



**OREGON
STATE
TREASURY**

Oregon Investment Council

March 9, 2022

Cara Samples
Chair

Tobias Read
State Treasurer

Rex Kim
Chief Investment Officer



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OREGON INVESTMENT COUNCIL

Agenda

March 9, 2022
9:00 AM

Oregon State Treasury
Investment Division
16290 SW Upper Boones Ferry Road
Tigard, OR 97224

<u>Time</u>	<u>A. Action Items</u>	<u>Presenter</u>	<u>Tab</u>
9:00-9:10	1. Review & Approval of Minutes January 26, 2022	Cara Samples <i>OIC Chair</i>	1
	2. Committee Reports	Rex Kim <i>Chief Investment Officer</i>	2
9:10-9:40	3. OPERF Benchmarking	Mika Malone <i>Managing Principal/Consultant, Meketa Investment Group</i> Paola Nealon <i>Managing Principal/Consultant, Meketa Investment Group</i> Kristen Doyle <i>Partner, Aon</i>	3
	<u>B. Information Items</u>		
9:40-10:10	4. OPERF Q4 Performance Review	Allan Emkin <i>Managing Principal/Consultant, Meketa Investment Group</i> Paola Nealon <i>Managing Principal/Consultant, Meketa Investment Group</i>	4
10:10-10:55	5. OPERF Real Estate Portfolio Annual Review	Anthony Breault <i>Senior Investment Officer, Real Estate</i> Christy Fields <i>Managing Principal/Consultant, Meketa Investment Group</i> Austin Carmichael <i>Investment Officer, Real Estate</i> Chris Ebersole <i>Investment Officer, Real Estate</i>	5

Cara Samples
Chair

John Russell
Vice-Chair

Monica Enand
Member

Tobias Read
State Treasurer

Kevin Olineck
PERS Director

-----BREAK-----

11:00-11:45	6. OPERF Real Assets Portfolio Annual Review	Ben Mahon <i>Senior Investment Officer, Alternatives</i> Thomas Martin <i>Head of PE & RA Research, Aksia/TorreyCove</i>	6
11:45	7. Asset Allocation & NAV Updates	Rex Kim	7
	a. Oregon Public Employees Retirement Fund b. SAIF Corporation c. Common School Fund		
	8. Calendar — Future Agenda Items	Rex Kim	8
11:50	9. Open Discussion	OIC Member Staff Consultants	

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TAB 1
REVIEW & APPROVAL OF MINUTES



**OREGON
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State of Oregon

Office of the State Treasurer

16290 SW Upper Boones Ferry Road
Tigard, Oregon 97224

OREGON INVESTMENT COUNCIL

January 26, 2022

Meeting Minutes

Members Present: Cara Samples, John Russell, Monica Enand, Tobias Read, Kevin Olineck

Staff Present: Rex Kim, John Hershey, Michael Langdon, David Randall, Karl Cheng, Ben Mahon, Tony Breault, Geoff Nolan

Staff Participating virtually: Caleb Aldridge, Kenny Bao, Amy Bates, Tyler Bernstein, Deena Bothello, Taylor Bowman, Tan Cao, Austin Carmichael, Andrew Coutu, Debra Day, Ahman Dirks, Chris Ebersole, David Elott, Alli Gordon, Will Hampson, William Hiles, Andrew Hillis, Ian Huculak, Claire Illo, Roy Jackson, Kristi Jenkins, Josh Jones, Robin Kaukonen, Amanda Kingsbury, Jeremy Knowles, Paul Koch, Krystal Korthals, Perrin Lim, Sommer May, Eric Messer, Tim Miller, Dana Millican, Mike Mueller, Dmitri Palmateer, Aadrial Phillips, Jen Plett, Tim Powers, Mohammed Quraishi, Jo Recht, Andrew Robertson, Scott Robertson, Angela Schaffers, Faith Sedberry, Mark Selfridge, Sam Spencer, Anna Totdahl, Andrey Voloshinov, Tiffany Zahas

Consultants Present: Allan Emkin, Christy Fields, Mika Malone, Colin Bebee, Paola Nealon (Meketa Investment Group, Inc.); Kristen Doyle, Stephen Cummings (Aon Investments); Tom Martin, (Aksia/TorreyCove Capital Partners LLC); Dan McLaughlin, Henry McVey (KKR); Derrek Ransford, Justin Maney, Karen Jakobi, Pete Veravanich (Pathway Capital)

PERS Present: Heather Case (PERS Board)

Legal Counsel Present: Steven Marlowe, Samuel Zeigler (Department of Justice)

Before proceeding with the OIC meeting, Chief Investment Officer Rex Kim provided a disclosure pertaining to the virtual set-up of this OIC meeting, informing those in attendance (virtual and in person) of the guidelines in which this meeting will proceed.

The January 26, 2022 OIC meeting was called to order at 9:01 am by Cara Samples, OIC Chair.

I. 9:01 am Review and Approval of Minutes

MOTION: Chair Samples asked for approval of the December 1, 2021 OIC training meeting and December 8, 2021 OIC regular meeting minutes. Treasurer Read moved approval at 9:01 am, and Member Russell seconded the motion which then passed by a 4/0 vote.



II. 9:02 am Committee Reports

Private Equity Committee:

December 9	Thoma Bravo XV	<\$250M
January 25	Advent International GPE X	\$250M
January 25	Permira VIII	€225M (~\$250M)

Real Estate Committee:

None

Opportunity Committee:

None

Alternatives Portfolio Committee:

December 14	Man AHL Alpha 1.5XL Ltd. & Man AHL Alpha Core 1.5x Ltd.	<\$250M
December 14	Brevan Howard Master Fund Ltd.	<\$250M

Staff Discretion

January 13	Co-invest sidecar for Brookfield Super Core	\$50M
January 21	Co-invest sidecar for Harrison Street Social Infrastructure	\$50M

III. 9:03 am OIC Calendar Approval

The proposed 2023 OIC meeting schedule was presented to the Council for review and approval.

MOTION: Chair Samples asked for motions to approve the 2023 meeting schedule. Treasurer Read moved approval at 9:03 am, and Member Enand seconded the motion which then passed by a 4/0 vote.

IV. 9:04 am Annual Placement Agent Report

Michael Langdon, Director of Private Markets, presented the Annual Placement Agent Report.

V. 9:06 am OPERF Private Equity Portfolio Annual Review

Michael Langdon, Director of Private Markets, presented the OPERF Private Equity Portfolio Annual Review. The three key points discussed were that the asset class had a strong year; absolute returns are exceptional, though the relative return picture is complex; and the allocation relative to target is high, due to outsized mark-ups.

Michael Langdon and Thomas Martin, Head of PE and RA Research, Aksia/TorreyCove, discussed private equity in 2021, including the investment environment, progress on initiatives, approvals, commitment pacing, cash flows, relative returns, and return attribution.

Karen Jakobi, Senior Managing Director, Derrek Ransford, Managing Director, and Pete Veravanich, Managing Director, Pathway Capital, discussed the assets managed for Oregon by Pathway.



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Chair Samples noted that this topic was running over time. She asked the presenters to stay on the meeting to return to the topic after the presentation for item VI.

VI. 10:02 am Market Commentary

Henry McVey, Partner & Head of Global Macro, Balance Sheet, and Risk, CIO of KKR Balance Sheet gave a presentation commenting on the current state of the market.

VII. 10:45 am OPERF Private Equity Portfolio Annual Review (cont.)

The item V presentation continued. Michael Langdon and Chair Samples further discussed relative returns.

Michael Langdon and Thomas Martin continued discussing the future of the portfolio.

VIII. 11:16 pm OPERF Opportunity Portfolio Annual Review

Mike Mueller, Investment Officer, Alternatives presented the annual review of the OPERF Opportunity Portfolio. Topics included driving beliefs, 2021 performance, and the future of the portfolio.

IX. 11:34 am OPERF Risk Parity Portfolio Annual Review

Karl Cheng, Senior Investment Officer, Portfolio Risk & Research presented the annual review of the OPERF Risk Parity Portfolio. Topics included risk parity's strategic role, asset allocations, performance,

Colin Bebee, Managing Principal/Consultant, Meketa Investment Group gave an overview of the portfolio.

X. 11:51 am Asset Allocation & NAV Updates

Rex Kim, Chief Investment Officer presented the asset allocation and NAV updates.

XI. 11:54 am Calendar – Future Agenda Items

Rex Kim presented the forward calendar.

XII. 11:55 am Open Discussion

Treasurer Read offered gratitude and acknowledgment to Treasury staff about improving transparency for public equity holdings, and expressed that it should set a standard going forward.

Member Olineck gave an update about the PERS board.

Member Russell congratulated Chair Samples on her first meeting.

Chair Samples reiterated the Council's desire to have an education presentation about cryptocurrency.

XIII. 11:59 am Public Comments

Ms. Samples adjourned the meeting at 12:00 pm.

Respectfully submitted,
Aadrial Phillips
Executive Support Specialist

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TAB 2
COMMITTEE REPORTS

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TAB 3
OPERF BENCHMARKING

Oregon Investment Council

Benchmarking Review Phase 2: Asset Class Benchmark Review and Recommendations

Table of Contents

1. Background
2. Public Equity
3. Private Equity
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5. Real Assets
6. Diversifying Strategies
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8. Risk Parity
9. Opportunity Portfolio
10. Conclusion/Recommendation

Background

Background

- In late 2021, Meketa and Aon provided a review of benchmarking broadly, focusing on the attributes of a desirable benchmark.
- Today's review is focused on the current total Policy benchmark in place for OPERF, and the asset class level benchmarks that feed into the total Policy benchmark.
- Given the asset liability study taking place during the remainder of 2022, we believe that there is just one change that is productive for the OIC to consider today:
 - In order to better assess the risk and return profile of the OPERF portfolio, we recommend adding a "Reference Portfolio Benchmark" to the standard reporting packages.
 - In order to assess what the "right" reference benchmark is, we evaluate the return history and risk profile of the OPERF portfolio over time.
- Changes to asset class level benchmarks, where warranted, should be aligned to take place at the conclusion of the asset liability process.
- As part of the review process, Meketa and Aon held informational sessions with each asset class head within the OST, in order to better understand the history of the benchmarks in place, how, in practice, they influence decision making in the Fund, and any insight Staff has into innovation in their asset class.

Total Fund Policy Benchmark

The current Policy Benchmark, as reported by State Street Bank, reflects the most recent Strategic Asset Allocation (SAA) as of October 1st, 2021.

Asset Class	Benchmark	Weight (%)	Benchmark in place since
Public Equity	MSCI ACWI IMI Net (Daily)	30.0	1/1/2008
Private Equity	Russell 3000 + 300 bps QTR LAG (Adj.)	20.0	5/1/2005
Fixed Income	Bloomberg US Aggregate	20.0	10/1/2021
Real Assets	CPI + 400 bps	7.5	2012
Diversifying Strategies	HFRI FOF Conservative	7.5	6/2021
Real Estate	NFI ODCE Custom (adj)	12.5	4/1/2016
Risk Parity	S&P Risk Parity - 12% Target Vol	2.5	5/1/2020
Total		100.0	

- The Total Fund Policy Benchmark is used to measure the performance of the total fund and serves as the primary quantitative tool to determine the relative performance success of the OPERF program.
- Policy benchmarks typically reflect asset class benchmarks weighted according to current policy targets and may change as Policy evolves over time; this has been the case for OPERF.
- There is currently no “Reference Portfolio” benchmark in place, such as a 60/40 or 70/30 benchmark, or risk-focused benchmark assigned to the program.

Public Equity

Public Equity
As of December 31, 2021

As of October 1st, 2021, the Public Equity Portfolio is benchmarked to the MSCI ACWI IMI Net (Daily) Index.

Purpose of the Asset Class:

- To generate long-term asset growth over a full market.
- Provide liquidity in support of OPERF’s cash flow requirements.

Total Public Equity	
<i>MSCI ACWI IMI Net (Daily)</i>	
US Equity	45.3%
<i>Russell 3000 TR</i>	
Non-US Equity	31.0%
<i>MSCI ACWI Ex US IMI (Net)¹</i>	
Global Equity	17.7%
<i>MSCI ACWI IMI Net (Daily)</i>	
<i>MSCI ACWI IMI Minimum Volatility Net</i>	

¹ June 1, 2008 to present Oregon MSCI ACWI Ex US IMI (Net) is 100% MSCI ACWI Ex US IMI (Net).

Public Equity (continued)
As of December 31, 2021

As of 12/31/2021	1 Yr.	3 Yr.	5 Yr.	10 Yr.
<i>Total Public Equity</i>	20.0%	19.2%	13.6%	12.1%
Annualized Std. Deviation	9.35%	17.48%	15.06%	13.38%
<i>MSCI ACWI IMI Net (Daily)</i>	<i>18.2%</i>	<i>20.2%</i>	<i>14.1%</i>	<i>11.9%</i>
Excess Performance	1.8%	-1.0%	-0.5%	0.2%
Annualized Std. Deviation	9.4%	17.5%	15.2%	13.4%
Annualized Tracking Error	2.7%	1.9%	1.5%	1.3%
Correlation	0.96	0.99	0.99	1.00

Total Public Equity: Benchmark History As of December 31, 2021

Benchmark Composition	Period
100% MSCI ACWI IMI	1/1/2008 – Present

- Public Equities were restructured in 2008 to align with an MSCI ACWI allocation, since then the benchmark has been maintained as the MSCI ACWI IMI.
- As of 12/31/2021 the MSCI ACWI IMI¹ was composed of 59% US, 29% Non-US Developed, and 12% Emerging Markets securities.
- Return Objective: Achieve an excess return of 50 basis points or more above the MSCI ACWI IMI over a market cycle of 3-5 years on a net of fee basis.
 - Risk objective: Manage active risk to a TE of 75 to 200 basis points relative to MSCI ACWI IMI.
 - The current benchmark provides a well-defined representation of the full global public equity market opportunity set for managing the Public Equity portfolio broadly.
 - The Public Equity portfolio further sub-divides the regional allocations into style and market cap groups that may deviate from the broader index and could result in additional tracking error on top of manager selection.

¹ MSCI ACWI IMI regional exposure provided by InvestorForce

Recommendation: Total Public Equity

- No recommended changes to the benchmark for Total Public Equity.
- ACWI IMI is an appropriately broad, and widely accepted benchmark in this space, and represents a reasonable objective for Staff to seek to outperform plus 50 basis points over full market cycles. More recently, the Board approved removal of explicit portfolio overweight or tilts namely, size and value. While this does not preclude the Public Equity portfolio from emphasizing such factors, it allows for greater investment flexibility based on perceived opportunities.

Private Equity

Private Equity

Purpose of the Asset Class:

- Provide returns in excess of public market returns.
- Provide diversification benefits to the overall OPERF portfolio.

The Private Equity portfolio targets a 65-85% allocation to leveraged buyouts, with the remaining allocation to venture capital (0-5%), growth equity (0-5%) and special situations (5-15%).

Private Equity	20%
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Russell 3000 + 300 BPS QTR LAG (Adj.)

Private Equity (continued)

As of 12/31/2021	1 Year	3 Year	5 Year	10 Year
OPERF Private Equity	41.6%	21.0%	19.7%	15.7%
<i>Russell 3000 +300bps (QTR Lag)</i>	<i>35.7%</i>	<i>19.4%</i>	<i>20.3%</i>	<i>20.1%</i>
Excess Return	5.8%	1.6%	-0.6%	-4.3%
Correlation	0.32	0.60	0.56	0.67
<i>MSCI ACWI +300bps (QTR Lag)</i>	<i>31.2%</i>	<i>15.9%</i>	<i>16.6%</i>	<i>15.2%</i>
Excess Return	10.4%	5.1%	3.1%	0.5%
Correlation	0.50	0.51	0.46	0.29

- It is worth noting that the correlation of the OPERF private equity portfolio to public equities in the U.S. increases substantially as the time period lengthens, while correlation to global equities decreases.

Private Equity: Benchmark History As of December 31, 2021

Benchmark Composition	Period
Russell 3000 + 300bps	5/1/2005 – Present
Russell 3000 + 500bps	Inception – 4/30/2005

- Private Equity is notoriously challenging to benchmark. A public market plus premium approach, as OPERF uses, while very reflective of the long-term objective of seeking higher returns as a tradeoff for the liquidity given up by investing in private markets, will not as accurately reflect the current environment for private equity transactions, volatility, and opportunity cost
- Public market index plus a premium definition: This method measures the opportunity cost of the decision to invest in private equity. Under this approach, institutional investors seek a premium over the return that they would expect to earn from public equities. A premium is added because private equity investments are expected to be more risky than public equity investments, on account of the illiquid nature and early stage of many private equity portfolio companies. Investors expect to earn a higher rate of return to be compensated for the higher risk.

Private Equity: Benchmark History (continued)
As of December 31, 2021

- Other benchmarks used by large US Pension funds include; Preqin, Burgiss, Cambridge, TUCS (all peer universe benchmarks), MSCI ACWI +300 bps, and Russell 3000 +200 bps. Each of these solves certain challenges but faces others. The peer benchmarks have survivorship and inclusion bias. Also, the mix of Buyouts, Venture, and Growth strategies may not represent OPERF's objectives.
- Given the challenges faced in the asset class, and the fact that there is no "right solution" most investors utilize more than one benchmark (secondary benchmark) to provide multiple data points in assessing performance success.

Recommendation: Private Equity

- We find OPERF's current approach of using a public market index plus a premium as the primary benchmark and a peer benchmark as the secondary benchmark to be an appropriate and effective means to benchmarking the private equity portfolio.
- The public market index utilized under the public market index plus a premium method should reflect the opportunity cost of the decision to invest in private equity. We believe it may be appropriate to adjust the benchmark from Russell 3000 Index to MSCI ACWI IMI as the MSCI ACWI IMI is consistent with the OPERF's opportunity cost of capital based on OPERF's current public equity benchmark. The composition of the MSCI ACWI IMI Index is also broadly aligned with the geographic weightings of the private markets around the world.
- Additionally, consideration could be given to a peer-based benchmarks. None of them provide satisfactory "attribution", but they can help guide the Staff's work to align with the Council's long-term risk and return objectives.
- There is no reason to make changes to this benchmark before the full asset liability study is completed.

Fixed Income

Fixed Income

Purpose of the Asset Class:

- To provide diversification to the overall OPERF portfolio, and more specifically, to public equities.
- Be a source of liquidity to OPERF's cash flow needs.

Background of the Asset Class: In 2019, an extensive strategic review of the Fixed Income was completed, with full implementation of changes still underway. Specific goals of the review centered on further improving upon the current diversification and liquidity objectives. The results of the review centered on: reducing credit exposure, increasing Treasury exposure as well as Global Sovereign exposure, and adding an internally managed OPERF Liquidity Fund ("OLF") to be composed of high quality fixed income instruments.

In addition, the return target was adjusted downward to mirror the risk reduction of the fixed income portfolio. Specifically, the return target calls for achieving a return target of at least 15 basis points above the Bloomberg Barclays Aggregate Bond Index + 15 bps over a 3 and 5-year market cycle.

As of October 1st, 2021, the Fixed Income Portfolio is benchmarked to the Bloomberg US Aggregate Index.

However, the composition of the portfolio includes exposure to non-core, and non-US assets.

Fixed Income (continued)
As of December 31, 2021

Total Fixed Income	20%
<i>Oregon Custom FI Benchmark¹ (currently Bloomberg Agg)</i>	
Core Fixed Income	39.7%
<i>Oregon Custom External FI BM²</i>	
US Government	38.1%
<i>Government Blended Index³</i>	
Non-Core Fixed Income	11.1%
<i>Custom Non-Core Fixed Income Index⁴</i>	
Global Sovereign	8.2%
<i>Bbg Global Treasury Ex-US</i>	
Emerging Markets Debt	2.8%
<i>JP Morgan EMBI Global Diversified</i>	

¹ From October 31, 2021 to present Oregon Custom FI Benchmark is 100% Bloomberg US Aggregate Index

² From October 31, 2021 to present Oregon Custom External FI BM is 100% Bloomberg US Aggregate Index

³ From March 1, 2016 to present Government Blended Index is 100% Bloomberg Treasury Index

⁴ Custom Non-Core Fixed Income Index represents 25% ICE BofA US High Yield Index and 75% S&P/LSTA Leverage Loan Index

Total Fixed Income: Oregon Custom FI Benchmark History As of December 31, 2021

Benchmark Composition	Period
Bloomberg US Aggregate Bond Index	10/1/2021 – Present
46% Bloomberg US Aggregate Bond Index, 37% Bloomberg Treasury, 4% BofA ML High Yield Master II, 13% S&P/LSTA Leveraged Loan Index	3/1/2016 – 9/30/2021
40% BC US Aggregate Bond Index, 40% BC US 1-3 Gov't/Credit Bond Index, 15% S&P/LSTA Leveraged Loan Index, 5% BofA ML High Yield Master II Index	1/1/2014 – 2/29/2016
60% BC US Universal Index, 20% S&P/LSTA Leveraged Loan Index, 10% JPM EMBI Global Index, and 10% BofA ML High Yield Master II Index	3/1/2011 – 12/31/2013
90% BC Universal Index, 10% SSBI Non-US World Gov't Bond Hedged Index	Inception – 2/28/2011

- The Total Fixed Income benchmark has historically reflected the benchmarks of underlying sub-asset classes including, US Investment Grade, Government, Bank Loans, and High Yield.
- As of October 1, 2021, the Total Fixed Income benchmark moved to the Bloomberg US Aggregate Index. The new benchmark presents a more simplified approach to benchmarking the broad Fixed Income portfolio, aligned with the de-risking of the portfolio.

Total Fixed Income: Oregon Custom FI Benchmark History
As of December 31, 2021

As of 12/31/2021	1 Yr(%)	3 Yrs(%)	5 Yrs(%)	10 Yrs(%)
Total Fixed Income	-0.9	5.1	3.8	3.7
<i>Oregon Custom FI Benchmark</i>	-0.9	4.8	3.6	3.2
<i>Correlation</i>	0.96	0.98	0.98	0.98
<i>Bloomberg US Aggregate TR</i>	-1.5	4.8	3.6	2.9
<i>Correlation</i>	0.93	0.94	0.94	0.87

Recommendation: Fixed Income Benchmark

- Selecting the appropriate benchmark is always a balancing act- often one must choose between simplicity and an accurate representation of the asset class. Given the goal of utilizing fixed income to provide ballast to the OPERF portfolio, we believe maintaining the Bloomberg US Aggregate Index is appropriate.
- If, however, during the course of the asset liability study, there is a change in objectives, it would be prudent to revisit this benchmark. For now, it is important for the OIC to note that while there is some out of benchmark exposure in this portfolio, the aggregated portfolio aligns closely.

Real Assets

Real Assets

Purpose of the Asset Class: Serve as a diversifier to the overall OPERF investment portfolio, provide inflation protection and participate in long-term investment opportunities.

Background of the Asset Class: In June 2021, Real Assets was approved as a stand-alone asset class with a Policy target of 7.5% - rather than a sub-component to what was previously the Alternatives Portfolio. No changes were made to the stated benchmark, CPI + 4%. It should be noted as CPI has increased most recently, so too has the portfolio’s return hurdle. In addition, while not an official policy benchmark, the Burgiss Real Assets (ex-real estate) universe is used for internal purposes and provides a secondary measure for comparative purposes.

The Real Assets portfolio targets a 65% allocation to Infrastructure and a 35% allocation to Natural Resources.

Real Assets	7.5%
<i>CPI +4%</i>	

As of 12/31/2021	1 Yr.	3 Yr.	5 Yr.
<i>Real Assets</i>	19.0%	5.3%	6.5%
Annualized Std. Deviation	5.5%	5.6%	4.8%
<i>CPI +4%</i>	11.3%	7.7%	7.0%
Excess Performance	7.7%	-2.4%	-0.5%
Annualized Std. Deviation	0.9%	1.2%	1.1%
Annualized Tracking Error	5.5%	5.3%	4.7%
Correlation	0.09	0.32	0.21

Total Real Assets: Benchmark History As of December 31, 2021

Benchmark Composition	Period
CPI +4%	Inception – Present

- The Real Assets benchmark is a challenging one, without an easy solution. There are no excellent options which meet the criteria laid out in the first benchmarking discussion of being investable, transparent, representative, etc.
- It is worth noting that a “CPI + Premium” benchmark will always be positive, while the underlying assets may not. This creates tracking error, which over long time periods will be moderated, but can create meaningful challenges in the near term. When inflation is rising, a CPI + benchmark becomes further challenged.

So, are there other options? Yes, but each with unique challenges.

- Other options include weighted sub-asset class benchmarks that incorporate the specific public or private markets indices for asset groups within real assets such as infrastructure, natural resources, commodities, etc.
 - Additionally, some plans choose to use a peer group benchmark
 - Private Markets indices can be used in certain cases, though these benchmarks tend to be very similar to peer group benchmarks as they are composed of various manager reported returns and are thus exposed to sample size and survivorship bias.
 - Generally speaking, an economic index, most commonly CPI plus a premium, has been a commonly used benchmark in the large public DB space, and among Meketa clients. The premium over CPI ranges from 2-5%, with 3% being most common.

Recommendation: Total Real Assets

- Based on our understanding of the objectives of the Real Assets portfolio, we believe the CPI+400 bps benchmark is reasonable, if not somewhat challenging. A possible alternative would be a weighted average of benchmarks that reflect the actual underlying assets of Infrastructure and Natural Resources. However, we note the challenges of utilizing benchmarks with a heavy weight to, and correlation to, public assets.
- We recommend continuing to discuss the long-term goals of the Real Assets portfolio in the context of the asset liability study, and consider any modifications to the benchmark alongside those objectives.

Diversifying Strategies

Diversifying Strategies

Purpose of the Asset Class:

- Serve as a diversifier to the overall OPERF investment portfolio.
- Participate in long-term investment opportunities.

Background of the Asset Class: In June 2021, Diversifying Strategies was approved as a stand-alone asset class with a Policy target of 7.5% - rather than a sub-component to what was previously the Alternatives Portfolio. At that time, the benchmark was switched from the CPI + 4% to its current policy benchmark of HFRI FOF Conservative Index.

Diversifying Strategies

As of 12/31/2021	1 Yr.	3 Yr.	5 Yr.	10 Yr.
Diversifying Strategies	8.7%	-1.6%	-2.1%	1.8%
Annualized Std. Deviation	5.13%	5.96%	6.24%	5.02%
<i>HFRI FOF Conservative Index</i>	7.6%	6.8%	4.7%	4.1%
Excess Performance	1.1%	-8.4%	-6.8%	-2.3%
Annualized Std. Deviation	2.7%	5.3%	4.4%	3.5%
Annualized Tracking Error	4.8%	6.0%	5.9%	5.3%
Correlation	0.4	0.43	0.43	0.28
<i>CPI +4%</i>	11.3%	7.7%	7.0%	6.2%
Excess Performance	-2.6%	-9.3%	-9.1%	-4.4%
Annualized Std. Deviation	0.9%	1.2%	1.1%	1.1%
Annualized Tracking Error	5.3%	5.7%	6.1%	5.2%
Correlation	-0.14	0.35	0.2	-0.08

Recommendation: Diversifying Strategies

- Due to the variety of sizes, asset classes and investment objectives amongst alternative investment strategies, benchmarking is inherently difficult. Deviations from respective benchmarks will vary depending on factors such as the risk profile of a strategy and the breakdown of subsequent asset classes in which a strategy is invested, often making the performance of a benchmark a less-than-ideal indicator of how an investment strategy performed relative to its expected performance.
- In June 2021, Staff, in conjunction with its specialty Consultant, Albourne, identified the HFRI Conservative FOF Index as most appropriate. The portfolio is classified as being relatively young and in expansion mode as more managers/ strategies are identified to further diversify and expand its existing roster of roughly ten investments. We do not recommend making any changes at this time. However, as the implementation of the Program approaches its final stage (phase 1 and phase 2 completion), re-evaluation of the existing Index is recommended

Real Estate

Real Estate

Total Real Estate	12.5%
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NCREIF ODCE (Custom)(adj)

- NCREIF ODCE (Custom) (Adj.) benchmark achieves monthly returns by geometrically linking intra-month returns in order to achieve the stated quarterly return of the NFI-ODCE benchmark, on a one quarter lag.
- NCREIF ODCE is the most widely used Real Estate benchmark in Meketa’s client base. Other industry benchmarks include the MSCI AFOE index and publicly traded REIT indexes
- One of the largest challenges with the NCREIF benchmark is that it only represents a subset of the funds in the marketplace- OPERF currently has a portfolio with minimal overlap that is represented by the benchmark, though we believe it still provides a valid assessment of the core nature of the portfolio today.

As of 12/31/2021	1 Yr.	3 Yr.	5 Yr.	10 Yr.
<i>Total Real Estate</i>	19.0%	9.4%	9.3%	10.5%
Annualized Std. Deviation	4.8%	4.0%	3.6%	4.5%
<i>NCREIF ODCE (Custom) (Adj.)</i>	13.6%	6.1%	6.6%	8.8%
Excess Performance	5.4%	3.3%	2.7%	1.7%
Annualized Std. Deviation	2.4%	2.2%	1.9%	3.5%
Annualized Tracking Error	3.9%	3.2%	3.0%	3.3%
Correlation	0.60	0.60	0.56	0.69

**Total Real Estate: Benchmark History
As of December 31, 2021**

Benchmark Composition	Period
<i>NCREIF ODCE (Custom) +50bps</i>	4/1/2016 - Present
100% NCREIF Property Index Qtr Lag	Inception - 3/31/2016

- The NCREIF Open End Diversified Core Equity Index (“NFI-ODCE”) is widely accepted as the standard benchmark for private real estate in the United States.
 - The NFI-ODCE is a capitalization-weighted, gross of fees, time-weighted return Index with an inception date of January 1, 1978. The NFI-ODCE also reports on an equal-weighted and net return basis.
 - As of June 30, 2021, the NFI-ODCE was comprised of 27 open-end core real estate funds with a total gross asset value of \$280.3 billion across 3,136 investments.
 - In order for a fund to be included as part of the NFI-ODCE, there are a number of requirements the fund must meet, including: being an open-end vehicle; having a diversified core real estate portfolio predominantly in the US; most of gross market value in office, industrial, apartment, and retail property types; and most of gross market value in stabilized assets more than 75% leased. There is also a strict leverage cap at 35%.

Recommendation: Total Real Estate

- No changes recommended to the Real Estate portfolio at this time.
- The current benchmark appears reasonable and represents both the opportunity set for the real estate portfolio, as well as the realistic expectations of achieving performance above and beyond, based on the limitations of a large public fund, and given employed leverage, and the stated objective of reducing opportunistic and value-add exposure in favor of core mandates.
- It is prudent to undertake a thorough review of the Real Estate benchmark as objectives are set in the asset liability study to ensure that the benchmark utilized going forward represents both the appropriate risk level the Council desires to see within the portfolio, as well as the right mix of Core, Value Add, and Opportunistic.

Risk Parity

Risk Parity

Purpose of the Asset Class: Provide return and diversification opportunities, as well as liquidity needs to the OPERF portfolio.

Risk Parity

S&P Risk Parity - 12% Target Volatility

As of 12/31/2021	1 Yr. ¹
<i>Risk Parity</i>	13.7%
Annualized Std. Deviation	6.8%
<i>S&P Risk Parity - 12% Target Volatility</i>	18.2%
Excess Performance	-4.5%
Annualized Std. Deviation	6.8%
Annualized Tracking Error	6.0%
Correlation	0.61

¹ Note the very short track record of this benchmark for evaluation purposes.

Risk Parity: Benchmark History As of December 31, 2021

Benchmark Composition	Period
S&P Risk Parity – 12% Target Volatility	May 1, 2020 – Present

In addition, to the Policy Benchmark referenced above, the asset class employs a secondary benchmark of 60% MSCI World Index and 40% Bloomberg Barclays Global Treasury Bond Index (“balanced portfolio”), which we have seen being used by a sub-set of our own clients as a primary benchmark.

As mentioned, other benchmarks utilized in the risk parity asset class (which is only found in a small number of clients as an asset class) include a 60/40 benchmark, HFRI Macro, Bloomberg Agg Index, and CPI+4.5%. There is the least consistency of almost any asset category found in benchmarking this particular space.

Depending on the outcome of the upcoming asset-liability study, Meketa may recommend alterations to the volatility targets of the benchmark at the manager and class level in order to better align with forward-looking expectations.

Opportunity Portfolio

Other: The Opportunity Portfolio

In addition to the explicit target policy allocations outlined in OPERF’s Investment Policy Statement (IPS), the fund allows for the inclusion of what is referred to as the opportunity portfolio. The rationale behind this “sleeve” is to capitalize on potential market opportunities or market dislocations that may fall outside of current strategic allocations. These investments aim to provide diversification through exposure to uncorrelated or less correlated assets already held in other areas of the OPERF portfolio. Investments can be short or long-term in nature and historically has incubated strategies that paved the way towards the adoption of formal portfolios/ sub-asset classes. For example, bank loans and infrastructure, was incubated as a result of initial investments identified for inclusion into the Opportunity portfolio. The policy benchmark stated is the CPI + 5%.

While not assigned a weighting within the OPERF Total Policy Benchmark, we highlight, here too, the challenges of using a CPI plus premium benchmark and the significant tracking error caused under a rapidly rising inflationary environment as witnessed most recently (See Table 1). Longer-term results provide a smoother reference rate to assess Program performance.

Table 1

Time-Weighted Returns	Performance 12/31/2021	CPI+5%	Performance 12/31/20	CPI+5%
1 Year	22.9%	12.4%	10.2%	6.4%
3 Years	12.9%	8.7%	7.4%	6.9%
5 Years	10.9%	8.1%	7.7%	7.0%
7 Years	8.9%	7.6%	7.1%	6.7%
10 Years	10.4%	7.2%	8.3%	6.8%
Since Inception Q3 2006	8.0%	7.1%	7.1%	6.8%

Source: State Street. Data as of 12/31/21.

Conclusion /Recommendation

Conclusion

Asset Class	Current Benchmark	Maintain	Add'l Discussion: Asset Liability Study
Total Fund	Policy Index	x	
Public Equity	MSCI ACWI IMI Net (Daily)	x	
Private Equity	Russell 3000 + 300 BPS QTR LAG (Adj.)		x
Fixed Income	Bloomberg US Aggregate	x	
Real Assets	CPI + 400 bps		x
Diversifying Strategies	HFRI FOF Conservative	x	
Real Estate	NFI ODCE Custom (adj)	x	
Risk Parity	S&P Risk Parity - 12% Target Vol		x
Opportunistic	CPI + 500 bps		

General Observations:

- Benchmarking is a useful tool in assessing risk and return of the various components (asset classes) that roll up to the Total Fund Performance. As such, identifying accurate benchmarks to assess success of your asset class performance becomes critical.
- The above table summarizes our views of the asset classes that comprise the OPERF portfolio. We highlight a few observations:
- For private markets, assessing benchmark performance is far more challenging than in the public market space. There is no one solution that reflects or aligns with OPERF's risk profile and investment strategy exposures. Often in this space, use of several benchmarks are applied to determine performance success.
- For public markets (equity and fixed) identifying a proper benchmark is an easier task and in the case of OPERF we believe the Policy benchmarks assigned are reasonable.
- For asset classes that are moving toward a shift in strategy and allocations, or ramping up their program, our recommendation is to maintain the stated benchmark and re-assess at a later date if necessary. Diversifying strategies is a good example.
- Overall, we do not find any compelling reason to adopt a new benchmark for any asset class. We also are cognizant of the asset liability discussion taking place this year, at which time, we will discuss objectives of each asset class, and recommend adjustments to the benchmarks, as needed.

Formal Recommendation: Add Reference Portfolio Benchmark at Total Fund Level

While we do not recommend making any asset class level benchmark changes, we recommend the addition of a 70/30 reference portfolio at the total fund level. This would be in addition to the stated Policy Index and used to compare relative performance against a benchmark that has a similar risk profile the OPERF portfolio. Given that Real Estate and Real Assets have attributes of both risk and risk mitigating assets, we feel a 70/30 is a reasonable reflection of underlying portfolio risks.

OPERF Total Fund Correlation to Market Blend Index	1 Year	3 Year	5 Year	10 Year
60/40 MSCI ACWI/Bloomberg US Aggregate	0.63	0.86	0.89	0.90
70/30 MSCI ACWI/Bloomberg US Aggregate	0.65	0.87	0.89	0.90
80/20 MSCI ACWI/Bloomberg US Aggregate	0.65	0.87	0.89	0.91

As of December 31, 2021	Market Value (M)	Weight (%)
Total Plan	\$96,536.8	100.0%
Risk Assets	\$71,535.8	74.1%
Public Equity	\$27,318.0	28.3%
Private Equity	\$24,811.0	25.7%
Real Estate	\$10,838.4	11.2%
Real Assets	\$6,203.9	6.4%
Opportunity	\$2,364.5	2.4%
Risk Mitigating Assets	\$25,001.0	25.9%
Fixed Income	\$16,087.0	16.7%
Risk Parity	\$2,276.3	2.4%
Diversifying	\$3,483.1	3.6%
Cash	\$3,154.6	3.3%

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OREGON
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TREASURY

TAB 4

OPERF Q4 PERFORMANCE REVIEW

Oregon Investment Council

March 9, 2022

OPERF Performance Report

Agenda

1. Executive Summary Q4 2021
2. Performance Update as of December 31, 2021
3. Disclaimer, Glossary, and Notes

Executive Summary

Q4 2021

OPERF Performance Summary – Commentary

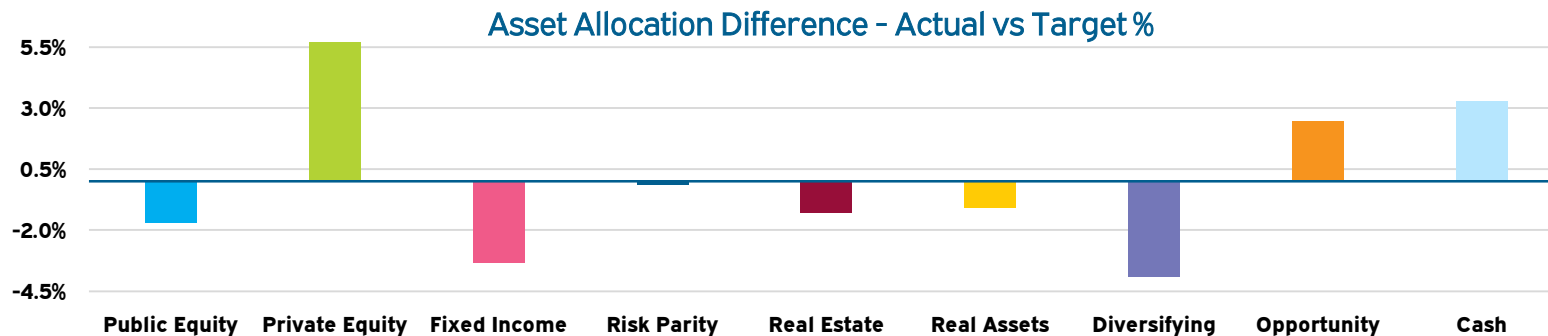
- OPERF posted a return of 4.0% for the fourth quarter, relative to a benchmark return of 3.1% and peer median return of 4.3%. This ranks in the third quartile of the InvestMetrics public plan peer universe of all DB plans over \$10 billion for the quarter.
- Public Equities (+5.8%) trailed the broad MSCI ACWI IMI Net (Daily) index (+6.1%). Underperformance was driven by the non-US portfolio including emerging markets and global equities which comprise just over half of the Public Equities portfolio. International markets experienced reduced risk appetite in November as the emergence of COVID variant Omicron shut down economies abroad and drove an increase in hospitalizations.
- OPERF's U.S. Equity portfolio (+8.9%) underperformed versus the Russell 3000 (+9.1%) benchmark during the fourth quarter. 1-Year trailing relative performance still outpaces the benchmark and absolute performance across longer trailing periods remains strong. Small Cap Value and Market Oriented (CORE) have detracted from quarter-to-date and longer trailing period performance.
 - Small Cap Growth and Value detracted from overall performance for the fourth quarter. Though detracting from US Equity portfolio performance versus the Russell 3000 benchmark, the Small Cap portfolios have outperformed their respective benchmarks over the fourth quarter as well as the broader MSCI ACWI IMI Net (Daily) benchmark. AQR Capital Management was the strongest performer on an absolute and relative basis for the quarter (+9.7%) and trailing 1-year (+46.3%) periods.
 - The Market Oriented (CORE) portfolio trailed the Russell 1000 benchmark for the quarter. Over the 3-, 5-, and 10-year trailing periods the portfolio has underperformed relative to its benchmark.

OPERF Performance Summary – Commentary (Cont.)

- OPERF has strong benchmark-relative performance across all time periods within International Equity.
 - Emerging Markets equities have been a drag on performance largely as a result of weakness in China.
 - International Market Oriented (CORE), which composes over half of the Non-U.S. Equity portfolio has outperformed over all trailing periods.
- The Global Equity Low Volatility sleeve comprises nearly 90% of the total allocation to Global Equity. Due to the emphasis on downside protection, these strategies have struggled to keep up with the MSCI ACWI IMI Index given the strong equity market experienced since implementation.
- The overweight to and performance within the Private Equity portfolio were strong contributors to excess return over the most recent quarter. The Private Equity portfolio has outperformed over the 1- and 3-year trailing periods due to strong relative performance during the 2021 calendar year and as the reporting lag catches up with public equity returns for the year. The OPERF Portfolio maintains a significant overweight relative to the target - actual allocation of 26.3% versus a target allocation of 20%. OPERF is actively looking to reduce private equity exposure, though it will take some time given the illiquid nature of the asset class

OPERF Asset Allocation as of December 31, 2021

Asset Class	Actual (\$ 000)	Actual Weight (%)	Target Weight (%)	Difference (%)	Difference (\$ 000)
Public Equity	27,317,959	28.3	30.0	-1.7	-1,643,080
Private Equity	24,811,036	25.7	20.0	5.7	5,503,677
Fixed Income	16,086,980	16.7	20.0	-3.3	-3,220,379
Risk Parity	2,276,298	2.4	2.5	-0.1	-137,121
Real Estate	10,838,424	11.2	12.5	-1.3	-1,228,676
Real Assets	6,203,882	6.4	7.5	-1.1	-1,036,377
Diversifying	3,483,088	3.6	7.5	-3.9	-3,757,171
Opportunity	2,364,484	2.4	0.0	2.4	2,364,484
Cash	3,154,645	3.3	0.0	3.3	3,154,645
Total	96,536,798	100.0	100.0		
YTD Net Cash Flow	1,667,044				
Gain/Loss	16,239,824				



- A significant majority of OPERF’s assets are allocated to risk-oriented assets in the public and private equity markets.
- Efforts are underway/ liquidity programs in place to reduce the overweight to Private Equity. It is important to note that reducing exposure to PE is challenging given the nature of the asset class, and a work in progress.

OPERF Q4 2021 Performance Attribution¹

	QTD	1 Yr	3 Yr	5 Yr	10 Yr
Total Fund	4.0	20.0	13.6	11.2	10.2
Total Fund ex Overlay	4.2	20.3	13.8	11.3	10.2
OPERF Policy Benchmark	3.1	15.6	14.0	11.6	10.8
Over/Under	0.9	4.4	-0.4	-0.4	-0.6
InvMetrics All DB > \$10B Net Median	4.3	16.7	15.0	11.6	10.1
InvMetrics All DB > \$10B Net Rank	68.0	14.0	86.0	73.0	39.0
Total Fixed Income	0.1	-0.9	5.1	3.8	3.7
Oregon Custom FI Benchmark	0.0	-0.9	4.8	3.6	3.2
Over/Under	0.1	0.0	0.3	0.2	0.5
Total Public Equity	5.8	20.0	19.2	13.6	12.1
MSCI ACWI IMI Net (Daily)	6.1	18.2	20.2	14.1	11.9
Over/Under	-0.3	1.8	-1.0	-0.5	0.2
Total Real Estate	8.8	19.0	9.4	9.3	10.5
NCREIF ODCE (Custom) (Adj.)	6.4	13.6	6.1	6.6	8.8
Over/Under	2.4	5.4	3.3	2.7	1.7
Risk Parity	2.1	13.7	--	--	--
S&P Risk Parity - 12% Target Volatility	4.2	18.2	19.5	12.5	10.3
Over/Under	-2.1	-4.5			
Opportunity Portfolio	4.1	22.7	12.8	10.9	10.4
CPI + 5%	2.9	12.4	8.7	8.0	7.2
Over/Under	1.2	10.3	4.1	2.9	3.2
Diversifying Strategies	1.6	8.7	-1.6	-2.1	1.8
HFRI FOF Conservative Index	0.6	0.6	0.6	0.6	0.6
Over/Under	1.0	8.1	-2.2	-2.7	1.2
Real Assets	4.1	19.0	5.3	6.5	--
CPI + 4%	2.6	11.3	7.7	7.0	6.2
Over/Under	-0.2	5.4	3.9		
Private Equity	3.6	41.6	21.0	19.7	15.7
Russell 3000 + 300 BPS QTR LAG (Adj.)	0.6	35.7	19.4	20.3	20.1
Over/Under	3.0	5.9	1.6	-0.6	-4.4
Cash	-0.1	0.1	1.6	1.7	1.3
ICE BofA US 3-Month Treasury Bill	0.0	0.1	1.0	1.1	0.6
Over/Under	-0.1	0.0	0.6	0.6	0.7

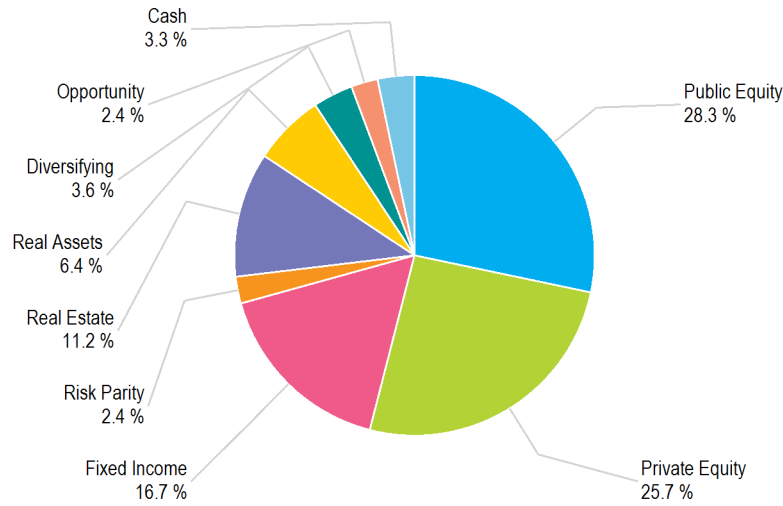
Target	Overweight / Underweight	Contributors / Detractors to excess return
Policy	As of 12/31/21	QTD
20.0%	-3.3%	Neutral
30.0%	-1.7%	Detractor
12.5%	-1.3%	Contributor
2.5%	-0.1%	Neutral
0.0%	+2.4%	Contributor
7.5%	-3.9%	Neutral
7.5%	-1.1%	Neutral
20.0%	+5.7%	Contributor
0.0%	+3.3%	Neutral

- Private Equity selection and allocation continue to drive outperformance over the most recent quarter and 1-year trailing periods.

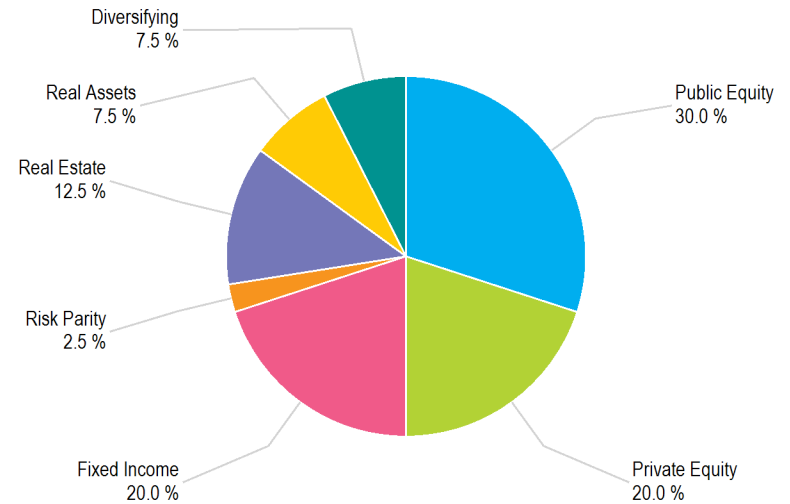
¹ Performance figures may differ versus State Street reporting due to calculation methodology differences.

Performance **Summary**
As of December 31, 2021

Actual Asset Allocation



Target Asset Allocation

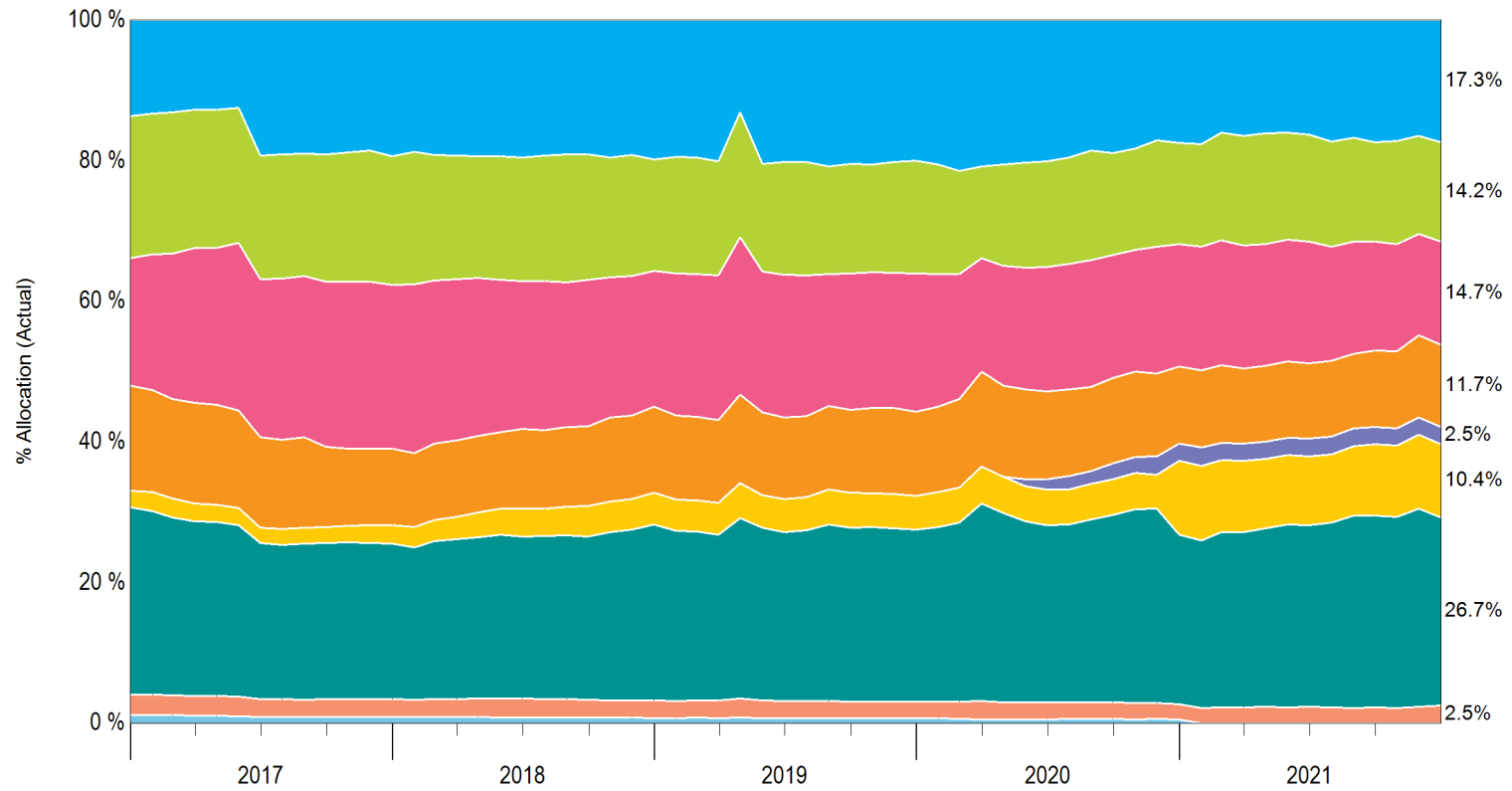


Asset Allocation vs. Target

As Of December 31, 2021

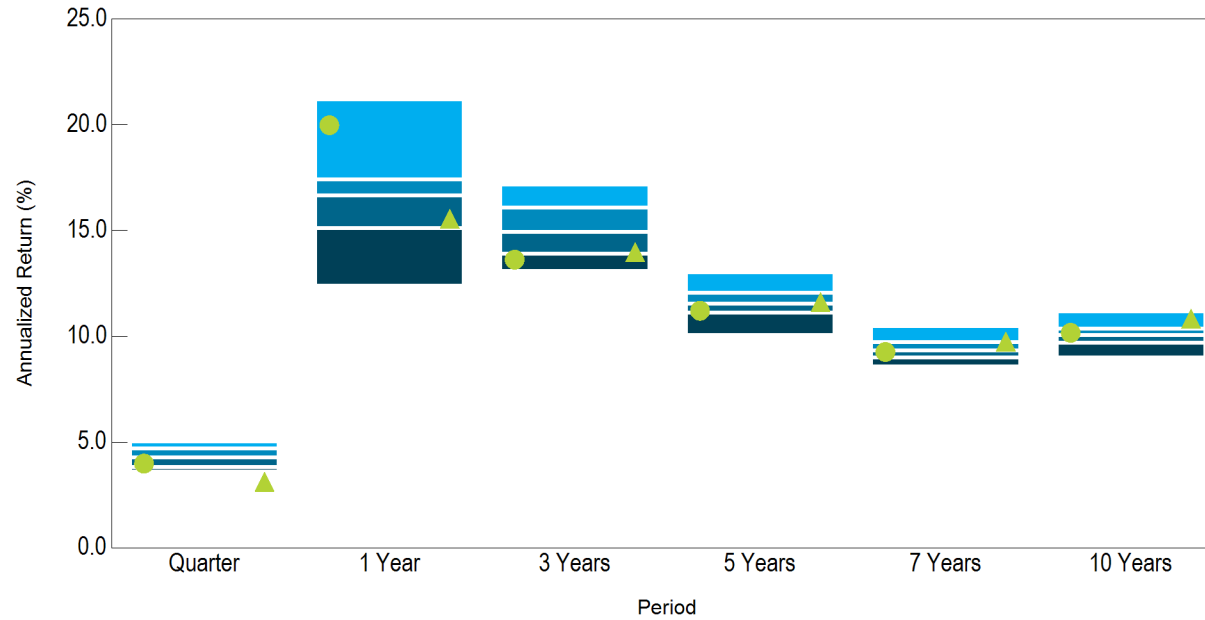
	Current	Current	Policy	Difference	Difference
Public Equity	\$27,317,959,318	28.3%	30.0%	-1.7%	-\$1,643,080,186
Private Equity	\$24,811,036,285	25.7%	20.0%	5.7%	\$5,503,676,616
Fixed Income	\$16,086,980,453	16.7%	20.0%	-3.3%	-\$3,220,379,217
Risk Parity	\$2,276,298,495	2.4%	2.5%	-0.1%	-\$137,121,464
Real Estate	\$10,838,423,887	11.2%	12.5%	-1.3%	-\$1,228,675,906
Real Assets	\$6,203,882,378	6.4%	7.5%	-1.1%	-\$1,036,377,498
Diversifying	\$3,483,088,410	3.6%	7.5%	-3.9%	-\$3,757,171,466
Opportunity	\$2,364,484,025	2.4%	0.0%	2.4%	\$2,364,484,025
Cash	\$3,154,645,096	3.3%	0.0%	3.3%	\$3,154,645,096
Total	\$96,536,798,348	100.0%	100.0%		

Asset Allocation History 5 Years Ending December 31, 2021



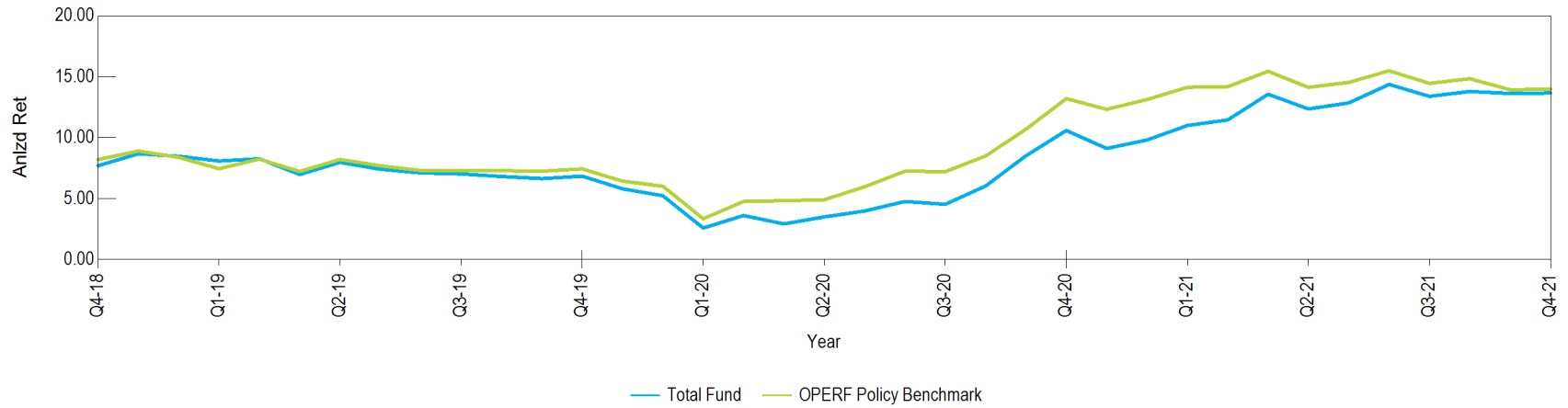
- Total Fixed Income
- Total Real Estate
- Alternative Portfolio
- Opportunity Portfolio
- U.S. Equity Portfolio
- Risk Parity
- Total Private Equity
- Cash
- Non-U.S. Equity Portfolio

InvMetrics All DB > \$10B Net Return Comparison Ending December 31, 2021

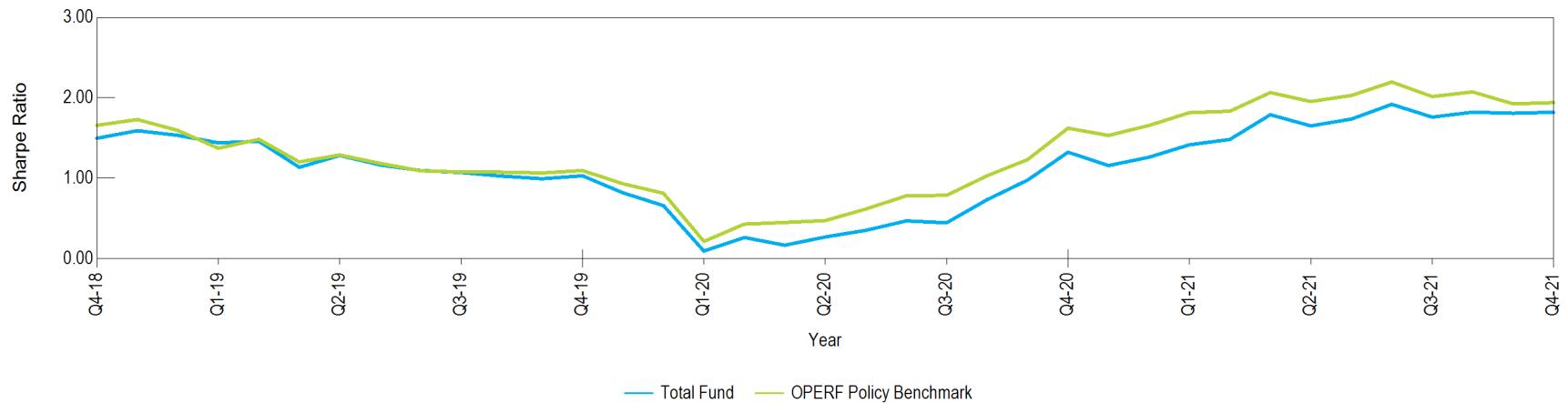


	Return (Rank)					
	Quarter	1 Year	3 Years	5 Years	7 Years	10 Years
5th Percentile	5.0	21.2	17.2	13.0	10.5	11.2
25th Percentile	4.7	17.4	16.1	12.1	9.7	10.4
Median	4.3	16.7	15.0	11.6	9.4	10.1
75th Percentile	3.8	15.1	13.9	11.1	9.0	9.7
95th Percentile	3.6	12.4	13.1	10.1	8.6	9.0
# of Portfolios	27	27	26	25	24	24
● Total Fund	4.0 (68)	20.0 (14)	13.6 (86)	11.2 (73)	9.3 (66)	10.2 (39)
▲ OPERF Policy Benchmark	3.1 (99)	15.6 (72)	14.0 (72)	11.6 (43)	9.7 (25)	10.8 (14)

Rolling 3 Year Annualized Return (%)
Total Fund vs. OPERF Policy Benchmark



Rolling 3 Year Sharpe Ratio
Total Fund vs. OPERF Policy Benchmark



Total Fund | As of December 31, 2021

Trailing Net Performance							
	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Total Fund	96,536,798,348	100.0	4.0	20.0	13.6	11.2	10.2
<i>OPERF Policy Benchmark</i>			3.1	15.6	14.0	11.6	10.8
<i>InvMetrics All DB > \$10B Net Median</i>			4.3	16.7	15.0	11.6	10.1
<i>InvMetrics All DB > \$10B Net Rank</i>			68	14	86	73	39
Total Fixed Income	16,086,980,453	16.7	0.1	-0.9	5.1	3.8	3.7
<i>Oregon Custom FI Benchmark</i>			0.0	-0.9	4.8	3.6	3.2
<i>Bloomberg US Aggregate TR</i>			0.0	-1.5	4.8	3.6	2.9
<i>Fixed Income Weighted BM</i>			0.2	-1.2	4.6	3.5	2.9
Core Fixed Income	4,312,023,484	4.5	0.2	-1.1	5.7	4.3	3.9
<i>Oregon Custom External FI BM</i>			0.0	-1.5	4.8	3.6	3.2
Alliance Bernstein	12,442,591	0.0	7.5	6.3	7.3	5.1	4.2
<i>Oregon Custom External FI BM</i>			0.0	-1.5	4.8	3.6	3.2
Blackrock	1,394,862,724	1.4	-0.2	-1.4	5.4	4.0	3.6
<i>Oregon Custom External FI BM</i>			0.0	-1.5	4.8	3.6	3.2
Wellington	1,438,563,933	1.5	0.4	-0.9	6.1	4.5	4.2
<i>Oregon Custom External FI BM</i>			0.0	-1.5	4.8	3.6	3.2
Western Asset	1,466,154,237	1.5	0.2	-1.2	6.5	4.8	4.5
<i>Oregon Custom External FI BM</i>			0.0	-1.5	4.8	3.6	3.2
U.S. Government	7,420,346,216	7.7	0.1	-2.3	4.1	3.1	--
<i>Government Blended Index</i>			0.2	-2.3	4.1	3.1	1.7
Government Portfolio	7,420,346,216	7.7	0.1	-2.3	4.1	--	--
<i>Government Blended Index</i>			0.2	-2.3	4.1	3.1	1.7

Total Fund | As of December 31, 2021

	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Non-Core Fixed Income	1,580,838,540	1.6	0.8	6.4	6.8	5.0	5.9
<i>Custom Non-Core Fixed Income Index</i>			0.7	5.3	6.4	4.7	5.2
KKR Asset Management	75,456,328	0.1	2.0	13.8	8.9	5.8	6.3
<i>KKR Custom Leveraged Loans & Bond Index</i>			0.7	5.2	6.7	4.9	5.4
Oak Hill	1,505,382,212	1.6	0.8	5.7	7.0	5.6	6.0
<i>Oakhill Custom Lev Loan & Bond Index</i>			0.7	5.2	6.1	4.6	5.0
Global Sovereign	1,166,287,966	1.2	-0.1	--	--	--	--
<i>BbgBarc Global Treasury Ex-U.S.</i>			0.1	-1.7	3.1	3.0	3.7
MSIM Global Sovereign	581,878,505	0.6	-0.1	--	--	--	--
<i>BbgBarc Global Treasury Ex-U.S.</i>			0.1	-1.7	3.1	3.0	3.7
PIMCO Global Sovereign	584,409,461	0.6	-0.1	--	--	--	--
<i>BbgBarc Global Treasury Ex-U.S.</i>			0.1	-1.7	3.1	3.0	3.7
Emerging Markets Debt	386,888,497	0.4	-1.1	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>			-0.4	-1.8	5.9	4.7	5.3
Ashmore EMD	126,120,838	0.1	-2.1	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>			-0.4	-1.8	5.9	4.7	5.3
Global Evolution EMD	130,243,398	0.1	-0.7	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>			-0.4	-1.8	5.9	4.7	5.3
PGIM EMD	130,524,261	0.1	-0.6	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>			-0.4	-1.8	5.9	4.7	5.3

Total Fund | As of December 31, 2021

	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Structured Credit Products	1,220,537,922	1.3	--	--	--	--	--
<i>Oregon Structured Credit Products FI BM</i>							
Schroders SCP	403,974,566	0.4	--	--	--	--	--
<i>ICE BofA AA-BBB US Asset Backed Sec Idx</i>							
Putnam SCP	581,508,100	0.6	--	--	--	--	--
<i>Bloomberg US MBS TR USD</i>							
Guggenheim SCP	235,055,256	0.2	--	--	--	--	--
<i>ICE BofA AA-BBB US Asset Backed Sec Idx</i>							
Total Public Equity	27,277,625,219	28.3	5.8	20.0	19.2	13.6	12.1
<i>MSCI ACWI IMI Net (Daily)</i>							
U.S. Equity	13,167,523,921	13.6	8.9	27.2	23.1	15.6	15.1
<i>Russell 3000 TR</i>							
Small Cap Growth	298,957,961	0.3	6.2	19.6	30.5	21.9	16.5
<i>Russell 2000 Growth TR</i>							
EAM MicroCap Growth	298,957,961	0.3	6.2	19.6	30.5	21.9	17.7
<i>Russell Microcap Growth Index (Daily)</i>							
Small Cap Value	743,929,978	0.8	6.7	35.6	18.2	8.8	11.9
<i>Russell 2000 Value TR</i>							
AQR Capital Management	191,652,871	0.2	9.7	46.3	16.1	4.8	10.0
<i>Russell 2000 Value TR</i>							
Mellon Asset Management	248,356,133	0.3	6.2	25.8	18.0	10.9	12.8
<i>Russell 2000 Value TR</i>							

Total Fund | As of December 31, 2021

	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
DFA MicroCap Value	151,998,422	0.2	6.2	41.6	19.3	8.9	--
<i>Russell Microcap Value (Daily)</i>			1.2	34.9	20.3	11.2	14.0
Callan US Microcap Value	151,922,552	0.2	3.9	31.7	19.9	11.0	--
<i>Russell Microcap Value (Daily)</i>			1.2	34.9	20.3	11.2	14.0
Market Oriented (CORE)	12,124,599,639	12.6	9.1	26.6	23.8	16.6	15.4
<i>Russell 1000 TR</i>			9.8	26.5	26.2	18.4	16.5
DFA Large Cap Core	3,026,428,295	3.1	9.1	27.8	23.0	15.4	--
<i>Russell 1000 TR</i>			9.8	26.5	26.2	18.4	16.5
Russell 2000 Synthetic - OST managed	421,149,372	0.4	5.7	27.1	20.6	12.2	13.9
<i>S&P 600 Custom</i>			5.6	26.8	20.1	12.1	13.3
S&P 500 - OST managed	3,295,769,651	3.4	11.0	28.7	26.1	18.5	16.6
<i>S&P 500 Index (Daily)</i>			11.0	28.7	26.1	18.5	16.6
S&P 400 - OST managed	814,961,843	0.8	7.9	24.6	21.4	13.2	14.4
<i>S&P 400 Midcap Index (Daily)</i>			8.0	24.8	21.4	13.1	14.2
OST Risk Premia Strategy	4,566,290,478	4.7	8.3	24.3	23.6	17.8	--
<i>Risk Premia Custom Index</i>			8.3	24.2	23.6	17.9	--
Non-U.S. Equity	8,985,505,719	9.3	2.2	12.7	16.2	11.7	9.3
<i>Oregon MSCI ACWI Ex US IMI (Net)</i>			1.6	8.5	13.6	9.8	7.6
Total International Overlay Accounts	39,842,259	0.0					
PERS-Adrian Lee Active Currency	31,399,748	0.0					
PERS-P/E Global Active Currency	-2,120,363	0.0					
PERS-Aspect Cap Active Currency	10,548,144	0.0					

Total Fund | As of December 31, 2021

	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
International Market Oriented (Core)	5,238,454,716	5.4	2.8	13.1	16.2	11.9	9.6
<i>MSCI World ex USA IMI Net Return</i>			2.7	12.4	14.4	9.8	8.1
Arrowstreet Capital	1,440,218,651	1.5	3.3	24.5	18.7	15.2	12.6
<i>Oregon MSCI ACWI Ex US IMI (Net)</i>			1.6	8.5	13.6	9.8	7.6
Lazard Asset Management	607,826,969	0.6	0.4	7.8	11.7	8.5	7.8
<i>Oregon MSCI ACWI Ex US (Net)</i>			1.8	7.8	13.2	9.6	7.3
Lazard International CEF	1,217,280,948	1.3	1.8	4.5	20.6	15.2	--
<i>Oregon MSCI ACWI Ex US (Net)</i>			1.8	7.8	13.2	9.6	7.3
AQR Capital Management	444,059,682	0.5	1.0	6.1	10.4	6.3	7.4
<i>Oregon MSCI WORLD Ex US (Net)</i>			3.1	12.6	14.1	9.6	7.8
OST Int'l Risk Premia	1,529,068,466	1.6	5.0	15.6	15.2	--	--
<i>MSCI World x US Custom Div Multiple-Factor</i>			5.0	15.0	14.7	--	--
<i>MSCI World ex USA Net Index</i>			3.1	12.6	14.1	9.6	7.8
International Value	1,150,400,240	1.2	2.4	18.0	13.4	9.9	8.8
<i>Oregon MSCI ACWI Ex US Value IMI (Net)</i>			1.1	11.0	8.9	6.4	5.7
Acadian Asset Management	609,186,646	0.6	4.4	21.7	17.5	13.1	10.5
<i>Oregon MSCI ACWI Ex US Value IMI (Net)</i>			1.1	11.0	8.9	6.4	5.7
Brandes Investment Partners	541,213,594	0.6	0.2	14.1	9.4	6.7	7.0
<i>Oregon MSCI ACWI Ex US Value (Net)</i>			1.2	10.5	8.3	6.0	5.3
International Growth	719,346,352	0.7	4.8	12.4	20.0	15.5	11.1
<i>Oregon MSCI WORLD Ex US (Net)</i>			3.1	12.6	14.1	9.6	7.8
Walter Scott Management	719,346,352	0.7	4.8	12.4	19.9	15.6	11.3
<i>Oregon MSCI WORLD Ex US (Net)</i>			3.1	12.6	14.1	9.6	7.8

Total Fund | As of December 31, 2021

	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
International Small Cap	716,380,637	0.7	1.5	18.1	17.0	9.6	9.7
<i>MSCI World Ex US Small Cap Value (Net)</i>			0.7	13.3	12.6	8.3	8.8
DFA International Small Cap	187,780,170	0.2	1.5	16.9	12.6	6.9	8.9
<i>MSCI World Ex US Small Cap Value (Net)</i>			0.7	13.3	12.6	8.3	8.8
Harris Associates	224,364,949	0.2	0.8	20.1	18.9	10.2	9.7
<i>MSCI ACWI ex USA Small Cap Value (Net)</i>			0.5	14.1	12.9	8.9	8.5
EAM International Micro Cap	176,110,460	0.2	3.5	17.8	25.2	13.6	--
<i>Oregon FTSE Global Ex US Micro Cap</i>			2.0	18.0	20.7	13.1	--
DFA International Micro Cap	128,125,059	0.1	0.3	17.1	13.6	8.4	--
<i>Oregon FTSE Global Ex US Micro Cap</i>			2.0	18.0	20.7	13.1	--
Emerging Markets	1,160,923,772	1.2	-1.5	4.3	16.3	12.0	7.4
<i>ORE MSCI Emerging Markets IMI (Net)</i>			-1.0	-0.3	11.6	10.1	5.7
Genesis Emerging Markets	247,500,464	0.3	-4.5	-6.6	12.4	9.8	6.3
<i>ORE MSCI Emerging Markets IMI (Net)</i>			-1.0	-0.3	11.6	10.1	5.7
Arrowstreet Emerging Markets	469,365,516	0.5	-0.4	9.6	21.4	14.3	8.4
<i>ORE MSCI Emerging Markets IMI (Net)</i>			-1.0	-0.3	11.6	10.1	5.7
Westwood Global Investment	170,814,643	0.2	-2.1	3.6	7.8	8.0	5.8
<i>MSCI Emerging Markets IMI Net</i>			-1.0	-0.3	11.6	10.1	5.6
William Blair and Company	166,206,061	0.2	-0.6	4.4	24.0	17.5	9.8
<i>MSCI Emerging Markets Growth Net</i>			-2.1	-8.4	14.6	11.1	6.0
William Blair Emerging Mkt Small Cap	106,859,680	0.1	0.4	17.9	24.0	14.8	--
<i>MSCI Emerging Markets Small Cap Gr Net</i>			2.9	20.4	19.2	12.6	8.0
OST EM Risk Premia ESG	177,407	0.0					

Total Fund | As of December 31, 2021

	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Global Equity	5,097,884,104	5.3	5.1	15.5	14.7	11.2	11.4
<i>MSCI ACWI IMI Net (Daily)</i>			6.1	18.2	20.2	14.1	11.9
Alliance Bernstein Global Value	504,322,614	0.5	2.7	18.1	13.9	7.8	9.6
<i>Oregon MSCI ACWI Value (Net)</i>			6.3	19.6	12.9	8.7	8.8
Global Equity Low Volatility	4,593,561,490	4.8	5.3	15.2	14.8	11.9	--
<i>MSCI AC World (Daily Const)</i>			6.7	18.5	20.4	14.4	11.9
<i>MSCI ACWI Minimum Volatility Index (Net)</i>			6.3	13.9	12.3	10.5	10.0
LACM Global Equity Low Volatility	1,099,451,406	1.1	5.8	15.4	17.8	13.3	--
<i>MSCI AC World (Daily Const)</i>			6.7	18.5	20.4	14.4	11.9
<i>MSCI ACWI Minimum Volatility Index (Net)</i>			6.3	13.9	12.3	10.5	10.0
Arrowstreet Global Low Volatility	1,039,493,397	1.1	1.8	15.1	16.6	--	--
<i>MSCI ACWI IMI Net (Daily)</i>			6.1	18.2	20.2	14.1	11.9
AQR Global Low Volatility	852,287,323	0.9	5.9	11.4	12.5	--	--
<i>MSCI AC World (Daily Const)</i>			6.7	18.5	20.4	14.4	11.9
<i>MSCI ACWI Minimum Volatility Index (Net)</i>			6.3	13.9	12.3	10.5	10.0
Acadian Global Low Volatility	827,966,016	0.9	7.3	17.5	11.5	--	--
<i>MSCI ACWI IMI Net (Daily)</i>			6.1	18.2	20.2	14.1	11.9
DFA Global Low Volatility	774,363,348	0.8	6.8	17.2	--	--	--
<i>MSCI AC World (Daily Const)</i>			6.7	18.5	20.4	14.4	11.9
Other Equity	27,203,316	0.0					
Transitional & Closed Accounts	506,571	0.0					
PERS- Equity Distribution	26,696,745	0.0					

Total Fund | As of December 31, 2021

	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Total Real Estate	10,838,423,887	11.2	8.8	19.0	9.4	9.3	10.5
<i>NCREIF ODCE (Custom) (Adj.)</i>			6.4	13.6	6.1	6.6	8.8
Real Estate excluding REITS	10,387,053,411	10.8	8.8	18.6	9.4	9.7	10.9
<i>NCREIF ODCE (Custom) (Adj.)</i>			6.4	13.6	6.1	6.6	8.8
Total REITS	451,370,475	0.5	9.5	28.2	10.9	7.9	9.1
ABKB - LaSalle Advisors	332,431,683	0.3	13.4	36.2	22.2	15.1	13.2
<i>Nareit Equity Share Price Index</i>			16.2	41.3	19.9	12.5	12.2
Woodbourne Investment Management	118,938,792	0.1	0.0	9.9	9.4	6.7	7.8
<i>Nareit Equity Share Price Index</i>			16.2	41.3	19.9	12.5	12.2
Risk Parity	2,276,298,495	2.4	2.1	13.7	--	--	--
<i>S&P Risk Parity - 12% Target Volatility</i>			4.2	18.2	19.5	12.5	10.3
Man AHL Target Risk	764,769,703	0.8	4.8	17.0	--	--	--
<i>S&P Risk Parity - 12% Target Volatility</i>			4.2	18.2	19.5	12.5	10.3
PanAgora Risk Parity	756,039,392	0.8	2.8	9.0	--	--	--
<i>S&P Risk Parity - 12% Target Volatility</i>			4.2	18.2	19.5	12.5	10.3
Bridgewater All Weather	755,489,400	0.8	-1.2	15.5	--	--	--
<i>S&P Risk Parity - 12% Target Volatility</i>			4.2	18.2	19.5	12.5	10.3
Opportunity Portfolio	2,364,484,025	2.4	4.1	22.7	12.8	10.9	10.4
<i>CPI + 5%</i>			2.9	12.4	8.7	8.0	7.2

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	Market Value (\$)	% of Portfolio	QTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Alternative Portfolio	9,686,970,789	10.0	3.1	14.8	1.9	2.2	2.3
<i>CPI +4%</i>			2.6	11.3	7.7	7.0	6.2
Diversifying Strategies	3,483,088,410	3.6	1.6	8.7	-1.6	-2.1	1.8
<i>HFRI FOF Conservative Index</i>			0.6	9.1	6.9	6.6	6.0
Real Assets	6,203,882,378	6.4	4.1	19.0	5.3	6.5	--
<i>CPI +4%</i>			2.6	11.3	7.7	7.0	6.2
Infrastructure	4,137,855,916	4.3	2.4	16.7	11.6	--	--
<i>CPI +4%</i>			2.6	11.3	7.7	7.0	6.2
Natural Resources	2,066,026,463	2.1	7.5	23.8	-1.8	--	--
<i>CPI +4%</i>			2.6	11.3	7.7	7.0	6.2
Private Equity	24,811,036,285	25.7	3.6	41.6	21.0	19.7	15.7
<i>Russell 3000 + 300 BPS QTR LAG (Adj.)</i>			0.6	35.7	19.4	20.3	20.1
Cash	2,772,490,766	2.9	-0.1	0.1	1.6	1.7	1.3
<i>ICE BofA US 3-Month Treasury Bill</i>			0.0	0.1	1.0	1.1	0.6
PERS-Russell Overlay Cash Balance	382,154,329	0.4					

Calendar Year Performance										
	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Total Fund	20.0	7.7	13.6	0.5	15.4	7.1	2.0	7.3	15.6	14.3
<i>OPERF Policy Benchmark</i>	15.6	12.4	14.0	1.2	15.6	9.0	1.6	8.2	15.6	16.6
<i>InvMetrics All DB > \$10B Net Median</i>	16.7	10.7	17.9	-2.6	15.4	8.2	0.3	6.6	14.0	12.8
<i>InvMetrics All DB > \$10B Net Rank</i>	14	94	92	8	51	82	3	34	29	2
Total Fixed Income	-0.9	7.7	8.8	0.3	3.7	2.8	0.6	3.5	1.0	10.4
<i>Oregon Custom FI Benchmark</i>	-0.9	7.3	8.3	0.3	3.3	2.5	0.1	3.0	0.3	8.6
Core Fixed Income	-1.1	8.7	9.8	-0.2	4.6	3.4	0.6	6.9	-1.4	9.1
<i>Oregon Custom External FI BM</i>	-1.5	7.5	8.7	0.0	3.5	2.7	0.6	6.0	-1.9	6.8
Alliance Bernstein	6.3	6.8	8.8	0.2	3.7	3.3	0.4	7.3	-1.8	7.6
<i>Oregon Custom External FI BM</i>	-1.5	7.5	8.7	0.0	3.5	2.7	0.6	6.0	-1.9	6.8
Blackrock	-1.4	9.1	8.9	0.1	3.8	2.8	0.9	6.7	-1.7	7.9
<i>Oregon Custom External FI BM</i>	-1.5	7.5	8.7	0.0	3.5	2.7	0.6	6.0	-1.9	6.8
Wellington	-0.9	9.6	9.8	-0.4	4.6	4.0	0.8	6.5	-1.2	10.0
<i>Oregon Custom External FI BM</i>	-1.5	7.5	8.7	0.0	3.5	2.7	0.6	6.0	-1.9	6.8
Western Asset	-1.2	9.4	11.6	-0.7	5.6	3.7	0.4	7.0	-1.0	11.0
<i>Oregon Custom External FI BM</i>	-1.5	7.5	8.7	0.0	3.5	2.7	0.6	6.0	-1.9	6.8
U.S. Government	-2.3	8.1	6.9	0.9	2.3	-1.6	0.9	1.0	--	--
<i>Government Blended Index</i>	-2.3	8.0	6.9	0.9	2.3	-1.3	0.8	0.8	--	--
Government Portfolio	-2.3	8.1	6.9	0.9	--	--	--	--	--	--
<i>Government Blended Index</i>	-2.3	8.0	6.9	0.9	--	--	--	--	--	--

Total Fund | As of December 31, 2021

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Non-Core Fixed Income	6.4	3.7	10.5	0.1	4.9	10.1	0.2	2.4	8.1	13.2
<i>Custom Non-Core Fixed Income Index</i>	5.3	3.9	10.1	-0.2	5.0	12.0	-1.7	1.8	5.8	11.1
KKR Asset Management	13.8	2.6	10.5	-0.4	3.4	9.3	-0.2	2.5	9.0	13.8
<i>KKR Custom Leveraged Loans & Bond Index</i>	5.2	4.3	10.6	-0.5	5.3	12.7	-2.1	1.9	6.0	11.7
Oak Hill	5.7	4.9	10.5	0.5	6.3	11.2	0.9	2.2	6.5	12.0
<i>Oakhill Custom Lev Loan & Bond Index</i>	5.2	3.6	9.5	0.0	4.6	11.2	-1.3	1.7	5.6	10.5
Global Sovereign	--	--	--	--	--	--	--	--	--	--
<i>BbgBarc Global Treasury Ex-U.S.</i>	--	--	--	--	--	--	--	--	--	--
MSIM Global Sovereign	--	--	--	--	--	--	--	--	--	--
<i>BbgBarc Global Treasury Ex-U.S.</i>	--	--	--	--	--	--	--	--	--	--
PIMCO Global Sovereign	--	--	--	--	--	--	--	--	--	--
<i>BbgBarc Global Treasury Ex-U.S.</i>	--	--	--	--	--	--	--	--	--	--
Emerging Markets Debt	--	--	--	--	--	--	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	--	--	--	--	--	--	--	--	--	--
Ashmore EMD	--	--	--	--	--	--	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	--	--	--	--	--	--	--	--	--	--
Global Evolution EMD	--	--	--	--	--	--	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	--	--	--	--	--	--	--	--	--	--
PGIM EMD	--	--	--	--	--	--	--	--	--	--
<i>JP Morgan EMBI Global Diversified</i>	--	--	--	--	--	--	--	--	--	--

Total Fund | As of December 31, 2021

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Structured Credit Products	--	--	--	--	--	--	--	--	--	--
<i>Oregon Structured Credit Products FI BM</i>	--	--	--	--	--	--	--	--	--	--
Schroders SCP	--	--	--	--	--	--	--	--	--	--
<i>ICE BofA AA-BBB US Asset Backed Sec Idx</i>	--	--	--	--	--	--	--	--	--	--
Putnam SCP	--	--	--	--	--	--	--	--	--	--
<i>Bloomberg US MBS TR USD</i>	--	--	--	--	--	--	--	--	--	--
Guggenheim SCP	--	--	--	--	--	--	--	--	--	--
<i>ICE BofA AA-BBB US Asset Backed Sec Idx</i>	--	--	--	--	--	--	--	--	--	--
Total Public Equity	20.0	12.7	25.3	-10.5	24.5	9.8	-1.7	3.3	26.7	17.5
<i>MSCI ACWI IMI Net (Daily)</i>	<i>18.2</i>	<i>16.3</i>	<i>26.4</i>	<i>-10.1</i>	<i>24.0</i>	<i>8.3</i>	<i>-2.1</i>	<i>3.8</i>	<i>23.5</i>	<i>16.4</i>
U.S. Equity	27.2	13.6	29.0	-7.9	20.3	14.9	-0.8	9.8	35.4	16.3
<i>Russell 3000 TR</i>	<i>25.7</i>	<i>20.9</i>	<i>31.0</i>	<i>-5.3</i>	<i>21.1</i>	<i>12.8</i>	<i>0.5</i>	<i>12.6</i>	<i>33.6</i>	<i>16.4</i>
Small Cap Growth	19.6	38.9	33.9	-4.7	26.8	6.3	-5.0	-3.6	57.9	11.3
<i>Russell 2000 Growth TR</i>	<i>2.8</i>	<i>34.6</i>	<i>28.5</i>	<i>-9.3</i>	<i>22.2</i>	<i>11.3</i>	<i>-1.4</i>	<i>5.6</i>	<i>43.3</i>	<i>14.6</i>
EAM MicroCap Growth	19.6	38.9	33.9	-4.7	26.8	6.3	-5.7	1.8	57.5	17.6
<i>Russell Microcap Growth Index (Daily)</i>	<i>0.9</i>	<i>40.1</i>	<i>23.3</i>	<i>-14.2</i>	<i>16.7</i>	<i>6.9</i>	<i>-3.9</i>	<i>4.3</i>	<i>52.8</i>	<i>15.2</i>
Small Cap Value	35.6	0.3	21.3	-14.1	7.5	31.4	-5.2	3.0	36.8	15.5
<i>Russell 2000 Value TR</i>	<i>28.3</i>	<i>4.7</i>	<i>22.4</i>	<i>-12.9</i>	<i>7.8</i>	<i>31.7</i>	<i>-7.5</i>	<i>4.3</i>	<i>34.5</i>	<i>18.1</i>
AQR Capital Management	46.3	-7.1	15.2	-18.1	-1.2	31.7	-2.5	4.7	36.9	11.8
<i>Russell 2000 Value TR</i>	<i>28.3</i>	<i>4.7</i>	<i>22.4</i>	<i>-12.9</i>	<i>7.8</i>	<i>31.7</i>	<i>-7.5</i>	<i>4.3</i>	<i>34.5</i>	<i>18.1</i>

Total Fund | As of December 31, 2021

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Mellon Asset Management	25.8	5.2	24.2	-8.0	10.8	26.8	-5.8	2.6	36.7	19.0
<i>Russell 2000 Value TR</i>	28.3	4.7	22.4	-12.9	7.8	31.7	-7.5	4.3	34.5	18.1
DFA MicroCap Value	41.6	1.1	18.5	-15.7	7.3	33.3	-6.3	0.2	--	--
<i>Russell Microcap Value (Daily)</i>	34.9	6.3	21.3	-12.0	11.1	30.6	-6.5	3.1	--	--
Callan US Microcap Value	31.7	2.0	28.3	-15.8	16.4	37.2	-7.0	5.2	--	--
<i>Russell Microcap Value (Daily)</i>	34.9	6.3	21.3	-12.0	11.1	30.6	-6.5	3.1	--	--
Market Oriented (CORE)	26.6	15.2	30.1	-7.1	22.0	14.8	-1.7	11.1	33.1	16.6
<i>Russell 1000 TR</i>	26.5	21.0	31.4	-4.8	21.7	12.1	0.9	13.2	33.1	16.4
DFA Large Cap Core	27.8	12.7	29.1	-9.0	21.1	15.6	-4.6	--	--	--
<i>Russell 1000 TR</i>	26.5	21.0	31.4	-4.8	21.7	12.1	0.9	--	--	--
Russell 2000 Synthetic - OST managed	27.1	11.8	23.4	-11.3	14.5	23.4	-3.6	5.8	39.9	17.3
<i>S&P 600 Custom</i>	26.8	11.3	22.8	-11.0	14.7	21.3	-4.4	4.9	38.8	16.3
S&P 500 - OST managed	28.7	18.4	31.7	-4.4	21.8	12.0	1.5	13.7	32.5	16.0
<i>S&P 500 Index (Daily)</i>	28.7	18.4	31.5	-4.4	21.8	12.0	1.4	13.7	32.4	16.0
S&P 400 - OST managed	24.6	13.5	26.6	-10.9	16.7	21.1	-2.0	10.0	33.9	18.0
<i>S&P 400 Midcap Index (Daily)</i>	24.8	13.7	26.2	-11.1	16.3	20.7	-2.2	9.8	33.5	17.9
OST Risk Premia Strategy	24.3	15.8	31.3	-5.5	27.1	10.8	4.5	13.0	--	--
Non-U.S. Equity	12.7	13.5	22.6	-14.9	30.4	4.6	-2.6	-2.9	18.6	18.9
<i>Oregon MSCI ACWI Ex US IMI (Net)</i>	8.5	11.1	21.6	-14.8	27.8	4.4	-4.6	-3.9	15.8	17.0

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Total International Overlay Accounts										
PERS-Adrian Lee Active Currency										
PERS-P/E Global Active Currency										
PERS-Aspect Cap Active Currency										
International Market Oriented (Core)	13.1	12.5	23.2	-14.3	31.0	2.5	-1.2	-2.6	21.3	19.3
<i>MSCI World ex USA IMI Net Return</i>	<i>12.4</i>	<i>8.3</i>	<i>22.9</i>	<i>-14.7</i>	<i>25.2</i>	<i>2.9</i>	<i>-1.9</i>	<i>-4.5</i>	<i>21.6</i>	<i>16.6</i>
Arrowstreet Capital	24.5	9.1	23.2	-10.3	35.4	4.7	0.4	0.8	26.2	20.1
<i>Oregon MSCI ACWI Ex US IMI (Net)</i>	<i>8.5</i>	<i>11.1</i>	<i>21.6</i>	<i>-14.8</i>	<i>27.8</i>	<i>4.4</i>	<i>-4.6</i>	<i>-3.9</i>	<i>15.8</i>	<i>17.0</i>
Lazard Asset Management	7.8	6.7	21.0	-13.4	24.8	0.9	-1.1	-2.8	19.1	21.4
<i>Oregon MSCI ACWI Ex US (Net)</i>	<i>7.8</i>	<i>10.7</i>	<i>21.5</i>	<i>-14.2</i>	<i>27.2</i>	<i>4.5</i>	<i>-5.5</i>	<i>-3.9</i>	<i>15.3</i>	<i>16.8</i>
Lazard International CEF	4.5	30.2	29.0	-17.2	39.8	0.1	-0.2	0.6	--	--
<i>Oregon MSCI ACWI Ex US (Net)</i>	<i>7.8</i>	<i>10.7</i>	<i>21.5</i>	<i>-14.2</i>	<i>27.2</i>	<i>4.5</i>	<i>-5.5</i>	<i>-3.9</i>	<i>--</i>	<i>--</i>
AQR Capital Management	6.1	5.9	19.6	-20.3	26.8	2.1	2.4	-4.9	23.1	22.6
<i>Oregon MSCI WORLD Ex US (Net)</i>	<i>12.6</i>	<i>7.6</i>	<i>22.5</i>	<i>-14.1</i>	<i>24.2</i>	<i>2.8</i>	<i>-3.0</i>	<i>-4.3</i>	<i>21.0</i>	<i>16.4</i>
OST Int'l Risk Premia	15.6	7.7	22.8	-12.0	--	--	--	--	--	--
<i>MSCI World x US Custom Div Multiple-Factor</i>	<i>15.0</i>	<i>7.3</i>	<i>22.4</i>	<i>-12.3</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
International Value	18.0	4.9	17.8	-12.4	25.7	9.8	-4.5	-4.3	25.0	15.1
<i>Oregon MSCI ACWI Ex US Value IMI (Net)</i>	<i>11.0</i>	<i>-0.1</i>	<i>16.3</i>	<i>-14.6</i>	<i>23.6</i>	<i>8.8</i>	<i>-8.9</i>	<i>-5.0</i>	<i>15.7</i>	<i>17.4</i>
Acadian Asset Management	21.7	11.5	19.4	-15.4	35.1	11.8	-7.2	-3.7	21.9	19.7
<i>Oregon MSCI ACWI Ex US Value IMI (Net)</i>	<i>11.0</i>	<i>-0.1</i>	<i>16.3</i>	<i>-14.6</i>	<i>23.6</i>	<i>8.8</i>	<i>-8.9</i>	<i>-5.0</i>	<i>15.7</i>	<i>17.4</i>

Total Fund | As of December 31, 2021

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Brandes Investment Partners	14.1	-1.3	16.4	-9.4	16.3	7.9	-1.6	-5.0	28.3	10.5
<i>Oregon MSCI ACWI Ex US Value (Net)</i>	<i>10.5</i>	<i>-0.8</i>	<i>15.7</i>	<i>-14.0</i>	<i>22.7</i>	<i>8.9</i>	<i>-10.1</i>	<i>-5.1</i>	<i>15.0</i>	<i>17.0</i>
International Growth	12.4	19.9	28.1	-6.4	27.5	1.3	1.9	-4.3	18.8	18.3
<i>Oregon MSCI WORLD Ex US (Net)</i>	<i>12.6</i>	<i>7.6</i>	<i>22.5</i>	<i>-14.1</i>	<i>24.2</i>	<i>2.8</i>	<i>-3.0</i>	<i>-4.3</i>	<i>21.0</i>	<i>16.4</i>
Walter Scott Management	12.4	19.9	28.0	-6.3	27.5	6.4	1.2	-3.1	13.1	20.3
<i>Oregon MSCI WORLD Ex US (Net)</i>	<i>12.6</i>	<i>7.6</i>	<i>22.5</i>	<i>-14.1</i>	<i>24.2</i>	<i>2.8</i>	<i>-3.0</i>	<i>-4.3</i>	<i>21.0</i>	<i>16.4</i>
International Small Cap	18.1	9.3	24.1	-24.3	30.2	4.9	6.1	-6.5	29.1	18.7
<i>MSCI World Ex US Small Cap Value (Net)</i>	<i>13.3</i>	<i>2.6</i>	<i>22.8</i>	<i>-18.4</i>	<i>27.9</i>	<i>7.9</i>	<i>1.1</i>	<i>-5.9</i>	<i>27.7</i>	<i>19.5</i>
DFA International Small Cap	16.9	1.1	20.9	-23.3	27.4	9.6	2.5	-6.6	32.9	20.5
<i>MSCI World Ex US Small Cap Value (Net)</i>	<i>13.3</i>	<i>2.6</i>	<i>22.8</i>	<i>-18.4</i>	<i>27.9</i>	<i>7.9</i>	<i>1.1</i>	<i>-5.9</i>	<i>27.7</i>	<i>19.5</i>
Harris Associates	20.1	5.0	33.4	-24.1	27.2	7.1	1.0	-6.7	30.9	17.9
<i>MSCI ACWI ex USA Small Cap Value (Net)</i>	<i>14.1</i>	<i>4.7</i>	<i>20.3</i>	<i>-18.2</i>	<i>29.9</i>	<i>8.2</i>	<i>-1.2</i>	<i>-4.5</i>	<i>20.9</i>	<i>20.2</i>
EAM International Micro Cap	17.8	38.4	20.3	-33.6	45.3	2.2	23.5	--	--	--
<i>Oregon FTSE Global Ex US Micro Cap</i>	<i>18.0</i>	<i>27.9</i>	<i>16.6</i>	<i>-20.0</i>	<i>31.4</i>	<i>6.0</i>	<i>2.9</i>	<i>--</i>	<i>--</i>	<i>--</i>
DFA International Micro Cap	17.1	5.7	18.5	-22.0	30.9	11.9	-1.8	--	--	--
<i>Oregon FTSE Global Ex US Micro Cap</i>	<i>18.0</i>	<i>27.9</i>	<i>16.6</i>	<i>-20.0</i>	<i>31.4</i>	<i>6.0</i>	<i>2.9</i>	<i>--</i>	<i>--</i>	<i>--</i>
Emerging Markets	4.3	23.5	22.1	-17.4	35.7	10.3	-14.5	1.2	-0.1	21.7
<i>ORE MSCI Emerging Markets IMI (Net)</i>	<i>-0.3</i>	<i>18.4</i>	<i>17.6</i>	<i>-15.0</i>	<i>37.0</i>	<i>9.9</i>	<i>-13.9</i>	<i>-1.8</i>	<i>-2.2</i>	<i>18.7</i>
Genesis Emerging Markets	-6.6	17.5	29.3	-15.9	33.6	12.0	-14.9	-1.0	0.7	21.6
<i>ORE MSCI Emerging Markets IMI (Net)</i>	<i>-0.3</i>	<i>18.4</i>	<i>17.6</i>	<i>-15.0</i>	<i>37.0</i>	<i>9.9</i>	<i>-13.9</i>	<i>-1.8</i>	<i>-2.2</i>	<i>18.7</i>
Arrowstreet Emerging Markets	9.6	32.1	23.7	-19.5	35.4	11.2	-15.8	1.1	-1.0	22.8
<i>ORE MSCI Emerging Markets IMI (Net)</i>	<i>-0.3</i>	<i>18.4</i>	<i>17.6</i>	<i>-15.0</i>	<i>37.0</i>	<i>9.9</i>	<i>-13.9</i>	<i>-1.8</i>	<i>-2.2</i>	<i>18.7</i>

Total Fund | As of December 31, 2021

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Westwood Global Investment	3.6	10.1	9.8	-9.3	29.5	19.0	-16.1	0.2	0.6	18.4
<i>MSCI Emerging Markets IMI Net</i>	-0.3	18.4	17.6	-15.0	37.3	11.2	-14.9	-2.2	-2.6	18.2
William Blair and Company	4.4	41.4	29.1	-21.6	50.2	1.9	-14.1	5.7	0.9	21.5
<i>MSCI Emerging Markets Growth Net</i>	-8.4	31.3	25.1	-18.3	37.3	11.2	-14.9	-2.2	-2.6	18.2
William Blair Emerging Mkt Small Cap	17.9	33.0	21.7	-24.4	38.5	-4.3	-5.9	14.9	--	--
<i>MSCI Emerging Markets Small Cap Gr Net</i>	20.4	25.6	12.0	-20.0	33.8	2.3	-6.8	1.0	--	--
OST EM Risk Premia ESG										
Global Equity	15.5	7.4	21.6	-7.9	22.3	9.4	-3.3	6.9	35.6	12.6
<i>MSCI ACWI IMI Net (Daily)</i>	18.2	16.3	26.4	-10.1	24.0	8.3	-2.1	3.8	23.5	16.4
Alliance Bernstein Global Value	18.1	4.2	20.1	-19.1	21.8	9.3	-3.3	6.9	35.6	12.6
<i>Oregon MSCI ACWI Value (Net)</i>	19.6	-0.3	20.6	-10.8	18.3	12.6	-6.3	2.9	22.4	15.5
Global Equity Low Volatility	15.2	7.9	21.7	-5.5	22.5	--	--	--	--	--
<i>MSCI AC World (Daily Const)</i>	18.5	16.3	26.6	-9.4	24.0	--	--	--	--	--
LACM Global Equity Low Volatility	15.4	15.0	23.1	-6.6	22.7	--	--	--	--	--
<i>MSCI AC World (Daily Const)</i>	18.5	16.3	26.6	-9.4	24.0	--	--	--	--	--
Arrowstreet Global Low Volatility	15.1	12.6	22.3	-2.7	--	--	--	--	--	--
<i>MSCI ACWI IMI Net (Daily)</i>	18.2	16.3	26.4	-10.1	--	--	--	--	--	--
AQR Global Low Volatility	11.4	6.8	19.6	-5.7	--	--	--	--	--	--
<i>MSCI AC World (Daily Const)</i>	18.5	16.3	26.6	-9.4	--	--	--	--	--	--
Acadian Global Low Volatility	17.5	-1.9	20.2	-7.0	--	--	--	--	--	--
<i>MSCI ACWI IMI Net (Daily)</i>	18.2	16.3	26.4	-10.1	--	--	--	--	--	--

Total Fund | As of December 31, 2021

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
DFA Global Low Volatility	17.2	5.5	--	--	--	--	--	--	--	--
MSCI AC World (Daily Const)	18.5	16.3	--	--	--	--	--	--	--	--
Other Equity										
Transitional & Closed Accounts										
PERS- Equity Distribution										
Total Real Estate	19.0	2.7	7.2	8.0	10.0	7.9	9.9	14.2	12.8	13.6
NCREIF ODCE (Custom) (Adj.)	13.6	0.6	4.7	7.7	6.7	8.9	13.5	11.3	11.0	11.0
Real Estate excluding REITS	18.6	3.0	7.3	8.9	11.2	10.0	12.7	12.0	15.8	10.8
NCREIF ODCE (Custom) (Adj.)	13.6	0.6	4.7	7.7	6.7	8.9	13.5	11.3	11.0	11.0
Total REITS	28.2	-0.9	7.2	-2.0	9.8	1.1	2.0	22.2	2.2	26.1
ABKB - LaSalle Advisors	36.2	3.0	29.9	3.2	7.4	5.4	2.9	32.1	1.6	17.7
Nareit Equity Share Price Index	41.3	-5.2	28.7	-4.0	8.7	8.6	2.8	28.0	2.8	19.7
Woodbourne Investment Management	9.9	0.6	18.5	-4.8	10.6	4.3	8.6	19.5	-1.8	15.8
Nareit Equity Share Price Index	41.3	-5.2	28.7	-4.0	8.7	8.6	2.8	28.0	2.8	19.7
Risk Parity	13.7	--	--	--	--	--	--	--	--	--
S&P Risk Parity - 12% Target Volatility	18.2	--	--	--	--	--	--	--	--	--
Man AHL Target Risk	17.0	--	--	--	--	--	--	--	--	--
S&P Risk Parity - 12% Target Volatility	18.2	--	--	--	--	--	--	--	--	--
PanAgora Risk Parity	9.0	--	--	--	--	--	--	--	--	--
S&P Risk Parity - 12% Target Volatility	18.2	--	--	--	--	--	--	--	--	--
Bridgewater All Weather	15.5	--	--	--	--	--	--	--	--	--
S&P Risk Parity - 12% Target Volatility	18.2	--	--	--	--	--	--	--	--	--

Total Fund | As of December 31, 2021

	2021 (%)	2020 (%)	2019 (%)	2018 (%)	2017 (%)	2016 (%)	2015 (%)	2014 (%)	2013 (%)	2012 (%)
Opportunity Portfolio	22.7	10.2	6.2	5.8	10.5	6.1	2.1	8.8	15.0	18.4
<i>CPI + 5%</i>	12.4	6.4	7.4	7.0	7.2	7.2	5.8	5.8	6.6	6.8
Alternative Portfolio	14.8	-6.6	-1.3	-2.4	8.3	6.6	-4.3	4.4	6.0	-0.8
<i>CPI +4%</i>	11.3	5.4	6.4	6.0	6.2	6.2	4.8	4.8	5.6	5.8
Diversifying Strategies	8.7	-11.6	-1.0	-13.1	8.8	0.8	8.1	9.4	7.9	3.7
<i>HFRI FOF Conservative Index</i>	9.1	5.4	6.4	6.0	6.2	6.2	4.8	4.8	5.6	5.8
Real Assets	19.0	-2.0	0.0	6.5	10.5	--	--	--	--	--
<i>CPI +4%</i>	11.3	5.4	6.4	6.0	6.2	--	--	--	--	--
Infrastructure	16.7	7.4	11.1	--	--	--	--	--	--	--
<i>CPI +4%</i>	11.3	5.4	6.4	--	--	--	--	--	--	--
Natural Resources	23.8	-13.0	-12.2	--	--	--	--	--	--	--
<i>CPI +4%</i>	11.3	5.4	6.4	--	--	--	--	--	--	--
Private Equity	41.6	12.7	11.1	18.2	17.3	6.3	7.3	15.9	16.2	14.4
<i>Russell 3000 + 300 BPS QTR LAG (Adj.)</i>	35.7	18.4	6.0	21.1	22.2	18.4	2.5	21.2	25.2	34.0
Cash	0.1	1.6	3.3	2.0	1.3	1.2	0.5	0.5	0.7	1.7
<i>ICE BofA US 3-Month Treasury Bill</i>	0.1	0.7	2.3	1.9	0.9	0.3	0.0	0.0	0.1	0.1
PERS-Russell Overlay Cash Balance										

Disclaimer, Glossary, and Notes

WE HAVE PREPARED THIS REPORT (THIS "REPORT") FOR THE SOLE BENEFIT OF THE INTENDED RECIPIENT (THE "RECIPIENT").

SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT AND THAT IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. ANY OPINIONS OR RECOMMENDATIONS PRESENTED HEREIN REPRESENT OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND ARE SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK. THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

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PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

Credit Risk: Refers to the risk that the issuer of a fixed income security may default (i.e., the issuer will be unable to make timely principal and/or interest payments on the security.)

Duration: Measure of the sensitivity of the price of a bond to a change in its yield to maturity. Duration summarizes, in a single number, the characteristics that cause bond prices to change in response to a change in interest rates. For example, the price of a bond with a duration of three years will rise by approximately 3% for each 1% decrease in its yield to maturity. Conversely, the price will decrease 3% for each 1% increase in the bond's yield. Price changes for two different bonds can be compared using duration. A bond with a duration of six years will exhibit twice the percentage price change of a bond with a three-year duration. The actual calculation of a bond's duration is somewhat complicated, but the idea behind the calculation is straightforward. The first step is to measure the time interval until receipt for each cash flow (coupon and principal payments) from a bond. The second step is to compute a weighted average of these time intervals. Each time interval is measured by the present value of that cash flow. This weighted average is the duration of the bond measured in years.

Information Ratio: This statistic is a measure of the consistency of a portfolio's performance relative to a benchmark. It is calculated by subtracting the benchmark return from the portfolio return (excess return), and dividing the resulting excess return by the standard deviation (volatility) of this excess return. A positive information ratio indicates outperformance versus the benchmark, and the higher the information ratio, the more consistent the outperformance.

Jensen's Alpha: A measure of the average return of a portfolio or investment in excess of what is predicted by its beta or "market" risk. $\text{Portfolio Return} - [\text{Risk Free Rate} + \text{Beta} * (\text{market return} - \text{Risk Free Rate})]$.

Market Capitalization: For a firm, market capitalization is the total market value of outstanding common stock. For a portfolio, market capitalization is the sum of the capitalization of each company weighted by the ratio of holdings in that company to total portfolio holdings; thus it is a weighted-average capitalization. Meketa Investment Group considers the largest 65% of the broad domestic equity market as large capitalization, the next 25% of the market as medium capitalization, and the smallest 10% of stocks as small capitalization.

Market Weighted: Stocks in many indices are weighted based on the total market capitalization of the issue. Thus, the individual returns of higher market-capitalization issues will more heavily influence an index's return than the returns of the smaller market-capitalization issues in the index.

Maturity: The date on which a loan, bond, mortgage, or other debt/security becomes due and is to be paid off.

Prepayment Risk: The risk that prepayments will increase (homeowners will prepay all or part of their mortgage) when mortgage interest rates decline; hence, investors' monies will be returned to them in a lower interest rate environment. Also, the risk that prepayments will slow down when mortgage interest rates rise; hence, investors will not have as much money as previously anticipated in a higher interest rate environment. A prepayment is any payment in excess of the scheduled mortgage payment.

Price-Book Value (P/B) Ratio: The current market price of a stock divided by its book value per share. Meketa Investment Group calculates P/B as the current price divided by Compustat's quarterly common equity. Common equity includes common stock, capital surplus, retained earnings, and treasury stock adjusted for both common and nonredeemable preferred stock. Similar to high P/E stocks, stocks with high P/B's tend to be riskier investments.

Price-Earnings (P/E) Ratio: A stock's market price divided by its current or estimated future earnings. Lower P/E ratios often characterize stocks in low growth or mature industries, stocks in groups that have fallen out of favor, or stocks of established blue chip companies with long records of stable earnings and regular dividends. Sometimes a company that has good fundamentals may be viewed unfavorably by the market if it is an industry that is temporarily out of favor. Or a business may have experienced financial problems causing investors to be skeptical about its future. Either of these situations would result in lower relative P/E ratios. Some stocks exhibit above-average sales and earnings growth or expectations for above average growth. Consequently, investors are willing to pay more for these companies' earnings, which results in elevated P/E ratios. In other words, investors will pay more for shares of companies whose profits, in their opinion, are expected to increase faster than average. Because future events are in no way assured, high P/E stocks tend to be riskier and more volatile investments. Meketa Investment Group calculates P/E as the current price divided by the I/B/E/S consensus of twelve-month forecast earnings per share.

Quality Rating: The rank assigned a security by such rating services as Fitch, Moody's, and Standard & Poor's. The rating may be determined by such factors as (1) the likelihood of fulfillment of dividend, income, and principal payment of obligations; (2) the nature and provisions of the issue; and (3) the security's relative position in the event of liquidation of the company. Bonds assigned the top four grades (AAA, AA, A, BBB) are considered investment grade because they are eligible bank investments as determined by the controller of the currency.

Sharpe Ratio: A commonly used measure of risk-adjusted return. It is calculated by subtracting the risk free return (usually three-month Treasury bill) from the portfolio return and dividing the resulting excess return by the portfolio's total risk level (standard deviation). The result is a measure of return per unit of total risk taken. The higher the Sharpe ratio, the better the fund's historical risk adjusted performance.

STIF Account: Short-term investment fund at a custodian bank that invests in cash-equivalent instruments. It is generally used to safely invest the excess cash held by portfolio managers.

Standard Deviation: A measure of the total risk of an asset or a portfolio. Standard deviation measures the dispersion of a set of numbers around a central point (e.g., the average return). If the standard deviation is small, the distribution is concentrated within a narrow range of values. For a normal distribution, about two thirds of the observations will fall within one standard deviation of the mean, and 95% of the observations will fall within two standard deviations of the mean.

Style: The description of the type of approach and strategy utilized by an investment manager to manage funds. For example, the style for equities is determined by portfolio characteristics such as price-to-book value, price-to-earnings ratio, and dividend yield. Equity styles include growth, value, and core.

Tracking Error: A divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark, as defined by the difference in standard deviation.

Yield to Maturity: The yield, or return, provided by a bond to its maturity date; determined by a mathematical process, usually requiring the use of a “basis book.” For example, a 5% bond pays \$5 a year interest on each \$100 par value. To figure its current yield, divide \$5 by \$95—the market price of the bond—and you get 5.26%. Assume that the same bond is due to mature in five years. On the maturity date, the issuer is pledged to pay \$100 for the bond that can be bought now for \$95. In other words, the bond is selling at a discount of 5% below par value. To figure yield to maturity, a simple and approximate method is to divide 5% by the five years to maturity, which equals 1% pro rata yearly. Add that 1% to the 5.26% current yield, and the yield to maturity is roughly 6.26%.

$$\frac{5\% \text{ (discount)}}{5 \text{ (yrs. to maturity)}} = 1\% \text{ pro rata, plus } 5.26\% \text{ (current yield)} = 6.26\% \text{ (yield to maturity)}$$

Yield to Worst: The lowest potential yield that can be received on a bond without the issuer actually defaulting. The yield to worst is calculated by making worst-case scenario assumptions on the issue by calculating the returns that would be received if provisions, including prepayment, call, or sinking fund, are used by the issuer.

NCREIF Property Index (NPI): Measures unleveraged investment performance of a very large pool of individual commercial real estate properties acquired in the private market by tax-exempt institutional investors for investment purposes only. The NPI index is capitalization-weighted for a quarterly time series composite total rate of return.

NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE): Measures the investment performance of 28 open-end commingled funds pursuing a core investment strategy that reflects funds' leverage and cash positions. The NFI-ODCE index is equal-weighted and is reported gross and net of fees for a quarterly time series composite total rate of return.

Sources: *Investment Terminology*, International Foundation of Employee Benefit Plans, 1999.
The Handbook of Fixed Income Securities, Fabozzi, Frank J., 1991

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Throughout this report, numbers may not sum due to rounding.

Returns for periods greater than one year are annualized throughout this report.

Values shown are in millions of dollars, unless noted otherwise.

Economic and Market Update

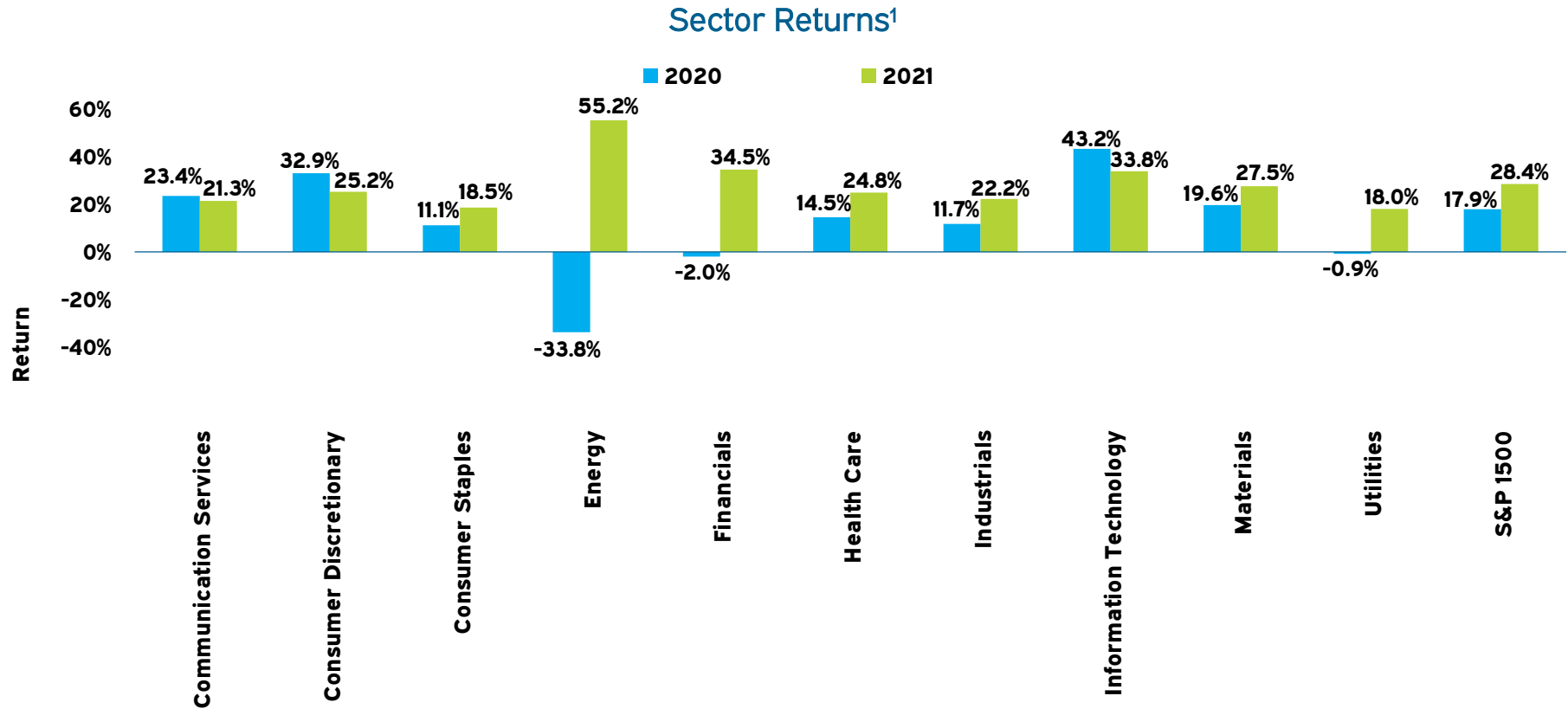
Data as of December 31, 2021

Market Returns¹

Indices	December	1 Year	3 Year	5 Year	10 Year
S&P 500	4.5%	28.7%	26.1%	18.5%	16.6%
MSCI EAFE	5.1%	11.3%	13.5%	9.6%	8.0%
MSCI Emerging Markets	1.9%	-2.5%	10.9%	9.9%	5.5%
MSCI China	-3.2%	-21.7%	7.8%	9.4%	7.2%
Bloomberg Barclays Aggregate	-0.3%	-1.5%	4.8%	3.6%	2.9%
Bloomberg Barclays TIPS	0.3%	6.0%	8.4%	5.3%	3.1%
Bloomberg Barclays High Yield	1.9%	5.3%	8.8%	6.3%	6.8%
10-year US Treasury	-0.4%	-3.6%	5.1%	3.5%	2.4%
30-year US Treasury	-2.1%	-4.6%	9.7%	7.0%	4.4%

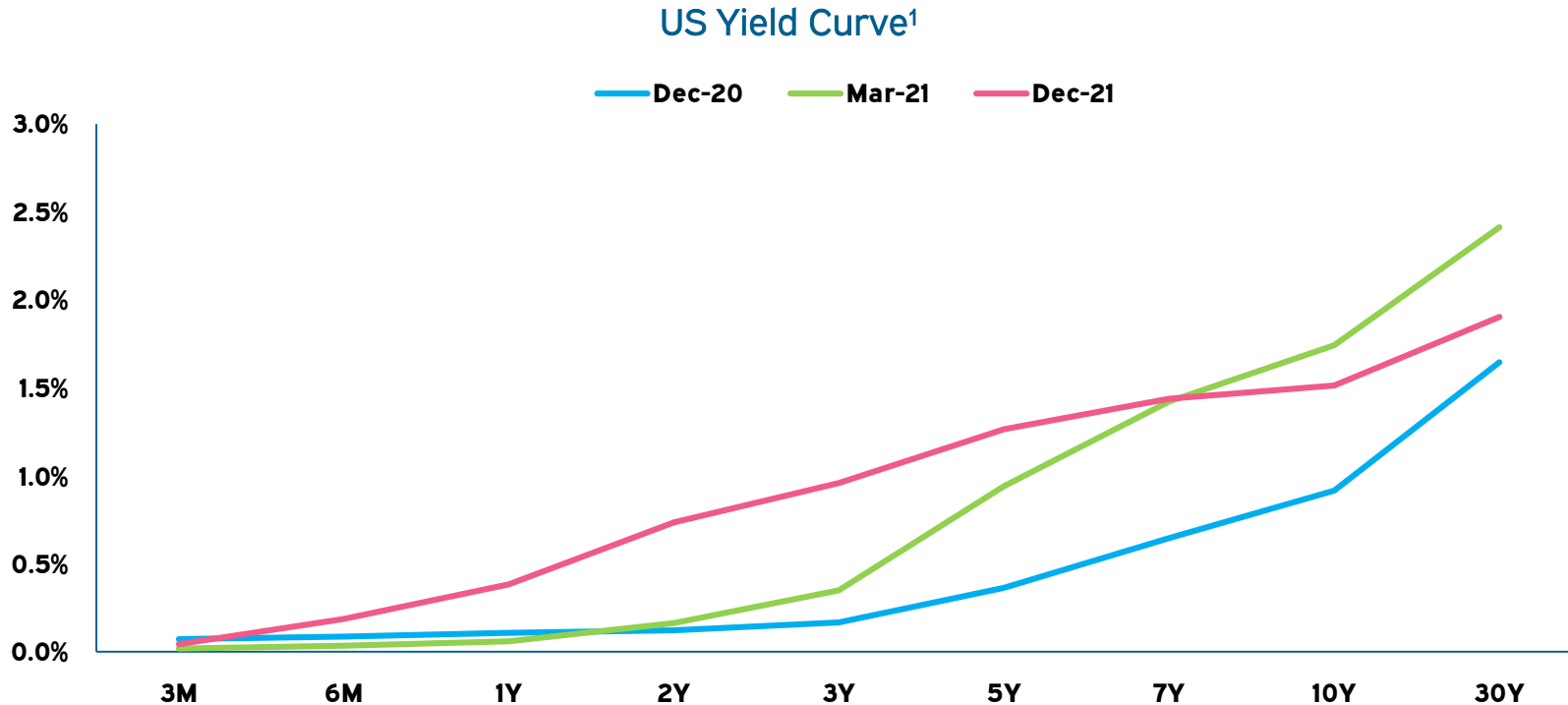
- Declining fears over the Omicron variant and expectations for continued corporate strength contributed to global equity markets posting positive returns for December. Developed markets led the way with international equities (MSCI EAFE) outpacing US equities (S&P 500). Emerging markets lagged mainly due to continued concerns related to China. Overall in 2021, US equities had the best results given continued policy support, relative success in reopening the economy, and strong corporate fundamentals.
- In December, rising inflation and expectations for less accommodative policy led to the US bond market (Bloomberg Barclays Aggregate) declining slightly, while high yield bonds increased in the risk-on environment. For the year, TIPS led the way in bonds, up 6%, followed by high yield with the broad bond market index declining by 1.5%.

¹ Source: Investment Metrics and Bloomberg. Data is as of December 31, 2021.



- All sectors advanced in 2021 with energy leading the way followed by financials, a reversal of the 2020 trend.
- The technology sector also produced strong results last year building on the 40%+ returns in the prior year.

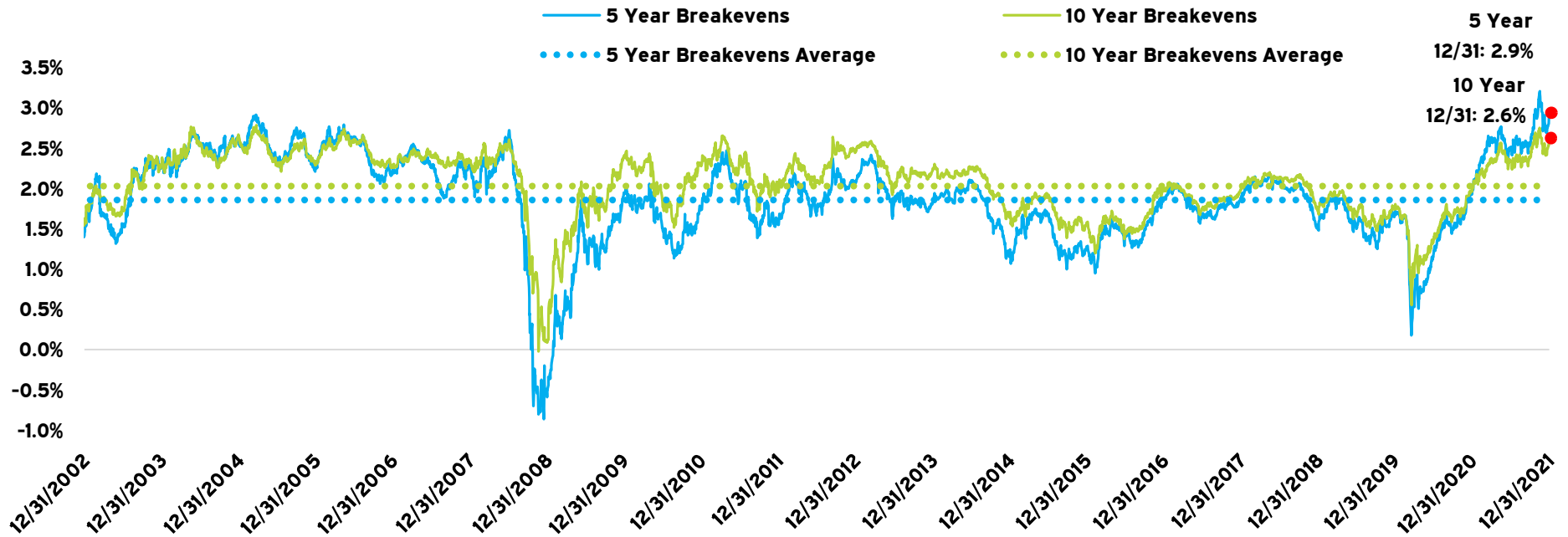
¹ Source: Bloomberg. Data is as of December 31, 2021.



- During the first half of 2021, the Treasury yield curve steepened on both higher growth and inflation expectations as vaccines were deployed and economic growth prospects improved on the opening of the economy, while monetary policy anchored short-dated rates near 0%.
- Over the latter-half of the year, however, shorter-dated yields from 1- to 5-years rose sharply as the FOMC signaled that policy rates may be tightened more aggressively than previously anticipated.

¹ Source: Bloomberg. Data is as of December 31, 2021.

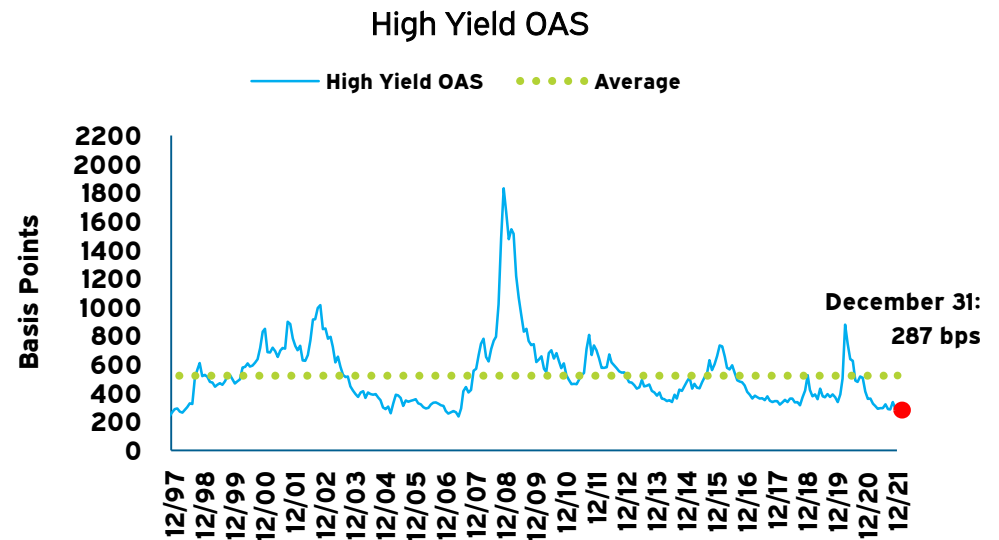
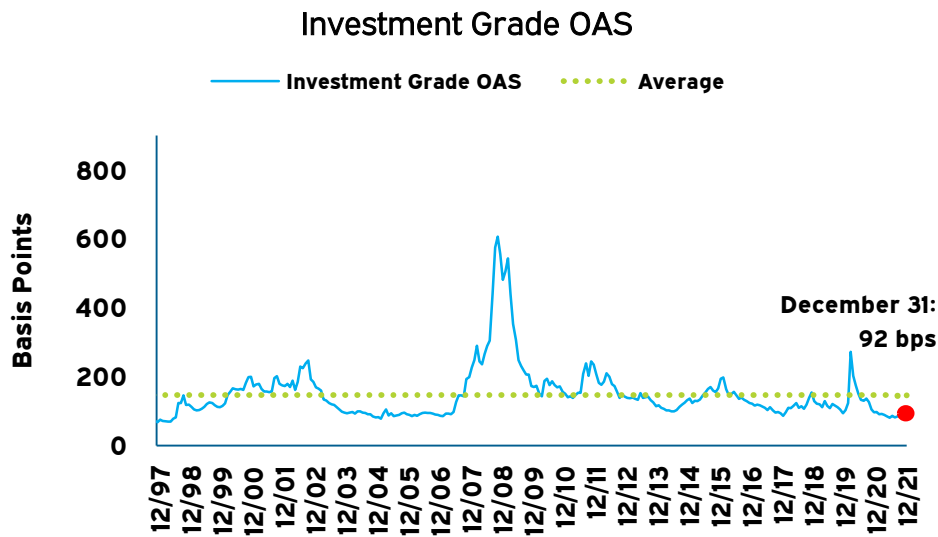
Breakeven Inflation¹



- Inflation expectations finished the year higher than they started, ending at a level well above the Fed’s 2% target.
- Supply chain issues potentially persisting as new variants of the virus increase the risk of re-shuttering sectors of the global economy and wage pressures remain key drivers of inflation expectations.
- Additionally, changes to Fed policy focused on an average inflation target may play a role in inflation market dynamics and, specifically, the risk that consumer inflation expectations get entrenched at higher inflation growth rates.

¹ Source: Bloomberg. Data is as of December 31, 2021.

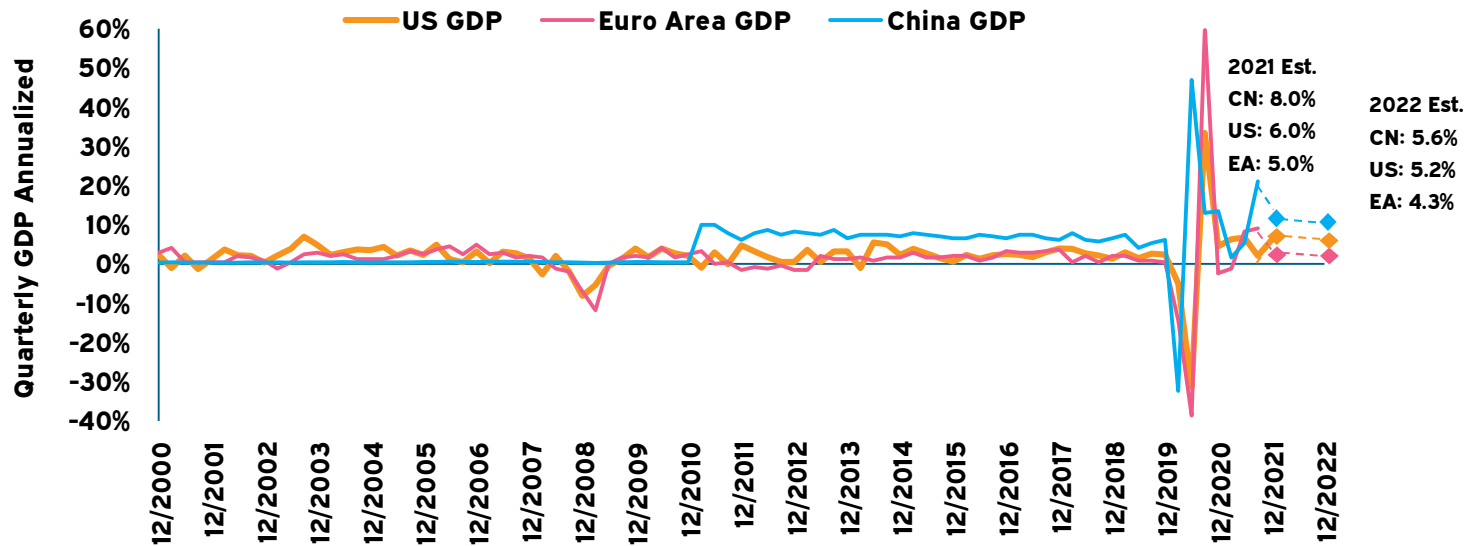
Credit Spreads (High Yield & Investment Grade)¹



- Credit spreads (the yield spread above a comparable maturity Treasury) narrowed in December after the modest widening in November on the discovery of the new virus variant (Omicron).
- Policy support, strong corporate fundamentals, and the search for yield in a low-rate environment have been key drivers in the decline in US credit spreads to well below long-term averages, particularly for high yield issuers.

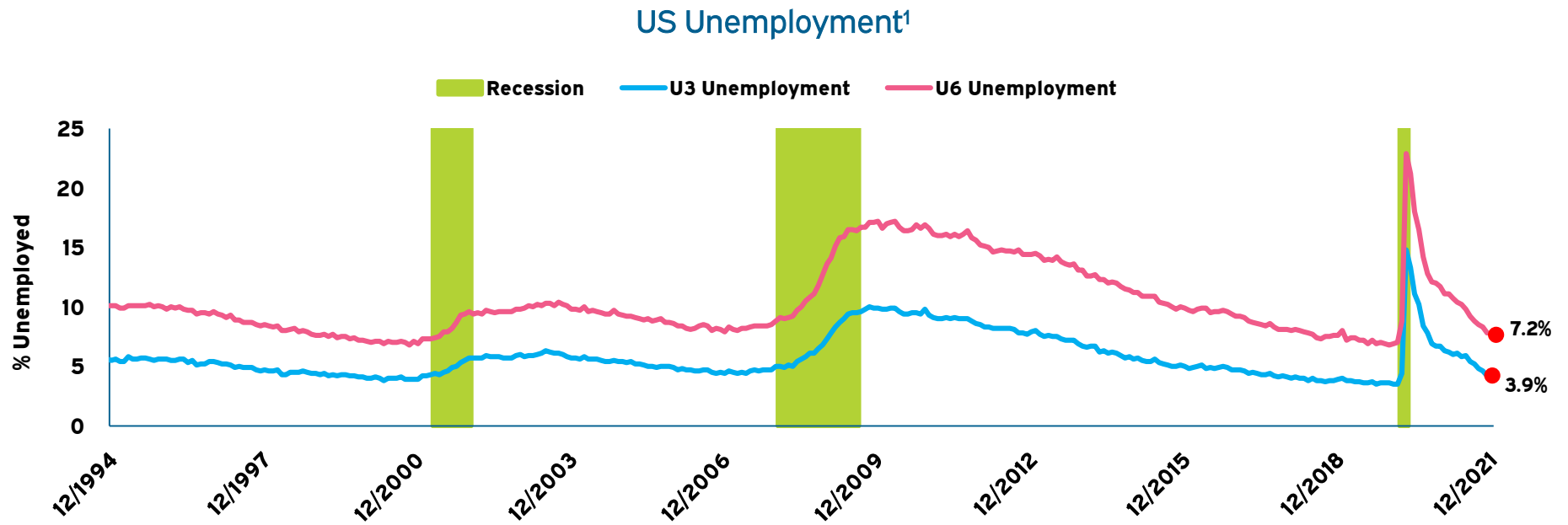
¹ Source: Barclays Live. Data represents OAS and is as of December 31, 2021.

GDP Data Shows Slowing Growth in 2022¹



- In late 2020 and early 2021, major economies grew at rates far above potential. These high rates of growth are expected to decline slightly, with projections continuing to decline due to supply disruptions, reopening trends moderating, and some countries continuing to struggle with the virus.
- The US is expected to grow faster than the euro area again in 2022, with some growth pulled forward due to the relative success in distributing the vaccine and a substantially larger fiscal stimulus response to the pandemic.
- China is projected to grow at 8.0% in 2021 and 5.6% in 2022, both above the expected US growth rate. Questions remain, though, about the highly levered property market and increased government regulations.

¹ Source: Bloomberg, and IMF; Euro Area and China figures annualized by Meketa. Projections via October 2021 IMF World Economic Outlook and represent annual numbers.



- The US labor market continues to recover, and the unemployment rate (U3) fell from 4.2% to 3.9% in December. It still remains slightly above pre-pandemic levels though, but far below the pandemic peak.
- The broader measure of unemployment (U6) that includes discouraged and underemployed workers also continued to decline but is much higher at 7.2%. Also, the labor force participation rate remains quite low at 61.9% and is below the 63.4% level of January 2020.
- Continued improvements in the labor market have contributed to recent expectations that the Federal Reserve will increase its pace of policy removal in 2022.

¹ Source: Bloomberg. Data is as of December 31, 2021. Bars represent recessions as observed by the National Bureau of Economic Research.

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To: The Oregon Investment Council

From: Karl Cheng, Senior Investment Officer, Portfolio Risk & Research

Re: Fourth Quarter 2021 Risk Report for the Oregon Public Employees Retirement Fund

Executive Summary

This memo summarizes OPERF’s predicted volatility, as estimated by Aladdin, Treasury’s end-to-end investment analytics platform built by BlackRock. As of December 31, 2021, Aladdin estimated a return volatility of 13.3% for OPERF, in-line with the forward assumptions of Meketa Investment Group (“Meketa”) presented at the June 2021 meeting. Therefore, **staff recommends no additional action at this point.**

The realized and predicted volatilities for the liquid portion of the Fund, mainly the Public Equity and Fixed Income Portfolios, are within OIC guidelines.

OPERF Asset Allocation

Investment Belief #2 in [INV 1201: Statement of OIC Investment and Management Beliefs](#) states: “Asset Allocation Drives Risk and Return”. Shown in the table below are OPERF’s target allocations approved by the Council at the June 2021 meeting.

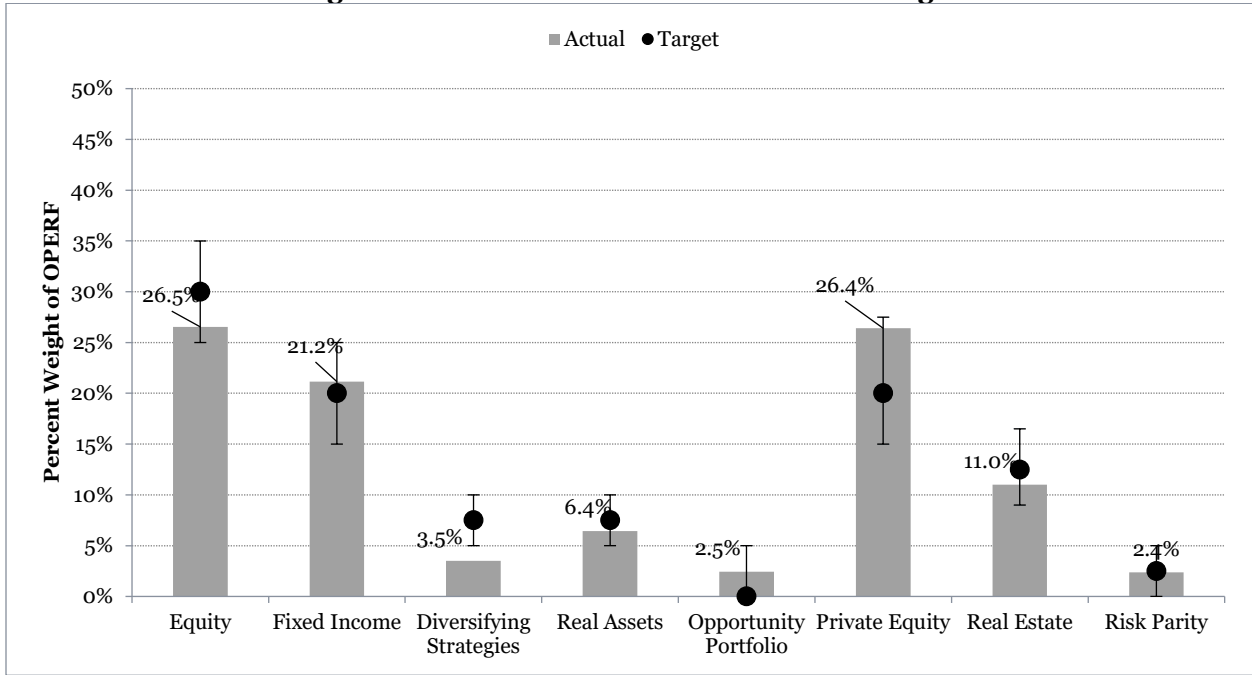
Table 1. OPERF Target Asset Allocation

Asset Class	Target Allocation (%)	Rebalancing Range (%)
Public Equity	30.0	25.0 – 35.0
Private Equity	20.0	15.0 – 27.5
Fixed Income	20.0	15.0 – 25.0
Real Estate	12.5	9.0 – 16.5
Real Assets	7.5	5.0 – 10.0
Diversifying Strategies	7.5	5.0 – 10.0
Risk Parity	2.5	0.0 – 5.0
Total Fund	100.0	

Including the synthetic overlays exposures managed by Russell Investments, Figure 1 below shows OPERF’s allocation.



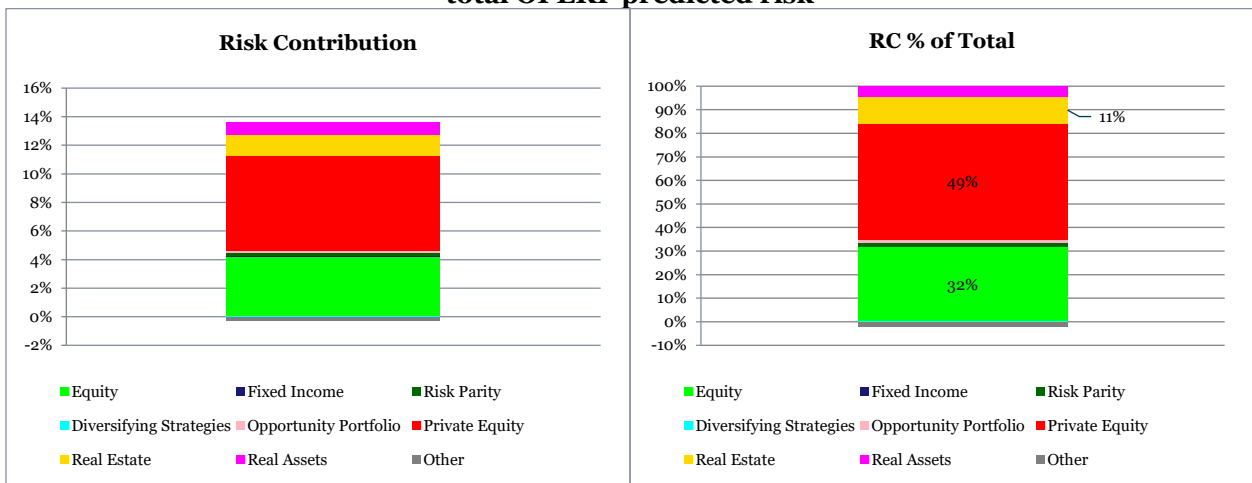
Figure 1. OPERF Actual Allocation versus Target



OPERF Predicted Risk

The risk estimates are shown in the charts below.

Figure 2. OPERF Risk Contribution by Asset Class and Risk Contribution as a percent of total OPERF predicted risk



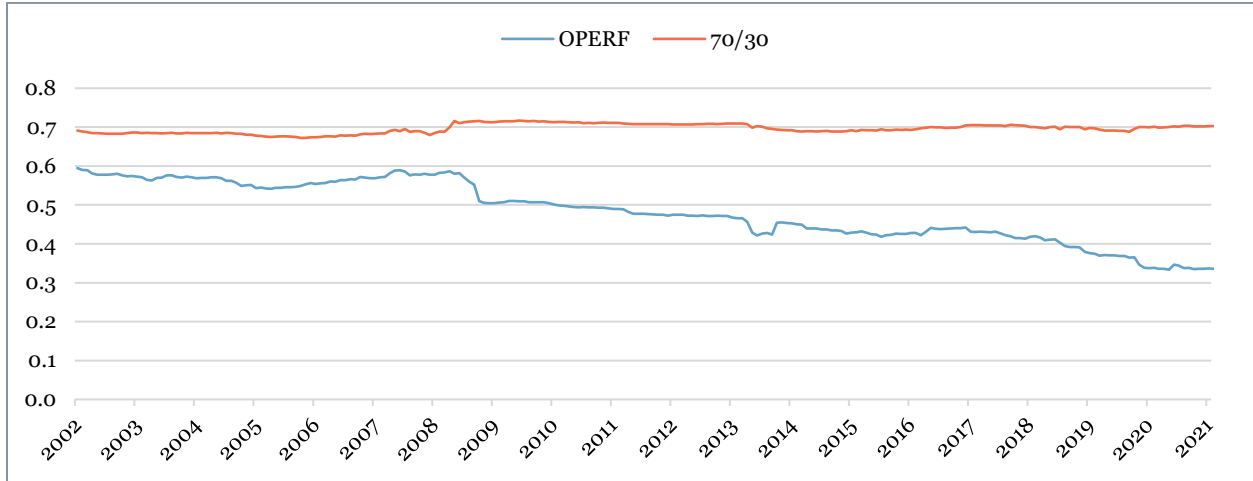
The total predicted **standard deviation**, or **volatility**, for OPERF is 13.3% as of December 31, 2021. To put that in context, Meketa, the OIC's investment consultant, estimates OPERF's long-term volatility to be 12.8% using their 2021 Capital Market Assumptions, which were a blend of forward 10- and 20-year assumptions from staff, Meketa, and Aon Investments, the Council's secondary investment consultant. Aladdin's model uses a medium-term, five-year lookback period so there will almost always be some difference between the two estimates.

Another item of note from Figure 2 is that "equity" risk, that is the predicted risk contributions from the Public Equity and Private Equity Portfolios, is estimated to be 81% of OPERF's predicted risk. Equity risk has always been the largest risk contributor to OPERF. OIC Investment Belief #3 summarizes the Council's objective for investing in equity: "*Over the long-term, equity-oriented investments provide reliable return premiums relative to risk-free investments.*" However, equity investments are much more volatile than investment grade fixed income and U.S. Treasuries. Over the past several years, the OIC has approved changes to asset allocations and portfolio construction to diversify the Fund from equity risk, including:

- Increasing Diversifying Strategies allocation,
- Rebalancing the Fixed Income and Real Estate Portfolios,
- Allocating to defensive equity within the Public Equity Portfolio, and
- Adding Risk Parity.

The OIC-approved changes have reduced OPERF's volatility over time. Figure 3 below plots OPERF's rolling 20-quarter realized beta to MSCI ACWI IMI as well as that of the 70% MSCI ACWI IMI & 30% Bloomberg Barclays blend, or the "Reference Portfolio". OPERF's realized beta hovered around +0.60 in the earlier portion of the analysis period before starting a steady decline. Part of that decline is due to an increasing allocation to illiquid investments, which tend to have performance smoothing, but the other cause is the aforementioned diversification.

Figure 3. OPERF's Beta to MSCI ACWI IMI

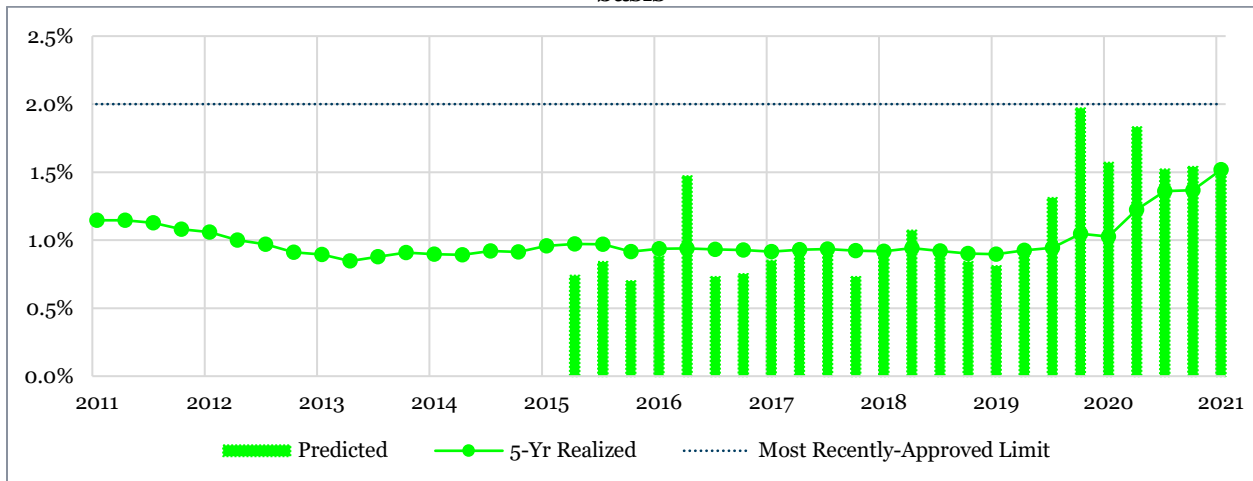


Capital Markets

Public Equity

The Public Equity Portfolio has an OIC-approved **tracking error** range of 0.75% to 2.00%. Using monthly performance data from State Street, the five-year tracking error through December 31, 2021 for the Portfolio is 1.52%, well within the approved range. Predicted active risk increased beginning with Q1 2020 as Covid concerns impacted all aspects of capital markets but still within the OIC-approved range. Since then, market volatility and active risk have moderated.

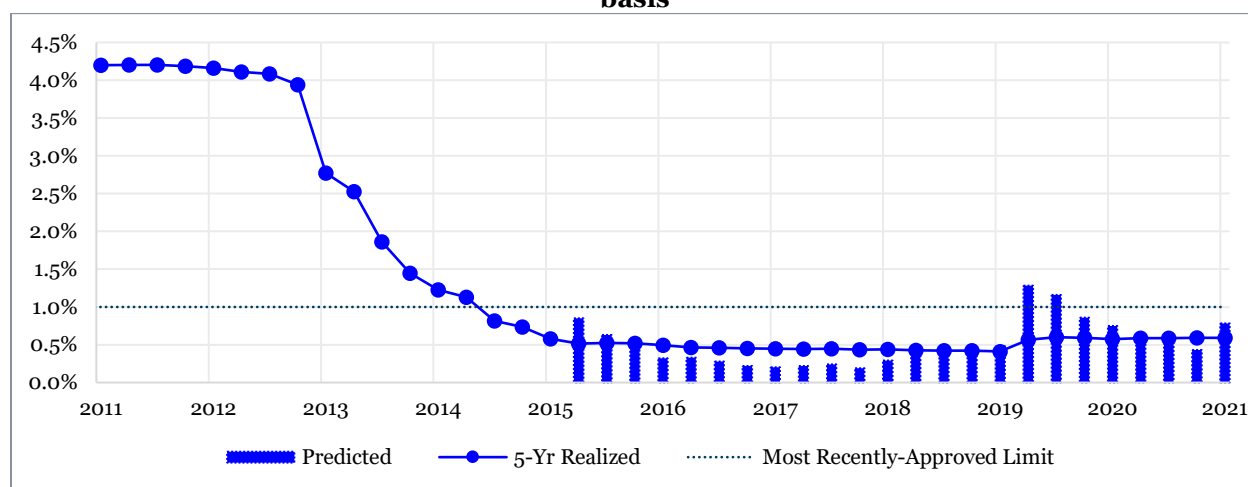
Figure 4. Public Equity's predicted risk and realized five-year tracking error on a quarterly basis



Fixed Income

The Fixed Income Portfolio has an OIC-approved **tracking error** of up to 1.0%. Using monthly performance data from State Street, the five-year tracking error through December 31, 2021 for the Portfolio is 0.59%, well within the approved range. Similar to what occurred for Public Equity, Covid concerns impacted all sectors of the fixed income market. Predicted risk spiked in Q1 and Q2 2020 as both credit and rate risks spiked, but have since moderated.

Figure 5. Fixed Income's predicted risk and realized five-year tracking error on a quarterly basis



OPERF Cash Flow

Table 2 below summarizes approximate net investment cash flow and pension cash flow for Year-to-Date 2021 and for the past five years.

Table 2. OPERF Net Cash Flow by Portfolio by Time Period

Asset Class	Net Cash Flow (\$M)					
	YTD 2021	2020	2019	2018	2017	2016
Public Equity	4,220	3,062	2,752	3,432	1,451	1,658
Private Equity	2,730	494	347	1,216	1,434	1,037
Fixed Income	-3,053	3,154	327	61	21	1,619
Real Estate	-396	15	-48	-28	508	228
Real Assets	-572	-564	-578	-524	-306	-1,280
Diversifying Strategies	381	-621	-490	-1,349	-395	-250
Opportunity	-248	71	26	156	-2	-146
Risk Parity	0	-1,800	0	0	0	0
Other	-227	-449	283	-15	0	170
Total Fund	2,836	3,362	2,617	2,948	2,711	3,035
<i>Net Pension</i>	-1,743	-2,984	-2,536	-2,671	-3,057	-2,795

The estimated uncalled commitments from the private market portfolios are tabulated below.

Table 3. OPERF Uncalled Commitments	
Asset Class	Uncalled
Portfolio	Commitment (\$B)
Private Equity	\$8.6
Real Assets	\$3.9
Real Estate	\$4.0
Opportunity	\$1.4
Total	\$17.9

O I C



OREGON
STATE
TREASURY

TAB 5
OPERF REAL ESTATE PORFOLIO
ANNUAL REVIEW

March 9, 2022

OPERF Real Estate Portfolio Annual Review & 2022 Plan



OREGON
STATE
TREASURY



Agenda

		OIC Investment and Management Beliefs Mapping																	
Section	Pages	1A	1B	1C	1D	2A	2B	3A	4A	4B	5A	5B	6A	6B	7A	7B	8A	8B	9A
Agenda	2																		
Real Estate Portfolio Preface	3 - 5					■	■	■	■	■									
Executive Summary	6						■			■			■	■					
Investment Environment	7									■									
Real Estate Year In Review	8 - 10						■		■	■			■	■			■		■
Real Estate Performance	11 - 12								■	■									
Real Estate Portfolio Update	13 - 18						■		■	■			■	■			■		■
2021 Real Estate Plan	19 -24						■		■	■			■	■					
Policy Reporting	25		■										■	■					
Closing	26						■		■	■			■	■					

LEGEND: OIC INVESTMENT AND MANAGEMENT BELIEFS

- 1 THE OIC SETS POLICY AND IS ULTIMATELY RESPONSIBLE FOR THE INVESTMENT PROGRAM**
 - A. Investment management is dichotomous -- part art and part science.
 - B. The OIC is a policy-setting council that largely delegates investment management activities to the OST and qualified external fiduciaries.
 - C. The OIC is vested with the authority to set and monitor portfolio risk. Both short-term and long-term risks are critical.
 - D. To exploit market inefficiencies, the OIC should be long term, contrarian, innovative, and opportunistic in its investment approach.
- 2 ASSET ALLOCATION DRIVES RISK AND RETURN**
 - A. Asset allocation is the OIC's primary policy tool for managing the investment program's long-term risk/return profile.
 - B. Portfolio construction, including diversification and correlation considerations, is essential to maximizing risk-adjusted returns.
- 3 THE EQUITY RISK PREMIUM WILL BE REWARDED**
 - A. Over the long-term, equity-oriented investments provide reliable return premiums relative to risk-free investments.
- 4 PRIVATE MARKET INVESTMENTS CAN ADD SIGNIFICANT VALUE AND REPRESENT A CORE OIC/OST COMPETENCY**
 - A. The OIC can capitalize on its status as a true, long-term investor by making meaningful allocations to illiquid, private market investments.
 - B. Dispersion in private market investment returns is wide; accordingly, top-quartile manager selection, diversification across vintage year, strategy type, and geography, and careful attention to costs are paramount.
- 5 CAPITAL MARKETS HAVE INEFFICIENCIES THAT CAN BE EXPLOITED**
 - A. Inefficiencies that can be exploited by active management may exist in certain segments of the capital markets.
 - B. Passive investment management in public markets will outperform the median active manager in those markets over time.
- 6 COSTS DIRECTLY IMPACT INVESTMENT RETURNS AND SHOULD BE MONITORED AND MANAGED CAREFULLY**
 - A. All fees, expenses, commissions, and transaction costs should be diligently monitored and managed in order to maximize net investment returns.
 - B. External incentive structures should be carefully evaluated to ensure proper alignment with investment program objectives.
- 7 FAIR AND EFFICIENT CAPITAL MARKETS ARE ESSENTIAL FOR THE LONG-TERM INVESTMENT SUCCESS**
 - A. The OIC recognizes that the quality of regulation and corporate governance can affect the long-term value of its investments.
 - B. The OIC also recognizes that voting rights have economic value.
- 8 THE INTEGRATION OF ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) FACTORS, SIMILAR TO OTHER INVESTMENT FACTORS, MAY HAVE A BENEFICIAL IMPACT ON THE ECONOMIC OUTCOME OF AN INVESTMENT AND AID IN THE ASSESSMENT OF RISKS ASSOCIATED WITH THAT INVESTMENT**
 - A. The consideration of ESG factors within the investment decision-making framework is important in understanding the near-term and long-term impacts of investment decisions.
 - B. Over time, there has been an evolution of multi-factor, or more holistic approaches, to identify opportunities and remediate risks, in a large globally-diversified investment portfolio.
- 9 DIVERSITY, IN ALL ASPECTS, IS ACCRETIVE TO MEETING OIC OBJECTIVES**
 - A. By embracing and enhancing diversity and inclusion efforts, the OIC ensures that the investment program will be exposed to and informed by a wide range of perspectives, ideas and opinions.

Real Estate Strategic Role

The strategic role of OPERF real estate investments is outlined in OIC INV 1201 – Statement of OIC Investment and Management Beliefs and OIC Policy INV 501 – Acquiring and Managing Equity Real Estate. Return and risk objectives for the Real Estate Portfolio (outlined in OIC Policy INV 501 Acquiring and Managing Equity Real Estate) are as follows:

- 1) To achieve long-term, net returns to OPERF above the NFI-ODCE plus 50 basis points; and
- 2) To reduce risk among the Portfolio’s investments through diversification by strategy, property type, investment size, geography, and time

Real Estate Policy Objective – The OIC’s real estate policy objective of long-term, net returns above the NFI-ODCE plus 50 basis points [bps] has been achieved over all time periods

Period Ending 9/30/2021	Net Asset Value	3 Months	1 Year	3 Years	5 Years	10 Years	Since Inception
OPERF Real Estate Portfolio	\$10,723,910,621	8.37%	18.94%	9.08%	8.91%	10.67%	10.55%
NFI-ODCE, Net +50bps		6.53%	14.14%	6.63%	7.06%	9.42%	
Excess		1.84%	4.80%	2.45%	1.85%	1.25%	

Real Estate Position

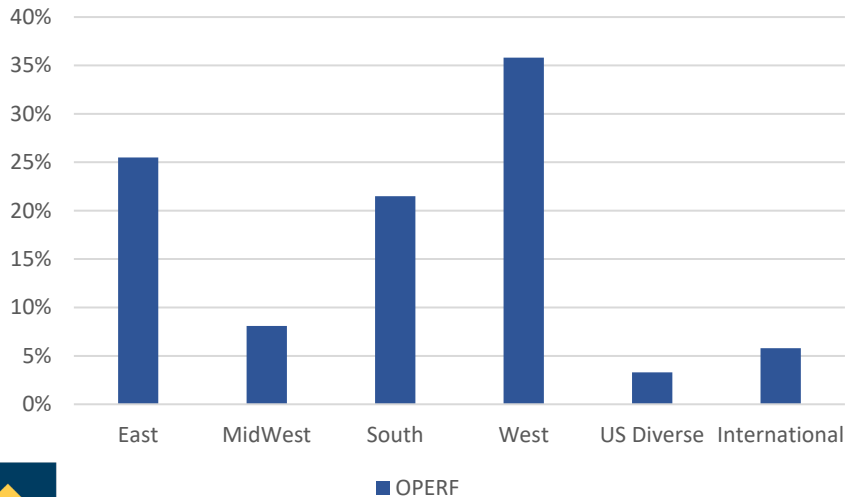
Strategic Allocation Targets

Allocation	Market Value (\$mm)	Market Value (%)	OIC Target	OIC Ranges
Core	\$ 7,883.0	73.5%	55%	+/- 10%
Value Added	\$ 1,208.9	11.3%	20%	+/- 10%
Opportunistic	\$ 1,218.0	11.4%	20%	+/- 10%
REITs	\$ 413.9	3.9%	5%	0-10%

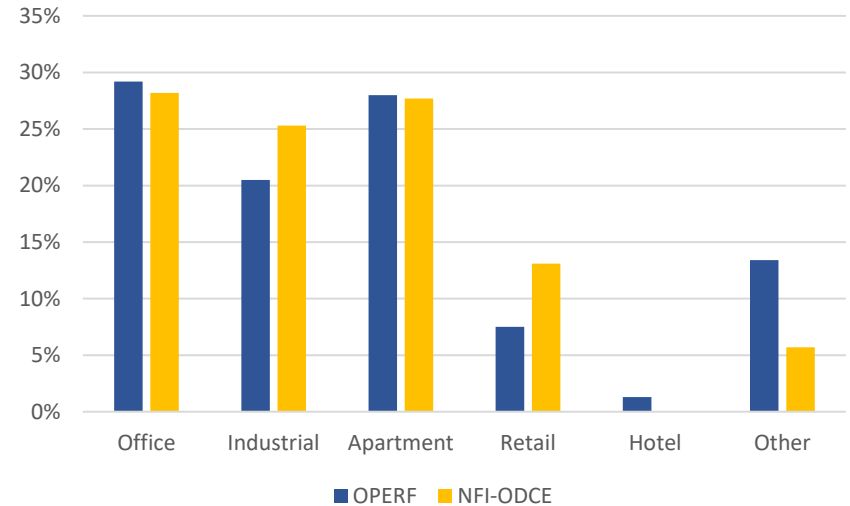
Top 10 Partnerships

Manager	Market Value (\$mm)	Market Value (%)	Risk
Lincoln Advisors	\$ 1,316	12.3%	Core
GID	\$ 1,282	12.0%	Core
Clarion Partners	\$ 1,004	9.4%	Core
Lionstone	\$ 860	8.0%	Core/Value Add
Prologis	\$ 622	5.8%	Core
Regency	\$ 557	5.2%	Core
Ascentris	\$ 453	4.2%	Core/Value Add
DivcoWest	\$ 432	4.0%	Core/Value Add
Harrison Street	\$ 415	3.9%	Core/Value Add
Waterton	\$ 345	3.2%	Value Add
Total:	\$7,288	68.0%	

Geographic Weights



Property Sector Weights



Real Estate Benchmark Composition

Market Coverage

Benchmark: National Council of Real Estate Investment Fiduciaries – Open End Diversified Core Equity Index (NFI-ODCE) + 50 bps (net)

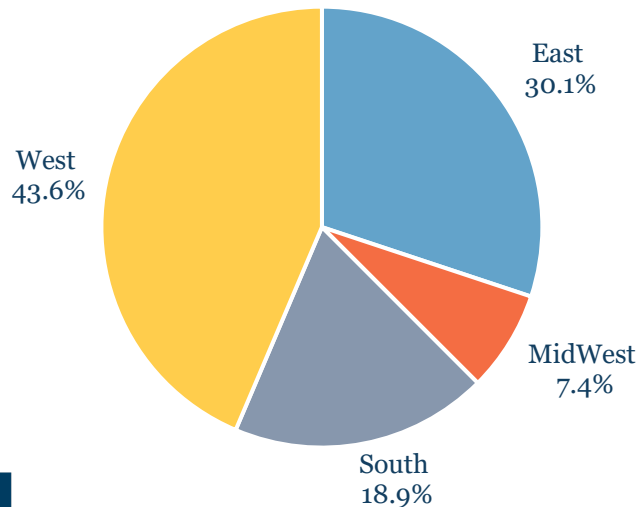
Number of Funds: 27

- United States
- Open-End Core Funds

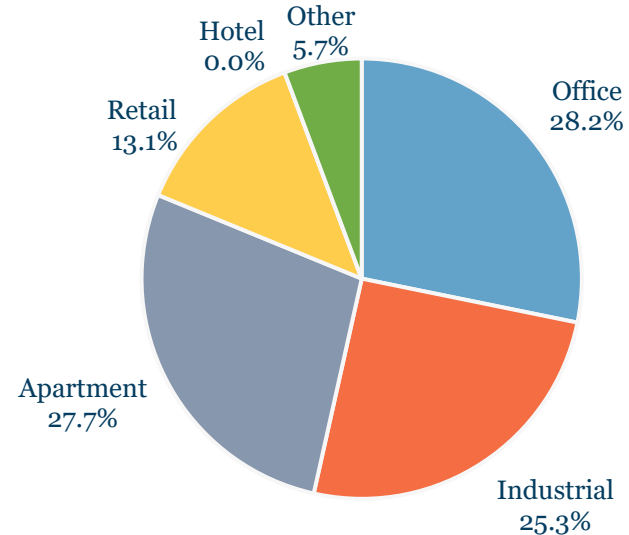
OPERF ODCE Funds

Fund	Fund NAV (\$M)	OPERF NAV (\$M)
AEW Core Property Fund	\$7,562	\$ 120.3
ASB Allegiance Real Estate Fund	\$6,155	\$ 180.8
Heitman America Real Estate Trust	\$9,660	\$ 163.3
JP Morgan Strategic Property Fund	\$30,827	\$ 305.9
Morgan Stanley Prime Property Fund	\$30,586	\$ 287.7
DWS RREEF America REIT II	\$13,442	\$ 110.8
Total	\$98,232	\$ 1,168.8

Geographic Weights



Property Sector Weights



Executive Summary

Key Takeaways...

1. Slight overweight to core
2. Portfolio returns have been strong across time periods, primarily attributed to fortunate timing in the pivot to core and flexibility of the transfer-to-core mechanisms within the Separately Managed Accounts (SMAs)
3. Allocation is within policy bandwidth but remains slightly below policy target midpoint
4. Much of the capital committed to evergreen structures (open-ended funds and SMAs) over the past 24 months is actively being deployed, with the majority of capital allocated to strategies with strong anticipated growth potential, improved inflation hedging characteristics, and long-term fundamentals beneficial for continued portfolio diversification

Investment Environment

• Capital Markets

- Real estate market conditions have been evolving at a rapid pace as the recovery phase of the pandemic began in 2H 2021 and we enter 2022
- 2021 was a very strong year for the property markets, particularly multifamily, industrial and life sciences, with capital flows into real estate increasing with the continued search for stable yields and rental growth favored by many investors
- Development strategies deemed favorable as the growth in value from rising rents and lower cap rates have outstripped rising construction costs, particularly in residential and industrial property types

• Residential

- The broader residential markets have demonstrated strong growth across all residential sectors, although there appear to be early signs of deceleration in some geographic markets heading into 2022
- While home price growth is expected to slow in 2022 forecasts, the December 2021 year-over-year national home price growth saw an 18.5% increase, the highest 12-month growth in the U.S. since the U.S. index series began in 1976⁽¹⁾
- Capital flows and transactions, across all residential property types, remain historically high with significant investor demand increasing for new development opportunities in both multifamily and single family residential

• Industrial

- The U.S. industrial market continued to outperform all other property sectors in 2021
- Strong growth in the e-commerce sector and robust consumer demand, coupled with a lack of warehouse supply, have created a favorable landlord market with exceptional rental growth, while paving the way for development opportunities
- Net absorption for U.S. industrial in 2021 saw an 86% increase from 2020 and the greatest amount in the past 25 years⁽²⁾

• Office

- Transaction volume remains low and market pricing transparency continues to be a challenge in traditional CBD office markets across the U.S., with most major markets waiting for tenants to return and long-term demand requirements in flux
- With rent collections remaining steady, there has been little distress or forced trades. As a result of short-term uncertainty in demand coupled with the high costs of capital required for this asset class, a repricing will most likely need to occur for this historically volatile property type to fall into favor with investors

• Retail

- Service and necessity retail has proven to be resilient, although local legislation continues to be an impediment in some markets
- Investors are finding value in repositioning lower-quality retail malls to other uses, with the higher quality regional centers beginning to benefit from accelerating spending growth and an easing of the pandemic-enforced restrictions

The global pandemic has stressed some property types and accelerated secular trends across all property types



Real Estate 2021 Year In Review

2021, on whole, was focused primarily on retaining staff cohesiveness, maintaining a long-term vision of seeking high-quality investment opportunities and continuing efforts to align strategic partnerships through renegotiated Limited Partnership Agreements

- \$1.46 billion in new commitments
- Fully onboarded additional reporting and attribution contracts with SitusAMC, MSCI and Juniper Square
- Completed amending three Separate Account agreements to reflect updated terms, improved alignment and significant fee savings
- Continued refinement of internal due diligence and monitoring processes, including the integration of ESG and DEI factors
- Given the remote working status and travel restrictions brought on by the global pandemic, further research into diversifying the portfolio via international core real estate exposures has been deferred to 2023

Real Estate 2021 Year In Review – Approvals

In 2021, 6 real estate commitments were approved, totaling \$1.5 billion

Pacing

- The commitments represent the continuation of a multi-year plan to increase exposures to asset classes and strategies that fulfill long-term portfolio construction needs
- Given the ongoing pandemic and primarily virtual meeting environment since March 2020, coupled with the inherent challenges of negotiating and crafting long-term partnerships without being able to conduct onsite multi-day due diligence, Staff elected to “lean-in” on our existing partners
 - 5 of the 6 commitments in 2021 were allocations to pre-existing partners within the portfolio

Fees

- Continued trend toward lower fees through tailored partnership structures, non-promoted open-ended funds, and smaller exposure to higher-fee closed-ended structures
- \$823 million of commitments in 2021 include no carried interest; \$910 million of the 2021 commitments include management fees <100 bps (30-50% below average fee structures for non-core marketed funds)

Strategy

- 2021 commitments represent: (1) continued long-term overweight intentions to multifamily, industrial and niche real estate assets; and (2) re-ups to existing partners with demonstrated track records

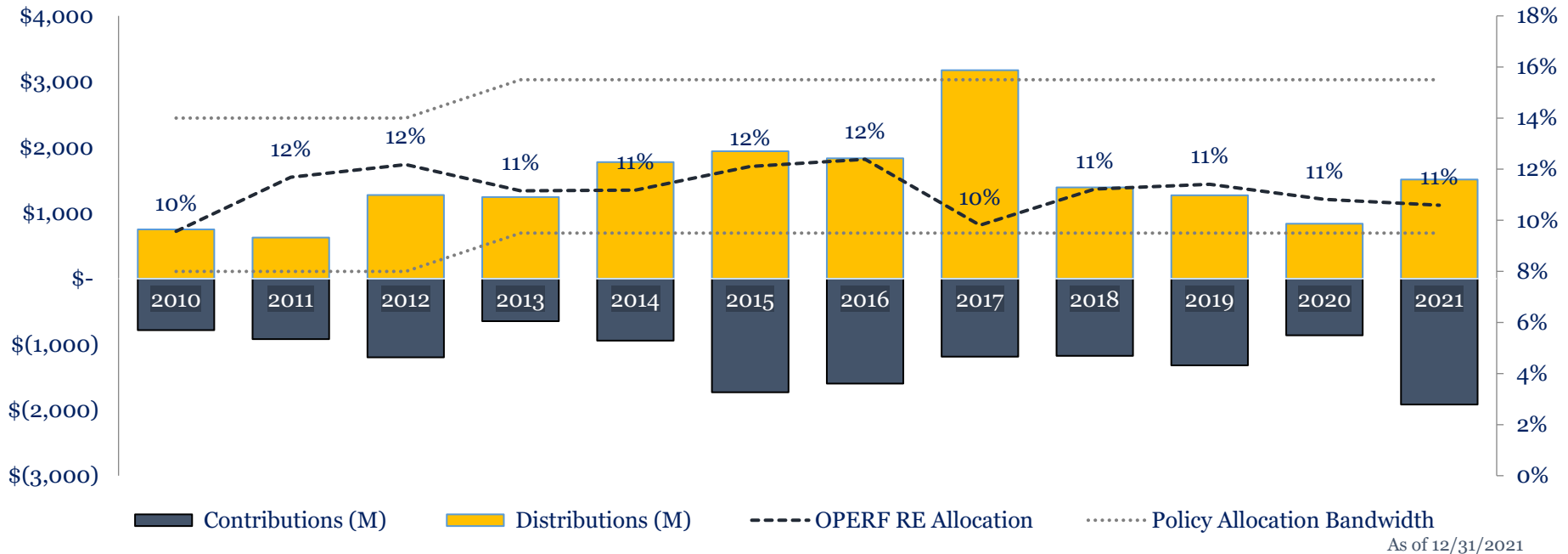
FUND NAME	STRATEGY	SUB-PORTFOLIO	GEOGRAPHY	COMMITMENT (\$ MM)	FUNDING STATUS
AEW Core Property Trust	Diversified	Core	Domestic	110	Funded
Ascentris-OR Cherry Creek West	Alternative / Niche	Opportunistic	Domestic	350	Unfunded
AEW Essential Housing Fund	Multifamily	Core	Domestic	250	Unfunded
LBA Core Industrial SMA (re-up)	Industrial	Core	Domestic	350	Unfunded
LBA Logistics Fund IX	Industrial	Value-Add	Domestic	200	Unfunded
Nuveen U.S. Cities Industrial Fund	Industrial	Core-Plus	Domestic	200	Unfunded
NEW COMMITMENTS SUB-TOTAL				1,460	



Real Estate 2021 Year In Review – Allocations

Portfolio allocation has been consistently within policy bandwidth

- The real estate portfolio has contributed \$2.7 billion in net cash flows to OPERF over the trailing five-year period
- As the core commitments made over the past few years fully invest, and with ~70% of the real estate portfolio in evergreen structures (open-ended funds and separate accounts), distributions from income will become an increasingly larger component of future portfolio cash flows
- At 11% of the OPERF portfolio, real estate is slightly below its 12.5% target, but well within policy bandwidth



Portfolio strategic weightings to Core = permanent positive cash flow & yield generation

Performance Review

- The Core portfolio has shown continued strong long-term performance, having outperformed the policy benchmark by 600, 435, 484, and 265 bps over the respective 1-, 3-, 5-, and 10-year periods
- Value Add underperformed the policy benchmark by 269, 260, and 88 bps over the 1-, 3-, and 5-year periods, although it outperformed by 161 bps over the trailing 10-years
- The Opportunistic portfolio underperformed the benchmark by 56, 94, and 150 bps over the trailing 3-, 5-, and 10-year periods, while outperforming over the 1-year time period by 317 bps

Summary of Portfolio Investment Returns		Q3 2021	1-Yr	3-Yr	5-Yr	10-Yr	Since Inception
Total Private Real Estate	Income	0.77%	3.23%	3.13%	3.58%	3.76%	3.88%
	Appreciation	7.94%	15.15%	6.03%	5.98%	7.01%	6.52%
	Total	8.70%	18.74%	9.31%	9.72%	10.96%	10.60%
Core	Income	0.98%	3.84%	4.10%	4.36%	4.98%	6.85%
	Appreciation	8.83%	15.86%	6.68%	7.30%	6.84%	3.25%
	Total	9.81%	20.14%	10.98%	11.90%	12.07%	10.27%
Opportunistic	Income	0.14%	2.90%	2.06%	3.20%	2.88%	0.33%
	Appreciation	4.89%	14.08%	3.93%	2.82%	4.91%	10.42%
	Total	5.02%	17.31%	6.07%	6.12%	7.92%	10.91%
Value Added	Income	0.09%	-0.19%	-0.54%	0.35%	2.10%	0.67%
	Appreciation	5.59%	11.69%	4.58%	5.81%	8.80%	3.91%
	Total	5.68%	11.45%	4.03%	6.18%	11.03%	4.31%
Public Real Estate – Domestic REITs	Income	0.80%	3.76%	4.29%	4.23%	4.05%	5.58%
	Appreciation	-0.09%	19.48%	4.27%	1.24%	6.20%	4.72%
	Total	0.72%	23.78%	8.68%	5.49%	10.42%	10.52%
Total Portfolio	Income	0.77%	3.25%	3.20%	3.57%	3.70%	4.74%
	Appreciation	7.60%	15.33%	5.74%	5.20%	6.78%	5.62%
	Total	8.37%	18.94%	9.08%	8.91%	10.67%	10.55%
NFI-ODCE, Net +50 bps		6.53%	14.14%	6.63%	7.06%	9.42%	
NAREIT Index		0.23%	31.54%	11.73%	8.33%	12.09%	

All returns represented are net of fees.

¹ Since Inception benchmark data not available due to cash flows not-verifiable for period prior to Private Edge contract commencement Q1 2006

² Policy benchmark through March 31, 2016 was NPI; gross of fees, unlevered

³ NFI-ODCE +50bps was adopted as Policy benchmark commencing April 1, 2016; net of fees, levered



Performance Review

Open-End Core Portfolio

Open-End Funds	NAV	1-Year	3-Year	5-Year	10-Year
AEW Core Property Trust	\$120,270,717	N/A	N/A	N/A	N/A
Nuveen U.S. Cities Multifamily Fund	\$77,777,553	N/A	N/A	N/A	N/A
Walton Street Real Estate Core-Plus Fund	\$126,986,873	N/A	N/A	N/A	N/A
GID Mainstay Fund	\$63,303,352	N/A	N/A	N/A	N/A
Harrison Street Core Property Fund	\$168,873,214	●	N/A	N/A	N/A
Harrison Street CPF Co-Investment	\$72,865,615	●	N/A	N/A	N/A
Heitman America Real Estate Trust	\$163,257,349	●	N/A	N/A	N/A
Prologis Targeted US Logistic Fund	\$375,751,827	●	N/A	N/A	N/A
ASB Allegiance Real Estate Fund	\$180,783,892	●	●	N/A	N/A
JP Morgan Strategic Property Fund	\$305,993,690	●	●	N/A	N/A
Morgan Stanley Prime Property Fund	\$287,748,750	●	●	N/A	N/A
Prologis European Logistics Fund	\$246,522,698	●	●	●	N/A
RREEF America II	\$110,802,230	●	●	●	●
Total:	\$2,300,937,761	18.96%	8.94%	9.16%	8.30%
NFI-ODCE + 50 bps		14.14%	6.63%	7.06%	9.42%

Separate Account

- Separate Accounts and Open-end Funds have been a positive driver of returns, outperforming the benchmark over all time periods since the portfolio shift started in 2015

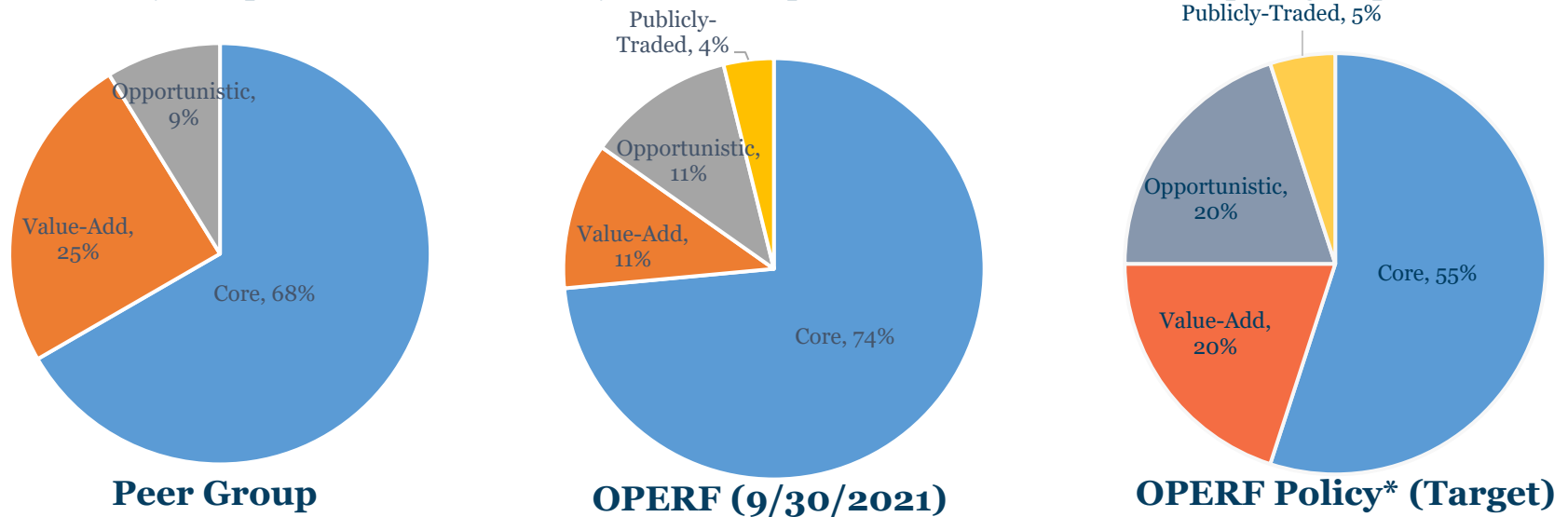
Separately Managed Funds	NAV	1-Year	3-Year	5-Year	10-Year
Abacus	\$183,750,992	●	N/A	N/A	N/A
LBA Industrial	\$219,123,954	●	N/A	N/A	N/A
DW-Columbia Perco	\$202,386,269	●	N/A	N/A	N/A
Ascentris	\$123,467,080	●	●	N/A	N/A
Lionstone LORE	\$566,699,437	●	●	●	N/A
Waterton Fund IX PT Chicago	\$197,963,364	●	●	●	N/A
Lincoln	\$1,316,312,941	●	●	●	●
Regency	\$557,323,107	●	●	●	●
GID WCRF	\$1,219,143,369	●	●	●	●
Clarion	\$995,891,873	●	●	●	●
Total:	\$5,582,062,387	20.64%	11.70%	12.46%	12.61%
NFI-ODCE + 50 bps		14.14%	6.63%	7.06%	9.42%



Portfolio Update – Peer Comparison

Risk Allocations

- OPERF has a marginally riskier portfolio, by policy target midpoints, than the average institutional investors surveyed by Pension Real Estate Association
- Conversely, the portfolio has less risk by current implementation than the same peer group



- While publicly-traded REITs were not represented in the Peer Group survey, many plans have a blend of private and public
- OPERF policy allocations include bandwidths of +/- 10% from target; REITs bandwidth is 0-10%
- Current Staff objectives include, over the near-term, weighting to Value-Add strategies as a means to access high quality, resilient Core investments at an improved cost basis upon stabilization

Portfolio Update – Portfolio Construction

The Real Estate “Top 10”

Significant portfolio reshaping occurred over the 5-year period 2013-2018, primarily:

- In keeping with reducing portfolio complexity while also leveraging OPERF’s scale to achieve preferred economics and improved alignment, the Top 10 managers represent 71% of the portfolio
- As part of Staff’s objectives to de-risk the real estate portfolio through lower volatility investments and reducing cyclical risks inherent in closed-end opportunistic funds, private Core now represents 71% of the Top 10 manager NAV, up from 35% in 2014

Risk Spectrum

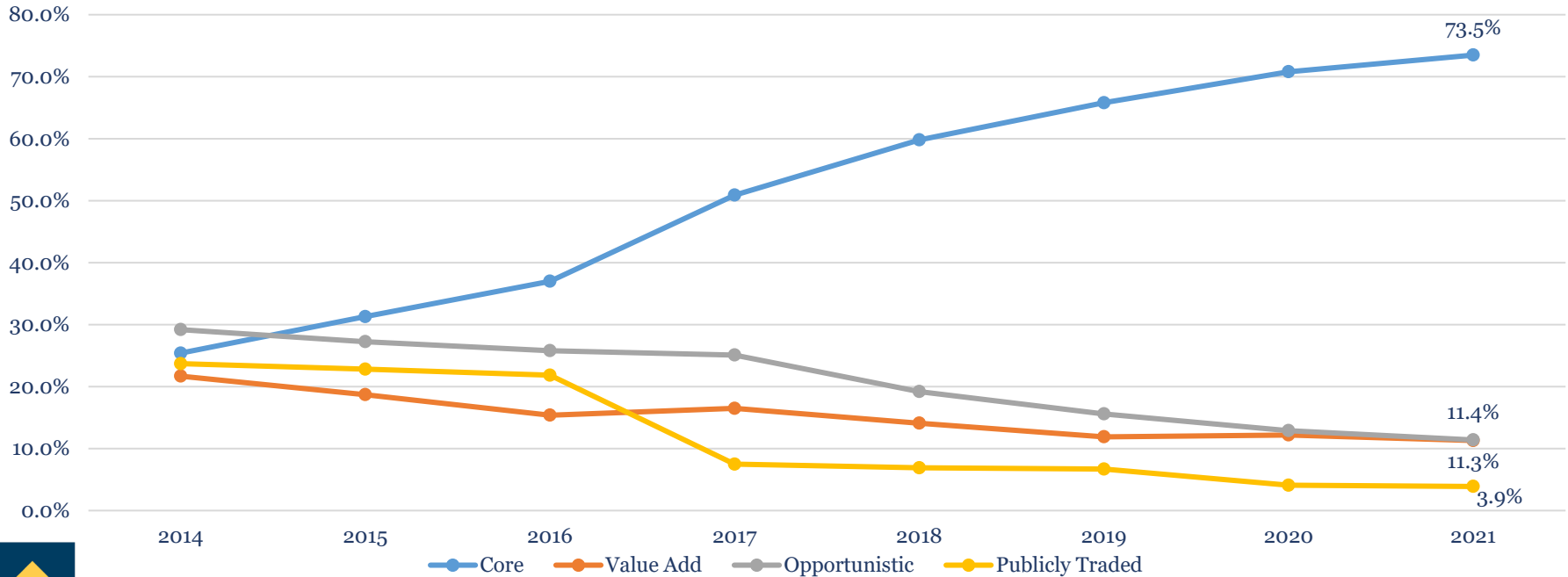
Core		Non-Core		
REITs	ODCE Funds	Non-ODCE Open-End Funds	SMAs	Closed-End Funds
LaSalle REIT	AEW Core Property Trust	GID Mainstay Fund	Ascentris-OR Partners	Beacon Capital Strategic Partners VI
Columbia Woodbourne Holding	ASB Allegiance Real Estate Fund	Harrison Street Core Property	Clarion Office Properties / Non-Mandate	DivcoWest Fund IV, V, VI
	Heitman America Real Estate Trust	Harrison Street Core Property Co-Investment	DW-Columbia Perfco	Oak Street Real Estate Capital Fund V
	JP Morgan Strategic Property Fund	Nuveen U.S. Cities Multifamily	LBA Core Industrial	Rockpoint Growth and Income Fund I
	Morgan Stanley Prime Property Fund	Prologis European Logistics	Lincoln CIP Industrial Core / Non-Mandate	Waterton Residential Property Venture XI, XII, XIV
	RREEF America II	Prologis Targeted US Logistic	Lionstone LORE One	Blackstone Real Estate VI, VII, IX
		Walton Street Real Estate Core-Plus Fund	Oregon Abacus Multifamily Associates	Harrison Street Life Science Non-Core
			Regency Retail Partners	Harrison Street V
			GID Windsor Columbia Realty Fund	Harrison Street V Co-Investment
			Waterton Fund IX PT Chicago	Harrison Street VIII
				Landmark Real Estate Partners VII
				Lone Star Fund V, VI, VIII, IX
				Lone Star Real Estate Fund I, II, III, IV, V
				Madison Realty Capital Debt Fund III
				Rockpoint IV
				Sculptor Real Estate Fund III, IV

Portfolio Update – Strategy Exposure

Portfolio Policy Change (“de-risking”) – 2014 to current

- Given starting point of portfolio risk allocations in 2014, Staff intentionally focused initial capital placement into long term investment partnerships – i.e., primarily Core and, to a lesser extent, Value Add
- Core:** overweight partially due to historically less vintage year pacing into VA and Opportunistic funds (“denominator effect”) coupled with cap rate compression resulting in outperformance of Core real estate relative to VA and Opportunistic
- Non-Core** (Value Add, Opportunistic): Combined allocation of 22.7% at the bottom of current policy range. Staff has allocated 15-25% non-core allowances to most SMAs, which will maintain long-term Non-Core exposures within range as this capital continues to invest
- Public REITs:** maintain exposure at midpoint of 0-10% allocation

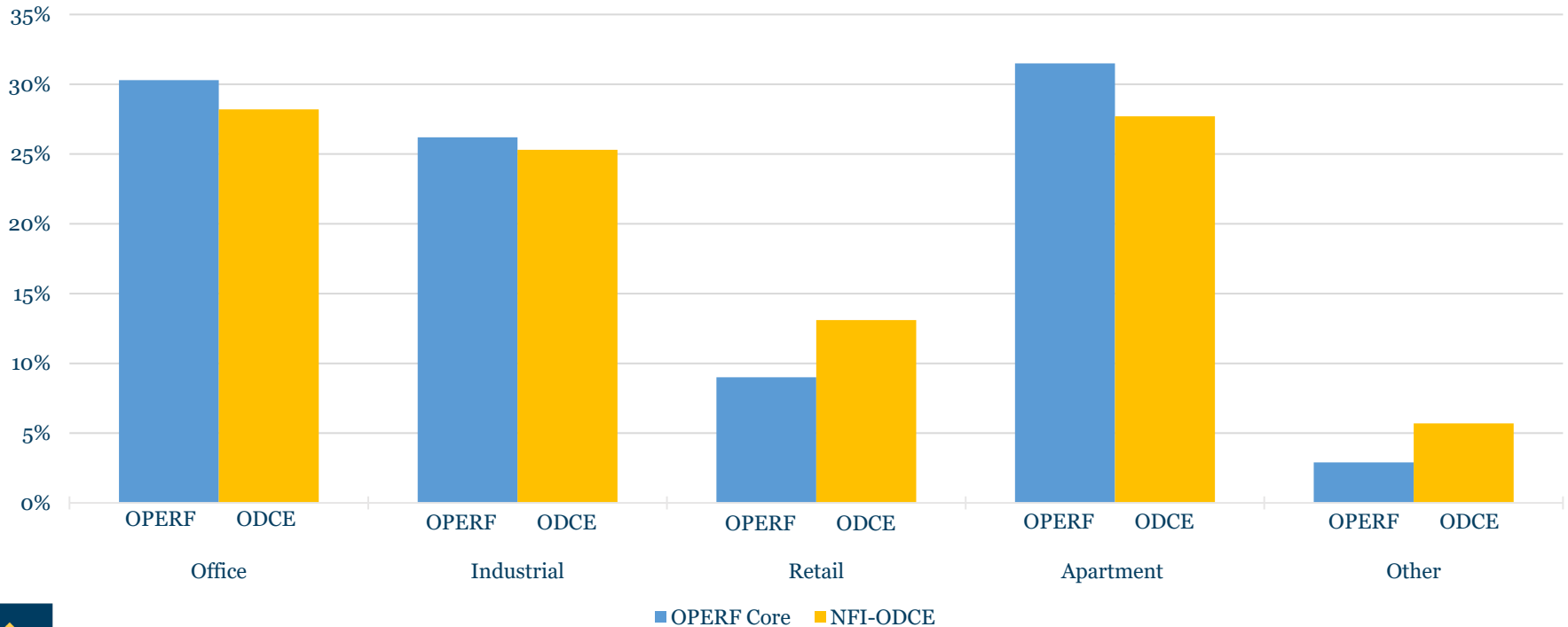
Real Estate Profile Transition



Portfolio Update – Property Exposure

Portfolio Weightings

- Staff actively manages portfolio exposures for strategic over and underweights to the benchmark
 - Portfolio has benefited from slight overweight to industrial and apartments, as well as an underweight to the retail sector
 - Long term intentions are to continue overweight to industrial and multifamily while strategically reducing office weightings through opportunistic dispositions
 - “Other” category consists of many non-traditional institutional property types which also have attractive demand drivers

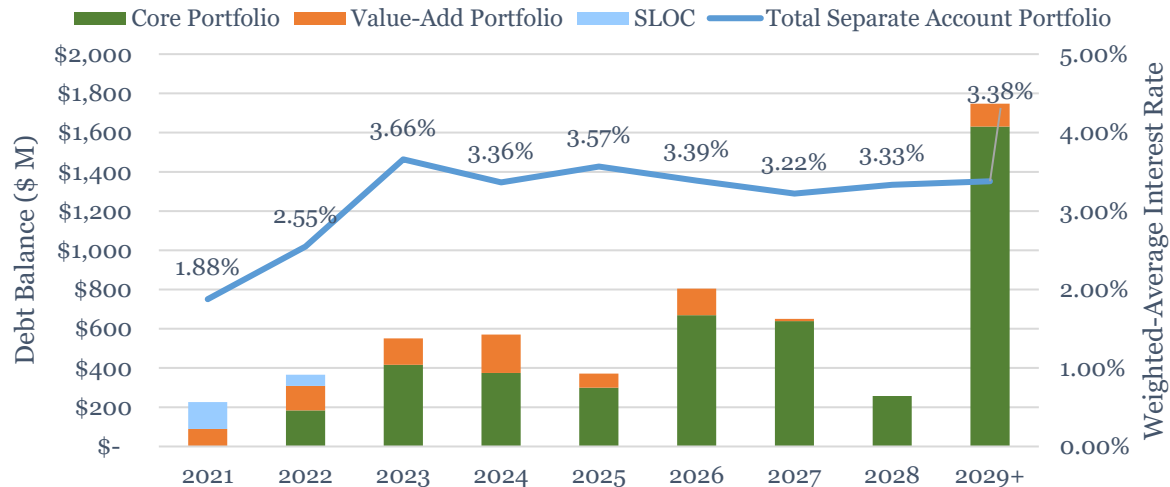


Portfolio Update – Debt Summary

Debt Breakdown

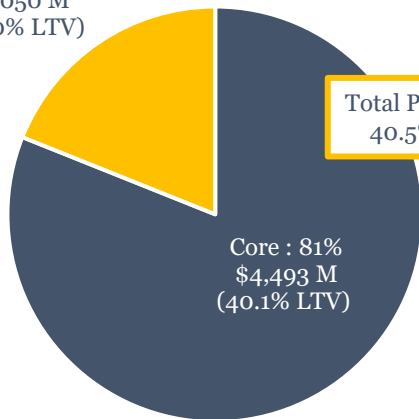
Total Separate Account Portfolio	Debt (\$ M)	Debt (%)	Weighted-Ave Years to Maturity	Weighted-Ave Interest Rate
Total Mortgage Debt	\$5,348	96%	5.4	3.32%
Fixed	\$4,122	74%	5.9	3.53%
Floating	\$1,226	22%	3.6	2.60%
Total Subscription Line of Credit (SLOC)	\$195	4%	0.2	1.32%
Fixed	\$0	0%	N/A	N/A
Floating	\$195	4%	0.2	1.32%
Total Debt	\$5,543	100%	5.2	3.25%

Debt Maturity Schedule



Separate Account Portfolio Outstanding Debt by Strategy²

Value-Add : 19%
\$1,050 M
(42.0% LTV)



Total Portfolio:
40.5% LTV

Core : 81%
\$4,493 M
(40.1% LTV)

Maturity Year	Core Portfolio		Value-Add Portfolio		SLOC		Total Portfolio	
	Debt Balance (\$ M)	Weighted-Ave Interest Rate	Debt Balance (\$ M)	Weighted-Ave Interest Rate	Debt Balance (\$ M)	Weighted-Ave Interest Rate	Debt Balance (\$ M)	Weighted-Ave Interest Rate
2021	\$0	N/A	\$89	2.80%	\$137	1.28%	\$226	1.88%
2022	\$184	2.89%	\$125	2.57%	\$57.8	1.41%	\$366	2.55%
2023	\$416	3.74%	\$135	3.42%	\$0	N/A	\$551	3.66%
2024	\$375	3.36%	\$195	3.36%	\$0	N/A	\$570	3.36%
2025	\$300	3.71%	\$71	2.97%	\$0	N/A	\$371	3.57%
2026	\$669	3.43%	\$135	3.19%	\$0	N/A	\$804	3.39%
2027	\$639	3.20%	\$12	4.35%	\$0	N/A	\$651	3.22%
2028	\$257	3.33%	\$0	N/A	\$0	N/A	\$257	3.33%
2029+	\$1,631	3.29%	\$116	3.37%	\$0	N/A	\$1,748	3.38%
Total	\$4,471	3.35%	\$878	3.16%	\$195	1.32%	\$5,543	3.25%

¹ Fixed rate debt includes floating rate debt that has been hedged with an interest rate swap.

² LTV calculations have the Subscription Lines of Credit allocated to the Core and Value-Add Portfolios, about half of which is allocated to the Value-Add portfolio and represents development activity undertaken by GID. For all debt maturity calculations, SLOC debt is shown separately.

² Maturity Year excludes any extension options that may require certain covenants to be met.

As of 9/30/2021

Portfolio Update – Implementation

Strategy Diversification

- Continue building out a well-balanced portfolio to optimize the long-term role of real estate within the OPERF portfolio, via:

Partnership Strategy	Objective
Strategic Partnerships: Investment mandates based upon long-term fundamentals and cycle-tested strategies (i.e., Core/Core plus/Value add)	<ul style="list-style-type: none">• Lower the beta of real estate, relative to a publicly-traded securities portfolio
Value Enhancers: Partnerships and investment strategies capable of reacting quicker to prevailing, and changing, market conditions	<ul style="list-style-type: none">• Alpha creation to achieve real estate portfolio outperformance relative to the portfolio's NFI-ODCE core benchmark (non-core risks: development, redevelopment, lease-up, etc.)

Tailored & Aligned Partnership Structures

Transfer to Core:

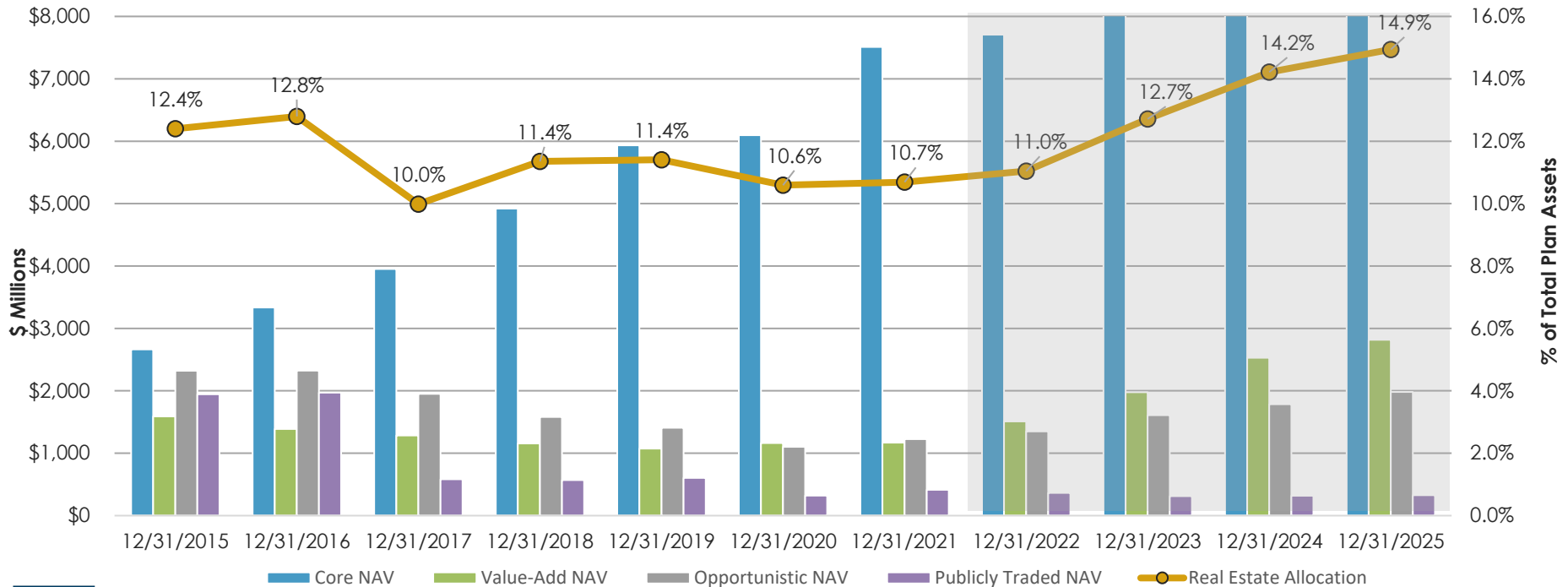
- The integration of the Transfer-to-Core mechanism into the separately managed accounts/programmatic JVs has been largely successful. Namely:
 - Provides staff greater oversight and discretion in controlling the core portfolio holdings by property type and geographic exposure
 - Removing frictional trading costs normally incurred in a typical property transaction from the transfer pricing and limiting carry incentives to outperformance hurdles to only non-core investments, has resulted in 150-200 bps in fee savings to OPERF, while greatly enhancing long-term alignment

2022 Plan – Pacing

Maintaining target real estate exposures will rely on allocation management of strategic partnerships

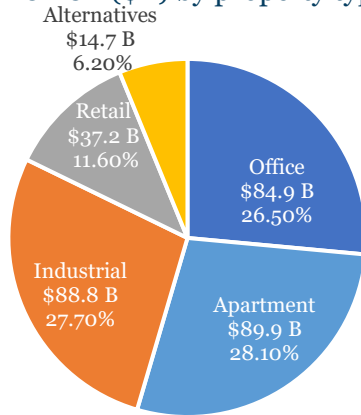
- With ~70% of the portfolio weighted towards separate accounts and open-ended structures, Staff has greater control of capital pacing through scaling successful partnerships. This, in turn, gives Staff improved negotiating leverage to reduce fees as partnership AUM grows
- At 20%-30% of the portfolio, closed-end funds will have a reduced impact on capital pacing considerations and will be limited to select non-core strategies

Historical & Projected NAV (2015-2025)

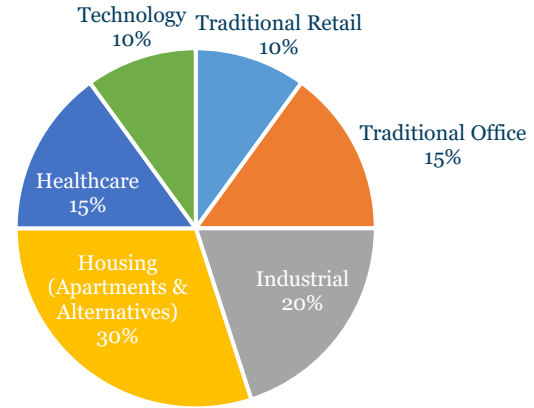


2022 Plan – Property Diversification

Current Real Estate Exposure
(NFI-ODCE (\$B) by property type)



Representative Future Real Estate Portfolio



NCREIF Total Returns by Sector

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
13.7%	17.1%	23.0%	21.2%	19.1%	20.5%	-4.1%	-10.9%	18.2%	15.5%	11.6%	12.9%	13.4%	15.3%	12.3%	13.1%	14.3%	13.4%	11.8%	43.3%
8.8%	8.9%	13.0%	20.3%	17.0%	14.9%	-5.8%	-17.5%	12.6%	14.6%	11.2%	12.3%	13.1%	14.9%	9.0%	6.2%	6.9%	6.6%	1.8%	19.9%
6.7%	8.2%	12.1%	20.0%	14.6%	13.5%	-7.3%	-17.9%	11.7%	13.8%	10.7%	10.4%	11.5%	12.5%	7.3%	6.0%	6.1%	5.5%	1.6%	6.1%
2.8%	5.7%	12.0%	19.5%	13.3%	11.4%	-7.3%	-19.1%	9.4%	13.8%	9.5%	9.9%	10.3%	12.0%	6.2%	5.7%	2.2%	1.9%	-7.5%	4.2%



Asset Type Diversification

- As noted above, the relative performance of the different property types can vary considerably over time, hence the need for diversification of asset types is critical in long-term portfolio construction
- Institutional real estate has been quickly expanding beyond the traditional “four food groups.” Alternative property types will take up a larger portion of an investor’s portfolio over time

2022 Initiatives

2022 OST Real Estate Staff Priorities

- 1. \$1.4-1.7 billion of new commitments**
 - 7-10 commitments of \$150-300 million
- 2. Complete renegotiations of remaining legacy separate accounts for long-term portfolio alignment while broadening reach in market and property types for further portfolio diversification**
- 3. Commence research into core international partnerships**
- 4. Reintegration of staff into post-pandemic office model and prioritization of in-person/market training following extended WFH status resulting**
- 5. Work with consultant on revised policy language recommendation for continued de-risking and improved flexibility of portfolio implementation**
- 6. Continue enhancements to due diligence and monitoring capabilities**

2022 Initiatives

2022 OST Real Estate Staff Priorities

7. Continue enhancing Oregon's brand through current industry participation:

- Board of Directors: Pension Real Estate Association (PREA)
- Board Member: PREA-NCREIF Reporting Standards Board
- Board & Founding Member: Institute for Real Estate Operating Companies (iREOC)
- Editorial Advisory Board Member: Institutional Real Estate Americas
- Board Member/Chair: Portland Alternative Investment Association (PAIA)

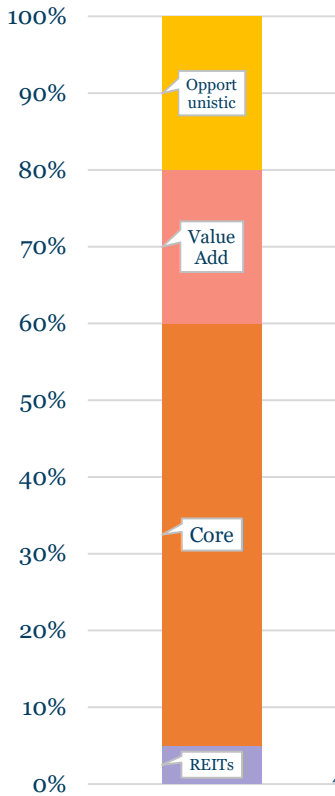
8. Reconstitute training initiatives started in 2019

- 60-hour program, over three phases; leveraging GP platforms, skillsets, and training

9. Continue integrating partnership due diligence for the Common School Fund (CSF) to reach its target allocation to real estate

2022 Plan – Long Term Construction

Policy Allocations



Opportunistic (Closed-Ended Funds)

- Allocation Range: 10-30%
- Objective: Tactical/ODCE + 300 bps
- Optimized portfolio:
 - 8-10 relationships
 - \$200MM min / fund
- **2022 focus: Active**

Value-Add (Closed-Ended Funds)

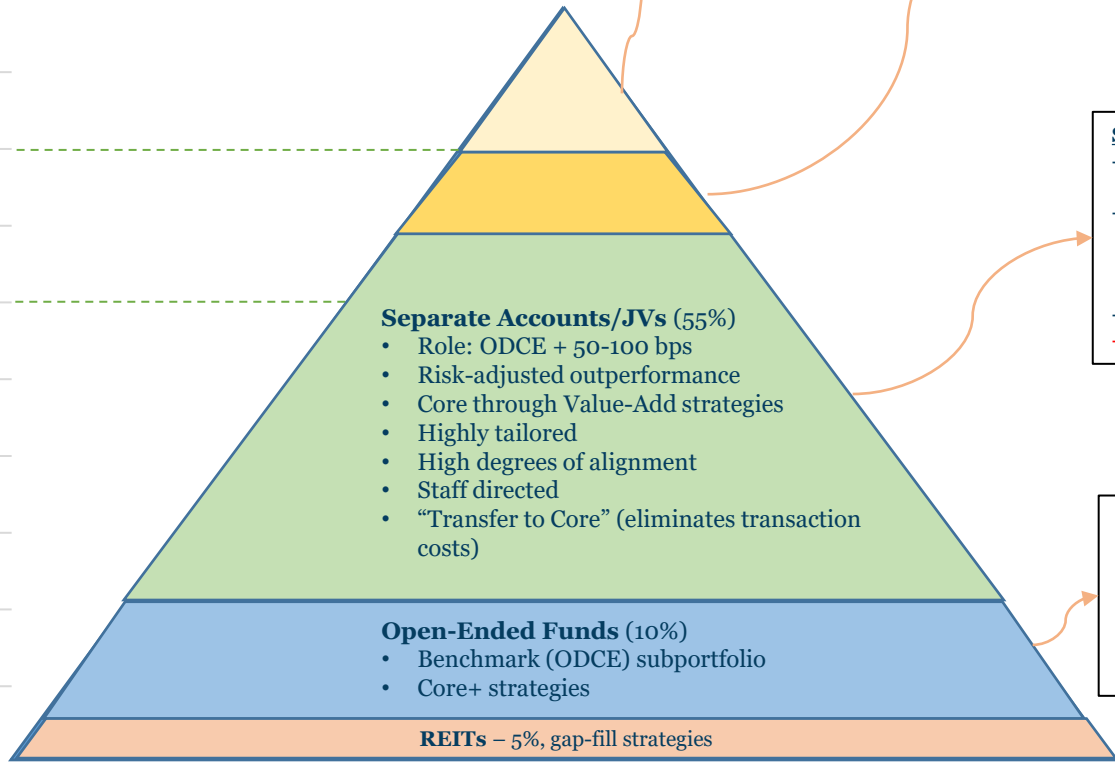
- Allocation Target: 10-30%
- Objective: ODCE + 100 bps
- Optimized portfolio:
 - 4-6 relationships
 - \$200MM min / fund
- **2022 focus: Active**

Separate Accounts

- Objective: ODCE + 50 bps
ODCE + 100 bps (VA)
- Optimized portfolio
 - 4-6 relationships (Core)
 - 2-4 relationships (VA)
- +\$400M / SMA
- **2022 focus: Active**

Open-Ended Portfolio (Core)

- Allocation Target: 10%
- Optimized portfolio
 - 7-9 funds
 - \$200+MM / SMA
- Benchmark: ODCE
- **2022 focus: Monitoring**



Policy Reporting

Responsible Contractor Policy (RCP)

- INV 504 (RCP) was approved by the OIC in January 2020
- Per policy, Staff shall “report on this Policy at a regular meeting of the OIC on an annual basis.”

OPERATIONAL CONTRACTS

	Payments to Responsible Contractors	Payments to Non-Responsible Contractors	Total Qualified Operating Expenditures	Payments as a % of Total Qualified Operating Expenditures
Total	\$ 24,786,312	\$ 126,567	\$ 24,912,879	99.5%

TENANT IMPROVEMENTS & OTHER CAPITAL EXPENDITURES

	Payments to Responsible Contractors	Payments to Non-Responsible Contractors	Total Qualified Operating Expenditures	Payments as a % of Total Qualified Operating Expenditures
Total	\$ 260,071,302	\$ 0	\$ 260,071,302	100%

* Qualified expenditures are services or tenant improvements and other capital expenditures greater than \$100,000. Total qualified expenditures include payments to both responsible contractors and contractors not meeting the responsible contractor definition.

Non-Mandate Activity

- There was no non-mandate activity in 2021

Closing

Key takeaways...

1. Performance has been strong, particularly with the core portfolio, both on an absolute basis and relative to the policy benchmark
2. As non-core, legacy fund exposures continue to liquidate, the portfolio returns for both Value-Add and Opportunistic have improved. Newer commitments to non-core real estate has been primarily through strategic partnerships which have improved capital stack flexibility, long-term investment horizons, and tailored economics for greater alignment
3. Portfolio remains at lower end of target bandwidth due to robust returns in the broader equity markets; current pacing plans project the portfolio remains on a glidepath to the target midpoint
4. With the policy shift, commenced in 2015, to lower the historic real estate volatility now completed, the real estate portfolio should remain cash flow positive to the broader OPERF portfolio
5. The portfolio is well-positioned to continue seeking resilient, income producing real estate while capitalizing on near term opportunities and market opportunities as this phase of the post-pandemic cycle continues



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Oregon State Treasurer

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O I C



OREGON
STATE
TREASURY

TAB 6
OPERF REAL ASSETS PORTFOLIO
ANNUAL REVIEW

March 9, 2022

OPERF Real Assets Portfolio

Annual Review and Forward Plan



OREGON
STATE
TREASURY



Agenda

Section	Pages	OIC Investment and Management Beliefs Mapping																	
		1A	1B	1C	1D	2A	2B	3A	4A	4B	5A	5B	6A	6B	7A	7B	8A	8B	9A
Real Assets Portfolio Overview	2-5				X	X	X		X	X			X	X					
Markets	7-10				X		X												
2021 Review	11-13				X	X	X		X	X			X	X			X		X
Exposures	14-15				X		X		X	X									
Results	16-19				X		X			X									
Pacing Analysis	20				X	X	X		X	X									
2022 Priorities	21				X	X	X		X	X			X	X			X		X
Appendix	23-24				X	X	X		X				X	X			X		X

LEGEND: OIC INVESTMENT AND MANAGEMENT BELIEFS

1 THE OIC SETS POLICY AND IS ULTIMATELY RESPONSIBLE FOR THE INVESTMENT PROGRAM

- A. Investment management is dichotomous -- part art and part science.
- B. The OIC is a policy-setting council that largely delegates investment management activities to the OST and qualified external fiduciaries.
- C. The OIC is vested with the authority to set and monitor portfolio risk. Both short-term and long-term risks are critical.
- X D. To exploit market inefficiencies, the OIC should be long term, contrarian, innovative, and opportunistic in its investment approach.

2 ASSET ALLOCATION DRIVES RISK AND RETURN

- X A. Asset allocation is the OIC's primary policy tool for managing the investment program's long-term risk/return profile.
- X B. Portfolio construction, including diversification and correlation considerations, is essential to maximizing risk-adjusted returns.

3 THE EQUITY RISK PREMIUM WILL BE REWARDED

- A. Over the long-term, equity-oriented investments provide reliable return premiums relative to risk-free investments.

4 PRIVATE MARKET INVESTMENTS CAN ADD SIGNIFICANT VALUE AND REPRESENT A CORE OIC/OST COMPETENCY

- X A. The OIC can capitalize on its status as a true, long-term investor by making meaningful allocations to illiquid, private market investments.
- X B. Dispersion in private market investment returns is wide; accordingly, top-quartile manager selection, diversification across vintage year, strategy type, and geography, and careful attention to costs are paramount.

5 CAPITAL MARKETS HAVE INEFFICIENCIES THAT CAN BE EXPLOITED

- A. Inefficiencies that can be exploited by active management may exist in certain segments of the capital markets.
- B. Passive investment management in public markets will outperform the median active manager in those markets over time.

6 COSTS DIRECTLY IMPACT INVESTMENT RETURNS AND SHOULD BE MONITORED AND MANAGED CAREFULLY

- X A. All fees, expenses, commissions, and transaction costs should be diligently monitored and managed in order to maximize net investment returns.
- X B. External incentive structures should be carefully evaluated to ensure proper alignment with investment program objectives.

7 FAIR AND EFFICIENT CAPITAL MARKETS ARE ESSENTIAL FOR THE LONG-TERM INVESTMENT SUCCESS

- A. The OIC recognizes that the quality of regulation and corporate governance can affect the long-term value of its investments.
- B. The OIC also recognizes that voting rights have economic value.

8 THE INTEGRATION OF ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) FACTORS, SIMILAR TO OTHER INVESTMENT FACTORS, MAY HAVE A BENEFICIAL IMPACT ON THE ECONOMIC OUTCOME OF AN INVESTMENT AND AID IN THE ASSESSMENT OF RISKS ASSOCIATED WITH THAT INVESTMENT

- X A. The consideration of ESG factors within the investment decision-making framework is important in understanding the near-term and long-term impacts of investment decisions.
- B. Over time, there has been an evolution of multi-factor, or more holistic approaches, to identify opportunities and remediate risks, in a large globally-diversified investment portfolio.

9 DIVERSITY, IN ALL ASPECTS, IS ACCRETIVE TO MEETING OIC OBJECTIVES

- X A. By embracing and enhancing diversity and inclusion efforts, the OIC ensures that the investment program will be exposed to and informed by a wide range of perspectives, ideas and opinions.



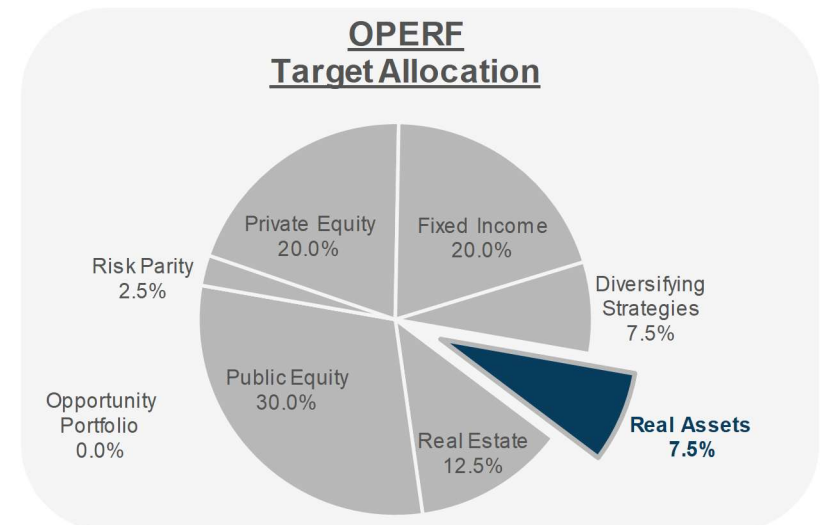
Real Assets Portfolio Strategic Role

➤ Portfolio background

- Alternatives Portfolio approved at January 2011 OIC meeting; seeded July 2011 with three investments from the Opportunity Portfolio.
- Initial 5.0% allocation increased to 7.5% in June 2013.
- Fair market value = \$6.1 billion (6.6% of OPERF) vs. target of \$7.0 billion.

➤ Portfolio objectives

- Participate in attractive long-term investment opportunities.
- Diversify the overall OPERF investment portfolio through differentiated (i.e., less correlated) returns.
- Seek non-real estate *real assets* (i.e., infrastructure and natural resources) exposures.
- Includes inflation hedging objective.
- Performance objective: CPI + 4%.



➤ Performance

IRR	Q321	YTD	1 Year	3 Year	5 Year	10 Year	ITD	ITD 9/20
Real Assets Portfolio	3.3%	12.7%	19.5%	4.4%	5.6%	5.1%	5.0%	1.8%
CPI + 4%	1.9%	8.3%	9.4%	6.8%	6.6%	5.9%	5.9%	5.6%
<i>Difference</i>	1.4%	4.4%	10.1%	-2.4%	-1.0%	-0.8%	-0.9%	-3.8%

Source: Aksia. Data as of September 30, 2021.



Real Assets Portfolio Positioning

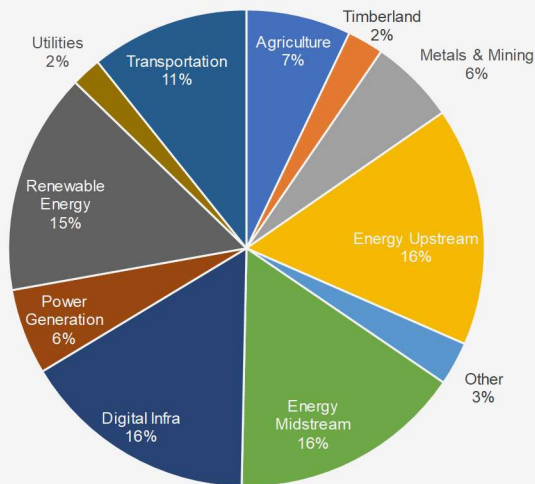
Portfolio Summary

Attribute	9/30/2020	9/30/2021	% Change
GP Relationships	29	32	10.3%
Holdings	55	65	18.2%
Total Commitment Amount	\$9,582.3	\$11,027.3	15.1%
Contributions	\$6,690.6	\$7,829.3	17.0%
Distributions	\$2,330.6	\$2,939.5	26.1%
Net Asset Value	\$4,682.1	\$6,138.1	31.1%
Weighted Average Age	5.0	5.4	7.8%
Unfunded Commitment	\$3,830.7	\$4,285.8	11.9%
Net TVPI	1.0x	1.2x	10.6%
ITD IRR	1.8%	5.0%	181.0%

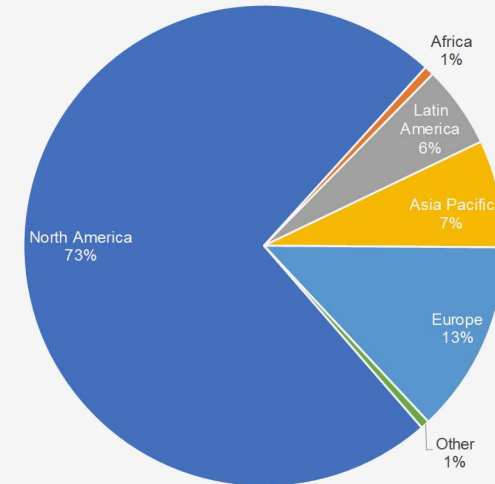
Top 10 Managers

Manager	# of Mandates	\$ of Exposure	% of Exposure
Stonepeak Partners	5	\$1,714.0	16.4%
Brookfield Asset Management	5	\$1,192.9	11.4%
Global Infrastructure Partners	5	\$1,192.1	11.4%
EQT Partners	3	\$1,003.2	9.6%
NGP Energy Capital Management	5	\$791.6	7.6%
LS Power	3	\$482.2	4.6%
Warwick Energy Group	2	\$401.6	3.9%
Silver Creek Capital Management	2	\$343.1	3.3%
Westbourne Capital	1	\$256.1	2.5%
Harrison Street Advisors	1	\$252.8	2.4%

Sector Weights



Geographic Weights



Source: Aksia. Data as of September 30, 2021. \$ in millions. Weighted average age is based on contributions.



Executive Summary

- What a difference a year makes (especially in commodity markets)!
 - Real Assets Portfolio IRR increased 325 bps year-over-year, now equal to 5.0%.
 - Contributors were broad based but led by Natural Resources sector (1-year IRR = 24.6%).
 - Strong performance from 2019-2021 VY Natural Resources funds (IRR = 34.2%).
- Co-investment program proceeding to plan
 - Including side cars under active legal negotiation, 15% of total capital commitments over past two years have been in co-investment vehicles.
 - Robust pipeline, with productive GP dialogue.
- CY 2021 commitment pacing lower than target...
 - ... but CY 2022 expected to be above target, moving rolling average into targeted range.
 - Strong set of existing managers, offering opportunities to expand relationships.
- Portfolio maturation
 - Steadily growing to target allocation.
 - All-time high \$905mn of distributions in 2021 (still net cash flow negative, -\$568mn).
 - Continued evolution of risk profile, steadily increasing exposure to lower risk segments.
 - Portfolio well diversified across sectors, assets, risk profile, etc.



Source: Aksia. Performance as of September 30, 2021.
Definitions: bps = basis points, CY = Calendar Year, VY = Vintage Year.

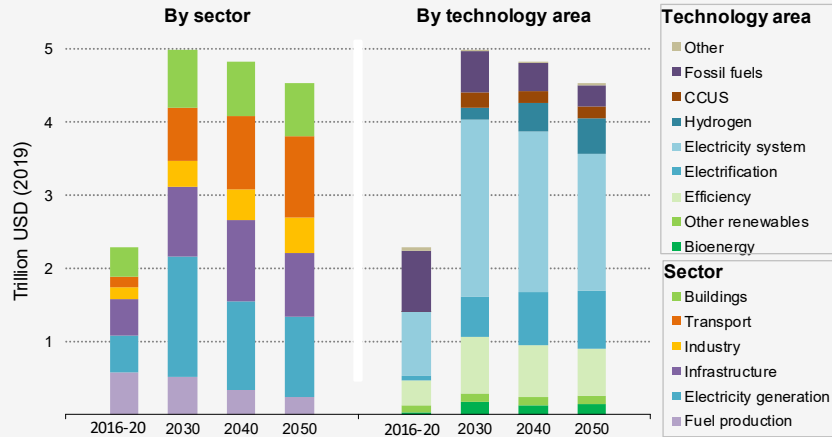
Topics

1. Real Assets Portfolio Overview
- 2. Real Assets Portfolio Update**
 - A. Markets
 - B. 2021 Review
 - C. Exposures
 - D. Results
 - E. Pacing Analysis
 - F. 2022 Priorities
3. Appendix



Markets: Infrastructure

Annual Average Capital Investment in Net Zero Emissions Scenario



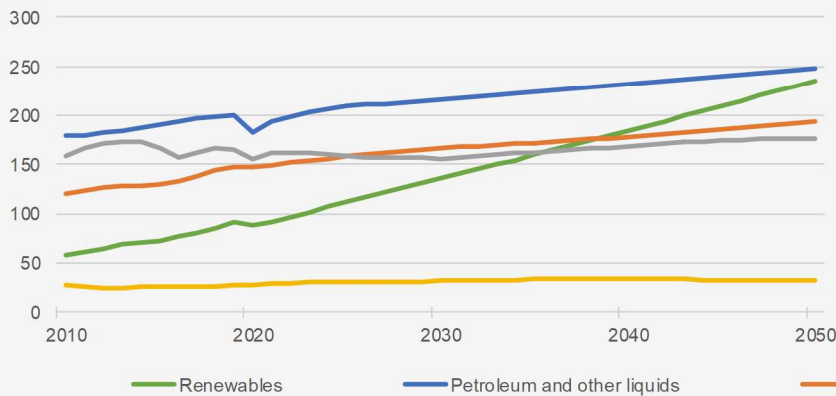
Source: International Energy Agency (2021), Net Zero by 2050, IEA, Paris

Digital Transformation

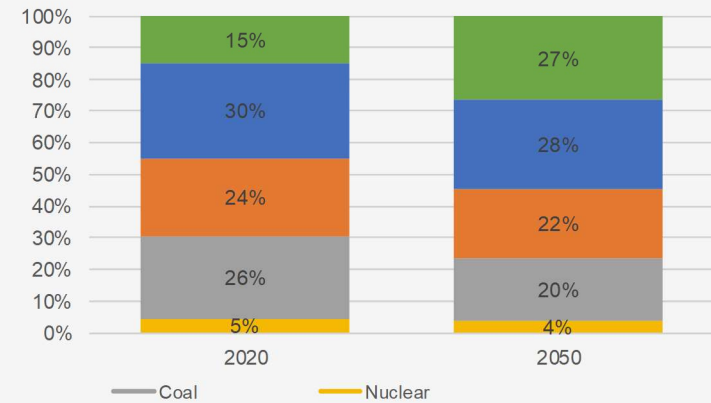
Metric	2018	2023	Growth	CAGR
Global population (bn)	7.6	8.0	1.1x	1%
Global internet users (bn)	3.9	5.3	1.4x	6%
Internet users % of pop.	51%	66%	1.3x	
Global mobile subscribers	5.1	5.7	1.1x	2%
Mobile subscribers % of pop.	67%	71%	1.1x	
Global Mobile Devices (bn)	8.8	13.1	1.5x	8%
Global avg. devices per capita	2.4	3.6	1.5x	8%
Global M2M connections	6.1	14.7	2.4x	19%
Global Wi-Fi hotspots (mn)	169	628	3.7x	30%
Global avg. mobile speed (Mbps)	13.2	43.9	3.3x	27%
Global avg. fixed broadband speed (Mbps)	45.9	110.4	2.4x	19%
Global mobile speed by network type (Mbps)	4G = 32	5G = 575	18.0x	78%
Number of DDoS attacks (mns)	7.9	15.4	1.9x	14%

Source: Cisco Annual Internet Report

Primary Energy Consumption by Source, World (quadrillion BTUs)



Primary Energy Consumption by Source, World (by share)



Source: EIA International Energy Outlook 2021

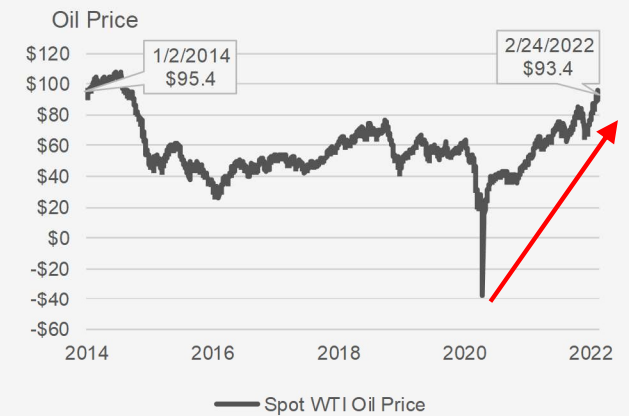
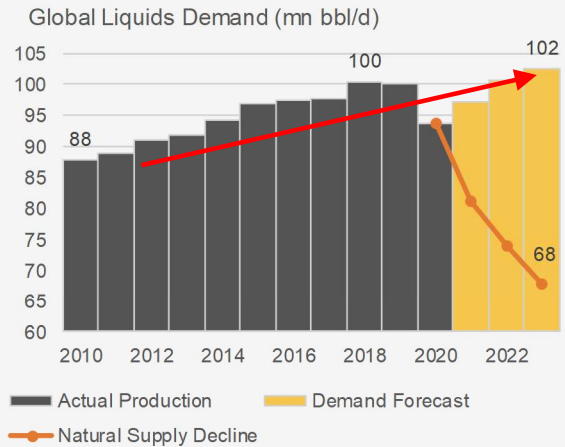
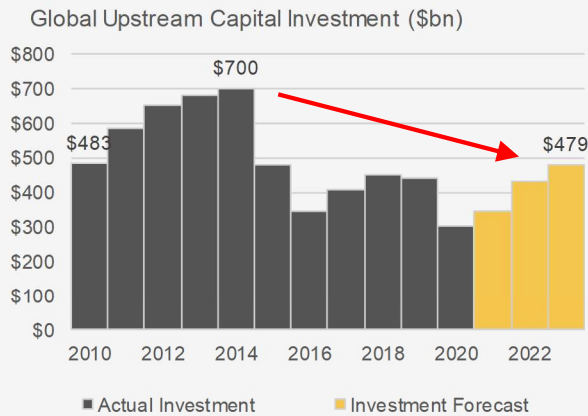
Markets: Natural Resources (1)

Market cycle in action

Investments Fall

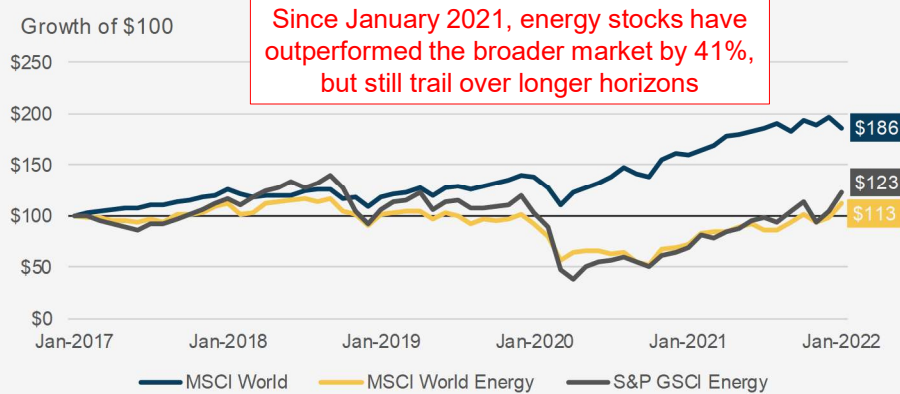
Demand Recovers

Prices Rebound



Source: EIA, IEA, IHS

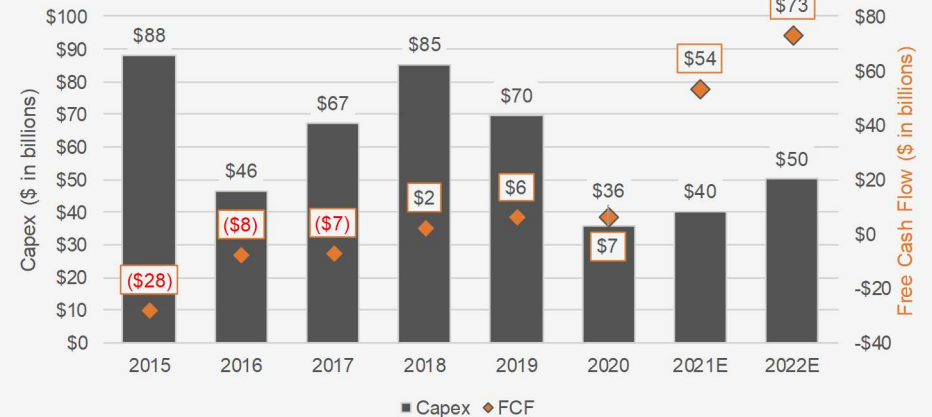
Energy Commodities vs. Equities



Since January 2021, energy stocks have outperformed the broader market by 41%, but still trail over longer horizons

Source: eVestment Alliance. Chart data: February 2017-January 2022.

U.S. Public E&P Independents Capex and Free Cash Flow

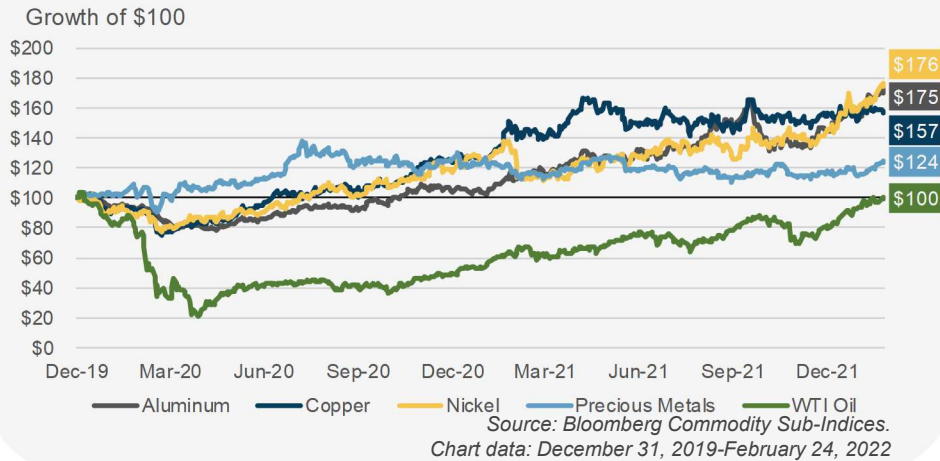


U.S. public E&P independents now supremely focused on free cash flow generation

Source: Bloomberg as of December 31, 2021

Markets: Natural Resources (2)

Commodity Price Performance

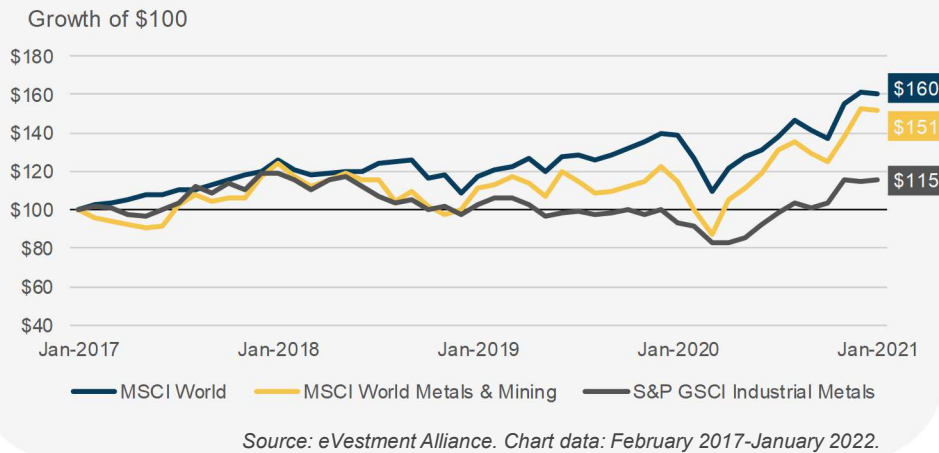


Mapping Commodities with Low-Carbon Technologies

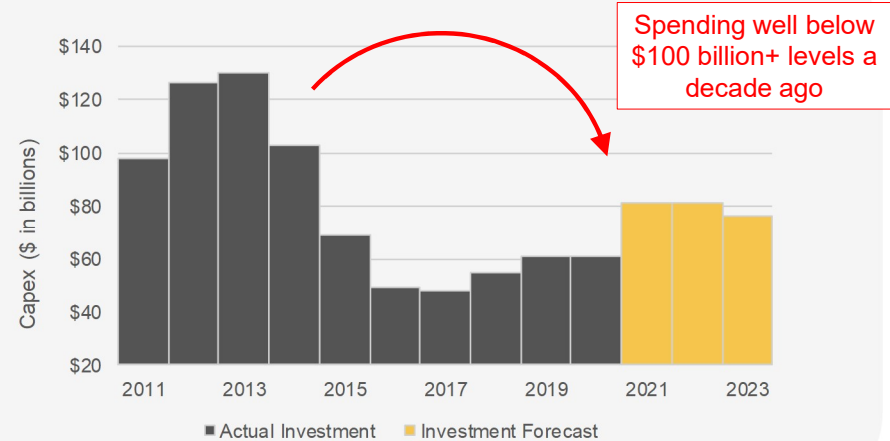
Commodity	Electric Vehicles	Wind	Solar PV	Hydro	Energy Storage	CCS	2040 projected ET-Related Demand ¹	Increase in ET Demand from 2020 to 2040 ¹
Cobalt							79%	18.0x
Copper							48%	6.7x
Lithium							91%	32.2x
Nickel							52%	40.0x

Source: World Bank, Wood Mackenzie.
¹ET = Energy Transition. Under a 2 degrees warming scenario.

Industrial Metal Commodities vs. Equities



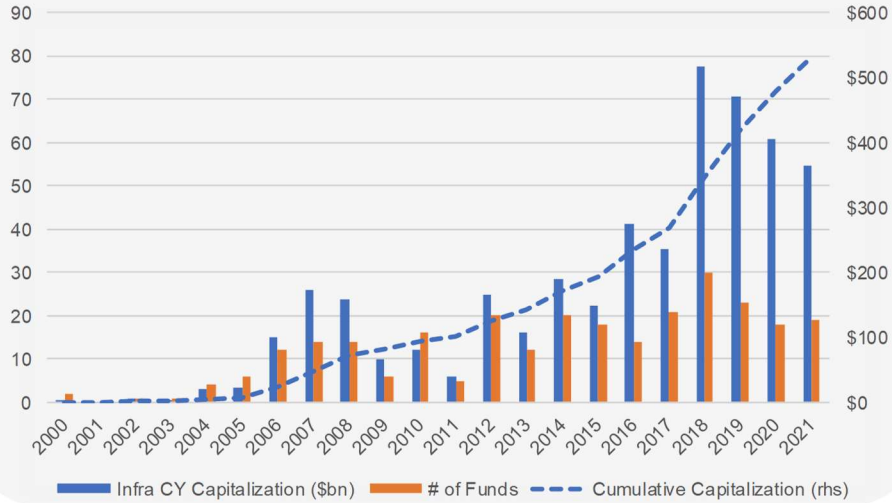
Global Mining Capital Investment



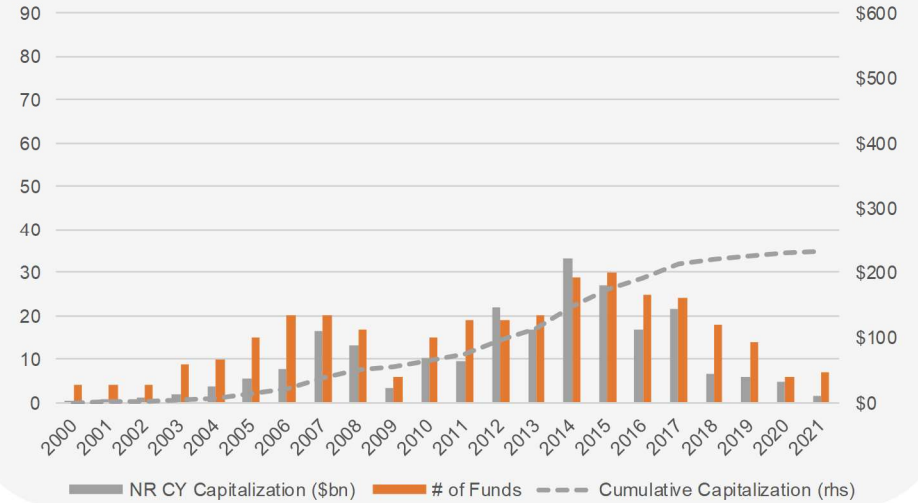
Source: PwC Mine 2021

Markets: Fundraising

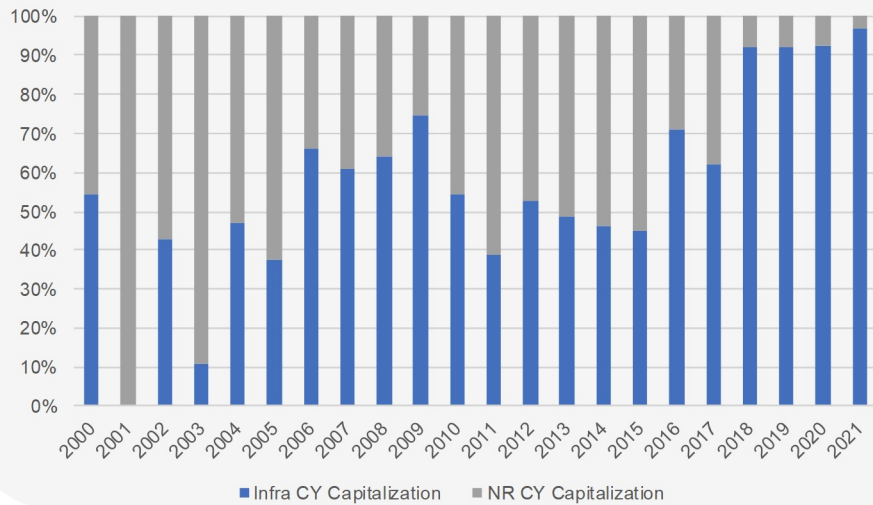
Infrastructure Fundraising, 2000-2021 YTD



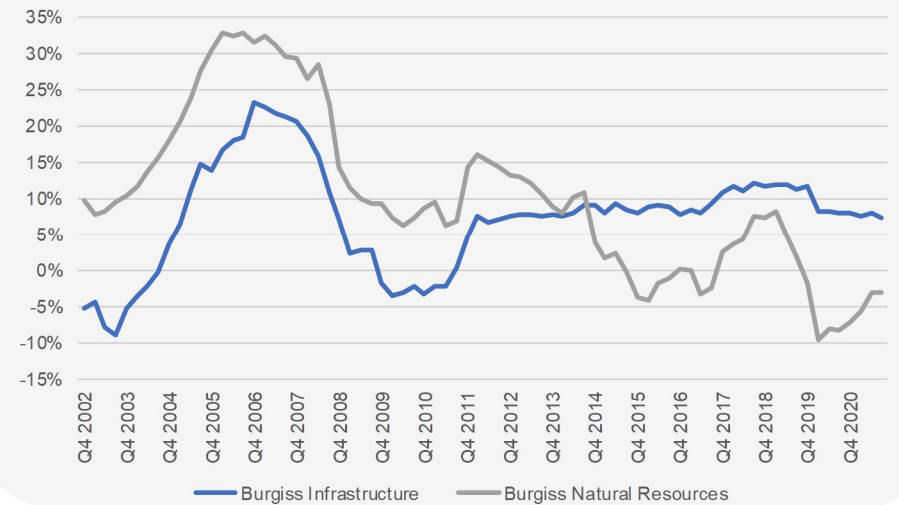
Natural Resources Fundraising, 2000-2021 YTD



Relative Fundraising, 2000-2021 YTD



Rolling 12-quarter Returns, 2000-2021 YTD



Source: Burgiss. Data as of September 30, 2021.



2021 Review: Priorities

- 2021 commitment pacing
 - \$1.5 - \$2.0 billion in aggregate commitments.
 - 5-10 commitments with an average commitment size of \$150-\$250 million.
 - ***Received approval for \$650 million in commitments across 5 investments. While 2021 pacing was below target, expect rolling average to revert to targeted range.***
- Co-investment
 - Continue to execute on envisioned structure.
 - ***Received approval for 3 co-investment side-car commitments in 2021; discussions with other relationships progressing well.***
- Consultant contract
 - Initial three-year term of Aksia/TorreyCove agreement ends on December 31, 2021. Targeting Q3/Q4 recommendation.
 - ***Completed. Two-year extension approved at October 2021 OIC meeting.***
- Monitoring and risk management
 - Continue to pursue enhancements to monitoring and risk management efforts.
 - Assist in formalization of ESG integration across the broader Alternatives Program.
 - ***Made significant progress across monitoring, risk management, and ESG efforts; continue to refine and integrate.***
- Conduct research reviews of areas of interest
 - Energy transition.
 - “Middle market” infrastructure.
 - Aviation finance.
 - ***All three completed.***



2021 Review: Approvals

➤ Portfolio build-out continues on track

- During 2021, OIC/OST authorized \$650 million in commitments across 5 investments.
 - 2 of the commitments were new relationships; 3 were expansions of existing relationships.
 - Pacing was below plan (\$1.5-2.0 billion per annum range).
- Continued progress towards lower fees through tailored partnership structures, seed capital negotiations, early close discounts, and co-investment. Of note, \$150 million (or 23%) of commitments were made to dedicated co-investment side car vehicles.
- Continued refinement to strategy and development of anchor positions complemented by specialist/next generation relationships. No shortage of deal flow! Steady stream of new managers, strategies, and structures.

Investment	Strategy	Authorized Date	Commitment Amount
NGP Royalty Partners co-invest side car	Natural Resources	June 2021	\$50.0
Cube Infrastructure Fund III*	Infrastructure	June 2021	\$250.0
Stonepeak Global Renewables Fund, L.P.	Infrastructure	June 2021	\$150.0
Sprott Private Resource Streaming and Royalty*	Natural Resources	August 2021	\$150.0
GIP Aquarius Fund SCSP	Infrastructure	September 2021	\$50.0
2021 Total			\$650.0



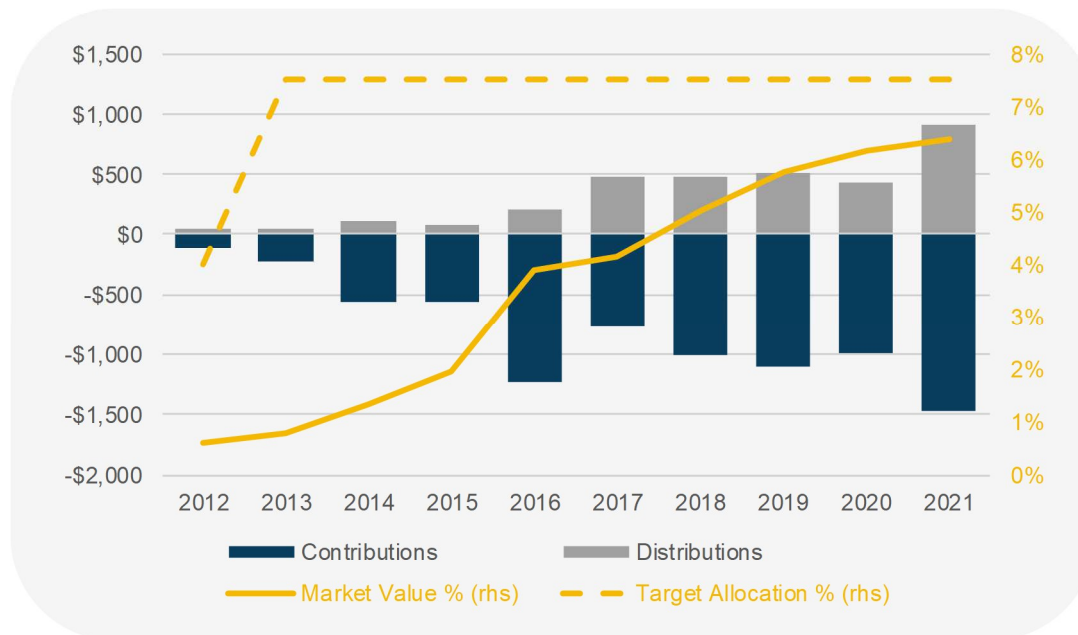
Source: OST Staff. Data as of December 31, 2021. \$ in millions.

*Includes initial \$50 million co-investment side car commitment.

2021 Review: Cash Flow Activity

➤ Cash flow activity consistent with expectations

- As anticipated, Portfolio cash outflows have exceeded cash inflows by a meaningful amount with pace of contributions increasing as capital commitments are made. The weighted-average age of contributions has increased gradually through time and is now equal to approximately 5 years (representing the early stage of the Portfolio).
- As of December 31, 2021, OPERF has funded \$7.2 billion of commitments, funding approximately 65% of total capital commitments. Approximately \$3.9 billion of capital commitments remain unfunded. Since inception, a total of \$3.3 billion has been distributed to OPERF.

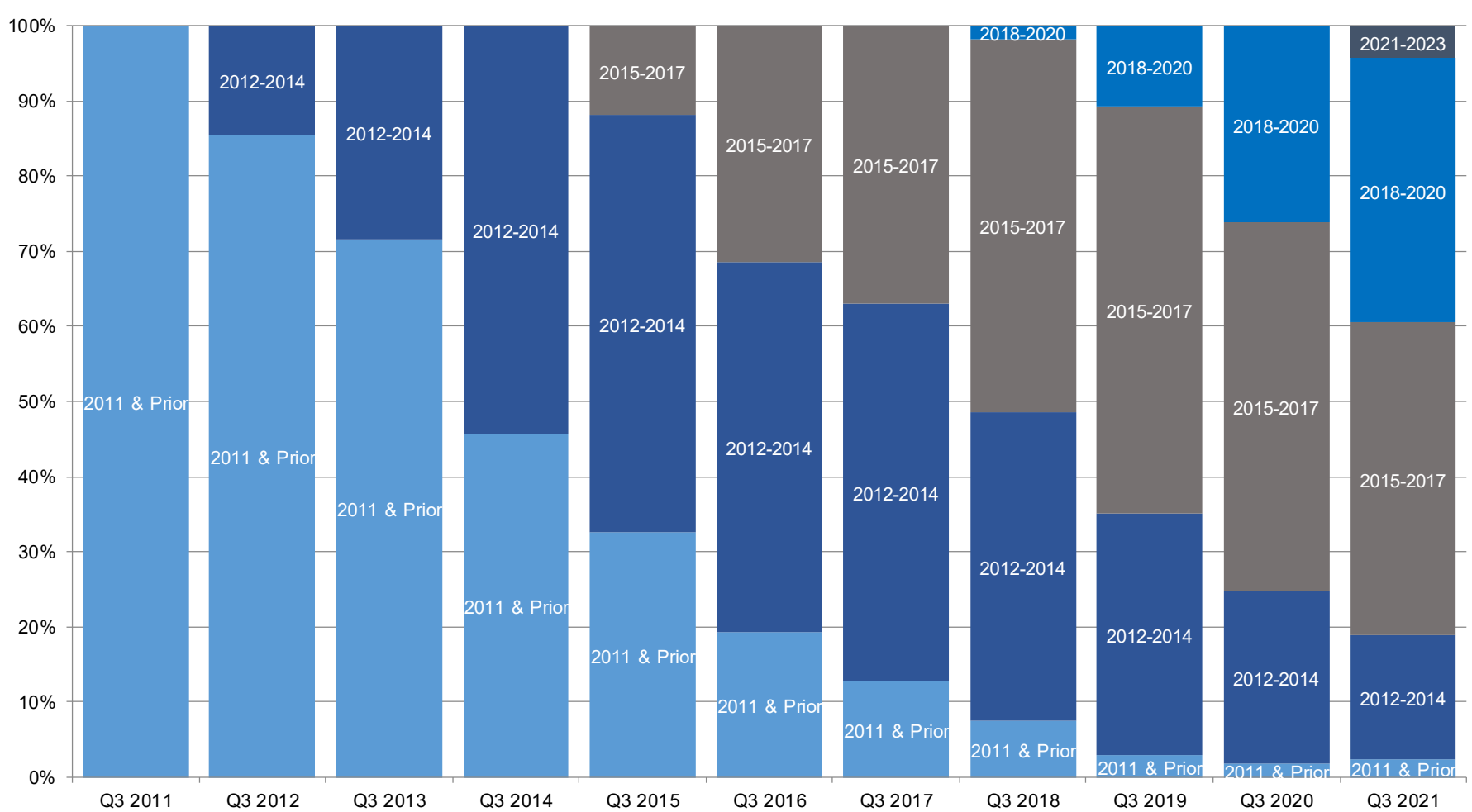


Source: Aksia. Data as of December 31, 2021. \$ in millions.

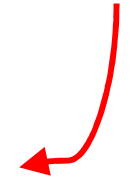


Exposures: Vintage Years

➤ Vintage year cohort exposure by market value



40% of FMV 2018 or later...



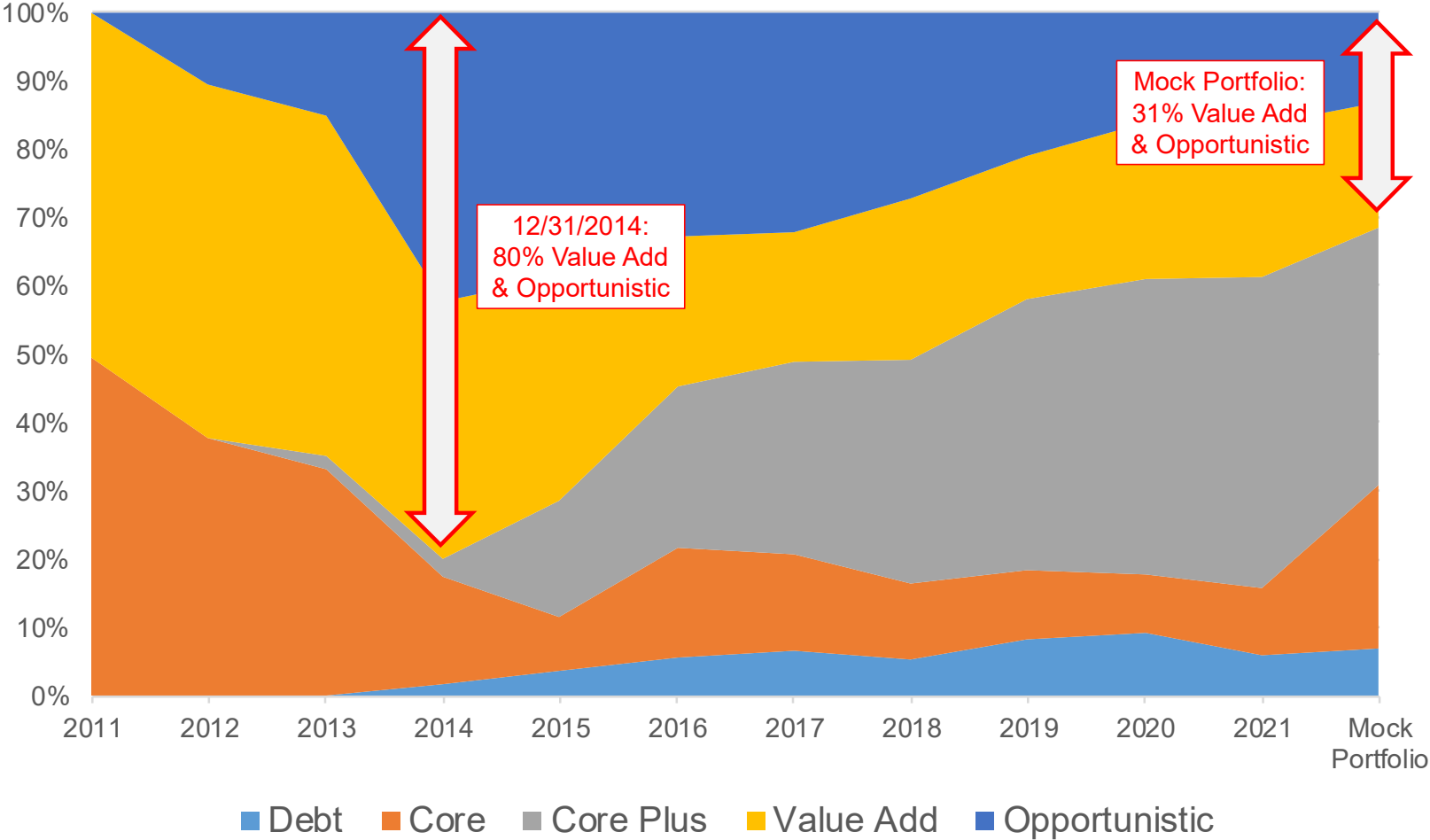
... compares to 31% for Burgiss universe and 28% for PE portfolio

Source: Aksia. Data as of September 30, 2021.



Exposures: Risk Metrics

➤ Risk categories by market value over time



Source: OST Staff, Aksia. Data as of September 30, 2021.



Results: Commentary

➤ Absolute return contributors since inception

▪ **Positive**

- Infrastructure: +10.2% (61% of RAP).
- Metals & Mining: +7.6% (8% of RAP).

▪ **Negative**

- Natural Resources: -0.4% (39% of RAP).
- Energy: -0.6% (21% of RAP).
- J-curve impacts (Portfolio weighted-average age of 5.4 years).

➤ Relative return contributors vs. Burgiss Real Assets (ex-Real Estate) Universe

While not an official RAP benchmark, the Burgiss Manager Universe dataset provides a point of comparison relative to the broader (and investable) market.

▪ **Positive**

- Manager selection in recent vintage years.
- Infrastructure outperformance.
- “Other” Natural Resources (e.g., Metals & Mining) outperformance.

▪ **Negative**

- Approx. equal impacts
- Manager selection in early vintage years.
 - Overweight to Natural Resources.



Source: OST Staff, Aksia. Data as of September 30, 2021. Weightings expressed as a percentage of contributions.

Results: Portfolio Returns at 9/30/21

IRR	Q321	YTD	1 Year	3 Year	5 Year	10 Year	ITD	ITD 9/20
Real Assets Portfolio	3.3%	12.7%	19.5%	4.4%	5.6%	5.1%	5.0%	1.8%
CPI + 4%	1.9%	8.3%	9.4%	6.8%	6.6%	5.9%	5.9%	5.6%
<i>Difference</i>	<i>1.4%</i>	<i>4.4%</i>	<i>10.1%</i>	<i>-2.4%</i>	<i>-1.0%</i>	<i>-0.8%</i>	<i>-0.9%</i>	<i>-3.8%</i>
Burgiss Real Assets (ex-RE)	1.5%	9.7%	16.5%	3.7%	6.6%	6.3%	6.1%	4.5%
<i>Difference</i>	<i>1.8%</i>	<i>3.0%</i>	<i>3.0%</i>	<i>0.7%</i>	<i>-1.0%</i>	<i>-1.2%</i>	<i>-1.1%</i>	<i>-2.7%</i>

What a difference a year makes!

IRR	Q321	YTD	1 Year	3 Year	5 Year	10 Year	ITD	ITD 9/20
Infrastructure	1.8%	8.9%	16.9%	10.6%	10.1%	10.2%	10.2%	8.4%
CPI + 4%	1.9%	8.3%	9.4%	6.8%	6.6%	5.9%	5.9%	5.6%
<i>Difference</i>	<i>-0.2%</i>	<i>0.6%</i>	<i>7.5%</i>	<i>3.8%</i>	<i>3.5%</i>	<i>4.3%</i>	<i>4.3%</i>	<i>2.9%</i>
Burgiss Infrastructure	1.1%	5.6%	11.5%	7.7%	9.4%	9.4%	9.2%	8.8%
<i>Difference</i>	<i>0.7%</i>	<i>3.3%</i>	<i>5.4%</i>	<i>3.0%</i>	<i>0.6%</i>	<i>0.8%</i>	<i>1.0%</i>	<i>-0.4%</i>
S&P Global Infrastructure	1.5%	7.0%	23.0%	6.7%	6.0%	7.9%	6.2%	4.5%
<i>Difference</i>	<i>0.3%</i>	<i>1.9%</i>	<i>-6.1%</i>	<i>3.9%</i>	<i>4.1%</i>	<i>2.4%</i>	<i>4.0%</i>	<i>3.9%</i>

IRR	Q321	YTD	1 Year	3 Year	5 Year	10 Year	ITD	ITD 9/20
Natural Resources	6.5%	20.9%	24.6%	-3.8%	0.2%	-0.3%	-0.4%	-5.0%
CPI + 4%	1.9%	8.3%	9.4%	6.8%	6.6%	5.9%	5.9%	5.6%
<i>Difference</i>	<i>4.6%</i>	<i>12.6%</i>	<i>15.2%</i>	<i>-10.6%</i>	<i>-6.4%</i>	<i>-6.3%</i>	<i>-6.3%</i>	<i>-10.5%</i>
Burgiss Natural Resources	2.4%	19.4%	28.1%	-2.7%	2.2%	1.8%	1.7%	-2.2%
<i>Difference</i>	<i>4.1%</i>	<i>1.5%</i>	<i>-3.4%</i>	<i>-1.1%</i>	<i>-2.0%</i>	<i>-2.1%</i>	<i>-2.1%</i>	<i>-2.8%</i>
S&P Global Natural Resources	-2.9%	16.1%	41.3%	3.9%	8.8%	4.0%	1.3%	-2.3%
<i>Difference</i>	<i>9.4%</i>	<i>4.8%</i>	<i>-16.7%</i>	<i>-7.7%</i>	<i>-8.6%</i>	<i>-4.3%</i>	<i>-1.7%</i>	<i>-2.7%</i>
S&P GSCI	5.2%	38.3%	58.3%	-1.5%	3.6%	-4.8%	-5.9%	-11.0%
<i>Difference</i>	<i>1.3%</i>	<i>-17.4%</i>	<i>-33.7%</i>	<i>-2.3%</i>	<i>-3.4%</i>	<i>4.5%</i>	<i>5.4%</i>	<i>6.0%</i>

Source: Aksia, Burgiss, eVestment. Portfolio inception July 1, 2011.



Results: VY Cohort Returns at 9/30/21

IRR	# of Obs	Q321	YTD	1 Year	3 Year	5 Year	ITD	ITD 9/20
RAP All Vintages	62	3.3%	12.7%	19.5%	4.4%	5.6%	5.0%	1.8%
RAP 2007-2014	22	5.0%	10.6%	12.2%	-7.1%	-1.6%	-0.5%	-2.0%
RAP 2015-2021	40	2.9%	13.3%	21.7%	10.3%	10.5%	10.7%	6.6%
Burgiss Real Assets (ex-RE) 2007-2014	253	1.3%	11.1%	16.5%	-0.2%	4.7%	4.9%	4.0%
<i>Difference vs 2007-2014</i>		3.8%	-0.5%	-4.3%	-6.9%	-6.3%	-5.4%	-6.0%
Burgiss Real Assets (ex-RE) 2015-2021	280	1.6%	9.1%	16.4%	6.9%	8.9%	9.1%	6.0%
<i>Difference vs 2015-2021</i>		1.3%	4.3%	5.3%	3.3%	1.6%	1.6%	0.6%

IRR	# of Obs	Q321	YTD	1 Year	3 Year	5 Year	ITD	ITD 9/20
Infrastructure All Vintages	32	1.8%	8.9%	16.9%	10.6%	10.1%	10.2%	8.4%
Infrastructure 2007-2014	10	1.0%	1.5%	3.7%	3.0%	5.0%	6.9%	7.2%
Infrastructure 2015-2021	22	1.9%	10.6%	20.4%	13.3%	12.8%	13.2%	9.9%
Burgiss Infrastructure 2007-2014	105	0.4%	5.6%	10.1%	5.6%	9.0%	8.8%	8.7%
<i>Difference vs 2007-2014</i>		0.6%	-4.1%	-6.5%	-2.6%	-4.0%	-1.9%	-1.4%
Burgiss Infrastructure 2015-2021	150	1.3%	5.6%	12.0%	8.9%	9.9%	10.1%	9.1%
<i>Difference vs 2015-2021</i>		0.7%	5.1%	8.4%	4.4%	2.9%	3.1%	0.8%

IRR	# of Obs	Q321	YTD	1 Year	3 Year	5 Year	ITD	ITD 9/20
Natural Resources All Vintages	30	6.5%	20.9%	24.6%	-3.8%	0.2%	-0.4%	-5.0%
Natural Resources 2007-2014	12	10.4%	23.8%	24.7%	-15.3%	-7.6%	-6.6%	-10.4%
Natural Resources 2015-2021	18	5.2%	19.8%	24.7%	4.9%	7.0%	7.2%	2.4%
Burgiss Natural Resources 2007-2014	148	2.2%	17.7%	24.6%	-6.1%	-0.3%	0.1%	-2.5%
<i>Difference vs 2007-2014</i>		8.2%	6.1%	0.1%	-9.2%	-7.3%	-6.6%	-7.9%
Burgiss Natural Resources 2015-2021	130	2.7%	21.2%	31.8%	2.2%	6.8%	6.9%	-1.2%
<i>Difference vs 2015-2021</i>		2.5%	-1.5%	-7.2%	2.7%	0.3%	0.4%	3.5%

Source: Aksia, Burgiss, eVestment. Portfolio inception July 1, 2011.



Results: Vintage Year Quartiles at 9/30/21

OPERF RAP					Burgiss Real Assets ex. Real Estate						
Vintage Year	IRR	TVPI	Commit. (\$mn)	# of Obs	Top Quartile		Median		Bottom Quartile		# of Obs
					IRR	TVPI	IRR	TVPI	IRR	TVPI	
2007	-100.0%	0.42x	\$10.5	1	7.4%	1.44x	2.8%	1.16x	-0.4%	0.94x	32
2008	2.3%	1.11x	\$129.6	1	11.0%	1.71x	4.8%	1.39x	-2.0%	0.91x	29
2009			\$0.0	0	9.1%	1.41x	6.1%	1.29x	-1.2%	0.94x	12
2010	-16.3%	0.48x	\$221.2	2	4.3%	1.35x	1.3%	1.05x	-4.3%	0.68x	30
2011	16.5%	1.87x	\$50.0	1	6.6%	1.36x	2.0%	1.16x	-11.1%	0.55x	25
2012	7.7%	1.32x	\$537.5	6	12.8%	1.57x	4.1%	1.16x	-1.7%	0.91x	38
2013	1.1%	1.05x	\$455.0	4	9.1%	1.56x	3.2%	1.17x	-1.7%	0.88x	32
2014	-3.1%	0.89x	\$1,150.0	7	10.6%	1.48x	7.8%	1.27x	1.5%	1.05x	51
2015	7.9%	1.37x	\$601.8	5	11.1%	1.41x	7.9%	1.27x	1.7%	1.09x	50
2016	8.9%	1.28x	\$1,675.0	7	12.6%	1.41x	8.3%	1.21x	-0.8%	0.99x	38
2017	11.1%	1.28x	\$659.4	4	16.7%	1.43x	8.4%	1.24x	4.3%	1.11x	48
2018	20.6%	1.34x	\$1,553.0	6	17.7%	1.36x	8.7%	1.14x	3.1%	1.05x	45
2019	11.7%	1.13x	\$1,641.1	10	21.4%	1.25x	8.6%	1.10x	-2.6%	0.97x	42
2020	56.5%	1.19x	\$1,393.1	6	22.4%	1.14x	3.6%	1.02x	-5.2%	0.95x	34
2021	18.0%	1.01x	\$950.0	8	1.3%	1.01x	-7.3%	0.93x	-15.1%	0.89x	17

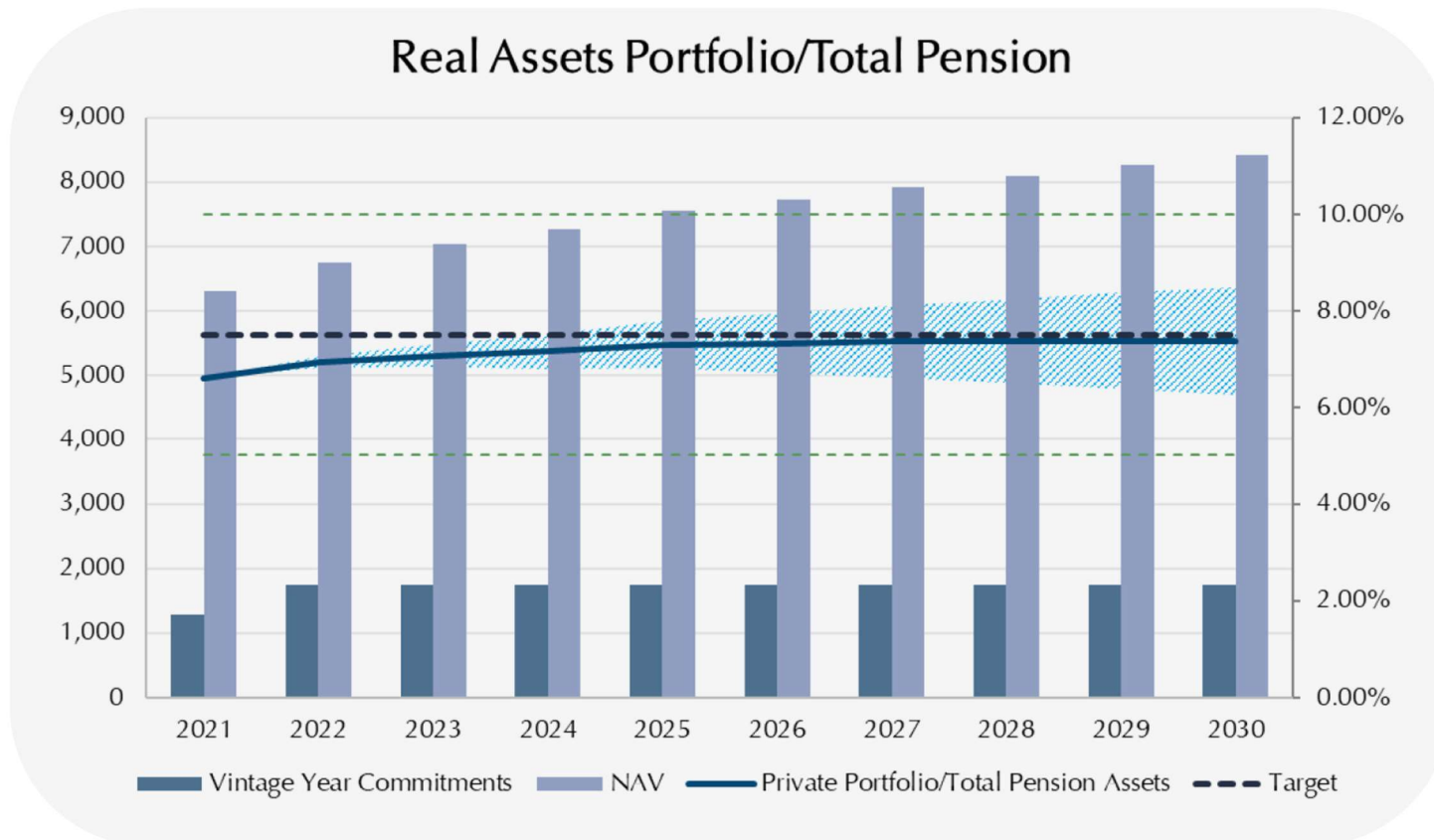
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Source: Aksia, Burgiss. Data as of September 30, 2021.



Pacing Analysis

- Pacing target remains unchanged from prior years
 - Targeting \$1.75 billion in annual commitments.
 - Assuming base case pension annual growth rate of 2%, expect to hit target allocation as early as 2024.



Source: Aksia. Data as September 30, 2021. \$ in millions.



2022 Priorities

1. 2022 commitment pacing

- After falling below target in 2021, expect to exceed target pacing in 2022.
 - Will move rolling average in-line with \$1.75 billion annual pacing target.
- ~10 commitments with an average commitment size of ~\$250 million.

2. Co-investment

- Continue to execute on envisioned structure.

3. Monitoring and risk management

- Continue to pursue enhancements to monitoring and risk management efforts.
- Further formalize ESG and D&I integration across the broader Alternatives Program.

4. Conduct research reviews of areas of interest

- Energy transition.
- “Core” infrastructure.
- Digital infrastructure.



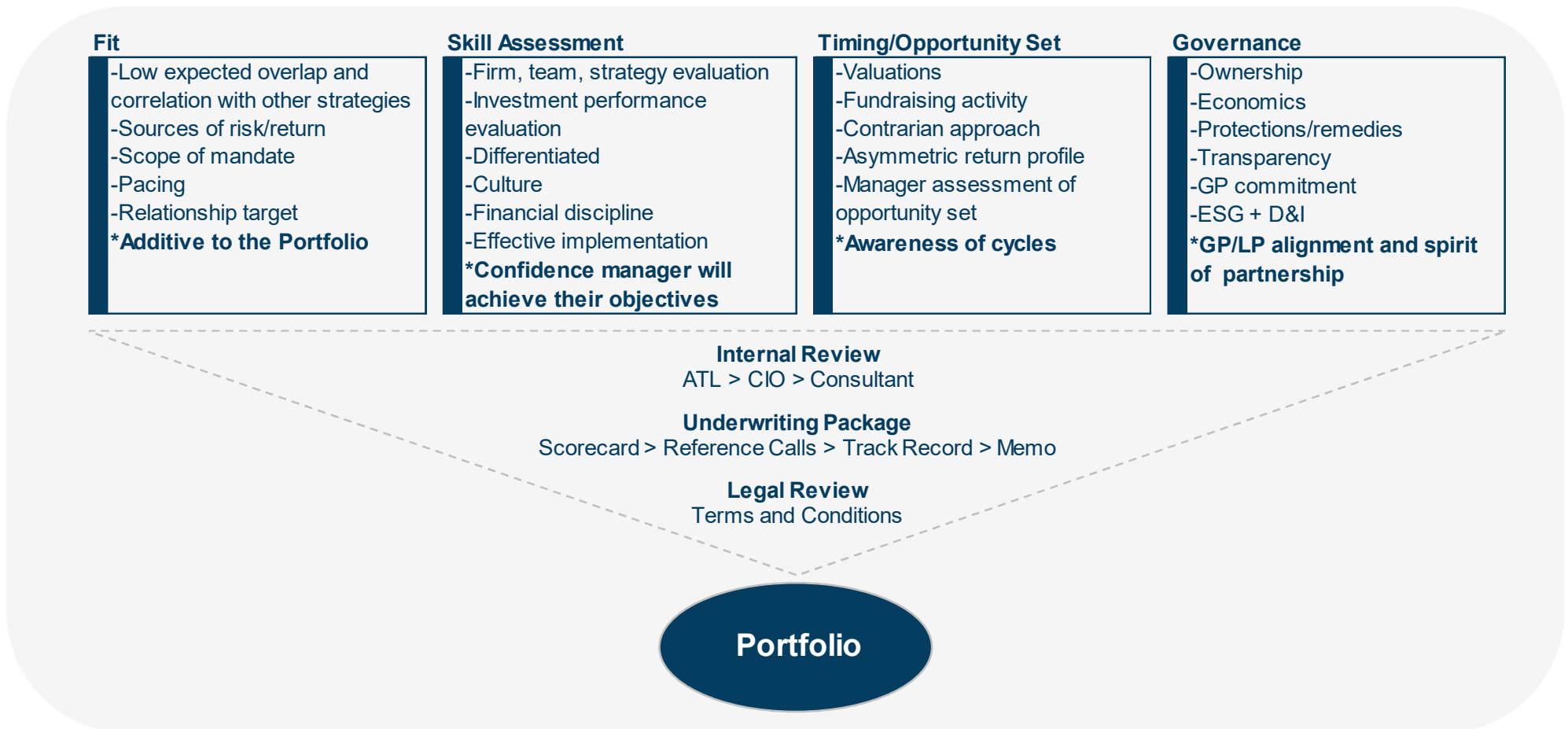
Topics

1. Real Assets Portfolio Overview
2. Real Assets Portfolio Update
- 3. Appendix**

Appendix: Investment Process

➤ Evaluation framework

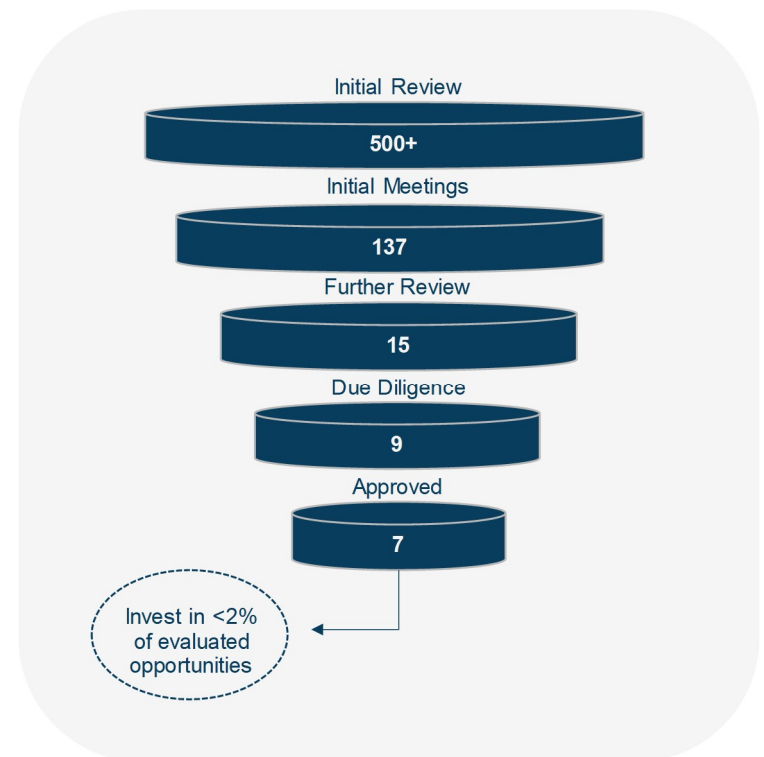
- Very high-level summary of Alternatives Portfolio investment evaluation framework below
- In practice, many more variables, non-linear, and with numerous feedback channels



Appendix: Investment Process, cont.

➤ 2021 Alternatives Portfolio meeting activity

- Began formally tracking meeting count in 2016.
- Scale, brand, and open door policy leveraged to foster deal flow.
 - E.g., among U.S. defined benefit plans, OPERF ranks (by assets) in the top 5 in infrastructure, the top 10 in energy and commodities, and the top 20 in hedge funds*.
- Over 4,400 notes and other correspondence deposited in research management system.
- After screening approximately 500 opportunities, held initial meetings (in-person or telephonic) with 137 distinct prospective managers/investments.
- “Deep dives” on 15 opportunities.
- Ultimately sought approval for 7 investments.



Source: P&I. Market values as of September 30, 2021.





OREGON STATE TREASURY

Tobias Read
Oregon State Treasurer

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TAB 7

ASSET ALLOCATIONS & NAV UPDATES

Asset Allocations at January 31, 2022

OPERF	Regular Account						
	Policy	Target ¹	\$ Thousands	Pre-Overlay	Overlay	Net Position	Actual
Public Equity	25.0-35.0%	30.0%	26,024,157	27.4%	(974,138)	25,050,019	26.4%
Private Equity	15.0-27.5%	20.0%	24,963,748	26.3%		24,963,748	26.3%
Total Equity	45.0-55.0%	50.0%	50,987,904	53.7%	(974,138)	50,013,766	52.6%
Opportunity Portfolio	0-5%	0.0%	2,378,481	2.5%		2,378,481	2.5%
Fixed Income	15-25%	20.0%	16,179,685	17.0%	3,631,159	19,810,844	20.8%
Risk Parity	0.0-3.5%	2.5%	2,225,836	2.3%		2,225,836	2.3%
Real Estate	7.5-17.5%	12.5%	11,012,472	11.6%	(2,000)	11,010,472	11.6%
Real Assets	2.5-10.0%	7.5%	6,205,867	6.5%		6,205,867	6.5%
Diversifying Strategies	2.5-10.0%	7.5%	3,392,649	3.6%		3,392,649	3.6%
Cash ²	0-3%	0.0%	2,647,383	2.8%	(2,655,021)	(7,638)	0.0%
TOTAL OPERF		100%	\$ 95,030,277	100.0%	\$ -	\$ 95,030,277	100.0%

Target Date Funds		Variable Fund	Total Fund
\$ Thousands		\$ Thousands	\$ Thousands
		396,185	26,682,528
			24,963,748
			51,646,276
			2,378,481
			21,929,695
			2,225,836
			11,010,472
			6,205,867
			3,392,649
		6,941	(697)
\$		\$ 403,126	\$ 98,788,579

¹Targets established in October 2021. Interim policy benchmark effective October 1, 2021, consists of: 30% MSCI ACWI IMI Net, 20% Bloomberg U.S. Aggregate, 20% Russell 3000+300bps (1 quarter lagged), 12.5% NCREIF ODCE net (1 quarter lagged), 7.5% CPI+400bps, 7.5% HFRI FOF Conservative & 2.5% S&P Risk Parity - 12% Target Volatility.
²Includes cash held in the policy implementation overlay program.

SAIF	Policy	Target	\$ Thousands	Actual
Total Equity	7-13%	10.0%	496,309	10.1%
Fixed Income	80-90%	85.0%	4,117,454	83.8%
Real Estate	0-7%	5.0%	267,144	5.4%
Cash	0-3%	0.0%	34,146	0.7%
TOTAL SAIF			\$ 4,915,053	100.0%

CSF	Policy	Target	\$ Thousands	Actual
Global Equities	40-50%	45.0%	1,111,711	51.3%
Private Equity	8-12%	10.0%	222,470	10.3%
Total Equity	58-62%	55.0%	1,334,181	61.5%
Fixed Income	20-30%	25.0%	511,150	23.6%
Real Estate	0-12%	10.0%	189,045	8.7%
Alternative Investments	0-12%	10.0%	116,715	5.4%
Cash	0-3%	0.0%	17,673	0.8%
TOTAL CSF			\$ 2,168,762	100.0%

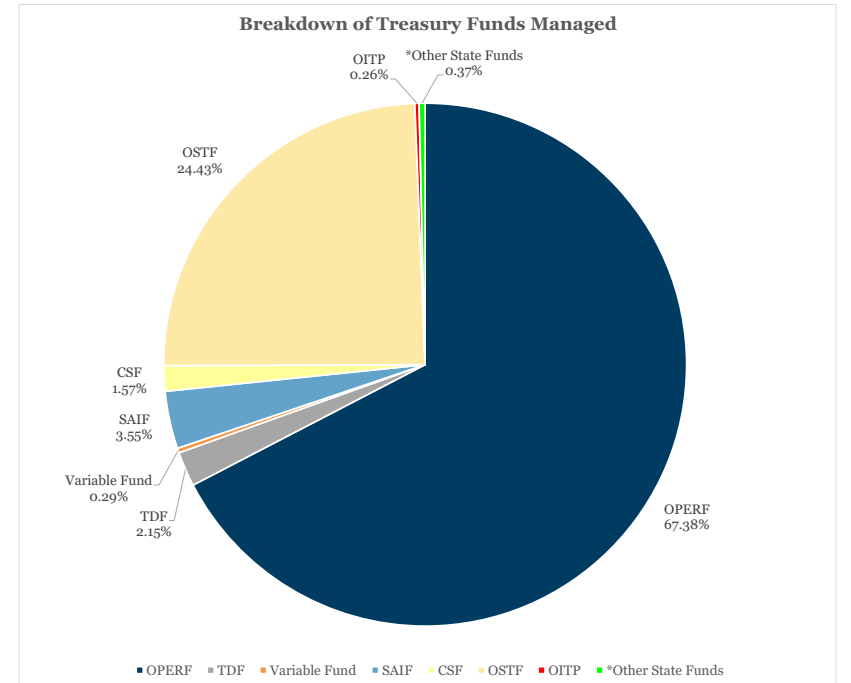
SOUE	Policy	Target	\$ Thousands	Actual
Global Equities	0-65%	N/A	2,294	75.2%
Fixed Income	35-100%	N/A	755	24.7%
Cash	0-3%	N/A	2	0.1%
TOTAL SOUE			\$ 3,051	100.0%

WOUE	Policy	Target	\$ Thousands	Actual
Global Equities	30-65%	55.0%	1,173	55.4%
Fixed Income	35-60%	40.0%	837	39.5%
Cash	0-25%	5.0%	108	5.1%
TOTAL WOUE			\$ 2,119	100.0%

OSTF, OITP & Other State Funds*	\$ Thousands	Actual
OSTF	33,549,981	94.0%
OITP	366,528	1.0%
DAS Insurance Fund	129,084	0.4%
DCBS Operating Fund	189,399	0.5%
DCBS Workers Benefit Fund	155,555	0.4%
DCHS - Elderly Housing Bond Sinking Fund	1,609	0.0%
DCHS - Other Fund	15,406	0.0%
Oregon Lottery Fund	122,613	0.3%
DVA Bond Sinking Fund	112,188	0.3%
ODOT Fund	496,934	1.4%
OLGIF	245,037	0.7%
OPUF	299,703	0.8%
Total OSTF & Other State Funds	\$ 35,684,036	100.0%

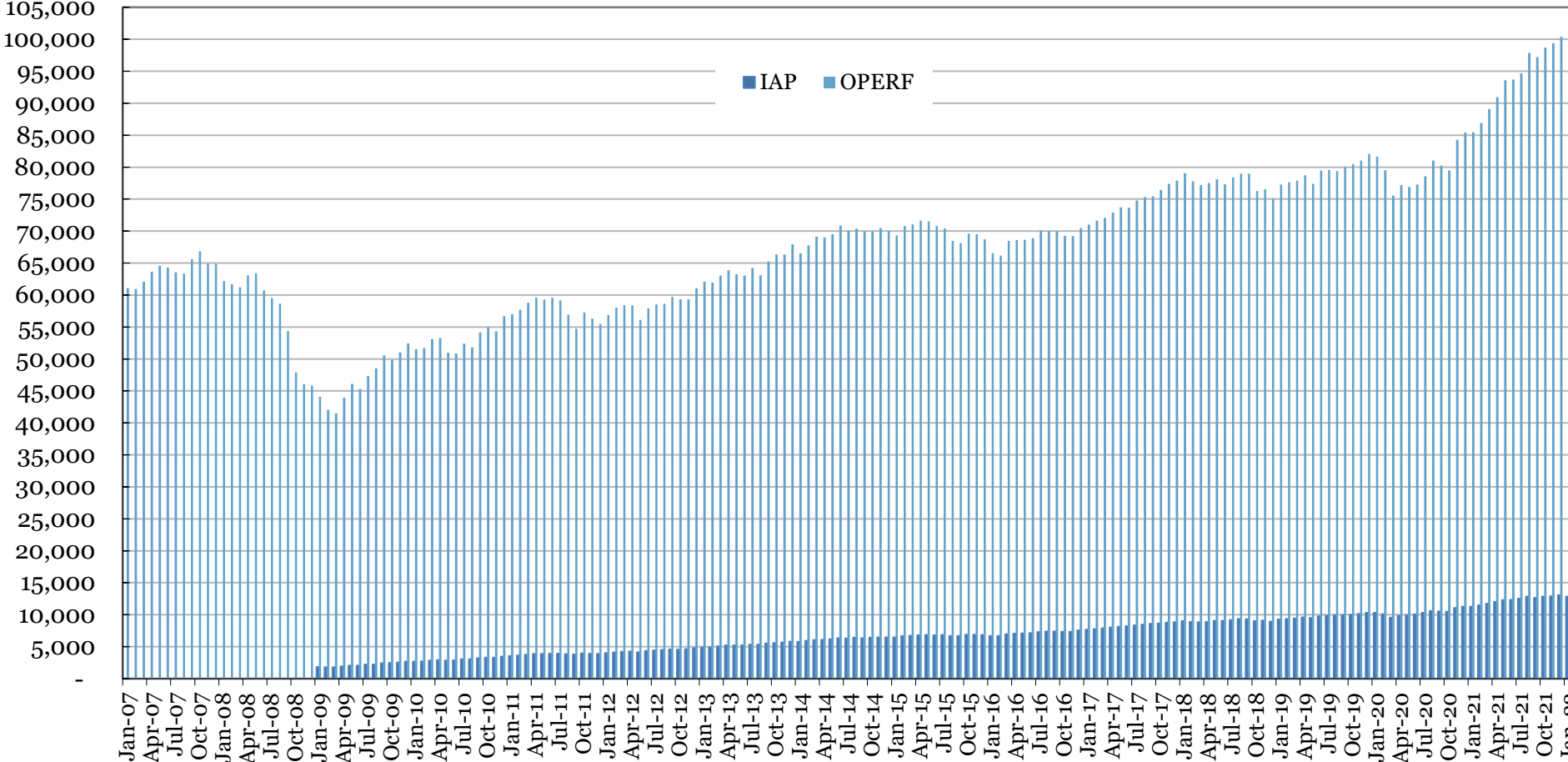
Total of All Treasury Funds** \$ 137,315,900

**Balances of the funds include OSTF or OITP investments, which is why total does not foot.

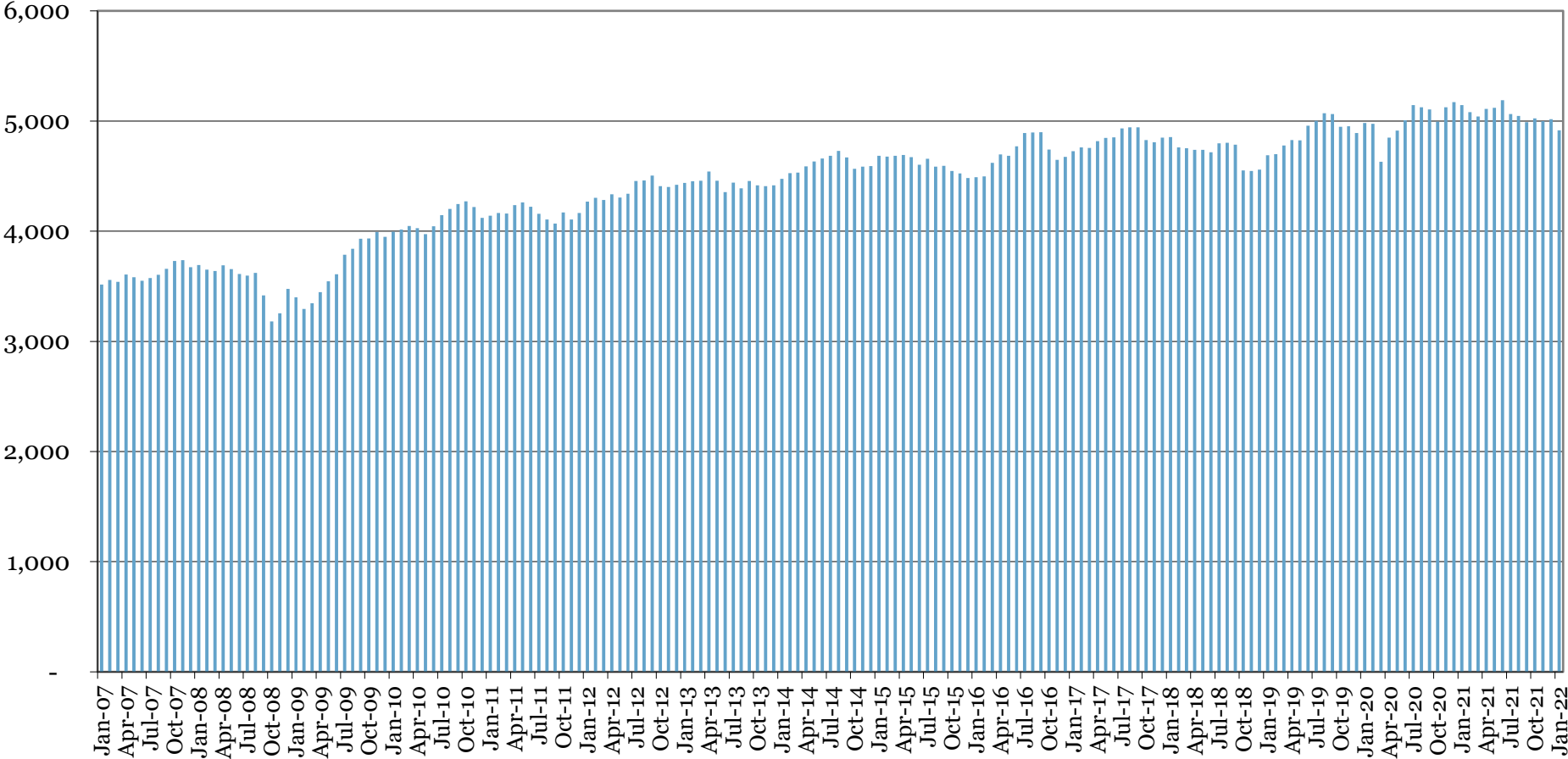


*Other State Funds include DAS Insurance Fund, DCBS Operating Fund, DCBS Workers Benefit Fund, DCHS - Elderly Housing Bond Sinking Fund, DCHS - Other Fund, Oregon Lottery Fund, DVA Bond Sinking Fund, ODOT Fund, OLGIF, & OPUF.

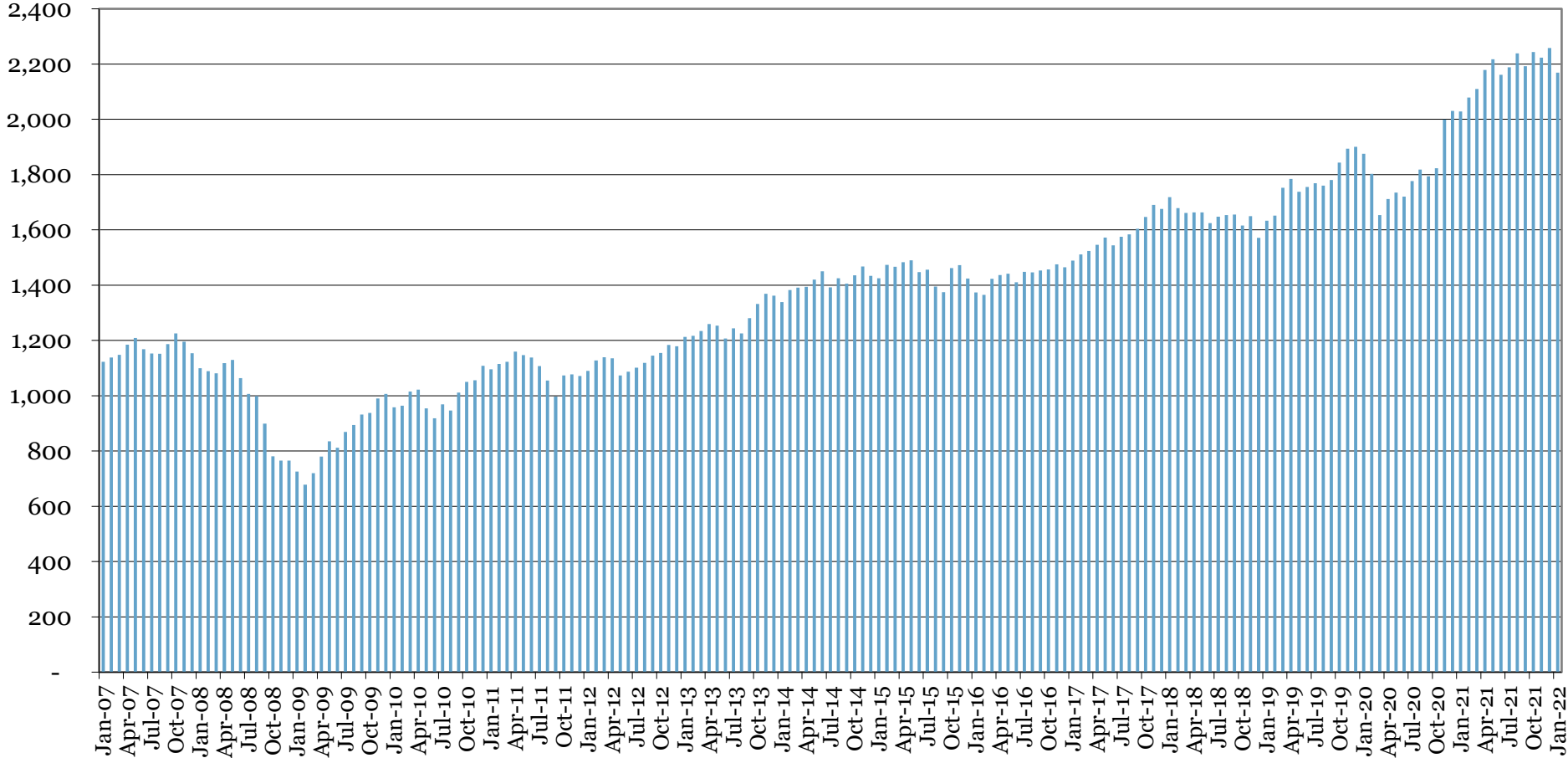
OPERF NAV
15 years ending January 31, 2022
(\$ in Millions)



SAIF NAV
15 years ending January 31, 2022
(\$ in Millions)



CSF NAV
15 years ending January 31, 2022
(\$ in Millions)



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TAB 8

CALENDAR – FUTURE AGENDA ITEMS

2021/22 OIC Forward Calendar and Planned Agenda Topics

April 20, 2022	Diversifying Strategies Portfolio Review OPERF Risk Survey OPERF Liquidity Tail Risk Hedging Common School Fund Investment Policy Statement
June 1, 2022	Q1 OPERF Performance Capital Markets Assumptions OPERF Leverage
July 20, 2022	Common School Fund Strategic Asset Allocation
September 7, 2022	OPERF Preliminary Asset/Liability Q2 OPERF Performance
October 26, 2022	OPERF Asset/Liability Study Individual Account Program (IAP) Review SAIF Annual Review Common School Fund Annual Review OSGP Annual Review
December 7, 2022	Q3 OPERF Performance
January 25, 2023	Private Equity Program Review 2024 OIC Calendar Approval
March 8, 2023	Q4 OPERF Performance Real Estate Portfolio Review Real Assets Portfolio Review

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TAB 9
OPEN DISCUSSION

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TAB 10
PUBLIC COMMENTS

Public comments can now be found at the OIC website at:
<https://www.oregon.gov/treasury/invested-for-oregon/pages/oregon-investment-council.aspx>