portfolio diversification
- Explore efficient ways to deploy
(co-investments and direct investments, anchor and seed investments, pursuing partnerships)
- Seeking one analyst



Private Infrastructure Program Overview

Infrastructure Consultant Performance



- Frequent calls with staff/in-person meetings
- Annual on-site visit at consultant office in September 2019
- Investment memorandums for deals
- Participation in Asset Class Investment Committee meetings
- Staff reviewed the Infrastructure Program Guidelines with consultant
 - No proposed changes

Questions?

*Public Agenda Item #16

*Review and Consideration of Proposed Infrastructure
Annual Tactical Plan for Fiscal Year 2021 – (Action)*

May 20, 2020

Pablo De La Sierra Perez, Director of Private Infrastructure

Private Infrastructure Tactical Plan

FY21 IAC and Board Approval Request



- Review and consideration of FY21 ERS Private Infrastructure Annual Tactical Plan:
 - Propose to invest in 3-6 investments with commitments totaling \$400MM (including co-investments/direct investments)
 - Commitment target range +/- 30% (\$280MM - \$520MM)
 - Continue seeking sector diversification
 - Opportunistically seek core assets
 - Continue establishing key relationships (and seeking seed investments, partnerships, etc.)
 - Continue to focus on efficiency and co-investments / direct investments

Consultant's Recommendations

- Core and non-US markets exposure
- Emerging market exposure
- Larger ticket sizes

Questions?
Action Item

*Public Agenda Item #17

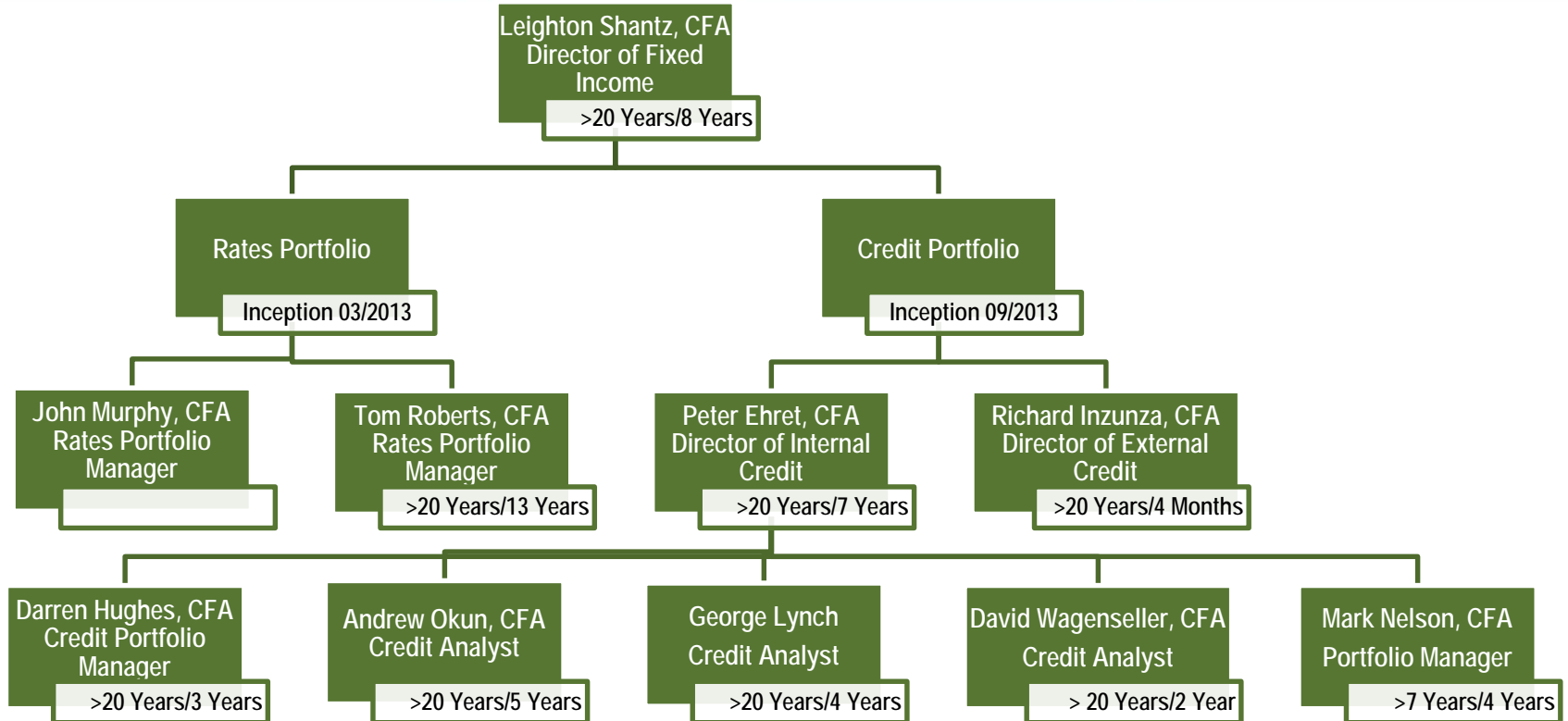
Fixed Income Market Update and Program Overview

May 20, 2020

Leighton Shantz, CFA, Director of Fixed Income

Fixed Income Program

Team



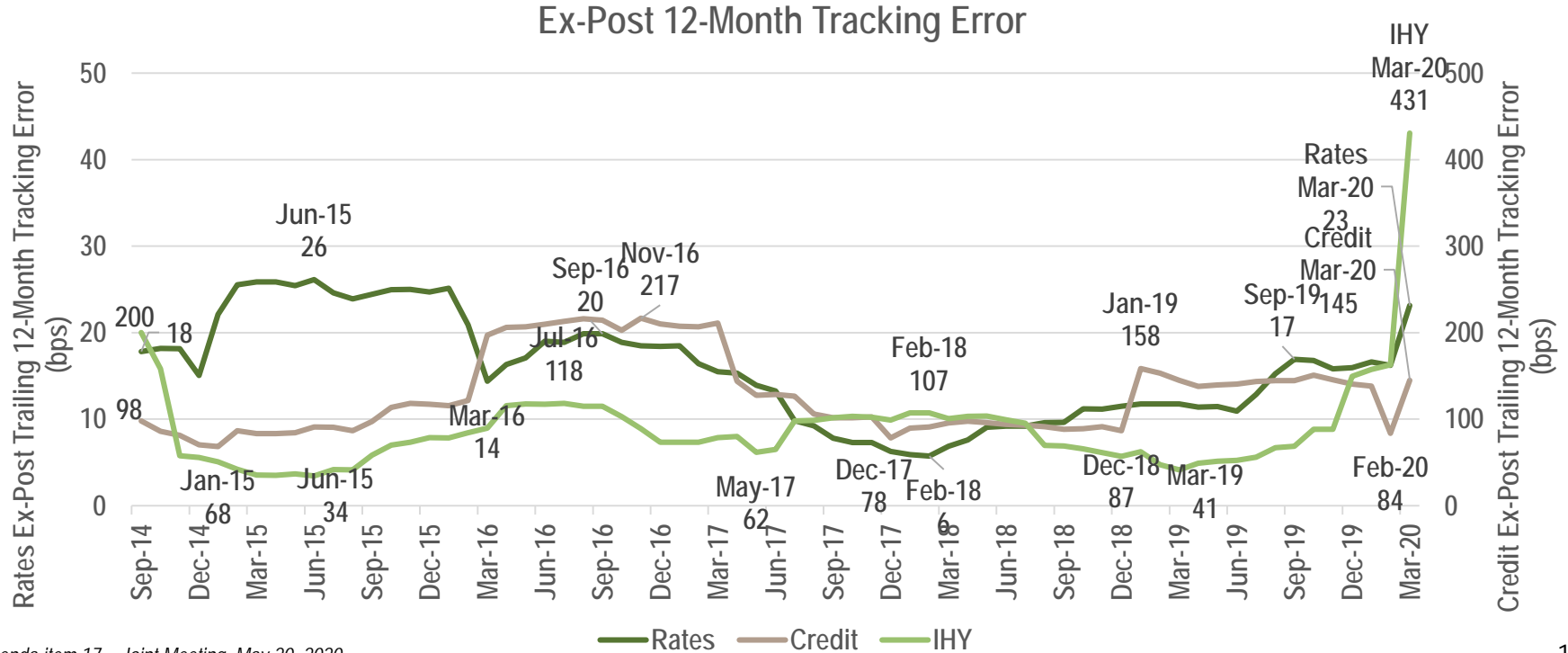
Return Summary



Periodic Annualized Total Rates of Return

PORTFOLIO	FYTD	1-YEAR	3-YEARS	5-YEARS
RATES	+473 bps	+893 bps	+422 bps	+287 bps
BENCHMARK	+479 bps	+902 bps	+415 bps	+278 bps
DIFFERENCE	-6 bps	-9 bps	+7 bps	+10 bps
CREDIT	-1251 bps	-1033 bps	-22 bps	+241 bps
BENCHMARK	-1008 bps	-694 bps	+76 bps	+278 bps
DIFFERENCE	-244 bps	-339 bps	-98 bps	-38 bps

Rolling 12-Month Tracking Error



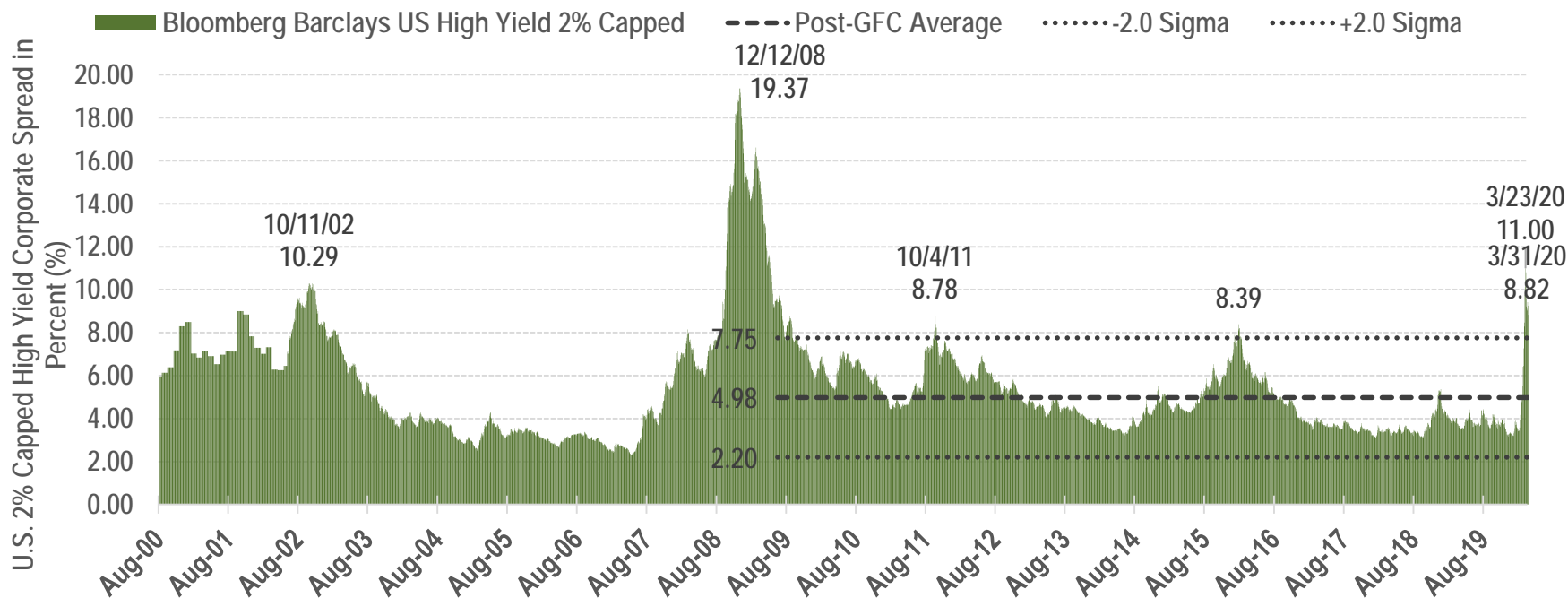
Rolling 12-month Return Dispersion



Benchmark Credit Spread History



Bloomberg Barclays 2% Capped U.S. High Yield Spread History



External Credit Investments



				LTM	ITD	ITD
NAME	Commitment	Drawn	Strategy	Return	IRR	\$ Gain
BCA	\$150mm	\$105mm	Special Situations HF	+219 bps	+547 bps	+\$40.6mm
BDC	\$100mm	\$75mm	Public BDC	-4782 bps	+500 bps	+\$11.3mm
BPCP	\$75mm	\$40mm	Middle Mkt Origination	+1473 bps	+1272 bps	+\$4.7mm
BSP	\$75mm	\$64mm	Middle Mkt Distress	+184 bps	+744 bps	+\$6.5mm
CLO	\$250mm	\$200mm	CLO Mezzanine & Equity	-412 bps	+641 bps	+35.5mm
CLOW	\$150mm	\$108mm	CLO Equity & Warehouse	+195 bps	+680 bps	+\$1.7mm
GOF	\$50mm	\$36mm	Opportunistic Distress	+915 bps	+576 bps	+\$10.8mm
GOF II	\$75mm	\$32mm	Opportunistic Distress	+488 bps	+4783 bps	+\$366m
VWH	\$50mm	\$12mm	Residential NPL	+760 bps	+713 bps	+\$743m

As of March 31 or last report

Questions?

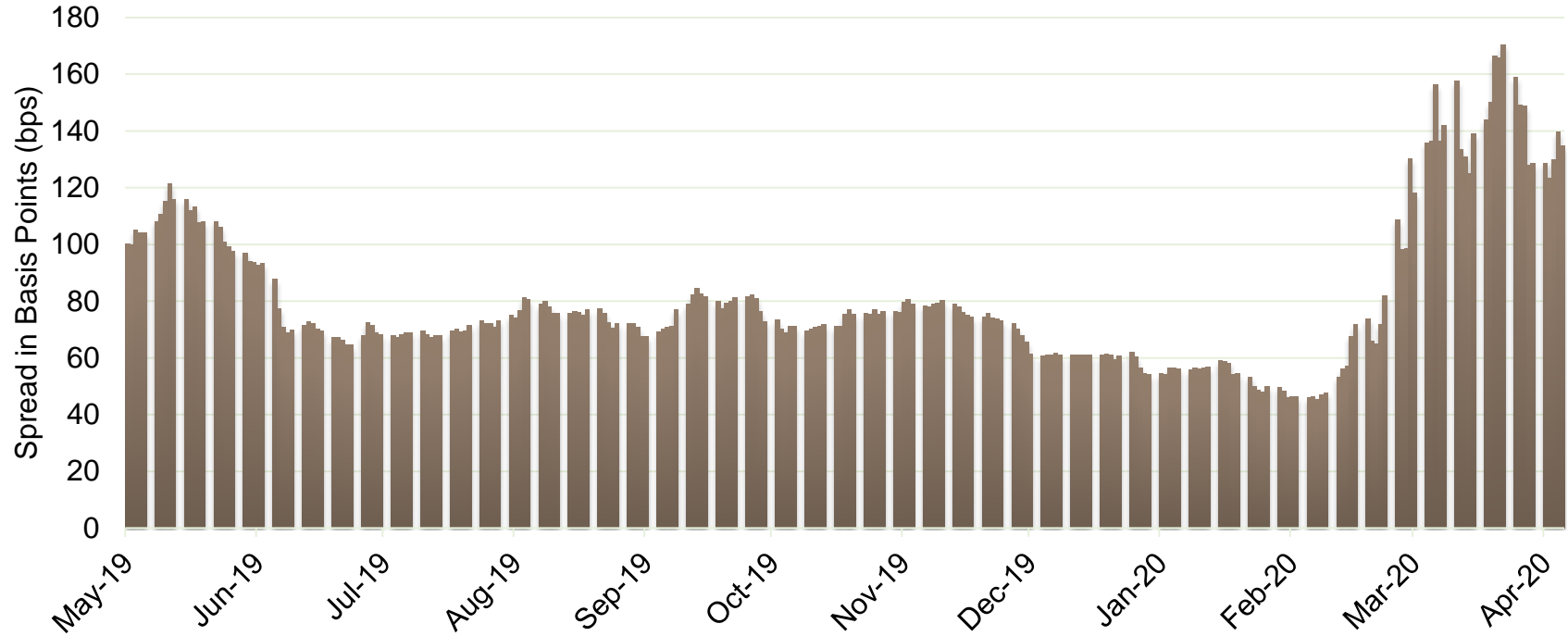
*Public Agenda Item #18

Fixed Income Program
Review of Securities Lending Program

May 20, 2020

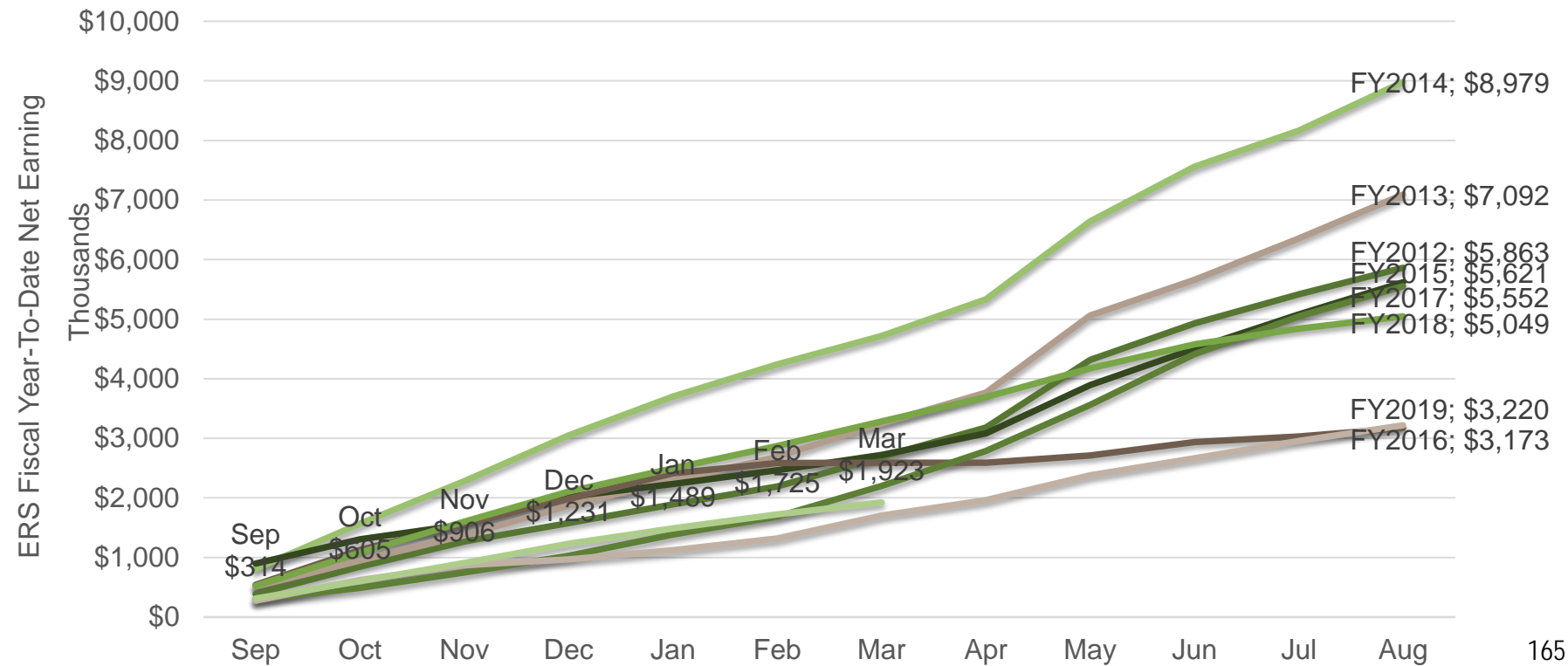
Leighton Shantz, CFA, Director of Fixed Income

Lending Agent CDS Spread



Securities Lending Revenue Comparison

Fiscal Year-to-Date



Questions?

Public Agenda Item #19

Reminder date for the next Joint Meeting of the Board of Trustees and Investment Advisory Committee, the next meeting of the Board of Trustees, and the next meeting of the Audit Committee

May 20, 2020

Next Meeting Dates



2020 Meeting Dates

Wednesday, March 11, 2020

Wednesday, May 20, 2020

Wednesday, August 19, 2020

2-Day Workshop:

Tuesday - Wednesday, December 8 & 9, 2020

Public Agenda Item #20

*Adjournment of the Joint Meeting of the Board of Trustees
and
Investment Advisory Committee*

May 20, 2020

Public Agenda Item #21

Recess of the Board of Trustees

Following a temporary recess, the Board of Trustees will reconvene to take up the Board agenda items

May 20, 2020