ALASKA RETIREMENT MANAGEMENT BOARD

SEPTEMBER
20-21, 2018

BOARD OF TRUSTEES MEETING

ROBERT B. ATWOOD BUILDING
ATWOOD CONFERENCE CENTER
550 W. 7TH AVENUE
ANCHORAGE, AK
(907) 269-0303

TELECONFERENCE: 1-800-315-6338
ACCESS CODE: 12762#

THURSDAY, SEPTEMBER 20, 2018

I. 9:00 am Call to Order

II. Roll Call

III. Public Meeting Notice

IV. Approval of Agenda

V. Public/Member Participation, Communications, and Appearances
(Three Minute Limit)

VI. Approval of Minutes – June 22-23, 2017

VII. 9:10 Staff Reports

1. Retirement & Benefits Division Report
   Ajay Desai, Director, Division of Retirement & Benefits
   Christina Maiquis, Acting CFO, Division of Retirement & Benefits

2. Treasury Division Report
   A. ARMB FY20 Budget - Action
   Pamela Leary, Director, Treasury Division

3. Calendar/Disclosure
   Stephanie Alexander, Liaison Officer

4. CIO Report
   Bob Mitchell, Chief Investment Officer

5. Fund Financial Presentation and Cash Flow Update
   Scott Jones, Comptroller, Department of Revenue
   Christina Maiquis, Acting CFO, Division of Retirement & Benefits

VIII. 9:45 Reports

6. Chair Report, *Rob Johnson*

7. Committee Reports

A. Audit Committee, *Rob Johnson, Chair*
B. Actuarial Committee, *Kris Erchinger, Chair*
C. Defined Contrib. Plan Committee, *Bob Williams, Chair*
D. Budget/Salary Committee, *Gail Schubert, Chair*
E. Alaska Retiree Health Plan Advisory Board, *Gayle Harbo, ARMB Member*

8. Legal Report, *Stuart Goering, Assistant Attorney General*

10:15AM – 10 MINUTE BREAK

10:25–10:55 9. 2014-2018 Experience Study
Kris Erchinger, Chair, Actuarial Committee

Action: Relating to Acceptance of Experience Study Actuarial Assumptions
Resolution 2018-19

11:00–11:30 10. Actuarial Resolutions – FY20 Contribution Rate Setting
Kris Erchinger, Chair, Actuarial Committee

Information: History of PERS/TRS Employer Contribution Rates
Action: Relating to FY20 PERS Contribution Rate
Resolution 2018-07
Action: Relating to FY20 PERS RMMI Contribution Rate
Resolution 2018-08
Action: Relating to FY20 PERS ODD Contribution Rate
Resolution 2018-09
Action: Relating to FY20 TRS Contribution Rate
Resolution 2018-10
Action: Relating to FY20 TRS RMMI Contribution Rate
Resolution 2018-11
Action: Relating to FY20 TRS ODD Contribution Rate
Resolution 2018-12
Action: Relating to FY20 NGNMRS Contribution Amount
Resolution 2018-13
Information: JRS Contribution

11:35-12:00 11. Review of Healthcare Transformation Strategy
Paul Erlendson & Andy Iseri, Callan LLC

LUNCH – 12:00PM - 1:15PM

1:15-2:00	12.	A.	Real Assets FY19 Annual Plan [Executive Session] *Nicholas Orr, Manager of Real Assets*
2:05–2:35		B.	Consultant Evaluation of Real Estate Plan: Diversification, Compliance, & Performance Measurement *Chris Cunningham, Associate Partner* *The Townsend Group, an Aon Company*
2:40-2:50		C.	Adoption: Real Assets FY19 Plan & Policies Board Discussion Action: Real Assets FY18 Annual Plan Resolution 2018-14 Action: Revised Investment Guidelines Resolution 2018-15 – Real Estate Resolution 2018-16 – Farmland Resolution 2018-17 – Timber Resolution 2018-18 – Infrastructure

2:50PM – 10 MINUTE BREAK

3:00–3:45	13.	Pathway Capital *Jim Chambliss and Canyon Lew,* *Pathway Capital Management GP, LLC*
3:50–4:20	14.	Asset/Liability Study *Paul Erlendson, Callan LLC*

RECESS

FRIDAY, SEPTEMBER 21, 2018

9:00		Call to Order
9:00-9:30	15.	IFM Infrastructure *Paul Burrastom, IFM Investors (US) LLC*
9:35–10:05	16.	JP Morgan Infrastructure *Nick Moller and Jeffry Shields,* *J.P. Morgan Asset Management*

10:05AM – 10 MINUTE BREAK

10:15–10:45	17.	Brookfield Listed Infrastructure *Craig Noble and Richard Torykian,* *Brookfield Private Advisors LLC*
10:50-11:20	18.	Lazard Listed Infrastructure *Tony Dote Jr. and Edward Keating* *Lazard Asset Management*
11:25-11:55	19.	Passive Cap wtd. Non-US DM and EM *Kimberly Cook, Craig DeGiacomo, and Karl Schneider,* *State Street Global Advisors*

LUNCH – 12:00PM - 1:15PM

1:15-2:00	20.	Scientific Beta MF non-US DM and EM *Ivy Flores, Senior Investment Director, and* *Shaun Murphy, Head of US Index,* *Legal & General Invt Mgmt America (LGIMA)*
2:05-2:50	21.	Performance Measurement – 2nd Quarter *Paul Erlendson & Steve Center, Callan LLC*

2:50AM – 10 MINUTE BREAK

3:00- 22. Investment Actions
- A. Scientific Beta Non-US Manager Selection
- B. Non-US Cap Weighted Manager Selection
- C. Analytic Treasuries
- D. Asset Liability Study
- E. RFP for General Consultant
- F. RFP for Real Assets Consultant

Bob Mitchell, Chief Investment Officer

IX. Unfinished Business

X. New Business

XI. Other Matters to Properly Come Before the Board

XII. Public/Member Comments

XIII. Investment Advisory Council Comments

XIV. Trustee Comments

XV. Future Agenda Items

XVI. Adjournment

NOTE: Times are approximate and every attempt will be made to stay on schedule; however, adjustments may be made.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
MEETING

Location:
Atwood Building
550 West Seventh Avenue
Anchorage, Alaska

MINUTES OF
June 21-22, 2018

Thursday, June 21, 2018

CALL TO ORDER

CHAIR ROBERT JOHNSON called the meeting of the Alaska Retirement Management Board (ARMB) to order at 9:01 a.m.

ROLL CALL

Eight ARMB trustees were present at roll call to form a quorum.

Board Members Present
Robert Johnson, *Chair*
Gail Schubert, *Vice Chair*
Gayle Harbo, *Secretary*
Kristin Erchinger
Commissioner Sheldon Fisher
Commissioner Leslie Ridle
Norman West
Bob Williams

Board Members Absent
Tom Brice

Investment Advisory Council Members Present
Dr. William Jennings
Dr. Jerrold Mitchell
Robert Shaw

Investment Advisory Council Members Absent
None

Department of Revenue Staff Present
Bob Mitchell, Chief Investment Officer
Scott Jones, State Comptroller
Zachary Hanna, Deputy Chief Investment Officer
Pamela Leary, Director, Treasury Division
Shane Carson, Investment Officer
Sean Howard, Investment Officer
Stephanie Alexander, Board Liaison

Department of Administration Staff Present
Ajay Desai, Director, DRB
Kathy Lea, Chief Pension Officer, DRB
Christina Maiquis, Accountant V, DRB (phone)

Consultants, Invited Participants, and Others Present
Steve Center, Callan LLC
Paul Erlendson, Callan LLC
John Pirone, Callan LLC
David Kershner, Conduent HR Services
Stuart Schulman, Conduent HR Services (phone)
Scott Young, Conduent HR Services
Stuart Goering, Department of Law, Assistant Attorney General
Leslie Thompson, GRS Consulting
Paul Wood, GRS Consulting
Joseph Maietta, MacKay Shields
Andrew Susser, MacKay Shields
Robert A. Gillam, McKinley Capital Management
Alex Slivka, McKinley Capital Management
Matt Day, Mondrian Investment Partners
Todd Rittenhouse, Mondrian Investment Partners
Brad Owens, Retried Public Employees of Alaska
Henry Disano, State Street Corporation

PUBLIC MEETING NOTICE

STEPHANIE ALEXANDER, Board Liaison, confirmed public meeting notice requirements had been met.

APPROVAL OF AGENDA

MS. HARBO moved to approve the agenda. MS. ERCHINGER seconded the motion.

BOB MITCHELL, Chief Investment Officer, requested to amend the agenda by adding an executive session after Item VIII.8. Legal Review.

VICE-CHAIR SCHUBERT moved to amend the agenda adding an executive session after Item VIII.8.Legal Review. MR. WEST seconded the motion to amend the agenda.
The motion to amend the agenda was approved without objection.

The amended agenda was approved without objection.

PUBLIC/MEMBER PARTICIPATION, COMMUNICATIONS, AND APPEARANCES

BRAD OWENS, Executive Vice-President of the Retired Public Employees of Alaska, noted he is impressed and pleased with the Advisory Board members' interest, intelligence, and willingness to listen. He has attended two meetings and believes the Department of Administration has been willing and active in helping the Advisory Board develop an awareness of the legal requirements in changes to benefit levels, types, and coverages. MR. OWENS reported on a subcommittee meeting focused on proposed changes to the pharmacy plan and proposed modernization changes of various benefits. He feels the Advisory Board has been a very productive and positive experience.

APPROVAL OF MINUTES: March 29 - 30, 2018

MS. HARBO moved to approve the minutes of the March 29 - 30, 2018 meeting. MS. ERCHINGER seconded the motion.

The minutes were approved without objection.

CHAIR JOHNSON commented on his and MS. HARBO's reappointment to the Board. CHAIR JOHNSON offered condolences on behalf of the Board to MS. HARBO for the loss of her husband SAM HARBO.

STAFF REPORTS

1. RETIREMENT & BENEFITS DIVISION REPORT

A. Conduent Consulting Invoices (informational)

CHAIR JOHNSON introduced Director AJAY DESAI and accountant CHRISTINA MAIQUIS. MS. MAIQUIS advised the report for the actuarial services for fiscal year (FY) 2018, through March 31, 2018, was provided in the Board packet. There were no questions.

B. Membership Statistics

MS. MAIQUIS advised the Membership Statistical Reports for FY18, through March 31, 2018, were included in the Board packet. She noted the number of active Defined Benefit (DB) members continues to decrease and the number of active Defined Contribution (DC) members continues to increase. Retirement numbers for both plans continue to increase.

MS. ERCHINGER requested MS. MAIQUIS summarize the recent letter distributed to employers regarding the return of contributions to employers for whom non-vested DC employee funds remain in the system. MS. MAIQUIS explained a change beginning in July, whereas employers can use the contributions for DCR members that are not fully vested as an offset against future contributions.

C. DRB Update / Legislation

MR. DESAI reviewed the 2018 legislative update report included in the Board packet. He highlighted specific bills. House Bill (HB) 47 passed and reset the salary floor from 2008 to 2012. HB 47 has connection to HB 286. HB 83 has not had any action and allows the opportunity to choose between the DB and DC plans. HB 224 passed under Senate Bill (SB) 185 and focuses on Teacher Retirement System (TRS) retiree rehires. HB 395 has not had any action and is a companion bill with SB 212. It focuses on peace officer/firefighters retiree benefits. SB 97 passed and focuses on pension obligation bonds. HB 306 passed and allows the offering of many benefit options for the DC retirees.

COMMISSIONER FISHER gave COMMISSIONER RIDLE the pen the Governor used to sign HB 306. COMMISSIONER RIDLE expressed appreciation to Chief Pension Officer KATHY LEA for her work and testimony, and to staff MINTA MONTALBO for her contribution in obtaining the votes to pass this bill.

MS. ERCHINGER directed the Board's attention to the intent language added by the Legislature in Sec. 27(h) of HB 286 suggesting the Board consider the funding ratio when recommending an amount for deposit in the National Guard Naval Militia Reserve System (NGNMRS). As of the June 30, 2017 roll-forward valuation report, the plan is funded at 122%. MS. ERCHINGER reiterated the Board reviews each plan individually and stressed the importance the public is made aware of the process. With respect to NGNRS, the concern is the data from employers is incomplete and inaccurate. The particular nuances of that plan justify a funding ratio above 100%.

MR. MITCHELL reminded the Board the inflation assumption will be discussed later in the meeting. He explained the return assumption is influenced by the inflation assumption. To the extent the inflation assumption is changed, resulting in a lower return assumption for the plan, the funded ratio would decrease from its current surplus level.

MR. DESAI requested MS. LEA provide on overview of the DC plan updates reviewed in yesterday's DC Plan Committee meeting. MS. LEA reported a survey of all 155 employers was sent out a few months ago and a low response of only 11 were returned. Out of the 11 responses, it was discovered the employers are not widely distributing the retirement information to new employees as instructed. This area of weakness prompted a two-day meeting with Empower to develop a strategy for the next two years focused on getting DCR members engaged and better educated.

MS. LEA explained the strategy and includes organizing the Empower representatives by region. An employer conference entitled "Better Together" will occur October 3rd through 5th

in Juneau and will detail the responsibility of the employer. It will provide an opportunity for the employer representatives to meet with the regional group. Another area of focus is on attraction and retention. The Department of Public Safety (DPS) is participating in a pilot program specifically designed to attract new Troopers and to retain current employees. DPS recognizes the problem of existing DB members disparaging the retirement plan to new DCR members. The problem will be mitigated by developing new informational flyers and creating a video showing a Trooper Lieutenant, an Empower representative, and a DRB representative dispelling the retirement myths heard in the workplace. MS. LEA noted the lessons learned from this pilot program will be leveraged across all State departments and eventually out to the political subdivisions and school districts.

MS. LEA announced the new employee orientation videos for SBS, Deferred Compensation, PERS, and TRS are all online for employers to use. Empower has agreed to move the targeted communication from targeted age groups to the individual. The targeted communication, which includes plan information, deferred compensation participation, increasing contributions, and general savings, will be based on the individual's specific demographic information and other investment information on-file.

2. TREASURY DIVISION REPORT

CHAIR JOHNSON invited Treasury Division Director PAMELA LEARY to present the Treasury Division Report. MS. LEARY informed the discussion at the Audit Committee meeting yesterday included staffing, promotions, and succession plans. Currently, there is one investment officer position open and two accountant positions open. The Treasury budget remains unchanged from the final budget. MS. LEARY and State Comptroller SCOTT JONES completed a due diligence meeting last week at State Street's data center outside of Boston. MS. LEARY announced the planning of a Board visit to the data center to receive a presentation on cyber security and visit with Fidelity Management. This would occur on October 10th, prior to the education conference. MS. LEARY noted additional information is forthcoming.

CHAIR JOHNSON emphasized the significance of cyber security awareness and the importance of maintaining a high level of education on these issues.

3. CALENDAR/DISCLOSURE

MS. ALEXANDER stated the disclosure memo is included in the packet and there are no transactions requiring additional discussion. The remaining 2018 calendar is also in the packet and the provided 2019 calendar is up for Board approval.

MS. HARBO moved to accept the proposed 2019 calendar. MS. ERCHINGER seconded the motion.

The motion passed with no objection.

4. CIO REPORT

MR. MITCHELL highlighted today's meeting will include presentations regarding economic assumptions embedded in the experience study. MR. MITCHELL encouraged the Board to discuss and make progress toward consensus on adopting actuarial assumptions at its next meeting. MR. MITCHELL informed his later presentation will ask the Board to consider modestly decreasing the risk profile of the plans. The presentation on international equities is a continuation of the review of asset classes. An investment action will be considered at the end of the meeting. Additionally, presentations from the high yield manager and the international fixed income manager will provide updates and proposed changes to their investment guidelines. At tomorrow's meeting, McKinley Capital will present on an innovative strategy for Board consideration.

MR. MITCHELL provided a summary of the 85 items in his transaction report. Item 1 is a series of asset allocation rebalances within the portfolio, and are primarily motivated by drifting asset allocations between the various plans resulting from cash flows. Items 2 through 9 detail the capital calls received on existing commitments. Items 10 through 19 are related to activity involved in the cash equalization program and rolling contracts forward on a quarterly basis. Items 20 through 22 relate to the liquidation of Alliance NFJ, which was a termination decision made at the December meeting. Items 23 through 51 relate to the transition of portfolios terminated during the March meeting. MR. MITCHELL reviewed the next category of other investment actions with existing strategies and funding of Board approved allocations through Item 80.

MR. MITCHELL noted Item 81 is a recommendation to place Mondrian International Small Cap on the watch list for performance reasons. The current portfolio amount is $195 million.

MS. HARBO moved to place Mondrian International Small Cap on the watch list. MS. ERCHINGER seconded the motion.

MR. WEST requested a review of the performance of the Mondrian International Small Cap portfolio. MR. MITCHELL informed the rolling six-year period as of December 2017, triggered the watch list performance criteria by underperforming the benchmark by 1.85%, underperforming the style by almost 3%, and underperforming 74% of their peers.

A roll call vote was taken, and the motion passed unanimously.

MR. MITCHELL explained Items 82 and 83 are notifications to the managers that were terminated in March and December. Item 84 begins the consolidation of the DC fixed income passive options. Item 85 describes Callan's engagement in three Board approved mandates. Callan's evaluation of PineBridge and Fidelity Signaling strategies resulted in recommendations to invest. Contract negotiations are underway. Callan is in the process of reviewing investment policies and the Policy and Procedures Manual. Lastly, MR. MITCHELL informed two college interns were hired and are participating in a variety of research projects.

5. FUND FINANCIAL PRESENTATION

MR. JONES advised the Fund Financial Report as of April 30, 2018, was included in the packet. MS. HARBO asked if the line item was added, as requested in the previous meeting, showing the total amount of assets managed in-house. MR. JONES indicated the line item has not yet been added to the report. He stated internally managed public assets were approximately $7.7 billion as of May 31st, of which $2.3 billion were public fixed income and $5.4 billion were public equities.

MR. JONES reported for the month of May, the plans' participant and nonparticipant directed funds had income of $341 million and outflows of roughly $88 million. As of June 19th, the year-to-date nonparticipant directed plans had income of $2.2 billion and outflows of $927 million, with changes in invested assets at just below 5%.

MS. MAIQUIS reported on the 10 months ending April 30th, 2018. Contributions for the funds were $1.1 billion and expenditures were $1.8 billion. MS. HARBO asked for verification the total refund to DC members leaving the system in the 10 months is about $51 million or about $5 million a month. MS. MAIQUIS agreed.

MS. ERCHINGER expressed gratitude for the supplemental notes provided in the Treasury Report. She stated the notes have been improving over time. MS. ERCHINGER commented on the $7.7 billion of funds being managed in-house and thanked staff for their hard work.

TRUSTEE REPORTS

6. CHAIR REPORT

CHAIR JOHNSON suggested a committee be created to focus on policies and procedures. He believes the timing is important now because of the pending Callan report reviewing investment guidelines and policies and procedures. CHAIR JOHNSON has received travel approval requests from staff and suggests the committee consider and debate what processes should be followed for such requests. CHAIR JOHNSON asked Board members to provide feedback regarding the creation of this committee by the next Board meeting.

CHAIR JOHNSON commented on the sheer volume of transactions undertaken by MR. MITCHELL and staff. He believes this indicates the in-house staff is doing an excellent job and it reflects the degree to which trust has been given. CHAIR JOHNSON noted he receives the reports on the transactions and invited other Board members to receive the information. CHAIR JOHNSON informed he has asked for a review of the boundaries of staff delegation over time to ensure the Board understands the decision-making. Board discussion and evaluation of findings will occur in the delegation component later in the meeting.

CHAIR JOHNSON stressed the importance of ensuring a proper record is built that reflects the Board's decision-making processes, especially on investments that are more exotic than the norm or that have a quick turnaround time.

7. COMMITTEE REPORTS

A. Audit Committee

CHAIR JOHNSON, as Chair of the Audit Committee, informed the Audit Committee met yesterday and enjoyed an excellent presentation by KPMG regarding their auditors' review of the fund financials, their process for the ARMB, and their processes worldwide. CHAIR JOHNSON expressed confidence in KPMG's approach and operations. The meeting discussion reviewed the concern of cyber security issues and what mitigations are occurring to identify problems and patterns.

CHAIR JOHNSON informed Chief Financial Officer from DRB, KEVIN WORLEY, has left employment and he will be missed. CHAIR JOHNSON believes MR. DESAI and staff will adequately replace the efforts.

CHAIR JOHNSON reported he testified before the legislative session on HB 306. CHAIR JOHNSON expressed appreciation to COMMISSIONER RIDLE, staff, and MS. LEA for presenting an excellent product, and to the Legislature for adopting the bill.

B. Actuarial Committee

MS. ERCHINGER, as Chair of the Actuarial Committee, reported the committee met yesterday and received the final report from GRS reviewing the valuation conducted by Conduent. This concludes the one-year timeline for completing the valuation. The recommendation by the Committee to the Board later in the meeting will be to approve both the Conduent valuation report and the GRS review of the valuation report. GRS also provided a review of the JRS and NGNMRS systems.

MS. ERCHINGER informed the Committee continued to work on the experience study, with particular discussion regarding the range of economic assumptions with respect to the inflation assumption, the real return assumption, and the tools used to develop the range of those levels. The specific rates will need to be approved by the Board in September. Additional discussion will occur later in today's meeting narrowing down the actual target.

MS. ERCHINGER reported Assistant Attorney General STUART GOERING provided legal input during the discussion focused on the legislation that created the 25-year closed amortization period and resultant Board constraints to alternatives. Future Committee discussion on that topic is expected.

C. DC Plan Committee

MR. WILLIAMS reported the Defined Contribution Committee met yesterday and heard a presentation by MS. LEA, which included the legislative update, employer survey results, and new retirement readiness marketing outreach. Discussion occurred comparing the defined benefit and defined contribution versus the final salary ratio. MR. WILLIAMS reported MR. MITCHELL presented information on the Monte Carlo analysis reviewing various

simulations of how long retirement benefits could last after 30 years of employment. Both of the presentations provided coherence and clarity to some of the challenges being faced. MR. WILLIAMS informed the State's deferred compensation is open to school districts and three districts have enrolled. MR. WILLIAMS believes this is a strong product and more information needs to be disseminated.

COMMISSIONER FISHER commented the discussions at yesterday's meeting were very helpful. He expressed appreciation for the work being done in both departments. COMMISSIOER FISHER expressed concern about setting expectations. He believes it may be unrealistic for a person to work from age 25 to age 55, and expect to have enough money through retirement.

MS. HARBO expressed concern on the decrease in 403(b) participation among teachers within the last 10 to 15 years, and would like to find a way to increase that participation. She also suggested reviewing the possibility of automatic enrollment and automatic escalation of contributions.

MR. WILLIAMS agreed to the importance of increasing awareness regarding strengthening a successful retirement through utilizing all the benefits available to employees, including SBS, deferred comp, and access to Social Security, if available.

COMMISSIONER RIDLE noted DRB will return to the DC Committee at the next meeting to continue discussion regarding possible Board supported legislation and ideas on how to increase participation in deferred compensation.

D. Alaska Retiree Health Plan Advisory Board

MS. HARBO, ARMB Advisory Board member, informed the full committee met on May 8th in Anchorage, adopted bylaws, developed a meeting calendar for 2018 and 2019, and discussed rules for public comments. A presentation was given on the Enhanced Employee Group Waiver Program (EEGWP) proposed to replace the retiree drug subsidy program for DC retirees and current DB retirees. A summary of the detailed presentation and frequently asked questions can be found at the website AlaskaRHPAB@alaska.gov.

MS. HARBO reviewed the presentation given by DRB centered around the 12 proposed DB health plan modernization areas of focus. Because of the complexity of the issues, initial work was assigned to a three-person subcommittee that met on June 12th. The subcommittee decided to concentrate on five priority issues; preventative care, lifetime max, pharmacy design, travel benefit, and rehabilitative services. The next subcommittee meeting will be in mid-July. Future full committee meetings will be held in conjunction with the Aetna quarterly meetings, with the next meeting being held in Juneau on August 29th. A draft form of the updated health plan booklet will be presented.

MS. HARBO thanked MR. OWENS for his positive comments in the public session and to COMMISSIONER RIDLE for her presence at both meetings.

COMMISSIONER RIDLE expressed her excitement regarding the committee and her appreciation to its dedicated members.

8. LEGAL REPORT

MR. GOERING reported on the summary judgment issued by the Superior Court on June 14th regarding the Metcalfe v. State litigation.

CHAIR JOHNSON requested additional information pertaining to the ongoing litigation on the subject of diminution of benefits relating to the health plan. COMMISSIONER RIDLE reported court hearings occurred in April and will continue in July. She informed there are two new cases concerning diminishment that have not had any action to-date. MR. GOERING stated he will check the status and provide an update to the Board. He commented JESSIE ALLOWAY has handled these cases and has done an excellent job.

EXECUTIVE SESSION: 10:21 a.m.

MR. WEST moved to go into executive session for the purposes of discussing attorney/client privileged information or matters that the immediate knowledge of which could negatively impact the finances of the Board. MR. WILLIAMS seconded the motion.

The motion passed with no objection.

CHAIR JOHNSON called the meeting back to order at 11:21 a.m., and noted no decisions were reached during executive session.

9. ACTUARIAL REVIEW / ACCEPTANCE - CERTIFICATION OF FY 2017 REVIEW REPORTS AND VALUATIONS

Action: Board Acceptance of GRS Certification for FY2017 PERS, TRS, NGNMRS, JRS, and DC Plan Valuations

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to accept the review and certification of FY2017 actuarial reports by Gabriel Roeder Smith and Company.

MS. ERCHINGER explained the valuation report is prepared by Conduent and reviewed by GRS. Both reports are presented to the Actuarial Committee. The thorough plan review process has occurred over a period of approximately six months, identifying potential conflicts and/or areas of recommended changes. Decisions were made by the Committee that provided Conduent direction to make specific changes. The Actuarial Committee recommends acceptance of the review and certification of the actuarial reports.

A roll call vote was taken, and the motion passed unanimously.

Action: Board Acceptance of FY2017 Conduent Valuations for PERS, TRS, NGNMRS, JRS, and DC Plan Valuations

MS. ERCHINGER explained the final valuation report contains the two recommended assumption changes. The medical trend assumption was updated to reflect anticipated increases in costs and an obligation was added with respect to the Cadillac tax because it is no longer deemed an immaterial impact on trend rates. Healthcare claim costs will be updated annually and have been described in the valuation reports.

MS. ERCHINGER, as Chair of the Actuarial Committee, moved to accept the Actuarial Valuation Reports prepared by Conduent for the PERS, TRS, DC, Teachers DC, and the Roll-Forward Actuarial Valuation Reports for Judicial and National Guard and Naval Militia Retirement Systems, as of June 30, 2017.

CHAIR JOHNSON commented the record of the lengthy Actuarial Committee meeting yesterday is available should anyone wish to review the robust discussions regarding support of this action and the previous action.

A roll call vote was taken, and the motion passed unanimously.

VICE CHAIR SCHUBERT requested the record reflect the action was brought before the Board by the Committee Chair on behalf of the Committee.

10. DEFINED CONTRIBUTION AND SUPPLEMENTAL BENEFIT SYSTEM PARTICIPANT INFORMATION

MS. LEA provided an overview of the information that is available to new hires and existing employees for the Defined Contribution and Supplemental Benefit participants. The partnership exists among the employer, the Division, and Empower Retirement Services. It is important for participants to be engaged in their plan from the time of hire. The employer is asked to be the first level of introduction to the general plan summary information by providing handbooks or links to the handbook, showing the videos during orientation meetings, posting flyers in the workplace to encourage savings, facilitating telephonic appointments with financial and benefit counselors, and alerting employees when the Division schedules a visit to the worksite. The employer has a required list of items to give each participant, including the investment fee structure, access to free financial advice, access to paid financial advice, as well as other available options.

The Division provides all the information given to the participant. The Division's biggest strength is the one-on-one counseling with members, which can occur in-person, through Web-ex, or telephonically. Empower Retirement Services is under contract to provide certain information to the employee, including a welcome letter containing important information about the retirement plans, contact information, a description of the target date funds, access to account information online, and additional disclosures. All participants receive a quarterly newsletter containing financial wellness information, basic savings, budgeting, tax information, financial education, and how to get help.

MS. LEA informed the website is currently undergoing a redesign to make finding the plan information more intuitive and employee specific, to include the ability to schedule an

appointment with a counselor online. The new website roll-out is expected in the fall. There will also be links to the Empower website, which contains education information, investment calculators, as well as access to the participant's own particular information.

MS. LEA stated a fourth Empower counselor representative will be added by January to assist in the requests from participants for in-person appointments. The demand is high. Currently, the wait is up to three months for an in-person appointment with a counselor. State budgetary constraints impede the hiring of additional counselors. The feedback regarding the Empower website's new web design was mixed between younger participants, who like the changes, and older participants, who do not like the changes as well. Empower is in the process of developing an instructional video on how to navigate through the new changes on the website.

MS. LEA noted the employer survey showed the employers were not disseminating their information as instructed and the welcome letter from Empower was acting as the first contact to the member. The Division and Empower are working together to modify the welcome letter to provide more robust information.

MS. HARBO inquired as to the timeframe employers have to transfer contributions to the plans from the payroll check. MS. LEA indicated the statute includes a 15-day period from the date the payroll check is issued until the information is submitted to the Division and then up to two days until the information is sent to Empower. Empower has 24 hours to process the information. MS. LEA advised the State of Alaska and the Municipality of Anchorage (MOA) have new payroll systems resulting in considerable issues that are being resolved. Currently, the 15-day timeframe for MOA is not being met. There would typically be an interest penalty applied for being late, but some of the limiting issues are within the DRB system and interest will not be charged until the issues have been resolved. Any interest penalty received would go directly to the plan and not to the individual. IRS rules provide 45 days for an employee contribution to be entered.

MS. ERCHINGER suggested a legislative review be conducted regarding the possibility of providing some level of interest to protect the employee against employers who take longer than 45 days to submit contributions into the system.

MR. WILLIAMS reiterated the public comment made yesterday in the meeting regarding the Social Security assumption automatically populating on Empower's DC platform. He noted multiple reports of this occurring with members and requested the automatic assumption of Social Security be turned off system-wide. MS. LEA noted the occurrence was an anomaly and Empower was directed to turn off the Social Security link systematically for all State employees and for all TRS members. She will review further to ensure system compliance.

11. DELEGATION

MR. MITCHELL requested MR. GOERING assist in facilitating the delegation discussion. MR. MITCHELL conveyed CHAIR JOHNSON requested additional information be presented regarding the Board's statutory authority to delegate, and provide examples of resolutions in which delegation has occurred.

MR. MITCHELL reviewed the Board shall exercise the powers and duties of a fiduciary of a State fund under AS 37.10.071, including the general investment powers and duties of how public funds are invested for the State of Alaska. As fiduciaries, the Board can delegate investment, custodial, or depository authority on a discretionary or nondiscretionary basis to officers or employees of the State or to independent firms, banks, financial institutions, and/or trust companies. The fiduciary shall apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the fund entrusted to the fiduciary.

MR. MTCHELL described the operational structure is established in AS 37.10.210 through 390. Consistent with standards of prudence, the Board has the fiduciary obligation to manage and invest these assets in a manner that is sufficient to meet the liabilities and pension obligations of the systems, plan, program, and trusts. The Department of Revenue shall provide staff to the Board.

MR. MITCHELL explained the delegations the ARM Board has made to staff. The CIO has the authority to adjust asset allocation within Board-approved parameters and may contract with current ARM Board managers in good standing in amounts up to 1% of total ARM Board defined benefit assets per single investment. Currently, 1% is approximately $260 million in authority. The CIO can rebalance the portfolio when the asset allocation falls outside of the strategic bands. The strategic band for equities is plus or minus 6% of current allocation. The ARM Board has delegated responsibility to staff to approve annual real estate investment manager property operating budgets, business plans, tactical/strategic plans, and variances up to $300,000 in annual approved capital expenditure budgets, subject to a $3 million maximum per separate account. Additionally, similar language is included in the farmland and timberland guidelines.

MR. MITCHELL reviewed the CIO has the authority to make direct investments in private equity partnerships. Abbott and Pathway have the ability to commit up to 50% beyond their target allocation with CIO approval, equaling to approximately $100 million each. The CIO has authority to commit up to 1%, currently $260 million, of total defined benefit assets in addition to the targeted amount for direct partnership investments.

CHAIR JOHNSON informed he requested this presentation to ensure the Board is familiar with the current delegations. He asked the Board to consider whether this range is legal and prudent, and if the Board is comfortable with these limits. CHAIR JOHNSON requested specific feedback regarding best practices from MR. MITCHELL, MR. GOERING, the IAC, and comments from Board members.

MR. MITCHELL believes the Board has the authority to delegate and he is comfortable with the existing delegation and level of authority, as it provides opportunities to express real-time best judgment, while maintaining transparency and a thoughtful process.

DR. JERRY MITCHELL noted in his many years of experience, the evolution has been toward more discretion for the staff, as staffs have become more professional and have demonstrated their ability to warrant more discretion.

MR. SHAW commented on the importance of the detailed feedback loop provided by the CIO, MR. MITCHELL during his Board reports on investment decisions made. This also allows for a specific opportunity the Board can ask questions and evaluate the decisions of staff that have occurred within the delegated authority.

DR. JENNINGS agreed with the comments made by both DR. JERRY MITCHELL and MR. SHAW. He gave anecdotal examples of the trend of increased delegation. DR. JENNINGS emphasized the importance of proper delegation for rebalancing and providing specific instructions to staff to carry out their delegations.

MS. ERCHINGER expressed her level of comfort with the existing delegation, primarily because of the ongoing detailed activity feedback reports given by MR. MITCHELL.

CHAIR JOHNSON shared his support for the existing level of delegation. He requested the CIO's report include a column on the chart citing the delegation of authority for each transaction; i.e., 2017-05.

MR. GOERING stated there is no such thing as perfection in any human endeavor. The Board is responsible for all delegations. Delegations to staff have to be prudent, and in the ARM Board's case, the staff role is assigned by law to the Treasury Division staff. The ARM Board has a supervisory responsibility over the staff delegation, which is absolutely appropriate from a legal perspective.

MR. GOERING advised if the Board wanted to revisit the subject at a later date to enhance capabilities or change anything related to delegations, he urged the process be undertaken in a very gradual and incremental manner with considerable deliberation in order to maintain stability. He counseled against making changes in response to an event.

MR. WILLIAMS shared his strong belief in building internal capacity and believes staff operates with high levels of trust and quality. He emphasized the importance of the feedback loop and communication between staff and the Board. MR. WILLIAMS asked the IAC for an explanation of a proper balance in delegation. DR. JERRY MITCHELL gave the example that portfolio rebalancing is appropriate, but investing in a new asset class for the first time probably would not be delegated to staff.

MR. WEST requested MR. MITCHELL explain the meaning of a single investment, as used in the statute, and if the definition offers enough latitude to operate during a catastrophic situation. MR. MITCHELL noted he interprets a single investment to mean an investment mandate. He believes his investment authority is sufficient to operate outside an extreme event.

CHAIR JOHNSON recessed the meeting from 12:27 p.m. to 1:30 p.m.

12. TRUSTEE INFO. REQUESTS AND PORTFOLIO UPDATE

MR. MITCHELL informed the Trustee information requests are responses to Trustee requests from the last meeting. MR. MITCHELL noted he provided the portfolio update in his opening comments.

MR. MITCHELL informed SHANE CARSON, Manager of External Equity and Defined Contribution Investments, is willing to present Item 13. Global Equity Ex-US at the end of the day to minimize disruption to the agenda. There was no objection.

14. FY 2013 - 2017 EXPERIENCE STUDY: PRESENTATION OF RECOMMENDED ASSUMPTIONS

DAVID KERSHNER introduced his colleagues SCOTT YOUNG, and STUART SCHULMAN, all from the actuary Conduent HR Services. MR. KERSHNER provided a high level overview of the 54-page presentation that was delivered in detail before the Actuarial Committee meeting yesterday. Most of the experience study discussions have focused on different analysis performed on the expected return and inflation rate assumptions, which are the two most important and significant assumptions for the retirement plans. The discussion process has been lengthy, including details about the various economic assumptions, interest rate, inflation rate, salary increase rate, potential funding method changes, and demographic assumptions.

MR. KERSHNER informed work was conducted with MR. MITCHELL to identify certain potential economic scenarios projected for PERS and the resultant cost impacts of different assumptions. Details were described at the Actuarial meeting regarding the economic simulator GEMS and the building block method used to assist in providing guidance on the potential ranges of expected returns and inflation rates. The modeling was based on the Board allocation adopted effective June 30, 2017. MR. KERSHNER stated MR. MITCHELL will be presenting a potential allocation change to the Board for adoption later in the meeting and the analysis that will be presented in September will reflect the new allocation.

MR. SCHULMAN continued the presentation detailing two approaches using the GEMS method and building block method to estimate the expected future return on assets over the time horizons of 10 years, 20 years, and 30 years. He focused the Board's attention to the GEMS geometric returns for a 20-year time horizon. MR. SCHULMAN informed the actuarial standards of practice support a range of reasonable methods for determining various economic metrics, including expected return valuations. MR. SCHULMAN advised all of the nominal rates of return net of investment expenses that were determined and illustrated are within the reasonable range. Certain stakeholders, actuaries, and investment consultants will feel more strongly about one set of rates than another set of rates. MR. SCHULMAN believes consensus for inflation over the next 10 to 30 years ranges from about 2.2% to 2.6%.

MR. MITCHELL requested additional explanation regarding how the 30-year inflation numbers were determined in Approach 1 for GEMS at 3.12% and in the building block method at 2.6%. MR. SCHULMAN gave a detailed explanation on how the GEMS model tends to revert to the mean of the historic long-term averages for inflation in the 3% range. The building block method utilizes estimates, including TIPS spreads, surveys of professional

forecasters, and last year's Social Security Trust Fund Report, which had inflation at around 2.6%. MR. SCHULMAN advised he is comfortable with the inflation assumption being 2.6%, but believes 2.5% is more reasonable.

MR. MITCHELL commented the two key decisions the Board needs to make are the inflation assumption and the real return assumption. He asked MR. SCHULMAN to provide more information regarding the 6.2% real return assumption that is used in both models. MR. SCHULMAN explained the 6.2% is a little bit higher than the peer group of public systems due to asset allocation. The ARMB portfolio has 11% in liability hedging non-risk assets like treasuries and cash equivalents. The remainder of the portfolio is invested in return generating, risk bearing assets like domestic and international equities, opportunistic assets, real estate, and private equity. The 6.2% real return assumption is based on the risk premium range of all the assets in the portfolio. MR. SCHULMAN is comfortable with the 6.2% range, and noted it would not be unreasonable for the estimated range to be from 5% to 6.2%.

MS. ERCHINGER requested more information on the definition of inflation used in the modeling. MR. SCHULMAN discussed the Fed target of 2% inflation is based on personal consumption expenditures, which is a different measurement than is used to calculate Consumer Price Index (CPI). If the Fed met its target of 2% inflation, the CPI would be around 2.3%. It is not a one-to-one correspondence.

MR. KERSHNER continued the presentation conveying the understanding there is no one single right answer to the assumed portfolio return. The reasonable range Conduent suggests is between 7.25% and 8%. The Board will also consider the rate of funding and pattern of funding in determining the specific return assumption. MR. KERSHNER described in detail each of the 18 reasonable scenarios that were diligently studied and explained the differences in the components. MR. KERSHNER reviewed the results of the changes in assumptions for each scenario, including the funded ratios of the plans, the total employer contribution rates, State contribution rates, and salary increase rates. MR. KERSHNER noted the projections shown do not include changes in the healthcare trend rate. He informed the real return assumption and the inflation assumption the Board adopts today will be used for the upcoming June 30, 2018 valuations.

COMMISSIONER FISHER expressed support for formally adopting an inflation rate and a real return rate; with the understanding the actuaries will add those together to get the nominal rate of return. He believes it is important to view the components separately.

MS. ERCHINGER commented on the distinction between the nominal rate of return and real rate of return. She believes setting these rates is one of the most critical and visible decisions for the ARMB. MS. ERCHINGER agreed it is important to reframe the conversation and view the return components as a combination of the real return assumption and the inflation assumption.

15. REVIEW OF EXPERIENCE STUDY RECOMMENDATIONS

LESLIE THOMPSON and PAUL WOOD of GRS Consulting gave their presentation on the review of the experience study assumptions. MS. THOMPSON informed the review included all the supportive data Conduent utilized, various presentations from Conduent, the history of the plan's performance, and best practices of public sector investment consultants. MR. WOOD explained the role of the review actuary is to provide a different opinion on the assumptions, to show what assumptions GRS would have set if GRS were the primary actuary, and to explain the process followed to arrive at these assumptions.

MR. WOOD agreed it is good to view the nominal assumption in two separate pieces; the sum of the real rate of return and the inflation rate. He noted GRS presents the nominal assumption as the combination of those two separate pieces.

MR. WOOD discussed the investment horizon relating to the closed period funding policy. The plan will be 100% funded by 2039. The plan's liquidity needs after the 21-year period are drastically different than the liquidity needs through that 21-year period. After the plan is fully funded, there will be a very high negative cash flow situation because contributions are no longer flowing in. The benefit payouts for the PERS plan will be over $2 billion. MR. WOOD explained GRS considered order of return during the investment time horizon while calculating the suggested real rate of return of 5%. MR. WOOD noted this is in line with Callan's real rate of return projection of 4.35% to 5.15%, and Conduent's real rate of return suggested in December of 5%.

MR. WOOD described GRS does not develop its own inflation assumption. GRS utilizes multiple sources to view trends and expectations. GRS surveys approximately 10 investment consultant firms and collects their capital market assumptions. GRS also uses the Social Security trustees' report to identify inflation assumptions, as well as TIPS versus nominal treasuries, and finally, GRS reviews information from Philadelphia's Professional Forecasters to determine inflation expectations. Based on all of the data studied, long-term inflation expectations over the last five to 10 years have been trending down dramatically in the range of 2% to 2.6%. GRS recommends setting an inflation rate at no higher than 2.5%.

MR. WOOD explained the amortization payment used to pay off the unfunded accrued liability is effected by the payroll growth assumption being calculated as a level percent of pay. He emphasized the importance of the payroll growth assumption being accurate. If payroll growth is slower than expected or does not materialize, the unfunded accrued liability will not be paid, which will create actuarial losses and put drastic upward pressure on the contribution rate, especially toward the end of the closed amortization period.

MR. WOOD discussed the payroll growth assumption is comprised of the inflation rate assumption and a productivity rate assumption. Currently the inflation assumption is 3.12% and the productivity assumption is 50 basis points, which totals 3.62% for the current payroll growth assumption. MR. WOOD agrees with the alternatives presented to decrease the spread between inflation and total wage growth from 50 basis points to 25 basis points. MR. WOOD noted individual merit and promotion increase assumptions is more data-driven and GRS concurs with the recommendations received. MR. WOOD stated additional discussion will be presented regarding the importance of the healthcare trend assumption and how it is

affected by a lower inflation rate, as well as the value of the healthcare benefit at the time of retirement.

MS. HARBO believes almost all the members in Tier 1 of TRS are at the top of the pay scale and are receiving bonuses rather than payroll increases of 3.62%. She recommends the consideration of lowering that assumption.

COMMISSIONER RIDLE informed PERS members, depending on the contract, have automatic every-other-year raises of about 3.25%, and they do not top-out of a pay scale. In addition, they also receive bonuses.

MS. THOMPSON continued the presentation and informed GRS would not support an 8% nominal return assumption. GRS agrees with Callan that a real return assumption in the range of 4.88% to 5% is reasonable, and the inflation assumption rate should be decreased to a 2.5% range. The Minnesota State plan reduced its assumption from 8% to 7.5% recently. Texas is the only other state retirement plan that has a nominal rate of return at 8%. If Alaska stays at 8%, it would place the plan as a significant outlier among peers.

MS. ERCHINGER requested additional explanation of the effects of having a high inflation assumption. MS. THOMPSON noted the inflation assumption affects both the nominal rate assumption and the salary assumptions. The nominal rate lasts from hire date until death of the member. The salary assumption lasts from hire until retire. If the inflation assumption is wrong and high, the offset of gains and losses is not equal. It becomes more of an issue because the Alaska plan is closed.

MS. THOMPSON reviewed the demographic assumptions in detail regarding the GRS findings of concurrence or concern. The areas of concurrence included mortality, retirement, withdrawal, disability, occupational-related death and disability, withdrawal of contributions upon termination, Alaska residency for COLA, part-time service, participation, aging, rehires, unused sick days, population growth, relative value between DCR and DB healthcare plans, coverage election percent for retiring members, and Medicare coordination discount.

MS. THOMPSON explained the few areas of concern. Conduent will make some labeling changes that will be reflected in the annual valuations, such as changing the name from marriage rates to spousal coverage election. The State of Alaska has many dual coverage participants and the concern is Conduent should review the assumption annually. The concern with the DCR Plan decreasing costs by .2% per year is not significant and is one of opinion. GRS understands Conduent's reasoning and disagrees with their process. The concern regarding the EGWP assumption on a perpetual subsidy is backed by measurements of possibilities in the event the law changes.

MS. ERCHINGER believes working with Conduent and GRS has satisfied exactly the purpose of the Actuarial Committee to have the opportunity for robust, professional and respectful discussions in reviewing and determining the best estimations possible with the available information. MS. ERCHINGER expressed appreciation to Conduent and GRS for working cooperatively, resulting in a much better product for the ARMB.

16. REVIEW OF EFFICIENT ASSET ALLOCATION MIXES

PAUL ERLENDSON and JOHN PIRONE of Callan, LLC led the review of efficient asset allocations. MR. ERLENDSON showed and described an exhibit he created last night, inspired by the Actuarial Committee meeting. He will provide a copy of the slide to members. The illustration shows the rolling 10-year real returns of public pension funds over the last 40 years, and the average is 5.1%. The average for the period before the 2009 financial crisis was about 5.6%.

MR. PIRONE continued the presentation noting the two sections of discussion will focus on Callan's economic assumptions, including real return rate, inflation rate, and time horizon, and the second area of focus is evaluation of the asset allocation of PERS. PERS will be used as a proxy for the other plans. Militia will be viewed separately. Callan's approach to developing economic assumptions embodies evaluation of current conditions combined with long-term expectations based on historical numbers. MR. PIRONE walked through the valuations for capital markets over a 10-year horizon, including components such as equities, asset allocation, and interest rates. The compilation for the 10-year nominal return reflected an expectation of 6.6%. The 10-year real return expectation equals 4.3%. The current nominal return is 8%, comprised of a real return of 4.88% and inflation rate of 3.12%.

MR. PIRONE described inflation assumptions are derived by reviewing the Federal Reserve policy and its near-term target indicators. Callan also looks to the market to gather expectations of inflation reflected through bonds of different maturities. The aggregate of information for inflation leads to a central expectation of CPI at 2.25%. MR. PIRONE noted Callan uses a 2.25% inflation rate for 10-year, 20-year, and 30-year time horizons.

MR. PIRONE discussed the process used for transitioning the 10-year expectations into longer time horizons using the building block approach. Additional study is reviewed which models the concept of equilibrium returns, where normal levels return for interest rates and equity valuations. As the timeframe moves from 10 years to 20 years to 30 years, the equilibrium model will increasingly be incorporated into the model. The 10-year nominal return shows 6.6%, with a 4.4% real return. The 20-year nominal returns shows 7.1%, with a 4.8% real return. The 30-year nominal return shows 7.4%, with a 5% real return.

CHAIR JOHNSON requested information on best practice regarding time horizon projections. He noted Social Security uses a 75-year horizon. MR. PIRONE reiterated best practice embeds understanding the specific characteristics of the plan. ARMB closed amortization plan makes it reasonable to utilize a 20-year horizon. MR. ERLENDSON explained the projections are assuming there will be no changes to the asset allocation policy. History has shown allocations do change and as the plan matures, the allocation may become more conservative. Callan finds the 10-year projections to be the most useful because it provides an intermediate planning horizon and is more reflective of investor behavior.

COMMISSIONER FISHER asked for additional explanation regarding the time horizon because the closed plan has 20 more years' worth of payments remaining and then an

additional 20 years or more of a decumulation period. MR. PIRONE commented the time horizon can be viewed as a math problem to the actuaries, in terms of determining an analytical figure. MR. PIRONE believes a 20-year time horizon is prudent.

MR. PIRONE noted the second area of focus for the presentation is the valuation of asset allocation mix alternatives. He emphasized the importance of the dimensions of a policy, not only the expected return, but also the risk factor in terms of standard deviation. The risk is shown as the extent of the variability of returns above or below the expectation. A higher standard deviation reflects that potential downside. MR. ERLENDSON reiterated this critical issue because the actuarial assumption is assuming the same return year after year after year. He noted the reality is returns do not happen that way. There are variations each year and although the median return is useful, it is not very informative, absent the idea of standard deviation around that median rate of return.

MR. PIRONE explained the risk of equities in the illustrations reflect a broadly diversified portfolio. The premium spread between equities and fixed income is approximately 4% per year. The models from left to right decrease the bond allocation by 5%, while increasing the equity allocation by 5%, and thus increasing the standard deviation risk.

MR. PIRONE showed the current PERS risk model has a 14.7% standard deviation, which is essentially the same as Mix 4. The PERS plan is somewhat aggressive in terms of having 10% as an anchor in fixed income. The way to decrease risk in the portfolio would be to increase allocation to bonds. This would also lower the expected return of the portfolio. Conversely, the option to decrease the allocation to bonds would increase the risk to the portfolio and increase the expected return.

MR. PIRONE reviewed the similar asset allocation exercise regarding the current Militia plan and showed the risk model has about 9% standard deviation, which is closest to Mix 3. The Militia plan has almost 50% of its asset allocation in bonds and a significantly more conservative expected 10-year return of 5.3%.

CHAIR JOHNSON recessed the meeting from 3:21 p.m. to 3:26 p.m.

17. ASSET ALLOCATION REVIEW AND APPROVAL

MR. MITCHELL conveyed his hope to advance the continued discussion regarding economic assumptions and to facilitate Board agreement with a set of real return assumptions and inflation assumptions. He explained the presentation describes the annual process of establishing a strategic asset allocation. The action memo refers to two asset allocation resolutions. The first resolution is a recommendation is to decrease the risk profile and liquidity risk of all the plans except for the Militia fund by increasing the allocation to fixed income by 5%. Using Callan's parlance, the recommendation is to move from Mix 4 to Mix 3. The impact, based on Callan and Conduent, over a 10-year period is a decrease in return of about 10 basis points. Longer-term, the decrease in return is estimated at about 20 basis points. The second resolution is a recommendation to decrease the fixed income allocation in the Militia fund by 3%.

MR. MITCHELL reviewed the Board statutes and highlighted the Board has the fiduciary responsibility to manage and invest assets in a manner that is sufficient to meet liabilities. MR. MITCHELL noted the Board has the authority to assess market conditions and make appropriate decisions regarding the risk profile and expected return assumptions in the best interest of the fund. MR. MITCHELL explained consideration to employer contributions and timing should be part of the decision because of the possible impacts to employers and their ability to make contributions.

MR. MITCHELL discussed the in-depth study completed by Deputy Chief Investment Officer ZACHARY HANNA of the funds return assumptions relative to 260 state and local peers from the National Association of State Retirement Administrators (NASRA) dataset. The highlight is the ARMB portfolio's nominal return assumption is about 50 basis points higher than the median peer and the asset allocation is riskier than the median peer. The data show the ARMB portfolio's risk profile has been incrementally increasing since 2001, and the median peers' portfolio risk profile has been relatively flat since 2001.

MR. MITCHELL described the ARMB portfolio over time has been expanding allocation to alternatives, materially decreasing allocations to fixed income, and remaining relatively flat with equity allocations. Alternatives include private real estate, some public real estate, private infrastructure, MLPs, farmland, timber, and private equity. MR. MITCHELL explained the staff focused on a study to determine the liquidity needs of the portfolio within the current asset allocation structure. The liquidity risk scenario was based on how much of an equity drawdown the portfolio could sustain before being unable to rebalance to target asset allocation, after a year's worth of net benefit payments were held back and 1% for capital calls for the alternatives portfolio was held back. The calculation yielded a 20% drawdown in equities would make it difficult to rebalance to target asset allocation. Staff requests the Board to consider this as a limit on how much risk should be taken at the broader portfolio level.

MR. MITCHELL reviewed the amounts of additional liquidity or fixed income the portfolio would need to handle 35%, 45%, and 55% drawdowns in the equity market to be able to rebalance to target allocations. The profile starts at 2% more liquidity needed and grows at a slightly positive slow until the end of the funding period, at which point employer contributions drop dramatically and the liquidity needs of the portfolio grow dramatically in 2039. MR. MITCHELL informed the recommendation to modestly increase the liquidity profile of the portfolio by moving to Mix 3 is based on this information.

MS. ERCHINGER asked if the State has other ways of addressing short-term liquidity needs from the possibility of a catastrophic event, including the ability to borrow money from other State holdings, rather than drag the portfolio's return for decades. MR. MITCHELL noted his view in only within the ecosystem of the retirement plans. COMMISSIONER FISHER responded his concern is if the ARMB portfolio is experiencing a severe drawdown, then other State financial sources will be in a similar trough, and it will be difficult for the State to divert money away from other places.

COMMISSIONER FISHER inquired if it is better to increase fixed income by decreasing equities or reducing alternative exposures. MR. MITCHELL noted he does not have a clear answer right now. Currently the alternatives are frozen at the same level in the Callan mixes. The risk profile and risk drivers in the alternative portfolio would have to be studied. The alternative portfolio consists of typically illiquid, slow-moving commitments that are limited as to the amount of adjustment that can be made. MR. MITCHELL informed addressing these issues are slated on his agenda before the asset allocation conversation arises next year.

CHAIR JOHNSON commented he believes the progression toward liquidity would arise years in the future due to being a closed-end fund and inquired as to the possibility of using funds in the future from the slow moving alternatives rather than converting the equities into bonds now. MR. MITCHELL explained the long-term liquidity concern occurs after the funding period in 2039. The possible short-term liquidity concern is the ability to rebalance to target after a market downturn. The proposed asset allocation change addresses the rebalancing concern. MR. MITCHELL asserted further analysis is necessary because reducing allocation to alternatives could entail a greater reduction in return.

MS. ERCHINGER requested more discussion regarding the importance of rebalancing. She expressed concern about a long-term reduction in the portfolio's return in order to address a potentiality that may never occur. MR. MITCHELL indicated the proposed asset allocation change is defining the liquidity limit. It is possible there could be a shallow recovery after a market correction that looks more like an L shape, and that would be a more difficult adjustment period, with possibly having to sell at distressed prices at that point. MR. MITCHELL believes a more aggressive asset allocation will have a higher return over the long-term, but this assumes rebalancing to target over time. The expected return may be degraded if rebalancing does not occur. The 5% move from equities to fixed income is approximately $1 billion and would partially come from liquidating equities and partially from the State assistance payment. The portfolio is cash flow negative and the approach would be to sell equities to fund benefit payments that come due. This would move the portfolio closer to the target asset allocation. Currently, the portfolio is at about 9% in fixed income, which is underweight by about 1%.

MR. MITCHELL discussed equity valuations are at the relatively high end of expectations and corporate profitability is at the high end of its historical range. Equities are expensive. Drawdowns could occur if price-to-earnings begin to normalize and earnings begin to normalize.

MR. MITCHELL explained staff's recommendation is to move from the current exposure slightly up in the Militia fund to Callan's Mix 4. He expressed being content with the current position if the Board does not want to adjust the allocation now.

MR. MITCHELL showed a comparison graphic of the impact on employee contributions over the next 10 years if returns were lower than the long-term expected return rate assumption. Beginning in year three, the employers would have to contribute more to make up for the shortfall. A higher set of employer contributions is estimated leading to 2039, followed by a set of surpluses in the plan or lower contributions. MR. MITCHELL explained another

graphic modeling the effects of discounting the cash flows back to the net present value with a flat return assumption. This would reduce contribution stress on employers by providing a smaller sine wave. MR. MITCHELL noted he would like Conduent to conduct additional study of this impact if the Board agrees.

MS. HARBO expressed discomfort with the recommendation to increase the fixed income allocation from 10% to 15%. She commented on being proud of the ARMB's diverse allocation and of the amount that is managed internally. MS. HARBO advised she could support a 1% increase.

CHAIR JOHNSON inquired as to the timing of the recommendation to change the asset allocation. He feels it is conflating asset allocation with the current process at hand of setting economic assumptions. MR. MITCHELL noted the annual review and establishing asset allocation historically has occurred in April and June. This is the last opportunity to make a decision prior to the beginning of the new fiscal year. MR. MITCHELL noted he appreciates the difficulty involved.

MR. WEST expressed support for the proposed increase allocation to fixed income from 10% to 15%. He feels the timing should occur now so the actuaries can run the economic assumptions and impacts with the updated information. MR. WEST agrees with the presentation and feels there are additional reasons why liquidity may become constrained that were not included.

CHAIR JOHNSON requested feedback from the IAC. DR. JENNINGS commented that altering the process to allow change is probably more important than the actual number chosen. He reiterated the importance of rebalancing and having the liquidity available to rebalance. MR. JENNINGS believes the stress testing the portfolio for a 20% to 30% decline is an appropriate level of magnitude.

DR. JERRY MITCHELL agreed with the staff proposal and suggested the 5% could be placed in cash rather than treasuries. This would give the most non-correlation against other assets and provide liquidity. He noted the liquidity might not be used to pay for benefits and could be use for making more private equity investments at the appropriate time.

Action: Adopt Asset Allocation
Resolution 2018-01:
DB PERS / TRS / JRS
PERS / TRS / JRS Retiree Health Trusts
Retiree Major Medical HRAP / ODD

MR. WEST moved to adopt Resolution 2018-01. COMMISSIONER FISHER seconded the motion.

COMMISSIONER FISHER expressed appreciation to MR. MITCHELL for the thoughtful energy and reflection in bringing this issue forward. He anticipated the day would come when the portfolio would need to shift to more liquid assets, but did not expect the transition

to occur so soon. He suggested the possibility of the State Assistance payment and new monies that come in could go into fixed income to fund the increase. COMMISSIONER FISHER asked if staff is satisfied this is now the correct asset mix or if the portfolio is now too heavily invested in illiquid assets. MR. MITCHELL responded that in the short-term, the increase in fixed income or cash would come from the public equity market. He proposed staff make a concerted effort to address the alternative and illiquid allocation question and bring the conclusion before the Board for discussion either during the asset allocation review next year or sooner.

MS. ERCHINGER expressed appreciation for the amount of work endeavored for this proposal from staff and consultants. She stated she is not prepared to vote in favor of a change at this point. MS. ERCHINGER noted the proposal caught her off guard and she does not feel she has had enough time to really address the issues. Previous liquidity presentations have shown liquidity is not a concern, and her impression today is the view has changed to addressing a possible catastrophic liquidity issue, which is driving this major decision. She requested to continue the discussion about liquidity to see what options are available to address the concerns. MS. ERCHINGER noted she is comfortable with the National Guard resolution.

CHAIR JOHNSON asked what effect this change would have on the recommendations with respect to assumptions from Conduent and GRS in 2018. MR. MITCHELL expects this change would have an approximate effect of 20 basis points off of return from Conduent's 30-year real return number presented in December, and an approximate effect of 10 basis points off of return from Callan's 10-year numbers.

VICE-CHAIR SCHUBERT inquired if there were any issues that will be faced by not adopting this resolution before the fiscal year-end. MR. MITCHELL indicated there are no explicit issues. He would be supportive of the decision to table this for further discussion and analysis.

A roll call vote was taken, and the motion failed, with VICE-CHAIR SCHUBERT, MS. ERCHINGER, MS. HARBO, and CHAIR JOHNSON voting against.

Resolution 2018-02: DB NGNMRS

MR. WEST moved to adopt Resolution 2018-02. MS. HARBO seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

13. GLOBAL EQUITY EX-US

MR. CARSON gave the presentation on the Global Equity Ex-US allocation. He noted the ARM Board has heard from a panel discussion and several managers in recent meetings presenting on the topic of the non-US equity investment environment, forecasts, and investment philosophies. The key takeaways from those presentations were, 1) the non-US economic landscape has become more globalized, 2) emerging markets may offer a higher

long-term return prospect from developed markets, and 3) China is anticipated to play an ever increasing role in the global markets.

MR. CARSON explained global ex-US and non-US will be used interchangeably throughout his presentation. He noted some of the benchmarks used in non-US equities are MSCI, MSCI World Ex-US, MSCI EAFE, EAFE Small Cap, and IMI. The current global equity ex-US portfolio allocation consists of the non-US component of a global mandate managed by Lazard and benchmarked to the MSCI EAFE Index, three non-US all country mandates, two non-US developed small cap mandates benchmarked to the MSCI EAFE Small Cap Index, two non-US all country passive mandates, and three emerging market mandates.

MR. CARSON discussed the dollar allocation to the different mandates and strategies do not necessarily represent the stylistic exposure within those mandates. He gave the example that an ACWI ex-US manager can invest in developed markets and emerging markets, but a developed manager in small cap will only focus in that area. MR. CARSON showed an illustration of the current style exposures in the aggregate total portfolio level. This is a snapshot in time because style exposure varies considerably as the market moves. MR. CARSON noted Callan will review the relative performance of the funds.

MR. CARSON outlined the recommended modifications to the portfolio and the evidence of support for each change. MR. MITCHELL informed the first two proposed recommendations were discussed with affected managers and the managers were supportive of the changes overall.

- Change Baillie Gifford performance benchmark to MSCI ACWI Ex-US Growth Index (Action).
- Modify the Brandes mandate to include emerging markets and change the benchmark to the MSCI ACWI Ex-US Value Index (Action).
- Terminate merging markets mandate currently managed by Parametric (Action).

MR. CARSON explained the next set of recommendations is related to manager searches. He reviewed the opportunities and provided effective reasoning for each category.

- Conduct a passive manager search to replace the current two passive ACWI Ex-US IMI mandates.
- Conduct an interim manager search to invest in the Board approved scientific beta, multi-beta, multi-strategy, equal-weighted, and developed ex-US strategy until internal management capabilities can be established.
- Conduct a manager search to invest the scientific beta, multi-beta, multi-strategy, equal-weighted, emerging markets strategy in the EM space.
- Engage Callan to conduct a manager search for emerging markets growth strategy (Action).
- Engage Callan to conduct a manager search for a dedicated all-China investment strategy (Action).

RECESS FOR THE DAY

CHAIR JOHNSON recessed the meeting at 5:01 p.m.

Friday, June 22, 2018

CALL BACK TO ORDER

CHAIR JOHNSON reconvened the meeting at 9:03 a.m.

Trustees Schubert, Harbo, Erchinger, Fisher, Ridle, West, and Williams were also present.

CHAIR JOHNSON recommended the Board make a specific decision or give particular guidance to staff regarding the real rate of return assumption and the interest rate assumption after agenda Item 23. There was no objection.

18. GLOBAL HEALTHCARE TRANSFORMATION STRATEGY

MR. MITCHELL introduced Robert A. Gillam and Alex Slivka of McKinley Capital Management. MR. MITCHELL explained discussions and developments with staff, Callan and McKinley have been ongoing for about eight months regarding the Global Healthcare Transformation strategy. MR. SLIVKA expressed appreciation to the Board and staff for their overall 20-year working relationship with McKinley. Over the past decade, McKinley has spent very heavily on both people and systems to focus in areas of the market where there is opportunity for alpha. A designated data science team with natural language processing expertise has been created as part of this transformative process.

MR. GILLAM described the Global Healthcare Transformation strategy represents one of the single best return opportunities and active risk diversifier opportunities for the next decade in the global equity markets. Healthcare spending is on the rise and is unsustainable. For the first time in human history, there are more people older than 65 than there are people younger than five. Technology, innovation and industrial redesign have been proven to be safe in the healthcare delivery space. McKinley believes a global transition is converging from the old model of healthcare to a new model of healthcare and is transforming across six main categories; payment reform, healthcare delivery redesign, patient-centered care, digital health, wireless and mobile health, and personalized medicine.

MR. GILLAM reviewed the rigorous process McKinley uses to build its portfolio. He gave a detailed description of the research developed and due diligence performed during portfolio construction. The standard deviation is expected to be at or below the global ACWI benchmark. MR. GILLAM shared the extensive biographies of two of McKinley's healthcare investor advisors; DANIEL LUBIN and GILLIAN SANDLER. MR. GILLAM expressed McKinley has clients from around the world, but he is Alaskan first. He feels it is important to offer Alaskan beneficiaries the opportunity to partner with McKinley on their best ideas.

EXECUTIVE SESSION: 9:28 a.m.

MR. MITCHELL recommended MR. GILLAM and MR. SLIVKA attend the initial part of the executive session to convey additional information, and then return after executive session

to answer any follow-up questions. CHAIR JOHNSON suggested staff and IAC members also attend the initial part of the executive session.

MS. HARBO moved to go into executive session for the purposes of discussing matters that the immediate knowledge of which could negatively impact the finances of the Board. MR. WEST seconded the motion.

The motion passed with no objection.

CHAIR JOHNSON called the meeting back to order at 9:56 a.m., and noted no decisions were made during executive session.

DR. MITCHELL requested further explanation regarding three topic areas; 1) transformative healthcare companies being part of larger companies that become unsuccessful, 2) the possibility of not being able to profit from innovative technology, and 3) the ability to invest in private companies. MR. GILLAM explained the evaluation McKinley uses to determine companies for the portfolio is protectively stringent. The opportunity for profit growth for innovative technology is expected to come directly from lowering the cost of care for the patient in general. MR. GILLAM stated this strategy does not intend to invest in private companies.

STEVE CENTER of Callan noted the initial reviews appear to have proposed holdings that skew toward the size of small cap and mid cap companies. He asked if the MSCI ACWI benchmark is the appropriate benchmark for this strategy. MR. GILLAM noted McKinley believes the MSCI's definition of healthcare misses transformation healthcare. The ACWI Small Cap Healthcare benchmark would theoretically be more demonstrative of the kinds of companies in the portfolio by size, but also misses the definition of transformative healthcare.

Action: Request to Engage Callan for Strategy Review

MR. MITCHELL stated staff recommends ARMB direct Callan to review the Diversified Public Portfolio of the Global Healthcare Transformation Fund managed by McKinley Capital and present the results of findings to the Board at the September 2018 meeting.

MS. HARBO moved to direct Callan to review the Diversified Public Portfolio of the Global Healthcare Transformation Fund managed by McKinley Capital and present the results of findings to the Board at the September 2018 meeting. VICE-CHAIR SCHUBERT seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

19. SECURITIES LENDING UPDATE

MR. MITCHELL introduced HENRY DISANO, Securities Finance Division of State Street Corporation, to provide the update on the securities lending program; its structure, mechanics, progress, and activity results. The ARMB reinstated its State Street Securities Lending

program in February 2017, after a hiatus of approximately nine years. MR. DISANO described security finance as the lending of cash or securities against collateral between two parties, for the purpose of enhancing yield, generating incremental revenue, assisting in trade settlement, or for other strategic purposes. The program lends the portfolio securities that are in custody at State Street in return for cash as collateral. MR. DISANO described other products the Securities Lending Division offers. State Street is one of the most experienced providers in the business, offering securities lending since 1974.

MR. DISANO noted benefits to the lender include additional alpha, ability to offset State Street custody service fees, outperformance of peers, data generation, market liquidity, and enhanced market price transparency. The lender receives collateral before or at the same time as security delivery. The security lending program does not impact the investment managers' ability sell the securities, nor does it limit the transaction of purchasing additional securities.

COMMISSIONER FISHER requested additional explanation of the process, because his experience with securities lending resulted in impact to the manager's ability to transact the stock and close. MR. DISANO explained the process that when a State of Alaska manager sells a security that is on-loan, State Street swaps that on-loan security to on-loan security with another State Street customer. This occurs 97% of the time. In the occasional instances a security is very illiquid, a delay in settlement could occur, but the price at which the security was transacted remains the price at which the trade will be settled.

MR. MITCHELL informed all the portfolio managers were advised regarding the reestablishment of the securities lending program and were offered the option of nonparticipation. One manager requested not to be included and the request was honored.

CHAIR JOHNSON expressed his concerns with securities lending include ensuring the ability to control the amount of lending activity, limiting certain securities from being included, and limiting lending activity during certain times. MR. MITCHELL stated the program was consciously constructed to have more staff control over the parameters of the securities being lent. The staff has the ability to recall a security at any time. MR. DISANO explained the program was designed to be as flexible as possible for the client. The client has the ability to restrict markets, limit the percentage of the security that can go on loan, and limit the borrowers.

MR. DISANO described the details of the transaction process. The cash collateral is invested at the discretion of the client. The current portfolio invests with SSgA in a government money market fund, which is the most conservative option for investing cash collateral. It also utilizes floaters. The revenue generated for lending transactions is split 80/20 between the client and State Street. MR. DISANO advised State Street has 265 clients in the program with almost $4 trillion in lendable assets and about 10%, close to $400 billion, in active securities on-loan. The credit rating for State Street is AA minus. MR. DISANO reported the State of Alaska program has generated about $4 million in revenue since reentry in February 2017. There are approximately $12 billion in lendable assets and the average return on loans is 225 basis points. Once revenues reach $2 million in a year, the fee split moves to 85/15.

MS. ERCHINGER requested a general description of the borrowers who participate in this program and the circumstances under which this program is useful to borrowers. MR. DISANO explained securities lending initially began to assist in the settlement of securities in the event the broker committed to make a delivery, and for whatever reason, did not have the security in their inventory. The bigger brokers include Goldman Sachs and Morgan Stanley. The most familiar reason for securities lending is the scenario when borrowers have a client who is shorting a security and needs to borrow the security to make the short sale. Treasuries are borrowed for other reasons, including use as collateral.

MR. WEST clarified the term securities lending and explained it is technically a structured purchase and sale. The brokerage firms are not lenders in the legal description and other readily used terms including rebates, loans, and collateral are not the actual legal descriptions.

MR. DISANO explained the credit risk involved in securities lending. The portfolio is indemnified against counter-party default in the event the borrower declares bankruptcy. State Street is focused on ensuring the credit quality of the counterparties. Market risk is the possibility of the value of the securities appreciating during the time they are on-loan, which is why the excess margin of 102 or 105 is established. Operational risk includes the complicated and important functions to ensure the securities are marked to market daily, the loan transactions are marked to market daily, borrowers are sending excess collateral when there is a shortfall and collateral is being returned where there is an excess. There are buffers in the program to assist with concerns around sell/fail transactions.

State Street mitigates the legal risk by utilizing their extensive experience and standard securities lending authorization agreement. Seven attorneys are dedicated to this product. Reinvestment risk is addressed by the State of Alaska deciding to only invest the cash collateral in the most conservative government money market fund and floaters. Yield has been increasing in alignment with the Fed interest rate hikes, but the impact has been minimal because of the floaters and the extremely short terms. Fifteen employees are dedicated to risk management and almost 270 employees are dedicated to securities lending. State Street also has an additional independent team outside of securities lending called Enterprise Risk Management who provides checks and balances and focuses on risk management. MR. DISANO expressed appreciation to the Board for participation in the program and was available to answer any questions.

CHAIR JOHNSON recessed the meeting from 10:34 a.m. to 10:43 a.m.

20. MACKAY SHIELDS HIGH YIELD INVESTMENT REVIEW

MR. MITCHELL introduced JOE MAIETTA of MacKay Shields who provided the portfolio update and described recommended changes to the investment guidelines for the strategy allowing for higher risk-adjusted returns. MR. MAIETTA introduced Lead Portfolio Manager and head of MacKay Shields' High Yield Team ANDREW SUSSER. MR. SUSSER informed MacKay Shields is 100% owned by New York Life, but operates separately from New York Life. The high yield group also operates separately from all other groups within MacKay Shields and manages approximately $22 billion of high yield for

institutional clients. The State of Alaska portfolio is a core high yield strategy. MR. SUSSER reviewed the experience and expertise of the investment team.

MR. SUSSER explained the portfolio focuses on the risks and rewards in the US high yield market. There are no hedge funds, no derivatives, no foreign currencies, no structured products, and no indexing. An emphasis is placed on asset coverage; the difference between the value of the company and the amount of company debt. A company must have a minimum of 1.5 times asset coverage to be considered for the portfolio. MR. SUSSER gave a detailed explanation of the accountability, analysis and investment process, which includes a formal, structured evaluation of environmental, social and governance (ESG) factors. MR. SUSSER discussed examples of specific credits within the portfolio and the investment discipline for selection.

MR. SUSSER reviewed the portfolio's net-of-fee returns. The year-to-date return is down 19 basis points, but is outperforming the market, which is down 91 basis points. Over the timeframes of one year, three years, and five years, the portfolio has provided value. The since-inception return is lagging due to the 2009 underperformance. MR. SUSSER showed the beta for the six-year period was .9 and the alpha generation was 1.5% per year. He described the current portfolio construction in terms of yield, duration, credit quality, and sector in comparison to the index.

MR. MAIETTA gave a thorough description of the proposed new high yield BB strategy designed to structurally improve the high yield risk-adjusted returns. It includes advantages of having minor flexibility to opportunistically invest in B or CCC rated bonds when the spreads are above the historical median of 525 basis points. The strategy would be benchmarked to a BB index. MR. MAIETTA extensively reviewed the investment risk, credit risk, long-term performance, standard deviation, Sharpe ratio, information ratio, and market liquidity of high yield BB rated bonds.

21. MONDRIAN INTERNATIONAL FIXED INCOME AND BLENDED EM DEBT

MR. MITCHELL introduced TODD RITTENHOUSE of Mondrian who provided the portfolio update and described proposed changes to the investment guidelines for the active strategy. The intent is to improve risk-adjusted performance relative to the benchmark. MR. RITTENHOUSE introduced Senior Portfolio Manager of the Global Fixed Income and Currency Team MATT DAY. Mondrian has been managing the portfolio since 1997. MR. DAY reviewed the strong relative performance track record since inception.

The current portfolio is comprised of 70% unhedged international fixed income and 30% local currency emerging market debt. The international fixed income contains government bonds denominated in foreign currencies of developed countries. The local currency emerging market contains government bonds of emerging markets. MR. DAY informed the proposal makes three changes; 1) the 70% unhedged international fixed income piece is reduced to 50% international fixed income and is hedged back to US dollars, 2) the 30% local currency emerging markets debt element is reduced to 25%, and 3) there is an addition of 25% of hard currency emerging markets debt. These are bonds issued by emerging market currencies that

are denominated in US dollars. The proposal moves from a portfolio entirely denominated in foreign currencies to a portfolio that is 75% denominated in US dollars.

MR. DAY explained Mondrian has worked closely with MR. MITCHELL and VICTOR DJAJALIE to develop the strategy and informed the investment process will remain the same. MR. DAY provided a detailed description of the simulated results of the proposed strategy compared to the current strategy. The proposed strategy involves shorting currencies because the index currency weights are zero due to moving to a hedged benchmark for developed market countries. MR. DAY answered questions and gave an extensive review of the portfolio risk controls, constraints, monitoring process, and manager experience the proposed portfolio offers.

MR. DAY noted the yield to maturity of the proposed portfolio is 4.5% compared to the US Aggregate of 3.2%. The credit rating distribution average is single A. MR. DAY explained in detail how the new strategy will allow additional flexibility under the proposed benchmark change and will continue to add performance to the portfolio above the benchmark.

22. CALLAN OVERSIGHT OF INTERNAL INVESTMENT MANDATES

MR. MITCHELL advised this presentation is the result of a question expressed at the previous meeting regarding the ability to provide oversight to internally managed strategies. MR. MITCHELL invited MR. ERLENDSON and STEVE CENTER to present Callan's framework for evaluating internally managed strategies. MR. ERLENDSON informed the review report does not include private equity or absolute return portfolios. It does include all other strategies. The findings suggest the majority of the strategies are meeting or exceeding the benchmarks for the period under which they have been managed internally.

MR. ERLENDSON recommended the evaluation continue using the same standards for other capital managers, including performance and characteristics expectations. Callan proposes the internally managed portfolios receive a review once a year. MR. ERLENDSON walked the Trustees through the draft of the report and requested feedback regarding additional information Trustees would like included in the report.

MR. ERLENDSON provided a detailed description of each portfolio in relation to current market conditions and in relation to matching the characteristics of the designated index. The Russell 1000 Growth, Russell 1000 Value, and Russell Top 200 strategies were recently implemented by the internal investment team at the end of the fourth quarter, and the long-term track record shown is not indicative on the internal team's management. The internally managed yield portfolio benchmarked to the Dow Jones US Dividend 100 was implemented in the first quarter of 2013, and has outperformed the benchmark over longer periods of time.

MR. CENTER noted the internally managed STOXX minimum variance portfolio was implemented in the fourth quarter of 2015, and has slightly outperformed the benchmark. This has been a difficult period for these types of strategies. The internally managed portable alpha portfolio began about a year-and-a-half ago and has trailed the benchmark by 150 basis points. There are no concerns at this point, given that the program has not yet completed a

full market cycle. MR. MITCHELL believes this strategy deserves additional scrutiny by both Trustees and Callan because of the use of derivatives and its complex structure.

CHAIR JOHNSON inquired as to the possibility of involving the IAC in review process of the internally managed portfolios. MR. MITCHELL noted the IAC is currently not involved in the review process of the underlying strategies. MR. MITCHELL noted he will participate in any level of scrutiny the Board recommends. CHAIR JOHNSON requested MR. MITCHELL utilize the expertise of the IAC.

MR. ERLENDSON described the internally managed S&P 600 is exceeding its benchmark since inception, just over a year ago. The internally managed Scientific Beta strategy is relatively new and lags the benchmark by three basis points over the year. The internally managed S&P 500 equal-weight benchmark is one basis point ahead of its benchmark over its short tenure. The internally managed REIT portfolio has a history of 13.5 years and is a tightly controlled active strategy. It has outperformed the benchmark over the long-term, but recently has lagged the benchmark. The internally managed US Treasury Pool portfolio has exceeded the 1.7% return of the benchmark over the last seven years. The internally managed TIPS portfolio has also outperformed the benchmark.

MS. HARBO expressed appreciation for the presentation. She requested the next report contain a table that includes the individual strategies, with a description of its investment start date, initial investment amount, and current investment amount.

MR. CENTER recommended Callan perform an onsite visit to the offices in Juneau to conduct an operational review and provide further due diligence regarding investment processes before the next annual report. MR. ERLENDSON believes the onsite visit is the final piece of the proposed reporting framework. The performance figures are gross of fees and were provided, calculated and verified through the third-party custodian. No tracking errors compared to the indices were found. Callan has not identified an accurate way to calculate a fee rate for staff or external portfolio costs. Callan will work with staff to determine reasonable alternatives in order to present a net-of-fee calculation.

MR. MITCHELL noted staff will continue to provide qualitative asset class reviews on a rotational basis, and specific presentations on private equity, absolute return, and real assets.

CHAIR JOHNSON recessed the meeting from 12:09 p.m. to 1:07 p.m.

23. PERFORMANCE MEASUREMENT – 1st QUARTER

MR. MITCHELL informed Callan will present the quarterly performance measurement and describe the one-time changes to the performance calculation. MR. CENTER explained private market assets, which include private equity, portions of the absolute return portfolio, and portions of the real assets portfolio, are typically reported on a one-quarter lag because the timing of the investment information is not available to include in the quarterly return calculation. MR. CENTER explained MR. MITCHELL wanted to institute the ability to remove the one-quarter lag by reporting two quarters' of performance within one single

quarter. This is called de-lagging. The effect is the private equity portfolio first quarter performance of 2018 includes the performance that was earned during the fourth quarter. The de-lagging contributed about 75 basis points to the plan's performance numbers. This is a one-time adjustment and should become less impactful for cumulative returns over time.

MR. ERLENDSON provided an overview of the markets noting the first quarter GDP estimates were at 2.3%. The new tariffs will be closely watched because they specific to certain products and industries and could have an up to 2% impact on S&P 500 earnings. The unemployment rate at the end of May is an 18-year low at 3.8%. The wage growth for hourly earnings is up about 2.5%. Consistent employment gains have been continuous for 94 months. Growth of earnings per share in the S&P 500 has been fairly steady since 2008. Emerging markets have been the strongest performing part of the market over the last three years. The best performing sector year-to-date has been small cap equities, which are up about 9.5% through June 8th. The growth small cap stocks are up 11.5% and value small cap stocks are up 7.3% year-to-date.

MR. ERLENDSON reviewed current short-term and long-term interest rates. The yield curve has started to flatten. The long-term interest rates have not increased as much as the short-term rates have increased over the last year. The Fed raised rates three times last year, and were raised a second time this year on June 13th to a target range of 1.75% to 2%. The expectation is the Fed will raise rates at least two more times this year, to end up at 2.5%.

MR. ERLENDSON discussed the market environment for real assets and noted appreciation growth is slowing. The benefits of real assets include producing income and stabilizing the value of the fund. The active managers are adding value over the benchmark.

MR. CENTER provided the overview of the performance for the quarter using the PERS plan as a proxy for the program. The returns were discussed gross-of-fees. As of the end of March, the portfolio was in line with its target asset allocation, but had a slight underweight to fixed income and opportunistic equity, and a slight overweight to opportunistic fixed income and non-US equities. The portfolio's asset allocation relative to peers tends to have a lower allocation to domestic equity and fixed income, and a higher allocation to real assets and alternatives. Total plan returns over the last quarter have outperformed the benchmark and contain the de-lagging positive effect. Total plan returns over the last year came in at 11.3%. The three-year return was 7.1% and the five-year return was 8.5%, just below the top quartile versus the peer group. Over the last 10 years, the plan has performed slightly below median, due primarily to the lower allocation to domestic equity relative to peers. The 26-year return is ahead of the benchmark.

MR. CENTER described the domestic equity performance within the portfolio was slightly behind the Russell 3000 and S&P 500 Index for the quarter. Longer-term performance is fairly close to or slightly ahead of the benchmark. The large cap portfolio slightly lagged the Russell 1000 for the quarter, but is very close to the benchmark over time. Positive contributors for the quarter included Lazard's value portfolio and McKinley's growth portfolio. Barrow Hanley's large cap value and QMA's large cap value both lagged the benchmark and negatively impacted performance. The internal scientific beta portfolio was a

positive performer during the quarter. The small cap portfolio contributed positively to the domestic equity portfolio and was well ahead of the benchmark. Positive contributors included Jennison, Arrowmark, Fidelity, and Frontier. Two of the three microcap managers, Lord Abbett and Zebra, had strong performance, while DePrince Race and Zollo lagged the benchmark. The standard deviation, downside risk, and tracking error are all below median for the small cap portfolio.

MR. CENTER continued the presentation noting the developed market international equity portfolio outperformed the MSCI EAFE by approximately 125 basis points during the quarter, is well ahead of the benchmark over the last year by about 3%, and ahead of the benchmark long-term. The stronger performers are Arrowstreet, Baillie Gifford and Brandes. The strugglers are most recently Mondrian and Schroder. Over the long-term, they have contributed positively to the program.

MR. CENTER reviewed the emerging markets portfolio and noted later in the meeting staff will recommend the Parametric portfolio be replaced, and request Callan to conduct a search for a portfolio that compliments Lazard. Both Lazard and Eaton Vance had a strong quarter returning ahead of their benchmark. The total bond portfolio slightly lagged the index during the quarter. The total bond portfolio has an intermediate duration bias and most public plan peers have a longer duration bias and more credit exposure. The opportunistic asset class has investments in both fixed income and equities. Positive performance came from the international fixed income portfolio. The taxable municipal portfolios were down about 1.5% and the high yield portfolio was slightly negative. The real assets portfolio was positive for the quarter, and both farmland and timber had strong quarters. The MLP portfolio was negative, but did not decline as much as the benchmark. Infrastructure was a positive contributor for the quarter. The absolute return portfolio was slightly negative for the quarter. The long-term performance compares favorably to the HFRI Fund-of-Funds Composite.

MR. CENTER described the overall investments and asset changes in the DC plan. The Balanced funds and the Target Date funds have performed in line with their benchmarks. The Target Date funds extend out to the Target 2060 Trust. The stable value funds have performed quite well. MR. CENTER made the correction the Allianz Socially Responsible fund returned a positive 1% for the quarter, not a negative 1%, and noted the portfolio has been replaced with a passive strategy. The passive options show no areas of concern and have performed in line with the benchmarks, as expected. The World Equity Index Fund did differ from the benchmark enough to be highlighted, but the difference resulted in a positive effect. MR. CENTER directed the Board's attention to the materials and research paper recently published by Callan included at the end of the report regarding cryptocurrencies. MR. CENTER noted he is available to answer any questions.

CONSIDERATION OF RATE ASSUMPTIONS

CHAIR JOHNSON advised this segment will address the consideration of setting rate assumptions for the actuarial analysis. MR. MITCHELL informed the Board will be asked to adopt a set of demographic and economic assumptions at the September Board meeting. The basis for the economic assumptions is an expectation of inflation and real returns for the

portfolio. The inflation assumption number will translate into other economic assumptions, such as salary growth rates and healthcare growth rates. Board presentations by Conduent, GRS, and Callan revealed their views regarding the assumptions and discussion regarding the material impact on the present value of liability. MR. MITCHELL believes additional study is warranted. He described the option the Board has to specify a new inflation assumption and a new real return number today, and direct Conduent to conduct a review of the impacts of the new set of assumptions on the valuations and present the results at the September meeting. He believes this would help the Board finalize their decision.

MS. ERCHINGER moved the ARM Board, for the purposes of Conduent's valuation reporting, approve a tentative rate recommendation for setting the inflation assumption at 2.50% and the real return assumption at the current 4.88%, for a total nominal return of 7.38%. MS. HARBO seconded the motion.

MS. ERCHINGER expounded the assumptions she used come specifically from the recommendation presentations of Conduent, GRS, and Callan. She cited Conduent's presentation on page 10 recommending an inflation assumption rate of lower than 2.6%. Page eight of GRS' presentation reflects an acceptance of an inflation assumption of no higher than 2.5%. Page two of Callan's presentation provides an inflation assumption rate range of between 2.0% and 2.5%.

MS. ERCHINGER stated the current real return rate is set at 4.88%. GRS states on page seven of their report that a real return assumption between 4.75% and 5% is reasonable. Callan supported a reasonable real return assumption between 4.35% and 5.15%. The 4.88% real return assumption falls in between Conduent's 20-year and 30-year historical information and Conduent's new Approach 2 modeling. The tentatively set rates are for the purpose of Conduent conducting their analysis and returning in September with the results. The Board will be asked to definitively approve economic rates in September. MS. ERCHINGER noted for the record the proposed decrease in the inflation assumption to 2.5% causes the total return assumption to decrease from 8% to 7.38%.

MS. HARBO expressed support for the motion.

COMMISSIONER FISHER expressed support for the motion.

MR. WILLIAMS expressed support for the motion. He requested additional information regarding the cost effects of such a change. COMMISSIONER FISHER noted Conduent will return in September with those study findings. He believes this change will result in a material increase in the State assistance.

CHAIR JOHNSON requested Callan and the IAC provide feedback. MR. ERLENDSON noted the proposed assumption numbers are entirely reasonable for a 20-year outlook.

DR. JENNINGS noted making a change and regularizing the Board's process for making a change is huge progress. Some of the presentations suggested the inflation range number

might be lower than 2.5%. He cautioned the review of the decision in the future be focused on whether or not the bulk of the probability distribution remains below the current status.

DR. MITCHELL agreed with the motion.

MR. WEST expressed support for the motion.

A roll call vote was taken, and the motion passed unanimously.

24. PRIVATE EQUITY ANNUAL PLAN

MR. HANNA introduced and welcomed Investment Officer SEAN HOWARD, who has been with the Treasury for eight years and has recently joined the Alternative Investment Team. MR. HANNA noted he will present the private equity annual plan and MR. HOWARD will present that absolute return annual plan. The private equity plan is brought before the Board twice a year. Callan reviews the program and manager performance each December and staff brings forward the annual tactical plan for the Board's review and approval. The ARM Board's private equity advisors, Abbot, Pathway, and Callan have all reviewed the plan and the recommendations.

MR. HANNA described the attributes and structure of private equity as illiquid, long-term investments in private companies. Fund sponsors like the ARM Board invest in private equity for higher returns. The expectation is 350 basis points over the Russell 3000 Index over the long-term. The asset class has delivered results in excess of the expectations. MR. HANNA explained private equity has become much more efficient and the excess returns going forward are anticipated to decrease. Callan is in the process of reviewing all of the ARM Board's investment policies. MR. HANNA noted his discussions with Callan regarded a recommendation to lower the private equity excess return expectation to a range between 200 and 250 basis points above the Russell 3000 Index. MR. HANNA believes the excess is reasonable compensation for the illiquidity aspect of investing in private equity.

MR. HANNA discussed one of the appeals of private equity is the large market. Over 90% of domestic companies with revenues over $25 million are private. There are only half as many public companies as there were 20 years ago, which contributed to the growth of the private equity market. Companies have been able to remain private and to access capital without the distraction and expense of being a public company.

MR. HANNA described most private equity groups share common characteristics and aim to buy higher growth companies at lower valuations, create value by making operational and financial improvement, and then sell the companies at higher valuations. The negatives of the private equity asset class include its long-term illiquid nature and fairly high fee structures to access investments through private equity funds. The funds have a general partner and the fund directs the investments in the underlying portfolio companies. The fund sponsor, ARMB, makes commitments to the funds to be drawn down and invested by the general partner over a four to five-year period. Distributions are returned to the fund sponsor in terms of gains and return of capital. The fund sponsor does not control the cash flow timing. The

fund sponsor can control the commitment pacing and the type of groups to which commitments are made; venture capital, buyout funds, and special situations. MR. HANNA gave a detailed description and examples of each strategy.

MR. HANNA reviewed the current private equity market. Fundraising peaked last year and has surpassed the previous peak years in 2007 and 2008. MR. HANNA believes some of this run-up is due to private markets becoming larger. This is related to strong performance and managers continuing to increase fundraising each year. Investment activity has been strong for the last four years. Pricing has reached all time highs. Leverage has remained range-bound and gets capped out at about six times. MR. HANNA emphasized the importance of being careful with investments in private equity and the importance of maintaining discipline over the cycle utilizing vintage year diversification.

MR. HANNA underlined manager selection in private equity is critical. Top quartile managers significantly outperform. The benchmarks used are Cambridge Associates and Burgiss, which compare the peer groups of professionally managed private equity portfolios. The ARMB portfolio is 150 to 250 basis points above median performance. MR. HANNA stressed the importance of careful manager due diligence and monitoring, as well as access to diversification. The ARMB has been invested in private equity for 20 years and has gone through two full market cycles. The end returns for the portfolio are measured on an internal rate of return (IRR) basis. The portfolio continues to have very strong performance with an IRR of 11.3%. This is 348 basis points over the public market equivalent return of 7.8% of the Russell 3000 Index, two basis points shy of the target. Over the life of the portfolio, the compounding performance has provided an additional $1.1 billion dollars to the portfolio.

MR. HANNA reviewed the cash flow activity, inflows and outflows, of the portfolio over the years. The portfolio reached essentially parity about a year ago where the inflows and outflows were equal. The simple standpoint is the ARMB has basically received all investment back and what remains on the balance sheet are the gains. The target diversifying allocations are 25% to venture, 40% to buyout, and 35% to special situations, with a wide range of 15% to 20%. The portfolio is close to these guidelines and is well diversified by sectors. MR. HANNA corrected a typographical error on the presentation. The 2017 commitment target was $560 million, not $590 million. MR. HANNA explained the plan outlined in 2016 has been to slowly build toward a long-term target of 12% allocation to private equity over the next 10 years. The program would then start to reduce exposure as the liquidity profile matures. The current allocation is at 9% and the recommendation is to maintain the asset targets. The expectation is private equity will continue to deliver meaningful premiums over public markets. Staff recommends Resolution 2018-03, approving the 2018 tactical plan for private equity.

MR. WILLIAMS requested clarification the commitment stated in the presentation of $210 million for Abbott and Pathway is actually $210 million for Abbott and $210 million for Pathway. MR. HANNA agreed.

MS. ERCHINGER asked if the resolution implies no other investors will be reviewed. MR. HANNA informed Abbott has been an advisor since inception and Pathway has been an

advisor for well over 10 years. Both portfolios have performed well and have relatively efficient fee structures. There are no compelling reasons to change at this time.

Action: Adopt Private Equity Annual Plan
Resolution 2018-03 - Private Equity Plan

MS. HARBO moved to adopt Resolution 2018-03, approving the 2018 annual tactical plan. MS. ERCHINGER seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

CHAIR JOHNSON recessed the meeting from 2:38 p.m. to 2:46 p.m.

25. ABSOLUTE RETURN ANNUAL PLAN

MR. MITCHELL informed it has been several years since the Board has heard an overview of the absolute return strategy. MR. MITCHELL intends to create a cycle to review each major asset class annually. MR. HANNA reported the presentation will include characteristics of the absolute return asset class, historical timeline, program and manager results, and the five-year plan and recommendations. The absolute return portfolio provides diversification with the goal of moderate returns with low correlation to traditional stocks and bonds. Absolute return characteristics include few manager restrictions with regard to short selling, leverage, and the use of derivatives. Returns are driven by sources other than traditional market beta. Investment are often less liquid than traditional asset classes. Fees are generally higher and include a performance component.

MR. HANNA discussed the ARMB target allocation to absolute return is 7%. The risk-adjusted return expectation is very efficient. Callan's capital market assumption for absolute return is projected at 5.1% with a 9.2% standard deviation. The expected correlation to equities is 0.8% and is valuable for portfolio construction.

MR. HOWARD described the current positioning within absolute return, as well as the risk and return objectives of the asset class. There are currently six managers with multiple underlying strategies. The policy benchmark is a 70/30 blend of the MSCI ACWI and Bloomberg Barclays Aggregate Bond Index. Two other benchmarks used for comparison are the HFRI Fund of Funds and the Callan Absolute Return Style Group. Both are composites of portfolios of hedge fund strategies. The risk objective is a 5% to 10% standard deviation with a beta to stocks and bonds of less than 0.5.

MR. HOWARD reviewed the net-of-fee performance numbers. Over the prior six-year period, performance was annualized at 5.8%, outperforming the composites. Over the past eight years, volatility is between the composites and below the target. This low volatility can be explained partially by the market environment post-financial crisis. The portfolio's volatility is expected to increase back to the 5% to 10% range over the longer-term.

MR. HOWARD reviewed each of the managers in the portfolio and described their net-of-fee performance, investment style, history, and long-term expectations. He discussed the plan over the next five years is to make a number of allocation changes to the portfolio.

- Continue to reduce exposure to traditional fund-of-funds mandates by phasing out a few legacy investments.
- Expand the allocation to alternative beta with the addition of one or more managers who can compliment Man and JPMorgan.
- Modestly grow idiosyncratic credit.
- Continue to search for other managers or strategies that can further diversify the program.

MR. HOWARD noted Callan is currently reviewing all investment policies and will be recommending changes to absolute return.

- Change the 0.5 equity beta risk constraint from the S&P 500 Index to the MSCI ACWI Index.
- Change the long-term benchmark from 70/30 ACWI/Aggregate Bond blend to the HRFI Fund of Funds Composite plus 50 basis points.

COMMISSIONER FISHER requested additional information regarding the liquidity characteristics of the absolute return and the possibility of a larger allocation to the asset class as a way of possibly providing stability and liquidity to the portfolio. MR. HANNA explained the liquidity profile is effectively equal-weighted with very liquid investments and illiquid investments. The very liquid investments include alt beta, fund-of-funds, equity market neutral fund, and the volatility fund. The primary illiquid investment is the idiosyncratic credit component, which typically has a liquidity profile of three to five years.

MR. MITCHELL believes staff needs to conduct a deeper analysis regarding increasing allocation to this asset class and considering its liquidity factors. He hopes to continue the examination over the next year and by the time the next asset allocation discussion occurs. MR. MITCHELL distinguished the increase to the fixed income allocation in the total portfolio is a separate focus. The determination needs to be made as to whether or not the assets come from public markets or nonpublic markets. MR. HANNA advised the absolute return portfolio is not a good source of liquidity during a crisis or severe market shocks to rebalance back into equities. The absolute return portfolio could only provide for normal ongoing liquidity needs.

26. INVESTMENT ACTIONS

MR. MITCHELL reviewed the first action item for consideration. By statute, the ARMB is required to engage in an audit of the performance calculation methodology. Staff recommends the Board direct staff to prepare an RFP for an independent audit of the State's performance consultant, as required by AS 37.10.220(a)(11).

MS. HARBO moved to direct staff to prepare an RFP for an independent audit of the State's performance consultant, as required by AS 37.10.220(a)(11). MS. ERCHINGER seconded the motion.

COMMISSIONER FISHER recommended staff prepare the RFP, and after the proposed investment policy committee is established, the committee can take leadership in the process.

CHAIR JOHNSON agreed with COMMISSIONER FISHER's suggestion and asked MR. MITCHELL if it would adversely impact the timing of moving forward with the RFP.

The question was called.

A roll call vote was taken, and the motion passed unanimously.

CHAIR JOHNSON requested MR. MITCHELL comment on the timing of the RFP. MR. MITCHELL anticipates the report would be generated and presented to the Board by December 2018. He believes it would be appropriate for the Board to delegate any further analysis or follow-up actions to the new policy and procedures committee.

MR. MITCHELL informed the next two action items relate to exercising one-year extensions to existing contracts with two consultants. The first one is for Callan, whose five-year contract includes the option of two one-year extensions. Last year, the ARMB exercised the first of those two one-year extensions. Staff recommends the ARMB extend the second of those two one-year extensions.

MS. HARBO moved to direct staff to exercise the second one-year contract option, extending the consulting contract with Callan Associates Inc. until June 30, 2019. MS. ERCHINGER seconded the motion.

COMMISSIONER FISHER commented he does not view this as a trivial decision and does not think the Board should get into the practice of extending the contracts. He believes it is appropriate to go out with an RFP for a broad range of options.

CHAIR JOHNSON requested clarification on the contract terms. MR. MITCHELL noted the contract is for five years and includes the provision of exercising two one-year extensions, for the possibility of a total seven-year relationship. If the Board elects not to extend the contract, the existing contract would end this year, June 30, 2018.

A roll call vote was taken, and the motion passed, with COMMISSIONER FISHER voting against.

MR. MITCHELL described the next action relates to the real estate consultant Townsend. The dynamics of the contract term and extension option are the same as the previous action. Staff recommends continuing the working relationship with Townsend and extending the current contract for the second allowable one-year extension.

MS. HARBO moved to direct staff to exercise the second one-year contract option, extending the contract with Townsend until June 30, 2019. MS. ERCHINGER seconded the motion.

COMMISSIONER RIDLE requested explanation of why consideration of these actions is only eight days before the otherwise contract expiration date. MR. MITCHELL explained staff does not have concerns about the contractor. If there were concerns, staff would have brought them before the Board earlier.

MR. WEST commented contracts should be brought before the Board with a fair amount of notice time.

A roll call vote was taken, and the motion passed unanimously.

MR. MITCHELL explained the next action concerns proposed changes to the Brandes mandate, as outlined by MR. CARSON during his presentation yesterday. Staff recommends modifying the mandate and contract with Brandes Investment Partners, L.P. to include emerging markets, and benchmark against the MSCI ACWI ex-Us Value Index.

MS. HARBO moved to direct staff to modify the mandate and contract with Brandes Investment Partners, L.P. to include emerging markets, and benchmark against the MSCI ACWI ex-Us Value Index. MS. ERCHINGER seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

MR. MITCHELL informed the next action item applies to growth manager Baille Gifford. Staff recommends modifying the mandate managed by Baille Gifford Overseas Limited to be benchmarked against the MSCI ACWI ex-US Growth Index.

MS. HARBO moved to direct staff to modify the mandate managed by Baillie Gifford Overseas Limited to be benchmarked against the MSCI ACWI ex-US Growth Index. MS. ERCHINGER seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

MR. MITCHELL described the next action item is the first of several that involve the emerging market equity area. He noted this would instruct Callan to engage in a search for an emerging markets growth manager with the purpose of hiring a manager that would represent a style that is currently absent in the overall structure. Staff recommends the ARMB direct staff to engage Callan Associates to conduct a search for one emerging markets equity growth manager. Additionally, ARMB direct staff to evaluate the Callan search results and bring the recommendation to the Board at a future meeting.

MS. HARBO moved to direct staff to engage Callan Associates to conduct a search for one Emerging Markets equity growth manager. Additionally, ARMB direct staff to evaluate the Callan search results and bring a recommendation to the Board at a future meeting. MS. ERCHINGER seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

MR. MITCHELL explained the next motion also relates to emerging markets. It is the recommendation to terminate the Parametric mandate. Parametric has a systemic underweight to areas in emerging market staff believes will have higher growth, specifically China.

MS. HARBO moved to direct staff to terminate the Parametric Emerging Markets mandate and reallocate those assets within the merging markets pool. MS. ERCHINGER seconded the motion.

VICE-CHAIR CHAIR SCHUBERT asked what the original investment amount was in Parametric. MR. MITCHELL did not have the number available. A June memorandum was shown listing approximately $308 million in ARMB assets.

CHAIR JOHNSON asked if Parametric was on the watch list. MR. MITCHELL confirmed Parametric is currently on the watch list.

A roll call vote was taken, and the motion passed unanimously.

MR. MITCHELL explained the next action item is to engage Callan to conduct a search for a China-only manager who would have the latitude to invest across various types of securities, as described by MR. CARSON in his presentation yesterday. Staff recommends the ARMB direct staff to engage Callan to conduct a search for an investment manager to invest a dedicated China equity mandate. Additionally, ARMB direct staff to evaluate the Callan search results and bring a recommendation to the Board at a future meeting.

MS. HARBO moved to direct staff to engage Callan Associates to conduct a search for an investment manager to invest a dedicated China equity mandate. Additionally, ARMB direct staff to evaluate the Callan search results and bring a recommendation to the Board at a future meeting. MS. ERCHINGER seconded the motion.

CHAIR JOHNSON commented it seems the number of fairly narrow investment manager mandates is increasing. He asked if there is a threshold as to how thinly sliced the allocation pie should be. MR. MITCHELL understood the concern and believes areas should be considered in which staff believes a difference can be made within the broader portfolio. A significant motivation for the strategy is the recognition of having more differentiated active exposures within emerging markets that can provide better relative performance to the benchmark with less risk, and maintain less correlation with developed market returns.

CHAIR JOHNSON requested the IAC provide commentary on this concept at a later date.

A roll call vote was taken, and the motion passed unanimously.

MR. MITCHELL reported the next two action items relate to proposed investment guideline changes for two fixed income oriented managers located within the opportunistic asset class that were discussed in presentations today. Staff recommends the ARMB approve Resolution

2018-05, amending the Guidelines to change the High Yield Fixed Income mandate to a BB-rated High Yield Fixed Income mandate.

MS. HARBO moved to adopt Resolution 2018-05, amending the Guidelines to change the High Yield Fixed Income mandate to a BB-rated High Yield Fixed Income mandate. MS. ERCHINGER seconded the motion.

MR. WILLIAMS expressed he support the motion. He has concern with the language under the Status that states BB-rated high yield bonds have performed in line or have outperformed the broader high yield market, because the table shows performance of outperformance in the 5-year and 20-year, same performance in the 10-year, and underperformance in the 15-year results. MR. MITCHELL understood and is happy to entertain changes in the action memo.

MR. WEST moved to amend Resolution 2018-05 under Status to add the word generally, so it reads, "BB-rated high yield bonds generally have performed in line or have outperformed the broader high yield market but with significantly less volatility." MS. WILLIAMS seconded the motion.

A roll call vote was taken, and the motion to amend Resolution 2018-05 passed unanimously.

A roll call vote was taken, and the motion to adopt Resolution 2018-05 as amended passed unanimously.

MR. MITCHELL described the next action relates to the recommendation to make investment guideline changes to the existing International Fixed Income Guidelines. Mondrian is the only portfolio managed against those guidelines. Staff recommends the ARM Board adopt Resolution 2018-06, amending the International Fixed Income Guidelines from an unhedged blend to a hedged blend, as described in the action memo.

MS. HARBO moved to adopt Resolution 2018-06, amending the International Fixed Income Guidelines from an unhedged blend to a hedged blend. MS. ERCHINGER seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

MR. MITCHELL explained the last action regards the 50% intermediate treasury fixed income allocation in the National Guard and Naval Militia Retirement Systems (NGNMRS). Staff feels it is appropriate to invest a bit more aggressively and allocate a portion of the fixed income mandate to the broader US aggregate fixed income passive mandate. MR. MITCHELL noted approximately 12% of the portfolio is needed to be accessible to facilitate rebalances.

Staff recommends ARMB, regarding the NGNMRS, implement a 12% allocation to the US Treasury Fixed Income Pool. Additionally, the Board direct the remainder of the Fixed Income allocation be invested in a US aggregate bond portfolio benchmarked against the Bloomberg Barclays US Aggregate Bond Index. Additionally, the ARMB direct staff to hire

BlackRock Institutional Trust Company to manage a passive fixed income strategy for the NGNMRS that is benchmarked against the Bloomberg Barclays US Aggregate Bond Index.

MS. HARBO moved regarding the National Guard and Naval Militia Retirement Systems (NGNMRS), the Alaska Retirement Management Board implement a 12% allocation to the US Treasury Fixed Income Pool. Additionally, the Board direct the remainder of the Fixed Income allocation be invested in a US aggregate bond portfolio benchmarked against the Bloomberg Barclays US Aggregate Bond Index. Additionally, the Board direct staff to hire BlackRock Institutional Trust Company to manage a passive fixed income strategy for the NGNMRS that is benchmarked against the Bloomberg Barclays US Aggregate Bond Index. MS. ERCHINGER seconded the motion.

A roll call vote was taken, and the motion passed unanimously.

UNFINISHED BUSINESS
None

NEW BUSINESS
None

OTHER MATTERS TO PROPERLY COME BEFORE THE BOARD
None

PUBLIC/MEMBER COMMENTS
None

INVESTMENT ADVISORY COUNCIL COMMENTS

DR. MITCHELL expressed appreciation to the Board for his appointment to another three-year term. DR. MITCHELL noted he has been associated with the ARMB and its predecessor, either as a manager or as an IAC member for over 25 years. He believes the Board and staff is as strong as it ever has been, and sees this demonstrated by the performance numbers Callan reviewed earlier. DR. MITCHELL encouraged the staff and Board to continue the discussion regarding liquidity, de-risking, and the different ways to prepare to retain the gains that have been made should times change.

DR. JENNINGS commented the asset class reviews conducted in the last two meetings contributed to understanding the context of many of the managers. The external review of the internally managed portfolios today provided good validation. He feels it was efficient, but risks glossing some important questions Trustees may have for these complex and large portfolios. There was one slide on a $2 billion portfolio and although there are no concerns with the portfolio, DR. JENNINGS encouraged reflection on the comfort level with the oversight. He noted the IAC is standing by for guidance on the suggestion to be more involved.

MR. SHAW stated this is the second longest bull market in US equities. He believes the system does a very good job of rebalancing back to benchmarks, as part of its risk management perspective. He noted many of MR. MITCHELL's comments focus on risk and risk adjusted returns. MR. SHAW believes risk management and risk controls will play a larger and larger role, given the current rich valuations in the market.

TRUSTEE COMMENTS

MS. HARBO expressed appreciation to MS. ERCHINGER for her work on the Actuarial Committee, her excellent guidance through the complex topics discussed, and her assistance in helping the actuaries work together.

MS. ERCHINGER reminded Trustees the approval of the tentative recommended economic rates today were solely for the purpose of evaluation. She encouraged Trustees to keep the great reference materials in the packet. A formal adoption of economic assumptions is anticipated to come before the Board in September.

FUTURE AGENDA ITEMS
None

ADJOURNMENT

There being no objection and no further business to come before the Board, the meeting was adjourned at 3:47 p.m. on June 22, 2018, on a motion made by MS. HARBO and seconded by MS. ERCHINGER.

Chair of the Board of Trustees
Alaska Retirement Management Board
ATTEST:

_____
Corporate Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits (DRB) Report - IT Modernization
September 21, 2018

The report intends to offer a status update on the DRB's IT modernization project:

Project Background: A primary goal of the DRB is to modernize the IT and work processes to drive efficiency, accuracy, and security associated with its core business and services. DRB capital project is for an integrated, enterprise-wide system that supports all of our core business functions for pension and health plans of all tiers including demographic information as a single source of truth. The system will be an enterprise-level retirement information system solution providing many modern tools to enable the state to maintain and improve service to members. The system will integrate core business processes, facilitate consistency and will enable additional oversight and accountability.

Project Overview: Implementing a multi-year DRB modernization project will require a massive effort and two-step procurement process. The first step seeks an appropriate project management consulting firm. A firm that is specialized in information technology project management delivering expertise to state employee benefits, public retirement plans, and health insurance in the US. As a second step, DRB would be seeking vendors for an enterprise-wide solution.

Project Management: The consulting firm will align with the DRB's strategy, assist in enterprise-wide system selection plans and roadmaps, participate in a deeper dive in business process analysis and workflow design. Additionally, the firm will assist division staff with developing the requirements of the RFP for soliciting and securing a vendor solution for modernizing DRB's enterprise platform.

Responsibilities include:

- Provide consulting services on solutions
- Manage vendor relations
- Manage project deliverables
- Prepare project documentation
- Manage change control process
- Manage project reporting
- Facilitate required meetings between stakeholders
- Manage project milestones
- Manage risk

Deliverables:

- End to end project management supported by ongoing project status reports to stakeholders
- Project management documentation developed during the course of the project.
- Project management oversight
- Product verification and validation
- Risk management
- Data analysis, cleansing, and conversion
- User testing
- Organizational readiness
- System rollout support up to go-live date

Current Status: DRB IT project has been appropriated in the FY19 capital budget. As of August 31, 2018, an RFP has been posted to Alaska's Online Public Notice (OPN) system (https://aws.state.ak.us/OnlinePublicNotices/Notices/View.aspx?id=191265) to seek a project management consulting firm.

Questions?

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits Report
September 20, 2018

Retirement System Membership Activity as of June 30, 2018 –

Attached for your information are the membership statistics for the quarter ending

- June 30, 2018

We see net decreases in active members from last quarter, primarily in PERS Tier 1-3 and TRS Tier 3 members:

- PERS Tier 1-3 active members decreased from 14,254 to 13,611, or a decrease of 643.
- PERS Tier 4 active members decreased from 20,916 to 20,811, or a decrease of 105.
- PERS active members had a net decrease of 748.

- TRS Tier 1-2 active members decreased from 4,873 to 4,457 or a decrease of 416.
- TRS Tier 3 active members decreased from 5,561 to 4,937 or a decrease of 624.
- TRS active members had a net decrease of 1,040.

Retiree counts have changed in the following manner:

- PERS retirees increased from 34,853 to 35,187, or an increase of 334 (Tier 1-4).
- TRS retirees decreased from 13,022 to 12,978, or an decrease of 44 (Tier 1-3).

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Retirement System Membership Activity as of June 30, 2018

ACTION: _____

DATE: September 20, 2018

INFORMATION: **X**

BACKGROUND:

Information related to PERS, TRS, JRS, NGNMRS, SBS, and DCP membership activity as requested by the Board.

STATUS:

Membership information as of June 30, 2018.

MEMBERSHIP STATISTICS AS OF SEPTEMBER 30, 2017

	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DC	SYSTEM	DB			DC	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	1,426	3,862	9,371	14,659	19,746	34,405	437	4,429	4,866	5,197	10,063	72	n/a	21,305	6,169
Terminated Members															
Entitled to Future Benefits	441	2,268	3,060	5,769	904	6,673	50	703	753	459	1,212	4	n/a	23,695	4,893
Other Terminated Members	1,153	2,234	7,978	11,365	10,822	22,187	286	1,678	1,964	2,056	4,020	-	n/a	n/a	n/a
Total Terminated Members	1,594	4,502	11,038	17,134	11,726	28,860	336	2,381	2,717	2,515	5,232	4	n/a	23,695	4,893
Retirees & Beneficiaries	23,805	7,336	3,414	34,555	20	34,575	10,693	2,309	13,002	9	13,011	118	682	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,507	5,507	n/a	n/a	n/a	1,514	1,514	n/a	n/a	1,354	1,466
Retirements - 1st QTR FY18	112	154	139	405	2	407	106	233	339	5	344	2	2	n/a	n/a
Full Disbursements - 1st QTR FY18	27	45	127	199	459	658	12	28	40	107	147	-	n/a	486	156
Membership information as of Decembe	n/a	n/a	n/a	n/a	69	69	n/a	n/a	n/a	21	21	n/a	n/a	971	531

MEMBERSHIP STATISTICS AS OF DECEMBER 31, 2017

	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DC	SYSTEM	DB			DC	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	1,400	3,786	9,245	14,431	20,458	34,889	435	4,447	4,882	5,550	10,432	72	n/a	20,437	6,058
Terminated Members															
Entitled to Future Benefits	391	2,198	3,025	5,614	991	6,605	45	664	709	441	1,150	3	n/a	24,809	5,082
Other Terminated Members	1,132	2,208	7,915	11,255	11,026	22,281	280	1,649	1,929	1,995	3,924	-	n/a	n/a	n/a
Total Terminated Members	1,523	4,406	10,940	16,869	12,017	28,886	325	2,313	2,638	2,436	5,074	3	n/a	24,809	5,082
Retirees & Beneficiaries	23,760	7,458	3,532	34,750	21	34,771	10,659	2,339	12,998	9	12,998	118	696	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,501	5,501	n/a	n/a	n/a	1,512	1,512	n/a	n/a	1,439	1,559
Retirements - 2nd QTR FY18	80	134	118	450	1	332	8	28	36	-	36	2	38	n/a	n/a
Full Disbursements - 2nd QTR FY18	22	32	107	161	357	518	15	25	40	56	96	-	n/a	504	120
Partial Disbursements - 2nd QTR FY18	n/a	n/a	n/a	n/a	72	72	n/a	n/a	n/a	11	11	n/a	n/a	1,161	612

MEMBERSHIP STATISTICS AS OF MARCH 31, 2018

	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DC	SYSTEM	DB			DC	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	1,376	3,725	9,153	14,254	20,916	35,170	432	4,441	4,873	5,561	10,434	72	n/a	20,235	6,165
Terminated Members															
Entitled to Future Benefits	371	2,136	3,020	5,527	985	6,512	43	641	684	427	1,111	3	n/a	24,759	5,020
Other Terminated Members	1,122	2,198	7,869	11,189	11,256	22,445	275	1,638	1,913	1,983	3,896	-	n/a	n/a	n/a
Total Terminated Members	1,493	4,334	10,889	16,716	12,241	28,957	318	2,279	2,597	2,410	5,007	3	n/a	24,759	5,020
Retirees & Beneficiaries	23,666	7,551	3,606	34,823	30	34,853	10,662	2,360	13,022	9	13,031	120	699	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,543	5,543	n/a	n/a	n/a	1,515	1,515	n/a	n/a	1,559	1,709
Retirements - 3rd QTR FY18	53	122	83	258	9	258	9	27	36	-	36	1	28	n/a	n/a
Full Disbursements - 3rd QTR FY18	26	31	103	160	449	609	24	28	52	58	110	-	n/a	621	181
Partial Disbursements - 3rd QTR FY18	n/a	n/a	n/a	n/a	79	79	n/a	n/a	n/a	18	18	n/a	n/a	1,126	602

MEMBERSHIP STATISTICS AS OF JUNE 30, 2018

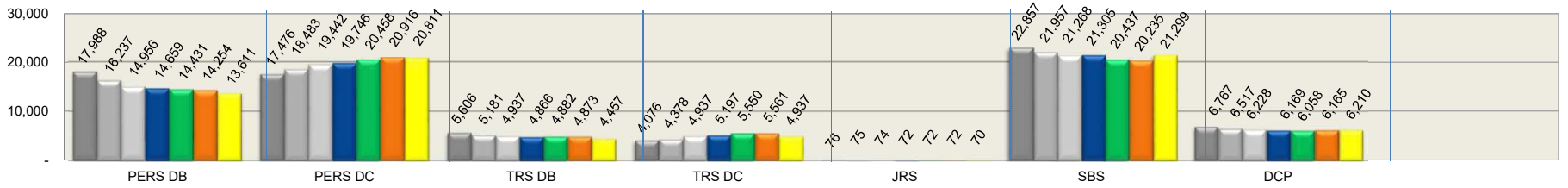
	PERS						TRS					JRS	NGNMRS	SBS	DCP
	DB				DC	SYSTEM	DB			DC	SYSTEM				
	Tier I	Tier II	Tier III	Total	Tier IV	TOTAL	Tier I	Tier II	Total	Tier III	TOTAL				
Active Members	1,230	3,503	8,878	13,611	20,811	34,422	342	4,115	4,457	4,937	9,394	70	n/a	21,299	6,210
Terminated Members															
Entitled to Future Benefits	375	2,137	3,094	5,606	1,146	6,752	60	741	801	607	1,408	4	n/a	24,205	5,020
Other Terminated Members	1,114	2,189	7,825	11,128	11,896	23,024	271	1,635	1,906	2,387	4,293	-	n/a	n/a	n/a
Total Terminated Members	1,489	4,326	10,919	16,734	13,042	29,776	331	2,376	2,707	2,994	5,701	4	n/a	24,205	5,020
Retirees & Beneficiaries	23,676	7,718	3,745	35,139	48	35,187	10,590	2,372	12,962	16	12,978	122	702	n/a	n/a
Managed Accounts	n/a	n/a	n/a	n/a	5,551	5,551	n/a	n/a	n/a	1,506	1,506	n/a	n/a	1,664	1,822
Retirements - 4th QTR FY18	123	196	153	472	18	472	38	137	175	7	175	1	22	n/a	n/a
Full Disbursements - 4th QTR FY18	16	37	111	164	405	569	12	29	41	49	90	-	n/a	496	569
Partial Disbursements - 4th QTR FY18	n/a	n/a	n/a	n/a	76	76	n/a	n/a	n/a	12	12	n/a	n/a	1,065	707

Alaska Division of Retirement and Benefits

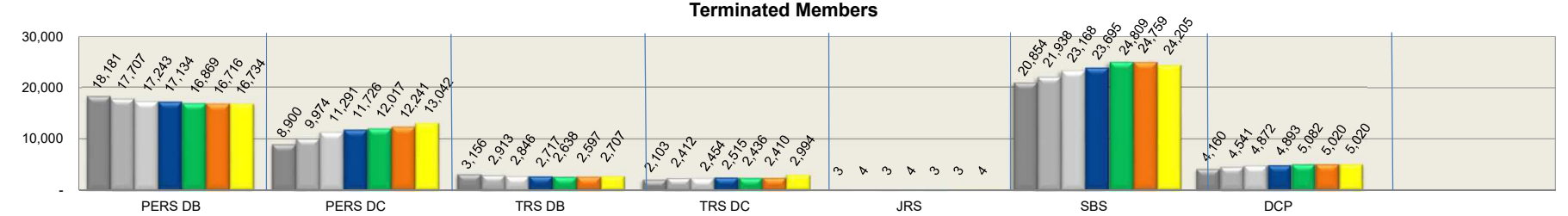
FY 2018 QUARTERLY REPORT OF MEMBERSHIP STATISTICS

Annual & Quarterly Trends as of June 30, 2018

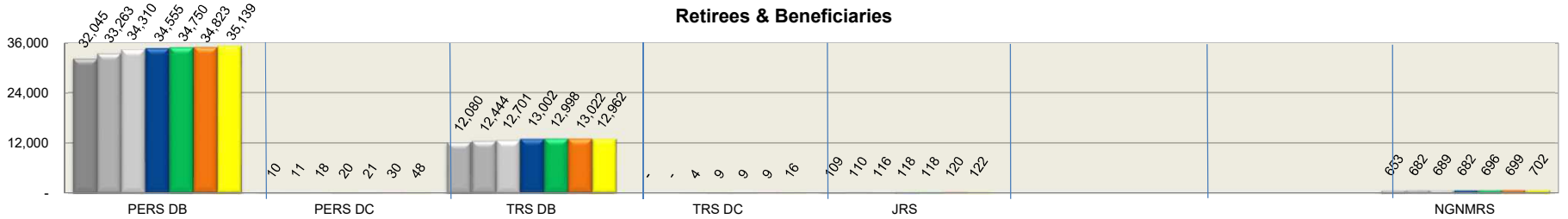
Active Members



Terminated Members



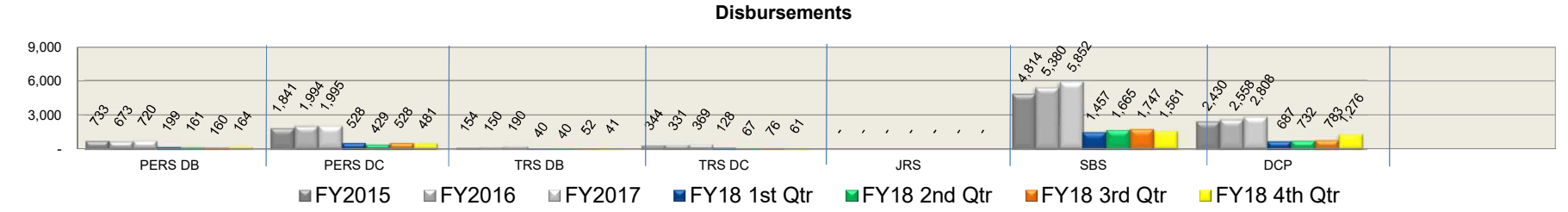
Retirees & Beneficiaries



Retirements



Disbursements



LEGEND

Active Members - All active members at the time of the data pull,
except SBS & DCP, which are counts of contributors during the final quarter of each period.

Terminated Members - All members who have terminated without refunding their account,
except SBS & DCP, which are counts of members with balances at the end of the period less active members.

Retirees & Beneficiaries - All members who have retired from the plans, including beneficiaries eligible for benefits.

Managed Accounts - Individuals who have elected to participate in the managed accounts option with Great West.

Retirements - The number of retirement applications processed.

Full Disbursements - All types of disbursements that leave the member balance at zero.

Partial Disbursements - All types of disbursements that leave the member balance above zero. If more than one partial disbursement is completed during the quarter for a member, they are counted only once for statistical purposes.

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Division of Retirement & Benefits Report
September 20, 2018

Summary of Monthly Billings / Buck –

Attached for your information are the quarterly payments related to actuarial services provided by the Division's consulting actuary, Buck.

Items listed represent regular and non-regular costs incurred under our current contract with Buck.

The listed costs are charged to the System or Plan noted on the column headings.

Summary through the twelve months ended June 30, 2018

New for this quarter is the GASB 75 Postemployment Benefits Other than Pension reports as of June 30, 2017 for PERS, TRS and JRS.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Summary of Monthly Billings - Buck	ACTION:	
DATE:	September 20, 2018	INFORMATION:	X

BACKGROUND:

AS 37.10.220(a)(8) prescribes that the Alaska Retirement Management Board (Board) "coordinate with the retirement system administrator to have an annual actuarial valuation of each retirement system prepared to determine system assets, accrued liabilities, and funding ratios…."

As part of the oversight process, the Board has requested that the Division of Retirement & Benefits provide quarterly summary updates to review billings and services provided for actuarial valuations and other systems' request.

STATUS:

Attached are the summary totals for the twelve months ended June 30, 2018.

Buck
Billing Summary
For the Three Months Ended September 30, 2017

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial valuations	$ 36,291	15,048	-	-	-	-	-	-	-	$ 51,339
Experience analysis	5,835	680	-	-	-	-	-	-	-	6,515
KPMG audit information request	2,250	915	15	65	-	-	-	665	165	4,075
ARMB presentations and meeting attendance	7,427	2,987	45	221	-	-	-	-	-	10,680
FY19 projected pay by employer	2,850	1,261	-	-	-	-	-	-	-	4,111
FY19 final PERS/TRS contribution rates	13,681	5,589	-	-	-	-	-	-	-	19,270
JRS alternate contribution pattern	-	-	1,438	-	-	-	-	-	-	1,438
Retiree medical change (reduced claim cost)	4,881	1,825	16	-	-	-	20	-	-	6,742
GASB 67 valuation reports as of 6/30/17 (PERS/TRS/ JRS/NGNMRS)	1,416	629	14	76	-	-	-	-	-	2,135
Economic assumption sensitivities analysis	3,723	1,654	37	201	-	-	-	-	-	5,615
Misc emails and phone calls	5,889	2,785	300	36	-	-	3	80	20	9,113
TOTAL	$ 84,243	33,373	1,865	599	-	-	23	745	185	$ 121,033
For the Three Months Ended September 30, 2016	$ 76,944	44,909	7,355	535	2,593	-	6,904	-	-	$ 139,240

For the Three Months Ended December 31, 2017

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial valuations	$ 72,086	57,002	-	-	-	-	-	-	-	$ 129,088
Experience analysis	36,041	36,042	-	-	-	-	-	-	-	72,083
KPMG audit information request	10,539	4,238	15	49	-	-	7	509	126	15,483
ARMB presentations and meeting attendance	50,801	20,443	313	1,518	-	-	-	-	-	73,075
Attendance and preparation for November NYC Trustees meeting	3,630	1,483	-	-	-	-	-	-	-	5,113
GASB 67 valuation reports as of 6/30/17 (PERS/TRS/JRS/NGNMRS)	17,860	7,908	5	28	-	-	-	-	-	25,801
GASB 74 valuation reports as of 6/30/17 (PERS/TRS/JRS)	83,481	32,939	188	-	-	-	-	-	-	116,608
Economic assumption sensitivities analysis	7,188	3,194	71	387	-	-	-	-	-	10,840
Misc EGWP savings	1,320	492	-	-	-	-	-	-	-	1,812
EGWP cost analysis	4,234	1,874	-	-	-	-	-	-	-	6,108
Misc emails and phone calls	1,618	1,007	4	23	-	-	-	1	-	2,653
TOTAL	$ 288,798	166,622	596	2,005	-	-	7	510	126	$ 458,664
For the Three Months Ended December 31, 2016	$ 142,178	71,844	13,926	3,918	3,823	-	59	-	-	$ 235,748

For the Three Months Ended March 31, 2018

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial valuations	$ 87,727	66,679	814	945	912	-	-	-	-	$ 157,077
Experience analysis	62,536	62,535	-	-	-	-	-	-	-	125,071
KPMG audit information request	1,089	407	4	-	-	-	5	-	-	1,505
ARMB presentations and meeting attendance	20,610	8,338	131	652	-	-	-	-	-	29,731
GASB 67 valuation reports as of 6/30/17 (PERS/TRS/JRS/NGNMRS)	2,900	1,283	-	-	-	-	-	-	-	4,183
GASB 68 work for PERS and TRS	12,705	5,645	125	684	-	-	-	-	-	19,159
EGWP cost analysis	13,456	5,957	-	-	-	-	-	-	-	19,413
100-year projections	760	310	-	-	-	-	-	-	-	1,070
Revised valuation results for new claims assumptions	24,537	9,172	-	-	-	-	-	-	-	33,709
Claims cost development presentation	5,819	2,175	-	-	-	-	-	-	-	7,994
Misc house finance committee PPT	482	197	-	-	-	-	-	-	-	679
Misc contribution rate details	2,640	887	-	-	-	-	-	-	-	3,527
TOTAL	$ 235,261	163,585	1,074	2,281	912	-	5	-	-	$ 403,118
For the Three Months Ended March 31, 2017	$ 143,976	73,568	23,644	44,033	4,381	-	17	-	-	$ 289,619

For the Three Months Ended June 30, 2018

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial valuations	$ -	-	2,327	845	-	-	-	-	-	$ 3,172
Experience analysis	1,129	1,129	-	-	-	-	-	-	-	2,258
KPMG audit information request	3,582	1,462	-	-	-	-	-	-	-	5,044
ARMB presentations and meeting attendance	58,105	23,498	370	1,829	-	-	-	-	-	83,802
JRS alternate contribution pattern	-	-	865	-	-	-	-	-	-	865
GASB 75 reports as of 6/30/17 (PERS/TRS/JRS)	26,281	9,842	84	-	-	-	-	-	-	36,207
100-year projections	3,478	1,422	-	-	-	-	-	-	-	4,900
Misc NGNMRS data	-	-	-	679	-	-	-	-	-	679
TOTAL	$ 92,575	37,353	3,646	3,353	-	-	-	-	-	$ 136,927
For the Three Months Ended June 30, 2017	$ 88,593	39,236	6,510	5,893	1,626	-	4,392	-	-	$ 146,250

Summary through the Twelve Months Ended June 30, 2018

	PERS	TRS	JRS	NGNMRS	EPORS	AHF	RHF	SBS	DCP	TOTAL
Actuarial valuations	$ 196,104	138,729	3,141	1,790	912	-	-	-	-	$ 340,676
Experience analysis	105,541	100,386	-	-	-	-	-	-	-	205,927
KPMG audit information request	17,460	7,022	34	114	-	-	12	1,174	291	26,107
ARMB presentations and meeting attendance	136,943	55,266	859	4,220	-	-	-	-	-	197,288
Attendance and preparation for November NYC Trustees meeting	3,630	1,483	-	-	-	-	-	-	-	5,113
FY19 projected pay by employer	2,850	1,261	-	-	-	-	-	-	-	4,111
FY19 final PERS/TRS contribution rates	13,681	5,589	-	-	-	-	-	-	-	19,270
JRS alternate contribution pattern	-	-	2,303	-	-	-	-	-	-	2,303
Retiree medical change (reduced claim cost)	4,881	1,825	16	-	-	-	20	-	-	6,742
GASB 67 valuation reports as of 6/30/17 (PERS/TRS/JRS/NGNMRS)	22,176	9,820	19	104	-	-	-	-	-	32,119
GASB 68 work for PERS and TRS	12,705	5,645	125	684	-	-	-	-	-	19,159
GASB 74 valuation reports as of 6/30/17 (PERS/TRS/JRS)	83,481	32,939	188	-	-	-	-	-	-	116,608
GASB 75 reports as of 6/30/17 (PERS/TRS/JRS)	26,281	9,842	84	-	-	-	-	-	-	36,207
Economic assumption sensitivities analysis	10,911	4,848	108	588	-	-	-	-	-	16,455
Misc EGWP savings	1,320	492	-	-	-	-	-	-	-	1,812
EGWP cost analysis	17,690	7,831	-	-	-	-	-	-	-	25,521
100-year projections	4,238	1,732	-	-	-	-	-	-	-	5,970
Revised valuation results for new claims assumptions	24,537	9,172	-	-	-	-	-	-	-	33,709
Claims cost development presentation	5,819	2,175	-	-	-	-	-	-	-	7,994
Misc house finance committee PPT	482	197	-	-	-	-	-	-	-	679
Misc contribution rate details	2,640	887	-	-	-	-	-	-	-	3,527
Misc NGNMRS data	-	-	-	679	-	-	-	-	-	679
Misc emails and phone calls	7,507	3,792	304	59	-	-	3	81	20	11,766
TOTAL	$ 700,877	400,933	7,181	8,238	912	-	35	1,255	311	1,119,742
Summary through the Twelve Months June 30, 2017	$ 451,691	$ 229,557	$51,435	$54,379	$12,423	$ -	$11,372	$ -	$ -	$ 810,857

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY2020 ARMB Budget Proposal — ACTION: X

DATE: September 20, 2018 — INFORMATION: ____

BACKGROUND:

Pursuant to its charter, the Alaska Retirement Management Board (ARMB) Budget Committee meets annually to review the actual expenditures in the immediately preceding fiscal year budget; consider and review the current fiscal year budget as approved by the legislature; and develop a proposed budget for the next fiscal year and make appropriate recommendations for action to the Board.

The ARMB budget is reflected in the Alaska Budget System in two budget components: the Alaska Retirement Management Board component which includes operations costs and the Alaska Retirement Management Board – Custody and Management component. For presentation purposes, the attached schedule combines these into one schedule for FY2016 through FY2018 actuals and FY2019 and FY2020 projected and proposed amounts.

STATUS:

Personal Services Costs

The ARMB purchases personal services from the Treasury division each year. The FY2019 budget is estimated to include $6.3 million for personal services. Increases for new positions and/or salary increases for FY2020 will be included in the budget proposal during discussions with the OMB and Legislature. The increase of $700,000 reflected in the FY2020 proposed personal services line are offset by the decreases in investment management fees discussed below.

Investment Management Fees

Total external public management fees decreased from $46.6 million in FY2017 to $44.5 million in FY2018 and total unbudgeted private investment fees (netted from investments and historically not included in budget appropriations) decreased from $62.1 million in FY2017 to $60.3 million in FY2018. This decrease of nearly $3.9 million is a direct result of moving assets managed by external firms to internally managed mandates and occurred despite total defined benefit assets growing by $1 billion. The investment management and custody fee request is proposed to decrease by $1 million to $49 million for FY2020 to offset the increase in personal services costs.

Other Budgeted Costs

The transition to more internally managed investments requires additional support costs. Increases to other service costs reflected in the attached working budget will be requested during discussions with the OMB and the Legislature.

Committee Recommendation

The Budget Committee met September 19, 2018 with Department of Revenue staff, reviewed the budget schedules and worksheets attached, and makes the following recommendation.

RECOMMENDATION:

That the ARMB adopt the FY2020 Proposed Budget as attached, with the understanding that components will be subject to appropriation by OMB and the Legislature.

Attachments: FY2020 ARMB Working Budget and Management Fee Spreadsheets.

FY20 ARMB Working Budget

THE STATE of ALASKA
TREASURY DIVISION

		FY16 Actuals	FY17 Actuals	FY18 Actuals	FY18 Budget	FY19 Projected	FY20 Proposed	$ Change from FY19	% change
Personal Services	Board	56,763	46,050	56,019	75,000	75,000	75,000		
	Staff	3,766,935	4,779,823	5,031,087	6,042,900	6,312,566	7,000,000		
		3,823,697	**4,825,873**	**5,087,106**	**6,117,900**	**6,387,566**	**7,075,000**	**687,434**	**10.8%**
Travel	Employee Travel	109,000	118,869	168,651	150,000	165,000	165,000		
	Non Employee Travel	45,936	27,710	18,654	40,000	40,000	40,000		
	Travel Agent Fees	773	432	647	500	650	650		
		155,709	**147,012**	**187,952**	**190,500**	**205,650**	**205,650**	**0**	**0.0%**
Management & Custody Fees	Custody Fees	1,381,228	1,446,493	1,388,486	1,447,000	1,497,000	1,497,000		
	Unbudgeted Private Investment Fees	60,707,238	62,144,558	60,309,727	67,116,123	65,134,505	65,134,505		
	External Public Investment Fees	40,530,306	46,645,967	44,508,963	48,553,000	48,503,000	47,503,000		
		102,618,772	**110,237,018**	**106,207,176**	**117,116,123**	**115,134,505**	**114,134,505**	**-1,000,000**	**-0.9%**
Investment Consulting	Investment Advisory Council	103,816	103,134	98,909	150,000	130,000	130,000		
	Investment/Performance Consultant	598,610	774,904	647,158	776,000	800,000	776,000		
	Other Consultants-Townsend/Crestline	100,000	287,400	160,000	110,000	100,000	100,000		
		802,426	**1,165,438**	**906,067**	**1,036,000**	**1,030,000**	**1,006,000**	**-24,000**	**-2.3%**
Investment Information Systems	Barclays Risk Analytics	5,604	0	0	0	0	0		
	TBD-Equity Analytics software	0	0	0	0	0	250,000		
	Bloomberg	379,991	457,660	498,964	500,000	500,000	500,000		
	CreditSights	2,939	3,829	5,804	4,000	5,800	5,800		
	FactSet	345,340	366,951	354,858	375,000	60,000	0		
	Frank Russell/FTSE International	18,805	1,860	44,580	19,000	19,000	19,000		
	GMEI Utility	110	119	99	100	100	100		
	ISS Proxy Voting	14,040	48,080	51,595	38,500	51,000	51,000		
	Moodys	18,886	25,209	38,029	25,000	40,000	40,000		
	MSCI	1,000	1,000	1,000	1,000	1,000	1,000		
	New York Stock Exchange	2,804	2,762	3,757	4,000	4,000	4,000		
	OMGEO	0	6,503	15,063	13,000	15,000	15,000		
	Scientific Beta EDHEC Index	0	57,400	0	60,000	0	0		
	Standard and Poors Financial Services	170,129	165,391	164,643	185,000	450,000	450,000		
	State Street Risk Management	0	75,000	87,050	100,000	87,000	87,000		
	Trade Web	5,187	7,096	10,613	10,000	11,000	11,000		
	Yieldbook	23,147	31,720	46,640	32,000	46,000	46,000		
	Zacks Investments Research	51,250	51,250	11,250	52,000	0	0		
		1,039,232	**1,301,829**	**1,333,944**	**1,418,600**	**1,289,900**	**1,479,900**	**190,000**	**14.7%**
Other Professional Services	Actuarial Services	244,578	226,249	246,634	250,000	250,000	250,000		
	DOA Finance (IRIS, ALDER, ADA,	40,072	95,080	33,161	90,000	50,000	50,000		
	DOA Human Resources	16,259	17,593	20,400	20,000	21,000	21,000		
	Financial Audit	93,778	77,895	91,670	95,000	95,000	95,000		
	International Tax Preparation	10,195	10,195	9,695	10,500	10,500	10,500		
	IT Support	38,795	37,797	39,296	20,000	40,000	40,000		
	Legal	81,211	62,692	83,687	100,000	100,000	100,000		
	Performance Consultant Audit	0	0	0	0	65,900	0		
	Recruitment and Compensation Studies	3,050	69,512	4,625	4,500	4,500	4,500		
	DOR ASD Support Services	119,604	237,201	524,338	240,000	550,000	700,000		
	DOR OOC Support Services	39,770	40,725	38,421	55,000	40,000	40,000		
	Translation Services	0	0	841	0	1,000	1,000		
		687,311	**874,940**	**1,092,769**	**885,000**	**1,227,900**	**1,312,000**	**84,100**	**6.8%**
Subscriptions and Training		**43,114**	**35,004**	**46,708**	**56,000**	**56,000**	**56,000**	**0**	**0.0%**
General Office Expenses	Building Related Expenses	123,143	139,717	148,212	122,500	125,000	125,000		
	Business Supplies	5,507	5,001	7,355	7,000	7,000	7,000		
	Equipment and Machinery	4,256	10,115	9,544	10,000	10,000	10,000		
	Information Technology Equipment	9,337	784	18,003	13,000	15,000	15,000		
	Mail/Courier Services	9,137	7,400	4,676	7,500	7,500	7,500		
	Public Notices	8,618	4,051	1,652	10,000	7,500	7,500		
	Software	12,204	12,233	68,576	20,000	20,000	20,000		
	Telecommunications	69,110	67,386	72,439	90,000	70,000	70,000		
		241,312	**246,687**	**330,458**	**280,000**	**262,000**	**262,000**	**0**	**0.0%**
Board Meeting Expenses		**72,323**	**54,772**	**75,074**	**75,000**	**75,000**	**75,000**	**0**	**0.0%**
Total all Expenses		**109,483,895**	**118,888,574**	**115,267,253**	**127,175,123**	**125,668,521**	**125,606,055**	**-62,466**	**0%**
Investment fees and custody		102,618,772	110,237,018	106,207,176	117,116,123	115,134,505	114,134,505	-1,000,000	-0.9%
Operations		6,865,123	8,651,556	9,060,078	10,059,000	10,534,016	11,471,550	937,534	8.9%
Total all Expenses		**109,483,895**	**118,888,574**	**115,267,253**	**127,175,123**	**125,668,521**	**125,606,055**	**-62,466**	**0%**

FY18 ARMB Actual Manager Fees

Fund	Manager Name	Asset Class	FY18 Actual Mgr Fees	FY2018 Avg Asset Value	Fees in Basis Points
AYGF	Frontier Capital Management Company	Broad Domestic Equity	$ 1,360,236	$ 160,032,320	85.00
AYGJ	Victory Capital Management	Broad Domestic Equity	1,217,213	190,690,868	63.83
AY4E	Deprince, Race & Zollo Inc	Broad Domestic Equity	1,121,728	112,248,882	99.93
AYGH	Fidelity (FIAM) Small Company	Broad Domestic Equity	944,900	135,350,177	69.81
AY4Z	Lord, Abbett & Co - Micro Cap	Broad Domestic Equity	881,238	101,152,044	87.12
AYGB	Jennison Associates	Broad Domestic Equity	859,981	110,109,270	78.10
AY47	Lazard Asset Management	Broad Domestic Equity	772,494	329,019,382	23.48
AY4U	Barrow, Hanley, Mewhinney & Strauss (Large Cap)	Broad Domestic Equity	621,723	145,607,401	42.70
AYKW	Zebra Capital Management, LLC	Broad Domestic Equity	583,903	101,639,924	57.45
AY48	Mckinley Capital	Broad Domestic Equity	530,864	135,228,186	39.26
AY4V	Quantitative Management Associates	Broad Domestic Equity	496,018	178,410,932	27.80
AYGN	BMO DSCC	Broad Domestic Equity	481,686	83,101,017	57.96
AYGD	Barrow, Hanley, Mewhinney & Strauss (Small Cap)	Broad Domestic Equity	442,654	81,537,234	54.29
AY38	Allianz Global Investors	Broad Domestic Equity	367,347	142,891,845	25.71
AYGP	Arrowmark	Broad Domestic Equity	351,298	47,946,907	73.27
AYGE	Lord Abbett Small Cap Growth	Broad Domestic Equity	254,808	33,641,290	75.74
AYG2	Portable Alpha	Broad Domestic Equity	210,328	420,334,219	5.00
AYLM	ARMB Scientific Beta	Broad Domestic Equity	199,616	324,593,036	6.15
AYG1	Portable Alpha AYG1	Broad Domestic Equity	198,036	395,631,969	5.01
AYGQ	T. Rowe Small Cap Growth	Broad Domestic Equity	162,408	33,317,739	48.75
AY4L	ARMB Russell 1000 Growth	Broad Domestic Equity	69,743	1,224,299,115	0.57
AY4M	ARMB Russell 1000 Value	Broad Domestic Equity	59,270	1,017,783,739	0.58
AYGL	SSgA Managed Volatility Russell 2000	Broad Domestic Equity	53,984	70,379,716	7.67
AY4R	ARMB Russell Top 200	Broad Domestic Equity	22,694	373,926,312	0.61
AYLN	ARMB S&P500 Equal Weight	Broad Domestic Equity	15,468	309,682,041	0.50
AY5E	ARMB Equity Yield	Broad Domestic Equity	10,656	347,984,767	0.31
AYGA	ARMB S&P 600	Broad Domestic Equity	9,391	188,142,916	0.50
AY6B	Ssga Futures Large Cap.	Broad Domestic Equity	3,247	6,492,939	5.00
AY6A	Ssga Futures Small Cap.	Broad Domestic Equity	1,911	3,825,872	5.00
AY6P	Lazard Asset Management (Emerging Markets)	Global Equity Ex-US	3,552,074	478,688,705	74.20
AY6Q	Eaton Vance (Emerging Markets)	Global Equity Ex-US	3,313,400	292,314,118	113.35
AY65	Brandes Investment Partners	Global Equity Ex-US	2,606,635	704,233,948	37.01
AY69	McKinley Capital (International Large Cap)	Global Equity Ex-US	2,560,157	535,423,751	47.82
AY67	Capital Guardian Trust	Global Equity Ex-US	2,201,671	557,842,454	39.47
AYLR	Baillie Gifford Overseas Limited	Global Equity Ex-US	1,920,632	465,211,478	41.29
AYLQ	Arrowstreet Capital, Limited Partnership	Global Equity Ex-US	1,778,979	388,488,828	45.79
AY5D	Schroder Investment Management	Global Equity Ex-US	1,619,853	209,342,693	77.38
AY5B	Mondrian Inv Partners, Ltd	Global Equity Ex-US	1,338,915	186,807,310	71.67
AYLP	Allianz Global Investors (International Large Cap)	Global Equity Ex-US	781,300	234,982,055	33.25
AY68	State Street Global Advisors	Global Equity Ex-US	605,542	1,009,234,534	6.00
AY58	Lazard Asset Management (International Large Cap)	Global Equity Ex-US	367,935	333,047,563	11.05
AY6U	Blackrock ACWI Ex-US IMI	Global Equity Ex-US	312,992	625,982,800	5.00
AYLG	DePrince, Race, and Zollo - Emerging Markets	Global Equity Ex-US	134,337	82,710,334	16.24
AY1H	Schroders Insurance Linked Securities	Opportunistic	1,575,020	232,265,653	67.81
AYRP	Fidelity Institutional Asset Management High Yield	Opportunistic	1,425,226	200,628,461	71.04
AY5M	Lazard Emerging Income	Opportunistic	1,269,884	169,375,729	74.97
AY52	Advent Capital Management Convertible Bond Fund	Opportunistic	857,232	138,193,243	62.03
AY63	Mondrian Investment Partners	Opportunistic	622,360	144,427,503	43.09
AY9P	MacKay Shields	Opportunistic	617,268	154,338,196	39.99
AY1F	Fidelity Institutional Asset Management	Opportunistic	522,986	151,074,620	34.62
AYRQ	Columbia Threadneedle	Opportunistic	458,437	121,168,173	37.83
AY4X	Analytic Buy Write Account	Opportunistic	430,762	8,727,079	493.59
AYRS	Eaton Vance High Yield	Opportunistic	383,922	98,397,163	39.02
AYRX	Quantitative Management Associates MPS	Opportunistic	322,665	125,977,113	25.61
AY1D	Western Asset Management Company	Opportunistic	275,431	120,521,992	22.85
AY1E	Guggenheim Partners	Opportunistic	180,987	82,499,417	21.94
AYKY	ARMB STOXX Min Var	Opportunistic	86,658	435,673,964	1.99
AY4W	Analytic SSgA Index Account - Index Fund	Opportunistic	40,579	349,918,483	1.16
AYKU	SSgA Managed Volatility-Russell 1000	Opportunistic	40,284	51,402,691	7.84

FY18 ARMB Actual Manager Fees

Fund	Manager Name	Asset Class	FY18 Actual Mgr Fees	FY2018 Avg Asset Value	Fees in Basis Points
AYLW	Allianz Global Investors (Absolute Return)	Absolute Return	6,370,312	370,222,551	172.07
AY9F	Crestline (Blue Glacier)	Absolute Return	3,885,403	416,541,632	93.28
AY8N	Prisma Capital (Polar Bear)	Absolute Return	2,729,051	402,596,956	67.79
AYL2	Man Group Alternative Risk Premia	Absolute Return	1,368,113	197,340,996	69.33
AYLY	KKR Apex Equity Fund	Absolute Return	1,215,210	97,508,814	124.63
AYLU	Zebra Global Equity Fund	Absolute Return	1,112,318	121,979,624	91.19
AYLV	Zebra Global Equity Advantage Fund	Absolute Return	583,476	63,112,772	92.45
AYLX	Crestline Specialty Fund	Absolute Return	475,900	33,747,814	141.02
AYL3	JPM Systematic Alpha	Absolute Return	471,260	124,894,640	37.73
AY8M	Global Asset Management (Glacier Bear)	Absolute Return	57,844	5,209,409	111.04
AYLZ	Crestline Specialty II	Absolute Return	19,025	3,545,146	53.66
AY98	Pathway Capital Management	Private Equity	2,818,708	960,571,254	29.34
AY85	Abbott Capital Management	Private Equity	2,172,340	877,457,210	24.76
AYKL	Dyal Capital Partners III	Private Equity	1,000,000	19,009,445	526.05
AYKM	Warburg Pincus XII	Private Equity	910,000	30,628,529	297.11
AYKG	NGP XI	Private Equity	700,666	39,814,244	175.98
AYRN	New Mountain Partners V	Private Equity	670,591	3,570,522	1878.13
AYKE	Glendon Opportunities	Private Equity	625,260	33,204,949	188.30
AYKR	Neuberger Berman Secondary Opportunities Fund IV	Private Equity	625,000	3,294,510	1897.10
AYKF	KKR Lending Partners II	Private Equity	531,894	82,467,971	64.50
AYKH	Lexington Capital Partners VIII	Private Equity	396,324	22,812,822	173.73
AYKJ	Advent International GPE Fund VIII-B	Private Equity	375,204	10,914,889	343.75
AYKA	Neuberger Berman Secondary Opportunities Fund III	Private Equity	350,263	30,384,114	115.28
AY8P	Lexington Capital Partners VII	Private Equity	329,300	27,159,804	121.25
AYKB	Resolute Fund III	Private Equity	206,264	13,090,336	157.57
AY7Y	Warburg Pincus XI	Private Equity	184,017	27,526,316	66.85
AY8Q	Onex Partners III LP	Private Equity	104,875	15,465,733	67.81
AY7Z	Merit Capital Partners	Private Equity	98,800	14,411,471	68.56
AY8W	Warburg Pincus X	Private Equity	79,634	14,182,940	56.15
AYKD	New Mountain Partners IV	Private Equity	71,638	23,764,929	30.14
AY8X	Angelo, Gordon & Co	Private Equity	9,355	236,442	395.66
AY9B	UBS Agrivest	Real Assets	4,582,423	569,660,587	80.44
AY7G	UBS Realty Separate Account	Real Assets	2,401,354	518,749,255	46.29
AYRA	IFM Global Infrastructure Fund	Real Assets	2,268,601	347,079,798	65.36
AY9G	Hancock	Real Assets	2,212,287	266,649,433	82.97
AY7A	JP Morgan	Real Assets	2,171,503	250,546,961	86.67
AY9Q	Timberland	Real Assets	2,159,442	266,636,229	80.99
AY1Q	Tortoise MLP	Real Assets	1,969,950	315,751,601	62.39
AY7B	UBS Realty - Trumbull Property Fund	Real Assets	1,477,978	182,034,828	81.19
AY1P	Advisory Research MLP	Real Assets	1,372,389	275,017,945	49.90
AY7E	LaSalle Investment Management	Real Assets	1,140,821	190,073,847	60.02
AYRB	JP Morgan Infrasturcture Fund	Real Assets	989,956	108,793,896	90.99
AYRF	Lazard Asset Management Infrastructure Fund	Real Assets	973,325	149,767,329	64.99
AY7F	Sentinel Separate Account	Real Assets	961,416	194,228,564	49.50
AY5J	EIG Energy Fund XVI	Real Assets	908,514	47,740,062	190.30
AYRE	Brookfield Investment Management	Real Assets	721,125	105,620,451	68.28
AY9S	Hancock Natural Resource Group	Real Assets	676,897	93,822,630	72.15
AY9Z	EIG Energy Fund XIV-A	Real Assets	580,578	12,667,410	458.32
AYKQ	Almanac Realty Securities VII L.P.	Real Assets	495,089	24,858,984	199.16
AY7L	KKR Real Estate Partners Americas	Real Assets	458,543	34,973,885	131.11
AY5Y	EIG Energy Fund XV	Real Assets	457,066	30,092,082	151.89
AY7P	Silverpeak Real Estate Partners II (Lehman)	Real Assets	192,889	8,757,823	220.25
AY7R	Tishman Speyer Fund VI	Real Assets	163,909	26,736,411	61.31
AYKP	ING Clarion Ventures 4 L.P.	Real Assets	125,799	19,010,625	66.17
AY7X	Tishman Speyer Fund VII	Real Assets	68,260	3,761,055	181.49
AY7W	Silverpeak Real Estate Partners III (Lehman)	Real Assets	62,950	5,359,044	117.46
AY7S	Almanac Realty Securities V	Real Assets	56,256	2,442,114	230.36
AYRM	KKR Real Estate Partners America II	Real Assets	48,256	480,281	1004.74
AY8S	Colony Investors VIII, L.P.	Real Assets	45,300	3,398,464	133.30
AY9H	ARMB REIT	Real Assets	17,805	318,606,443	0.56
AY9A	EIG Energy Fund XD	Real Assets	1,003	72,001	139.29
	Total Manager Fees		**$ 104,818,690**	**$ 26,162,960,813**	**40.06**

FY18 ARMB Actual Manager Fees

Fund	Manager Name	Asset Class	FY18 Actual Mgr Fees	FY2018 Avg Asset Value	Fees in Basis Points
Manager Fees by Asset Class					
	Broad Domestic Equity		$ 12,304,842		
	Global Equity Ex-US		23,094,420		
	Opportunistic		9,109,701		
	Absolute Return		18,287,912		
	Private Equity		12,260,133		
	Real Assets		29,761,682		
			$ 104,818,690		
	Custody Fees		1,388,486		
	Total FY2018 Custody and Management Fees		**$ 106,207,176**		

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Disclosure - Calendar Update
September 20, 2018

The Disclosure Memorandum is included in the packet; no transactions requiring additional review or discussion. The 2018 ARMB calendar-to-date and the finalized 2019 ARMB calendar are also attached.

Additionally, attached are written communications the ARMB has received for public distribution.

Nothing further to report.

ALASKA RETIREMENT MANAGEMENT BOARD
M E M O R A N D U M

To: ARMB Trustees
From: Stephanie Alexander
Date: September 7, 2018
Subject: Financial Disclosures

As required by AS 37.10.230 and Alaska Retirement Management Board policy relating to investment conduct and reporting, trustees and staff must disclose certain financial interests. We are hereby submitting to you a list of disclosures for individual transactions made by trustees and staff.

2nd Quarter – April 1, 2018 to June 30, 2018

Name	Position Title	Disclosure Type	Disclosure Date
Scott Jones	State Comptroller	Equities	07/06/2018
Sheldon Fisher	ARMB Trustee	Equities	08/09/2018
Bob Mitchell	Chief Investment Officer	Equities	07/06/2018

ALASKA RETIREMENT MANAGEMENT BOARD
2018 Meeting Calendar

DATE	LOCATION	DESCRIPTION
September 19 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Budget Committee Defined Contribution Plan Committee
September 20-21 Thursday - Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Set Contribution Rates* **Audit Results/Assets – KPMG* **Approve Budget* **Performance Measurement – 2nd Quarter* **Real Estate Annual Plan* **Real Estate Evaluation – Townsend Group* **Manager Presentations*
October 11-12 Thursday - Friday	**New York, NY**	**Board of Trustees Meeting: Education Conference**
October 24 Wednesday	Telephonic	Audit Committee
December 12 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
December 13-14 Thursday-Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Audit Report - KPMG* **Performance Measurement – 3rd Quarter* **Manager Review (Questionnaire)* **Private Equity Review* **Manager Presentations*

ALASKA RETIREMENT MANAGEMENT BOARD
2019 Meeting Calendar

DATE	LOCATION	DESCRIPTION
February 11 Monday	Telephonic	Actuarial Committee
April 3 Wednesday	Juneau, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
April 4-5 Thursday-Friday	**Juneau, AK**	**Board of Trustees Meeting:** **Performance Measurement – 4th Quarter* **Absolute Return Annual Plan* **Conduent Draft Actuary Report/GRS Draft Actuary Certification* **Capital Markets – Asset Allocation* **Manager Presentations*
May 2 Thursday	Anchorage, AK or Telephonic	Actuarial Committee **As necessary: follow-up/additional discussion/questions on valuations*
May 3 Friday	**Anchorage, AK**	**Board of Trustees Meeting** **As necessary*
June 19 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
June 20-21 Thursday - Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Final Actuary Reports/Adopt Valuation* **Adopt Asset Allocation* **Review Private Equity Annual Plan* **Performance Measurement - 1st Quarter* **Manager Presentations*
September 18 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee Budget Committee
September 19-20 Thursday - Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Set Contribution Rates* **Audit Results/Assets – KPMG* **Approve Budget* **Performance Measurement – 2nd Quarter* **Real Estate Annual Plan* **Real Estate Evaluation – Townsend Group* **Manager Presentations*
November 7-8 Thurs.- Fri. (placeholder)	**New York, NY**	**Board of Trustees Meeting: Investment Education Conference**
November 15 Friday (placeholder)	Telephonic	Audit Committee
December 11 Wednesday	Anchorage, AK	Actuarial Committee Audit Committee Defined Contribution Plan Committee
December 12-13 Thursday-Friday	**Anchorage, AK**	**Board of Trustees Meeting:** **Audit Report - KPMG* **Performance Measurement – 3rd Quarter* **Manager Review (Questionnaire)* **Private Equity Review* **Manager Presentations*

CITY OF SEWARD
P.O. BOX 167
SEWARD, ALASKA 99664-0167

• Main Office (907) 224-4050
• Police (907) 224-3338
• Harbor (907) 224-3138
• Fire (907) 224-3445
• City Clerk (907) 224-4046
• Community Development (907) 224-4049
• Utilities (907) 224-4050
• Fax (907) 224-4038

July 20, 2018

Ms. Leslie Ridle
Commissioner, Department of Administration
State of Alaska
PO Box 110200
Juneau, AK 99811

RE: PERS Regulation Proposed Amendment

Dear Commissioner,

As local government agencies find it increasingly more difficult to attract and retain qualified candidates to fill positions in government service, I would like to propose for your consideration, a means by which political subdivisions (and perhaps the State) can rehire qualified PERS retirees without imposing additional burdens on the State retirement system.

Please consider an amendment to PERS legislation allowing employers to rehire PERS retirees under the condition that once an individual has begun to draw retirement benefits, they can either stop their benefit and continue working (current regulations) or have the option to elect to continue working but without accumulating additional retirement benefits. Under this proposal, employers would be required to pay the full employer contribution rate (currently 22%) to the retirement system based on the employee's wages -- as if that employee were eligible for the DB Plan -- but 100% of the employer contributions would be applied to the unfunded liability. The employee would not contribute to PERS as they would not accumulate additional benefits. This change could reduce the retirement system healthcare claims costs for rehired individuals since while re-employed, rehired retirees would be eligible for employer-sponsored healthcare coverage, making that coverage primary. In the end, we believe this proposal offers a win/win for the retirement system, employers and employees, and represents an improved means to reduce the unfunded liabilities of the PERS retirement system.

This proposal addresses two primary concerns of both the State and its political subdivisions; the need to attract and retain the most qualified individuals in government service at a time when Alaska is having difficulties doing so, as ensuring that the State retirement system has sufficient assets to satisfy its obligations to beneficiaries into the future. This solution would allow the State and political subdivisions to rehire retirees who have unique qualifications that are in high demand, while reducing rather than increasing, the unfunded pension liabilities of the State's retirement system.

If you are amenable to sponsoring such a proposal, we would be willing to assist with drafting proposed legislation should you find that helpful. I would welcome your thoughts or feedback on this suggestion.

Sincerely,

James Hunt, City Manager

Phone: (907)224-4047
E-mail: jhunt@cityofseward.net

Cc: Ajay Desai, Retirement Division Director

Summary of Portfolio Moves
June - August, 2018

Item	Action	Date	Amount	Description/Summary
	Rebalance Transactions:			
1	Rebalance Retirement Funds	6/14, 6/25, 6/28, 6/29, 7/12, 7/13, 8/14, 8/17, 8/31		Available upon request.
	Futures Rolls and Adjustments:			
2	Cash Equitization	6/8/2018	$19,100,000	Adjusted size of Small Cap Equitization.
3	Cash Equitization	6/8/2018	$19,100,000	Adjusted size of Small Cap Equitization.
4	Small Cap Portable Alpha Overlay	6/8/2018	~$374 million	Rolled short futures position in Russell 2000 eMini contracts from June to Sept. expiry.
5	Large Cap Portable Alpha Overlay	6/8/2018	~$428 million	Rolled long futures position in S&P 500 eMini contracts from June to Sept. expiry.
6	Large Cap Portable Alpha Overlay	6/25/2018	~$9 million	Bought September 2018 S&P 500 eMini contracts to adjust hedging position.
7	Large Cap Portable Alpha Overlay	7/3/2018	~$4.8 million	Sold September 2018 S&P 500 eMini contracts to adjust hedging position.
8	Small Cap Portable Alpha Overlay	7/17/2018	~$6.2 million	Sold September 2018 Russell 2000 eMini contracts to adjust hedging position.
9	Portable Alpha Cash Transfers	Multiple Dates		Directed multiple transfers of cash into or out of PA futures accounts to maintain necessary margin positions; copies of transactions available upon request.
	Investment Actions:			
10	McKinley Capital International	6/5/2018	($50,000,000)	Liquidated from strategy.
11	Baillie Gifford International	6/5/2018	($50,000,000)	Liquidated from strategy.
12	Parametric Emerging Markets	6/5/2018	($100,000,000)	Liquidated from strategy.
13	Short-term Investment Pool	6/5/2018	$100,000,000	Invested in strategy.
14	Intermediate US Treasuries	6/5/2018	$100,000,000	Invested in strategy.
15	Multiple terminated Opportunistic fixed income and domestic equity accounts.	6/13/2018	($3,521,555)	Liquidated residual cash positions.
16	Short-term Investment Pool	6/13/2018	$3,521,555	Invested in strategy.
17	Russell 1000 Growth	6/14/2018	($100,000,000)	Liquidated from strategy.
18	Short-term Investment Pool	6/14/2018	$50,000,000	Invested in strategy.
19	Intermediate US Treasuries	6/14/2018	$50,000,000	Invested in strategy.
20	Parametric Emerging Markets	6/29/2018	($100,000,000)	Liquidated from strategy.
21	Analytic Buy/Write	6/29/2018	$100,000,000	Invested in strategy.
22	Allianz Structured Alpha	7/2/2018	($50,000,000)	Liquidated from strategy.
23	Prisma Polar Bear Fund - Class B	7/2/2018	($10,000,000)	Liquidated from strategy.
24	Short-term Investment Pool	7/2/2018	$60,000,000	Invested in strategy.
25	Fidelity Real Estate High Income	7/3/2018	($50,000,000)	Liquidated from strategy.
26	Short-term Investment Pool	7/3/2018	$50,000,000	Invested in strategy.
27	Lazard Emerging Income	7/5/2018	($75,000,000)	Liquidated from strategy.
28	Short-term Investment Pool	7/5/2018	$75,000,000	Invested in strategy.
29	Multiple terminated Opportunistic fixed income and domestic equity accounts.	7/6/2018	($548,513)	Liquidated residual cash positions.
30	Short-term Investment Pool	7/6/2018	$548,513	Invested in strategy.
31	Western Asset Management co.	7/20/2018	($50,000,000)	Liquidated from strategy.
32	Short-term Investment Pool	7/20/2018	$50,000,000	Invested in strategy.
33	Zebra Global Equity Fund LP	7/31/2018	($25,000,000)	Liquidated from strategy.

Summary of Portfolio Moves
June - August, 2018

Item	Action	Date	Amount	Description/Summary
34	Prisma Apex Equity Fund	7/31/2018	($15,000,000)	Liquidated from strategy.
35	Short-term Investment Pool	7/31/2018	$40,000,000	Invested in strategy.
36	Multiple terminated Opportunistic fixed income and domestic equity accounts.	8/16/2018	($276,980)	Liquidated residual cash positions.
37	Short-term Investment Pool	8/17/2018	$276,980	Invested in strategy.
38	Parametric Emerging Markets	8/21/2018	($84,778,819)	Liquidated remainder of strategy.
39	Short-term Investment Pool	8/21/2018	$84,778,819	Invested in strategy.
40	Advisory Research	8/29/2018 - 9/6/2018	($150,000,000)	Liquidated from strategy.
41	Short-term Investment Pool	8/29/2018 - 9/6/2018	$150,000,000	Invested in strategy.
	Watch List:			
42	Lazard Emerging Markets Equity			Recommend placing on watch list due to performance.
43	Prisma			Recommend placing on watch list due to transition of co-CEOs to advisory roles.
	Other Actions:			
44	Parametric Emerging Markets Equity	06/25/2018		Notified managers of termination.
45	Socially Responsible Investment Fund	06/28/2018		Replaced Allianz with Northern Trust Investments
46	Alaska International Equity Pool	06/28/2018		Replaced Russell Investments with Baillie Gifford
47	Mondrian International Small Cap	06/25/2018		Notified manager of placement on watch list.
48	Interest Income and Stable Value Funds	08/01/2018		The Interest Income and Stable Value strategies were combined.
49	BlackRock Aggregate Index Fund	08/01/2018		Several passive fixed income, participant directed options were moved to a passive fixed income mandate benchmarked to the BB Aggregate Index.
50	Participant inquiry relating to stable value funds.	07/11/2018		Participant questioned why the interest income and stable value funds were being combined. We noted the improved cash flow diversification benefits and the potental benefits when negotiating with wrap providers that one larger fund may have in the future.
51	Participant requested divestment from the securities issues by several companies that participated in the separation of families at the border.	07/16/2018		I noted, in my response, that the ARMB is required by statute to exercise its fiduciary duty in the sole financial best interests of the participants.
52	Participant inquiry relating to stable value funds.	07/19/2018		Participant requested more information on the nature of the investment be made available to participants on-line.
	Announcements:			
53	Keith Elliott accepted investment officer position.	09/10/2018		Mr. Elliott is a member of the internal equity team.

PAAMCO PRISMA HOLDINGS

PAAMCO Prisma Announces Leadership Transition

IRVINE, Calif. & NEW YORK—July 17, 2018 – PAAMCO Prisma today announced that Co-CEOs Jane Buchan and Girish Reddy are transitioning to advisory roles at the Company. A team of long-tenured senior leaders will assume the day-to-day responsibility of running PAAMCO Prisma. The transition comes more than a year after Prisma and PAAMCO combined to form PAAMCO Prisma Holdings, a majority employee-owned firm that today has $30 billion of assets under management or advisement through its subsidiaries.

Effective August 1st, PAAMCO Prisma will be led by an Executive Committee, comprised of six senior leaders of the combined enterprise: Anne-Gaelle Carlton, Mayer Cherem, Vince Cuticello, Von Hughes, Paul Roberts and Eric Wolfe. Mr. Wolfe will serve as the Chairperson of this Executive Committee.

Of the transition, Girish Reddy stated: "With the combination of PAAMCO and Prisma, our vision was to create a world class alternatives business of significant scale, able to deliver exceptional performance and service to clients. Today, we feel the organization is ready to move to the next generation." Jane Buchan added: "Having accomplished the launch of our new products and with strong year-to-date investment performance, now is the time to pass the torch which has always been our dream." Ms. Buchan and Mr. Reddy both stated: "The team we are putting in place has significant industry experience and is unified with a collective commitment to product innovation, exceptional performance and client service."

With over 33 years of experience in investment management, including 18 years as a co-Founder of PAAMCO, Ms. Buchan will remain involved with PAAMCO Prisma in an advisory capacity through 2018. In 2019, Ms. Buchan intends to return to her roots in direct investing through the launch of a quantitative investment fund.

"Jane is a rare combination: a former academic with a highly technical finance background coupled with a strong aptitude for creative client solutions. She has successfully launched several new investment areas this year — and I fully support her decision to launch the Alternative Beta quantitative business as a new firm outside of PAAMCO with her as Chief Executive Officer. We are grateful for her strategic vision and leadership over the past year and look forward to her ongoing relationship with PAAMCO Prisma and KKR," Scott Nuttall, Director of PAAMCO Prisma Holdings, said.

After more than 40 years in the industry, including as a Partner at Goldman Sachs prior to co-founding Prisma in 2004, Girish Reddy plans to spend time pursuing his passions of investing and educational philanthropy through various university affiliations.

Mr. Nuttall continued, "Girish has had an extraordinary career — a Partner of Goldman Sachs, an entrepreneur founding and building Prisma, a Member at KKR and, most recently, Co-CEO of PAAMCO Prisma. He built a leading client-focused enterprise and mentored a team committed to excellence in investment performance and client service. We thank Girish for his partnership, wish him continued success in his philanthropic work, and look forward to leaning on his advice and counsel going forward as an Advisor."

On behalf of the Executive Committee and the entire partnership, Eric Wolfe and Mayer Cherem continued, "We are grateful to Jane and Girish for their extraordinary leadership and vision in creating PAAMCO Prisma and the many years of dedicated commitment to the firm, its clients and employees. We thank them for the foundation that they laid and wish them well in their respective new chapters."

About Anne-Gaelle Carlton
About Mayer Cherem
About Vince Cuticello
About Von Hughes
About Paul Roberts
About Eric Wolfe

About PAAMCO Prisma

PAAMCO Prisma Holdings combines two leading firms, each with a history of performance, innovation, and steadfast dedication to serving as fiduciaries to their investors. PAAMCO and Prisma were both put into business by institutional investors and share a long-standing commitment to serving the needs of the world's preeminent investors. Each firm brings with it a track record of performance and leadership in alternatives, as well as innovative alpha strategies such as Prisma Apex Tactical (Prisma's unconstrained thematic strategy) and Horizons (PAAMCO's liability-driven investing approach).

PAAMCO Prisma Holdings LLC, through its subsidiaries, PAAMCO and Prisma, offers a broad suite of liquid alpha solutions to address a wide spectrum of client needs. With a combined $30 billion in assets under management or advisement and a shared vision for the future of asset management, we believe PAAMCO Prisma is well positioned to remain at the forefront of innovation and alpha creation. For more information on PAAMCO Prisma Holdings, visit the firm's website at www.paamcoprisma.com.

Media Contacts

Steve Bruce / Mary Beth Grover
sbruce@ascadvisors.com / mbgrover@ascadvisors.com
203-992-1230

ALASKA RETIREMENT MANAGEMENT BOARD

STAFF REPORT

Fund Financials – Cash Flow Report
September 20, 2018

Scott Jones, State Comptroller, Department of Revenue

As of July month-end, total plan assets were as follows: PERS - $18.9 billion, TRS - $9.2 billion, JRS - $216 million, NGNMRS - $41 million, SBS - $4.0 billion, DCP - $954 million. Total non-participant direct plans totaled $26.8 billion, and participant-directed plans totaled $6.4 billion. Total assets were $33.2 billion.

Year-to-date income was $564 million, and the plans experienced a net contribution of $165 million. Total assets were up 2.24% year-to-date.

Internally managed assets totaled $8.9 billion

As of month-end, all plans were within the bands of their asset allocations.

Christina Maiquis, Acting Chief Financial Officer, Department of Administration, Division of Retirement & Benefits

Presented is the Division of Retirement & Benefits (DRB) Supplement to the Treasury Division's Financial Report as of July 31, 2018. DRB's supplement report expands on the ARMB Financial Report column "Net Contributions (Withdrawals)" located on pages 1 and 2. DRB reports the summary totals of actual employer, State of Alaska, and other revenue contributions, as well as benefit payments, refunds / distributions, and combined administrative and investment expenditures.

DRB's report presents cash inflows and outflows for the one month ending July 31, 2018 (page 1) and the month ending July 31, 2018 (page 2). Also presented are participant-directed distributions by plan and by type for the one month ending July 31, 2018 on page 3. Located on page 4 and 5, "Notes for the DRB Supplement to the Treasury Report" includes information for the pension and healthcare plans.

ALASKA RETIREMENT MANAGEMENT BOARD
FINANCIAL REPORT

As of July 31, 2018

ALASKA RETIREMENT MANAGEMENT BOARD
Schedule of Investment Income and Changes in Invested Assets by Fund
Fiscal Year-to-Date through July 31, 2018

	Beginning Invested Assets	Investment Income [1]	Net Contributions (Withdrawals)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income [2]
Public Employees' Retirement System (PERS)						
Defined Benefit Plans:						
Retirement Trust	$ 9,279,978,252	$ 159,895,661	$ 96,315,731	$ 9,536,189,644	2.76%	1.71%
Retirement Health Care Trust	7,653,992,293	130,375,215	(28,505,931)	7,755,861,577	1.33%	1.71%
Total Defined Benefit Plans	16,933,970,545	290,270,876	67,809,800	17,292,051,221	2.11%	1.71%
Defined Contribution Plans:						
Participant Directed Retirement	1,041,422,342	23,079,935	4,875,999	1,069,378,276	2.68%	2.21%
Health Reimbursement Arrangement	356,026,985	6,079,023	3,090,620	365,196,628	2.58%	1.70%
Retiree Medical Plan	99,169,627	1,693,437	923,527	101,786,591	2.64%	1.70%
Defined Benefit Occupational Death and Disability:						
Public Employees	20,872,152	356,161	123,339	21,351,652	2.30%	1.70%
Police and Firefighters	9,776,610	166,817	52,282	9,995,709	2.24%	1.70%
Total Defined Contribution Plans	1,527,267,716	31,375,373	9,065,767	1,567,708,856	2.65%	2.05%
Total PERS	**18,461,238,261**	**321,646,249**	**76,875,567**	**18,859,760,077**	2.16%	1.74%
Teachers' Retirement System (TRS)						
Defined Benefit Plans:						
Retirement Trust	5,466,056,988	94,534,390	96,251,216	5,656,842,594	3.49%	1.71%
Retirement Health Care Trust	2,883,838,182	49,125,557	(10,119,424)	2,922,844,315	1.35%	1.71%
Total Defined Benefit Plans	8,349,895,170	143,659,947	86,131,792	8,579,686,909	2.75%	1.71%
Defined Contribution Plans:						
Participant Directed Retirement	442,323,051	10,016,752	3,036,042	455,375,845	2.95%	2.26%
Health Reimbursement Arrangement	105,665,716	1,804,534	912,845	108,383,095	2.57%	1.70%
Retiree Medical Plan	36,357,065	620,873	296,711	37,274,649	2.52%	1.70%
Defined Benefit Occupational Death and Disability	3,797,783	64,716	(2,060)	3,860,439	1.65%	1.70%
Total Defined Contribution Plans	588,143,615	12,506,875	4,243,538	604,894,028	2.85%	2.12%
Total TRS	**8,938,038,785**	**156,166,822**	**90,375,330**	**9,184,580,937**	2.76%	1.74%
Judicial Retirement System (JRS)						
Defined Benefit Plan Retirement Trust	176,358,294	3,055,500	4,344,836	183,758,630	4.20%	1.71%
Defined Benefit Retirement Health Care Trust	31,621,813	538,831	(9,781)	32,150,863	1.67%	1.70%
Total JRS	**207,980,107**	**3,594,331**	**4,335,055**	**215,909,493**	3.81%	1.71%
National Guard/Naval Militia Retirement System (MRS)						
Defined Benefit Plan Retirement Trust	39,449,053	524,014	703,033	40,676,100	3.11%	1.32%
Other Participant Directed Plans						
Supplemental Annuity Plan	3,905,659,481	64,769,935	(4,917,670)	3,965,511,746	1.53%	1.66%
Deferred Compensation Plan	938,806,799	17,320,603	(2,535,812)	953,591,590	1.57%	1.85%
Total All Funds	**32,491,172,486**	**564,021,954**	**164,835,503**	**33,220,029,943**		
Total Non-Participant Directed	26,162,960,813	448,834,729	164,376,944	26,776,172,486	2.34%	1.71%
Total Participant Directed	6,328,211,673	115,187,225	458,559	6,443,857,457	1.83%	1.82%
Total All Funds	**$ 32,491,172,486**	**$ 564,021,954**	**$ 164,835,503**	**$ 33,220,029,943**	**2.24%**	**1.73%**

Notes:

(1) Includes interest, dividends, securities lending, expenses, realized and unrealized gains/losses

(2) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates and can be found at: http://www.revenue.state.ak.us/treasury/programs/programs/other/armb/investmentresults.aspx

ALASKA RETIREMENT MANAGEMENT BOARD
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For the Month Ended July 31, 2018

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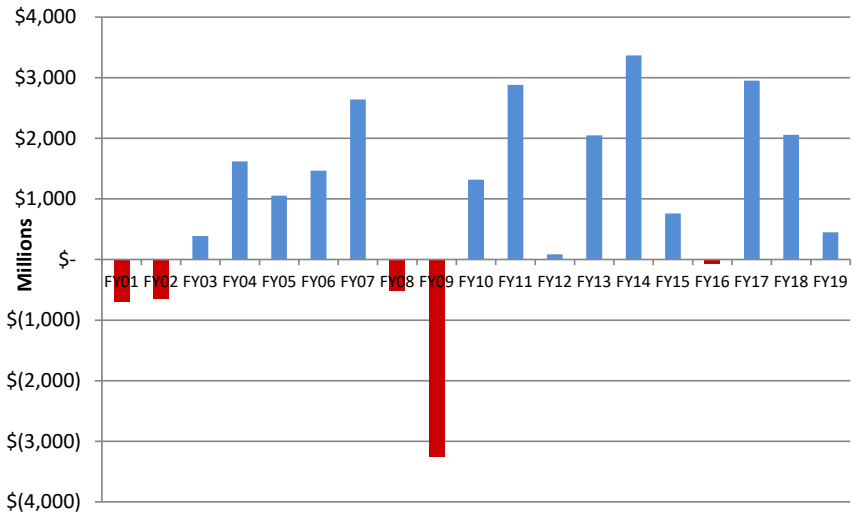
Total Non Participant Directed Assets

As of July 31, 2018

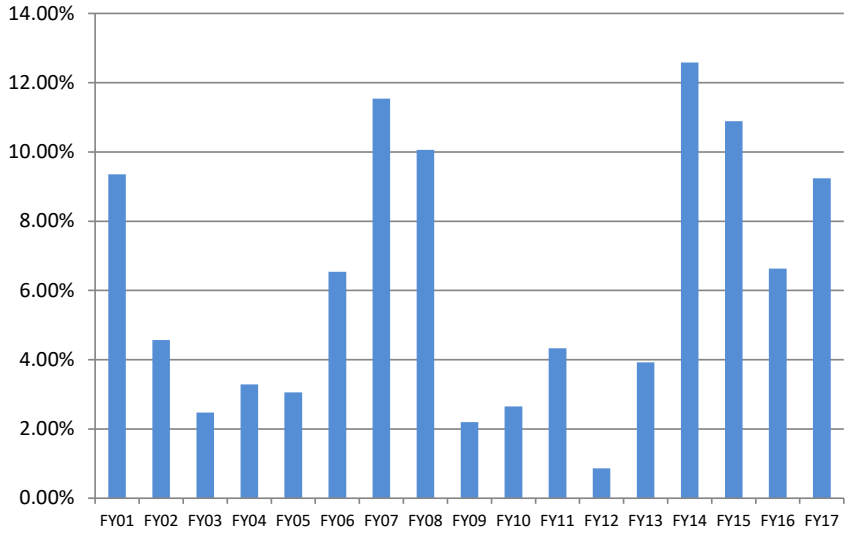
Total Assets History



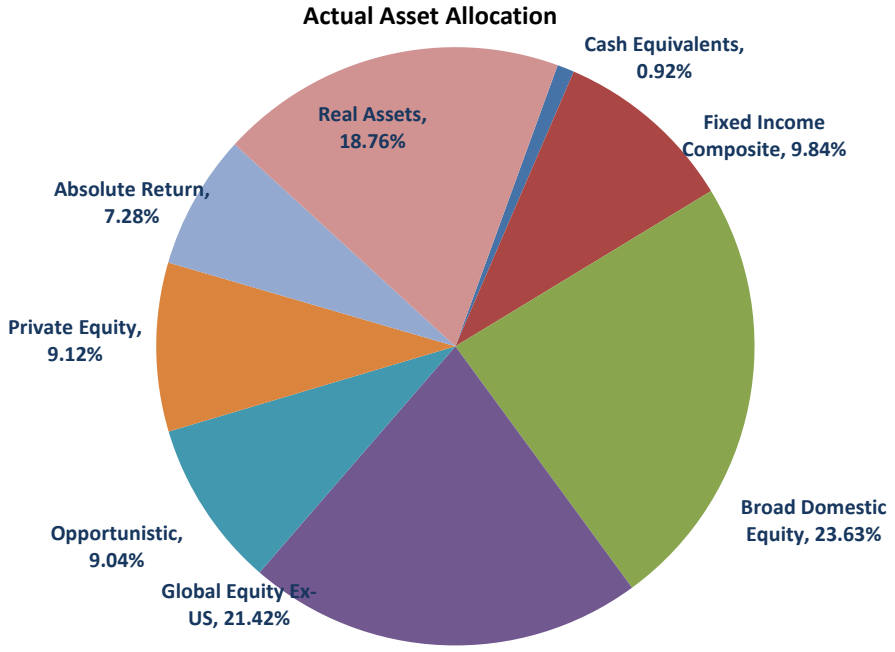
Income by Fiscal Year



5-year Annualized Returns as of Fiscal Year End



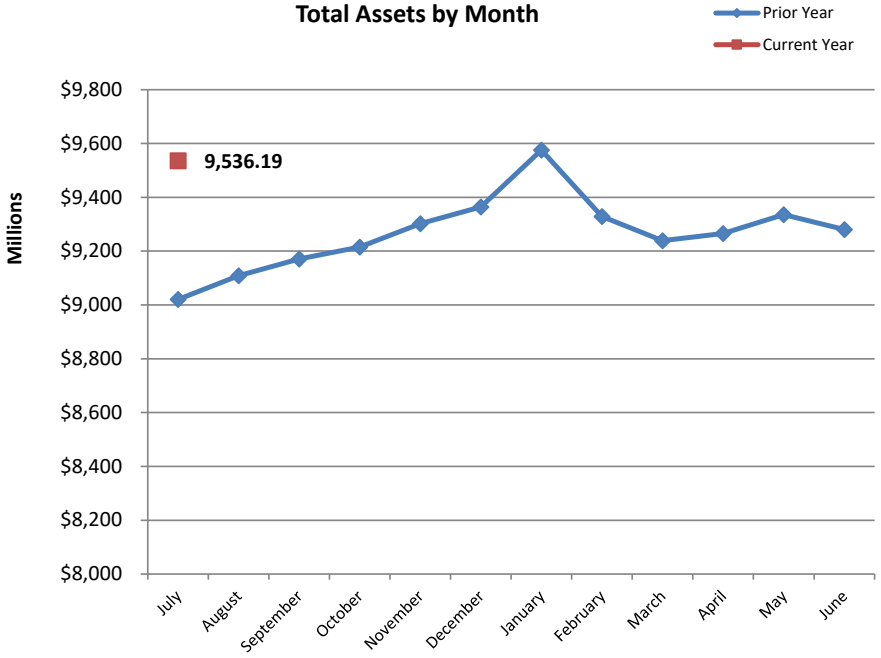
Actual Asset Allocation



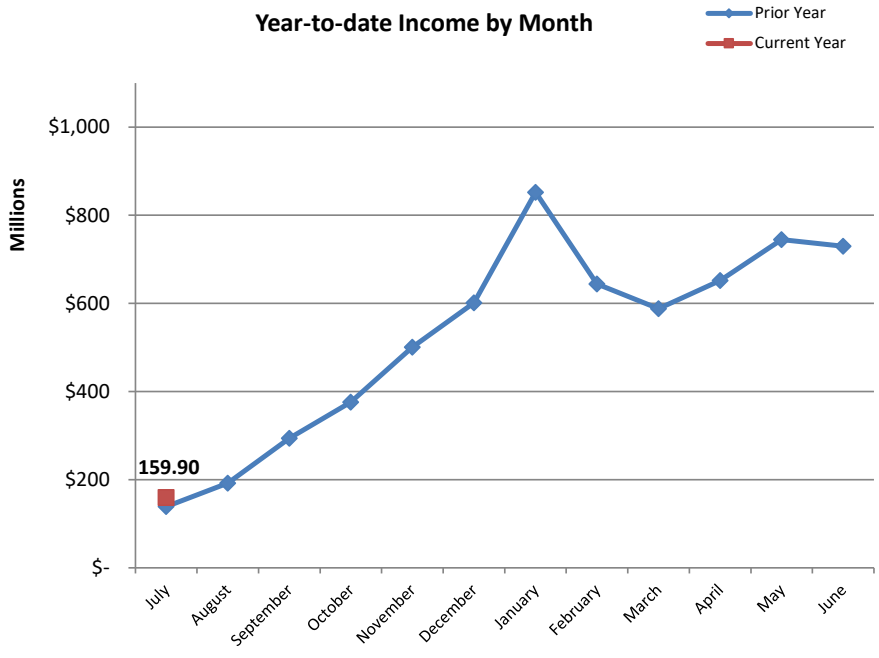
Public Employees' Retirement Pension Trust Fund

Fiscal Year-to-Date through July 31, 2018

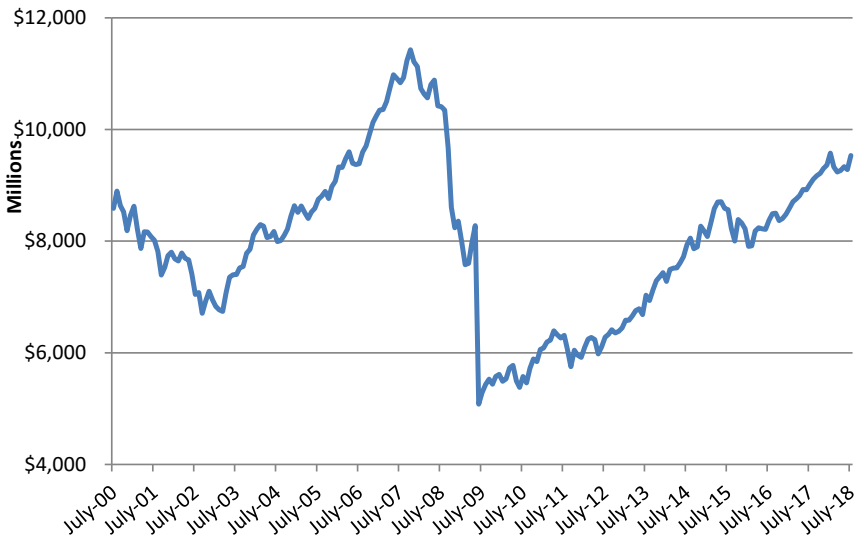
Total Assets by Month



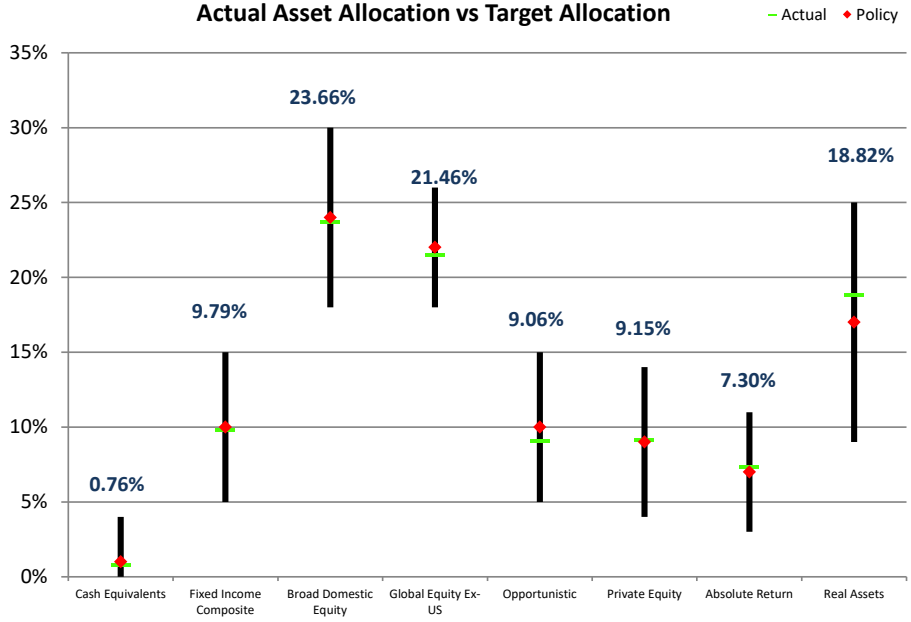
Year-to-date Income by Month



Total Assets History



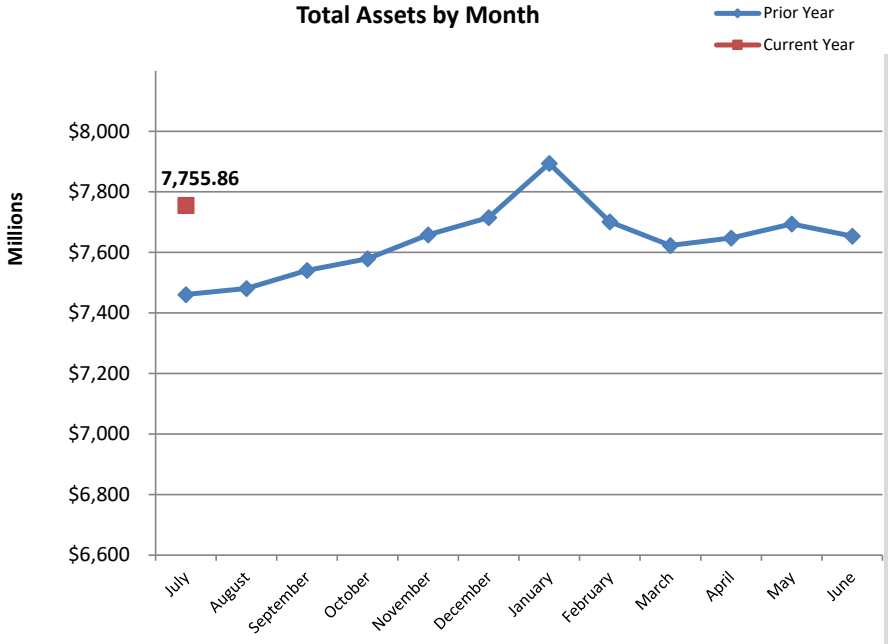
Actual Asset Allocation vs Target Allocation



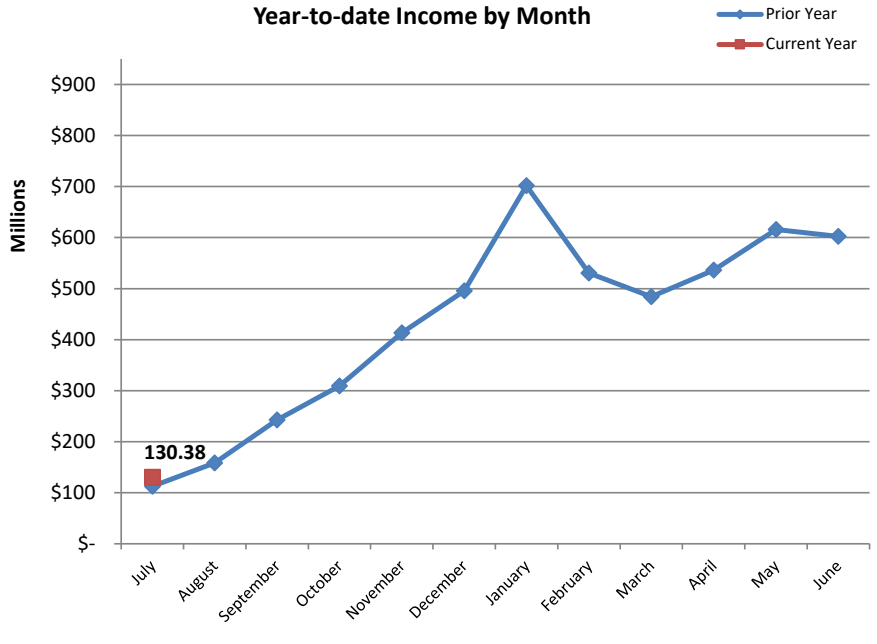
Public Employees' Retirement Health Care Trust Fund

Fiscal Year-to-Date through July 31, 2018

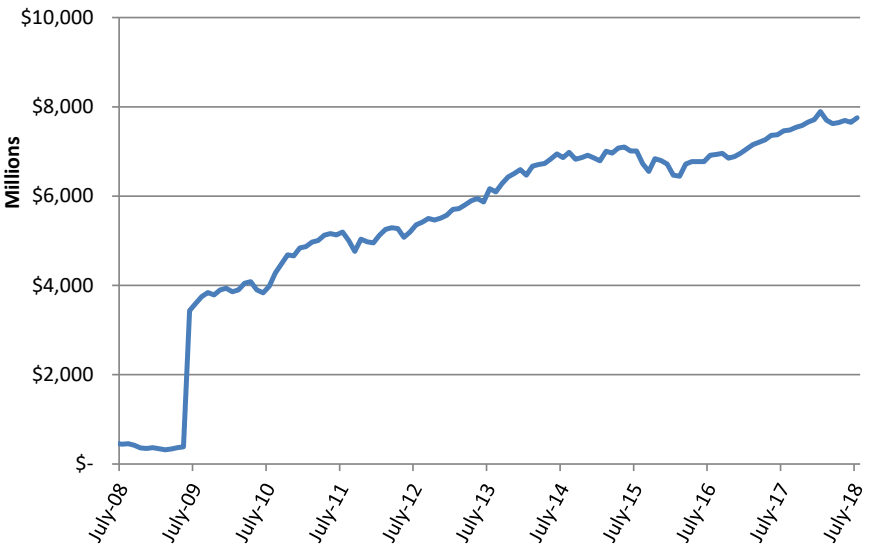
Total Assets by Month



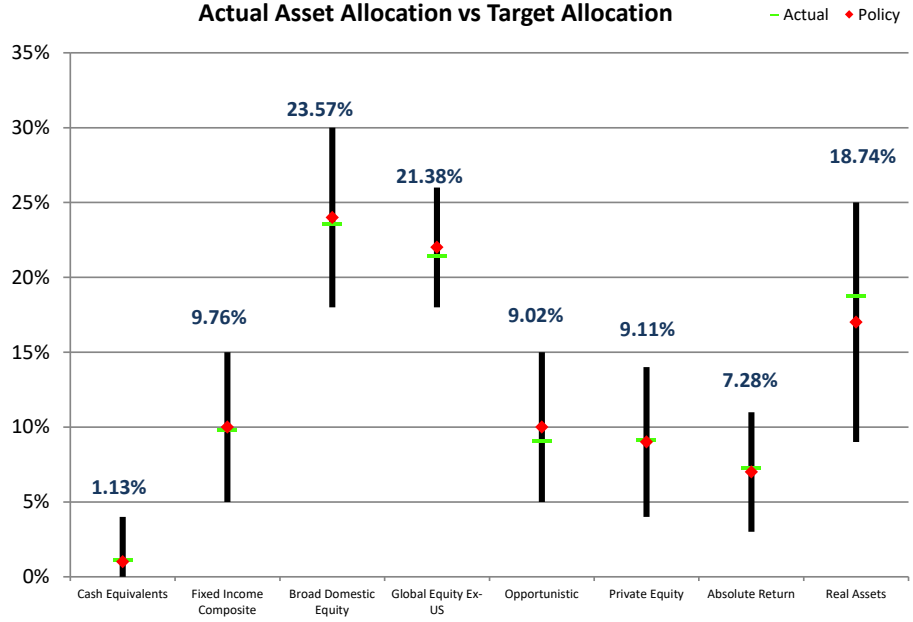
Year-to-date Income by Month



Total Assets History



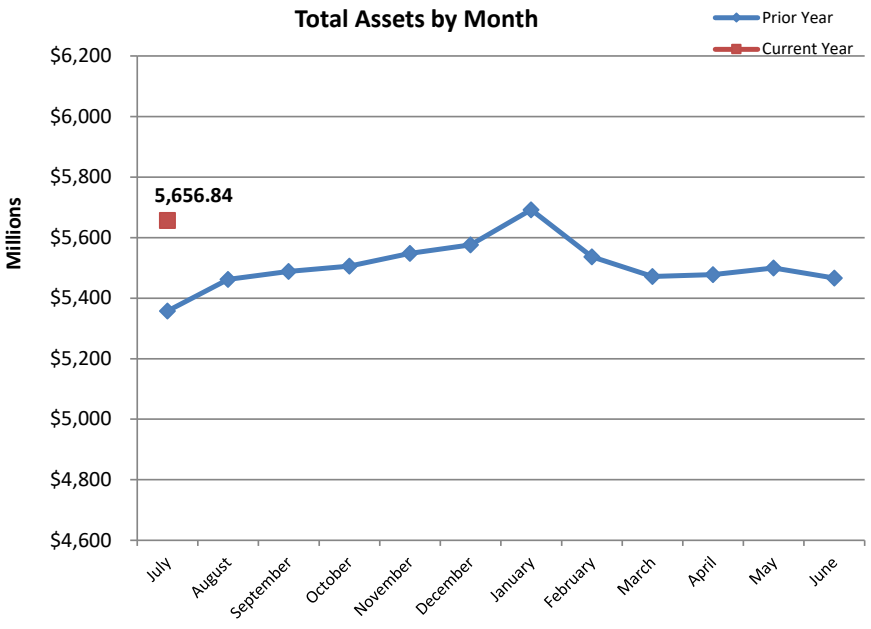
Actual Asset Allocation vs Target Allocation



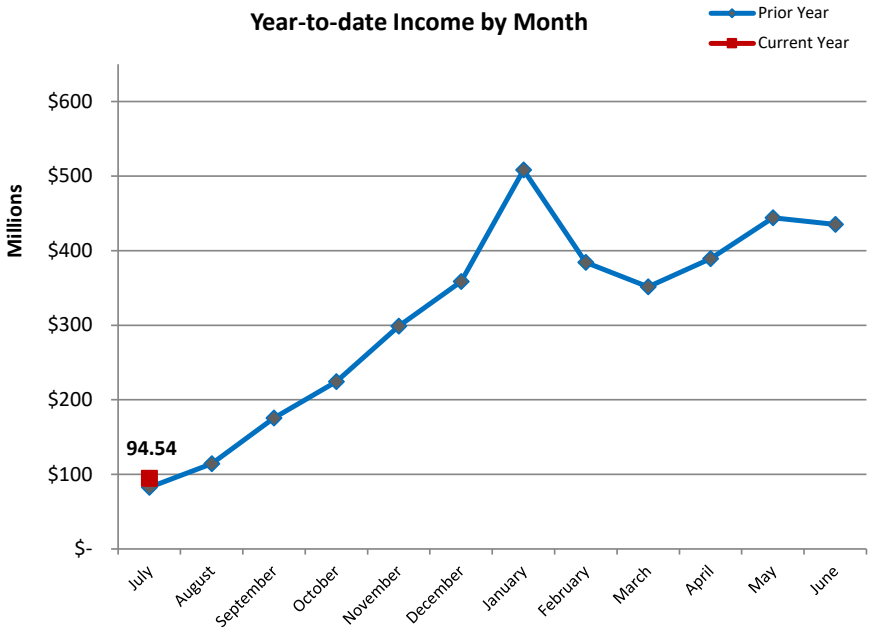
Teachers' Retirement Pension Trust Fund

Fiscal Year-to-Date through July 31, 2018

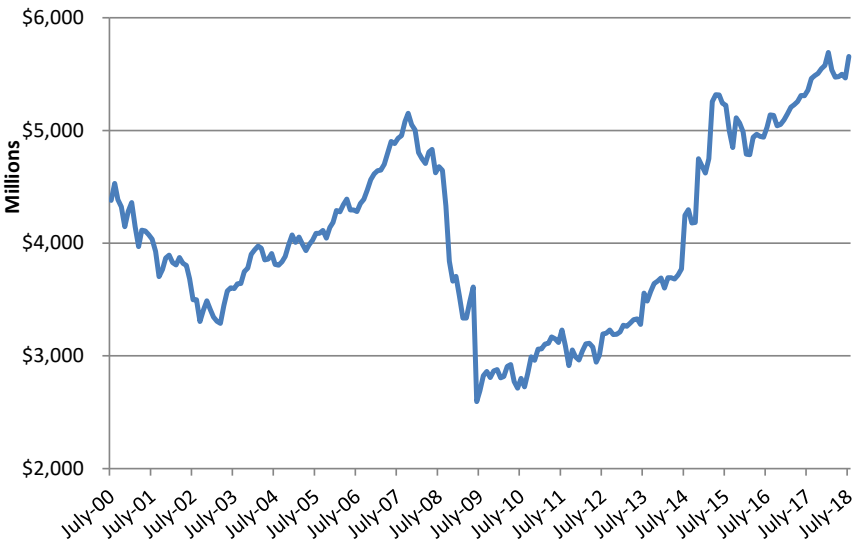
Total Assets by Month



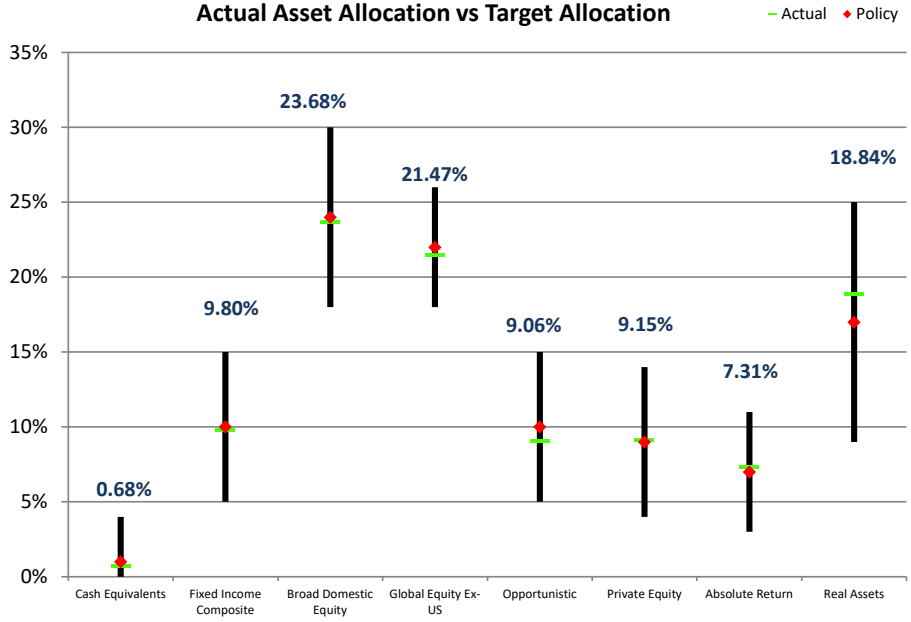
Year-to-date Income by Month



Total Assets History



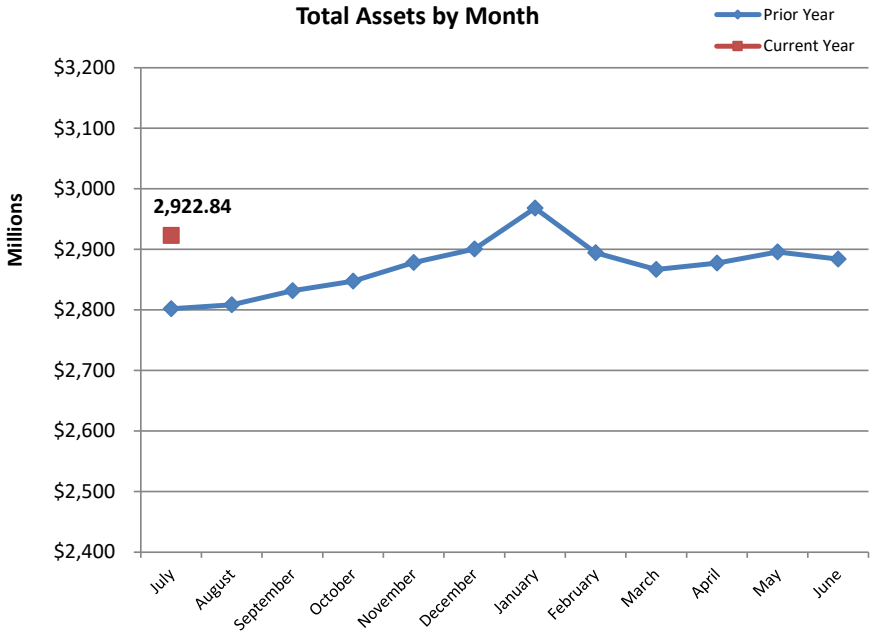
Actual Asset Allocation vs Target Allocation



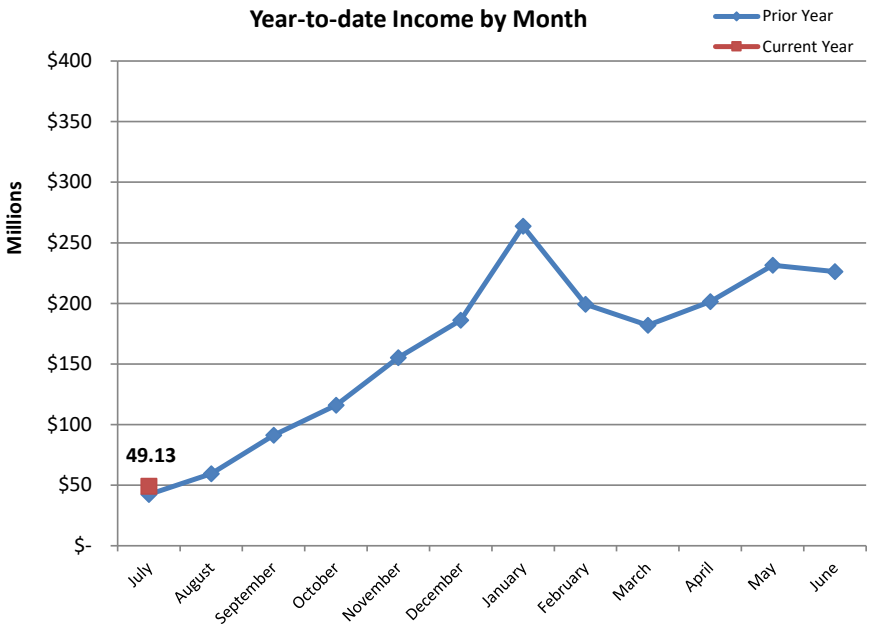
Teachers' Retirement Health Care Trust Fund

Fiscal Year-to-Date through July 31, 2018

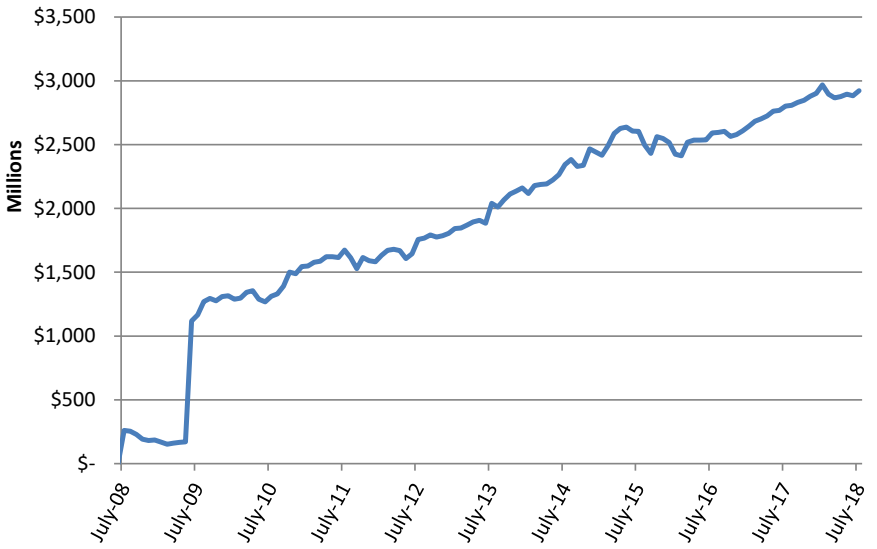
Total Assets by Month



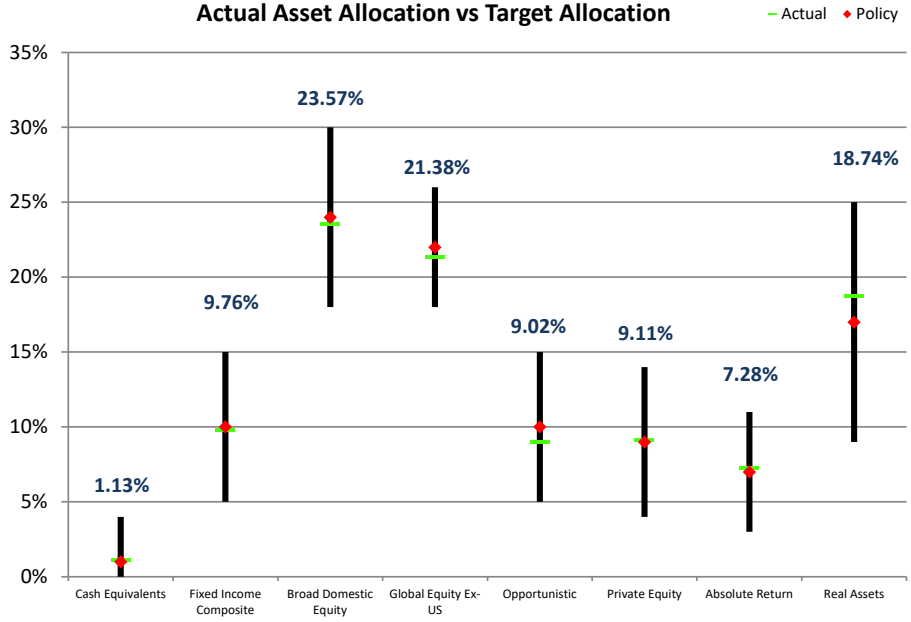
Year-to-date Income by Month



Total Assets History



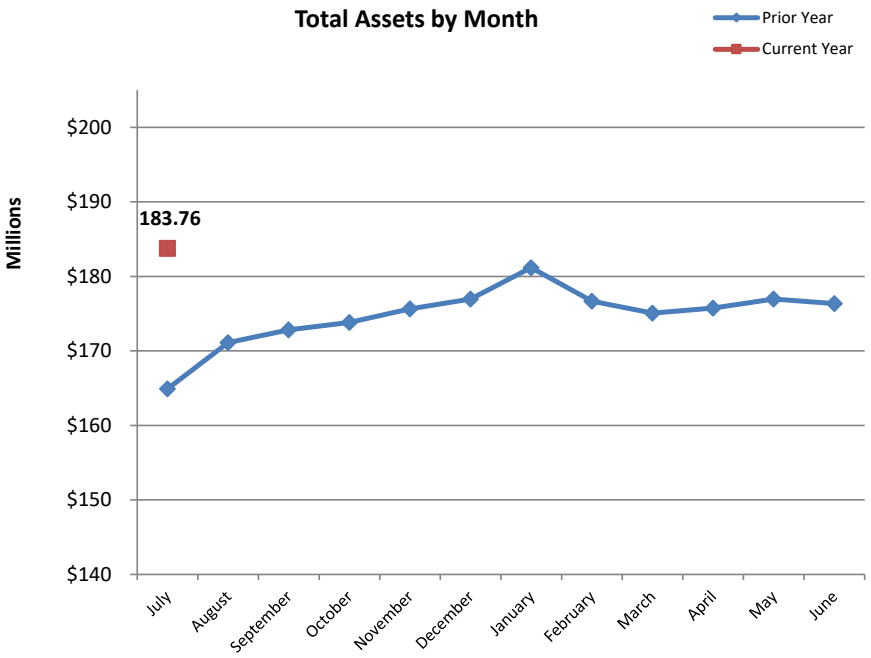
Actual Asset Allocation vs Target Allocation



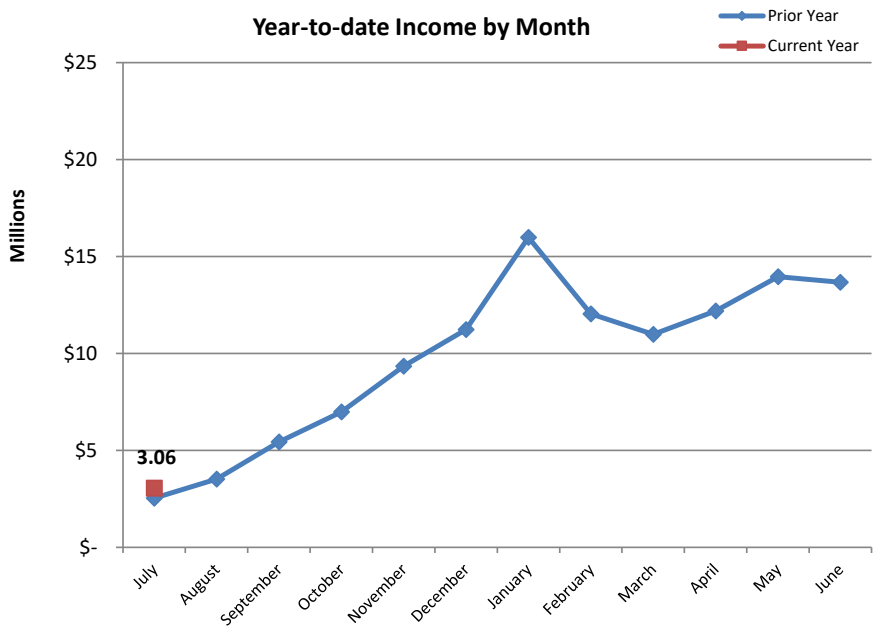
Judicial Retirement Pension Trust Fund

Fiscal Year-to-Date through July 31, 2018

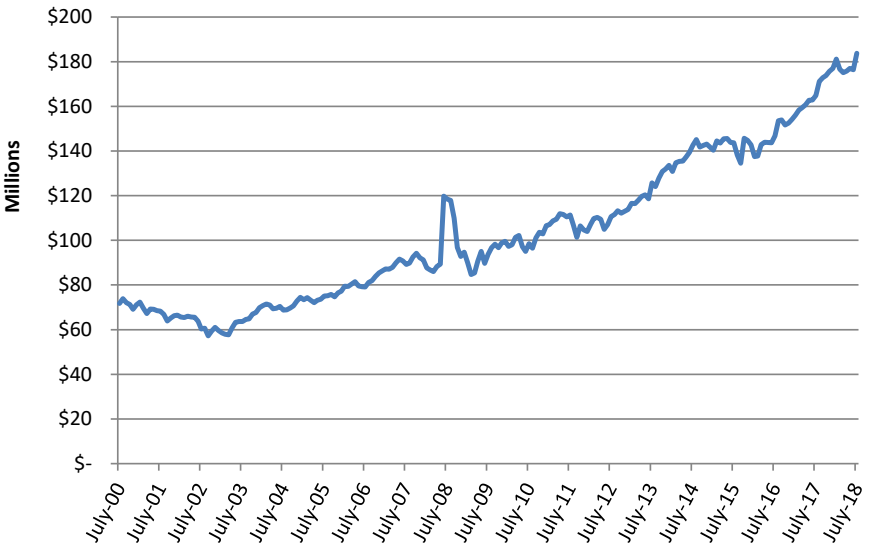
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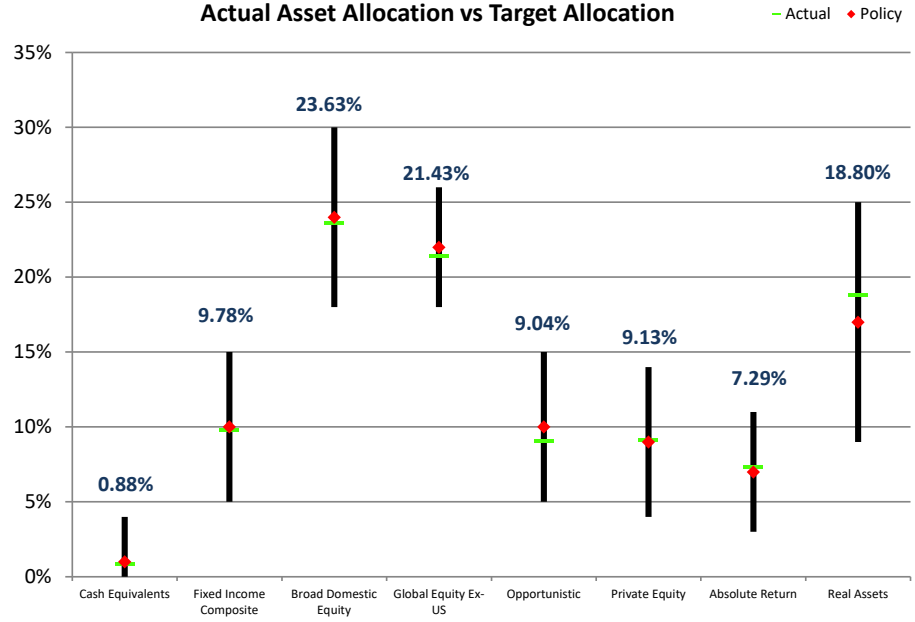
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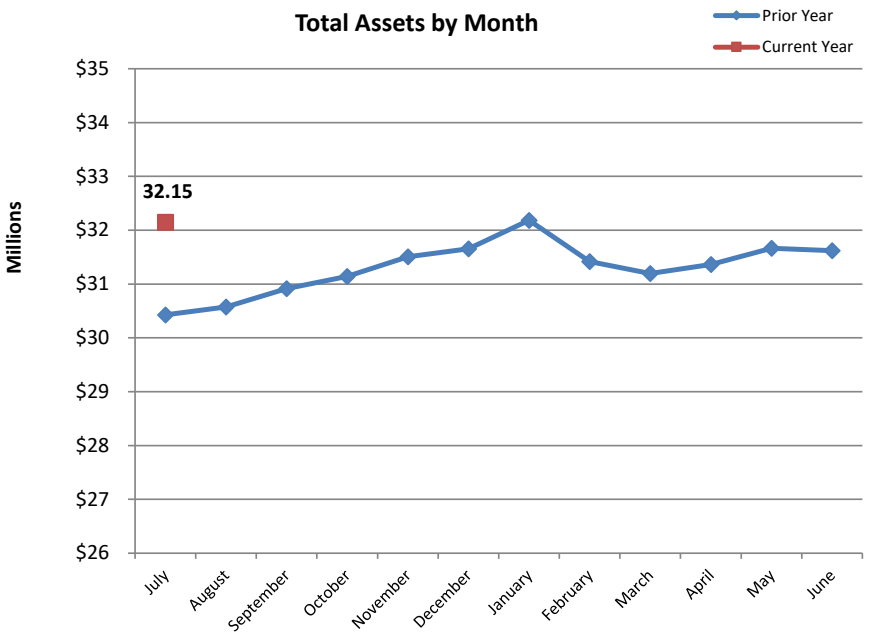
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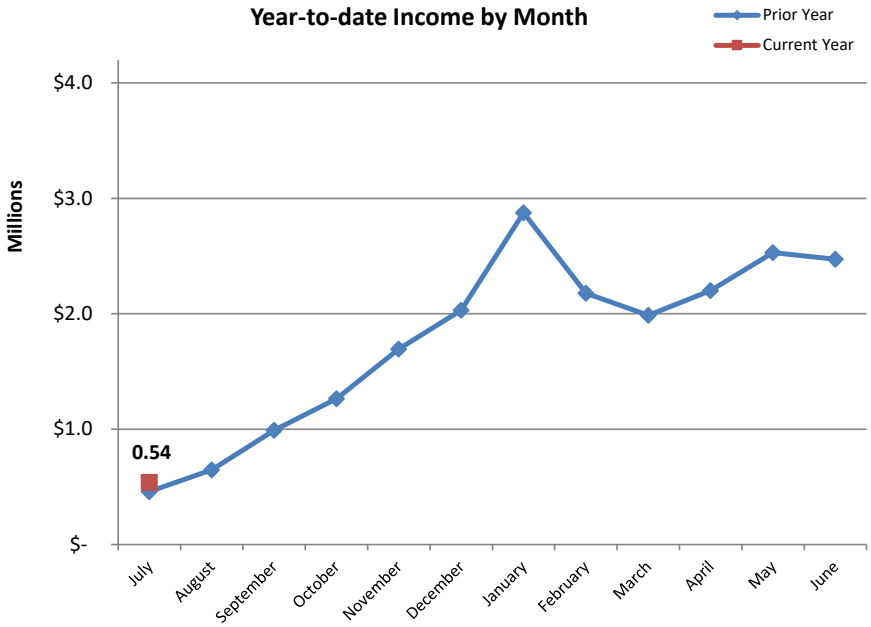
Judicial Retirement Health Care Trust Fund

Fiscal Year-to-Date through July 31, 2018

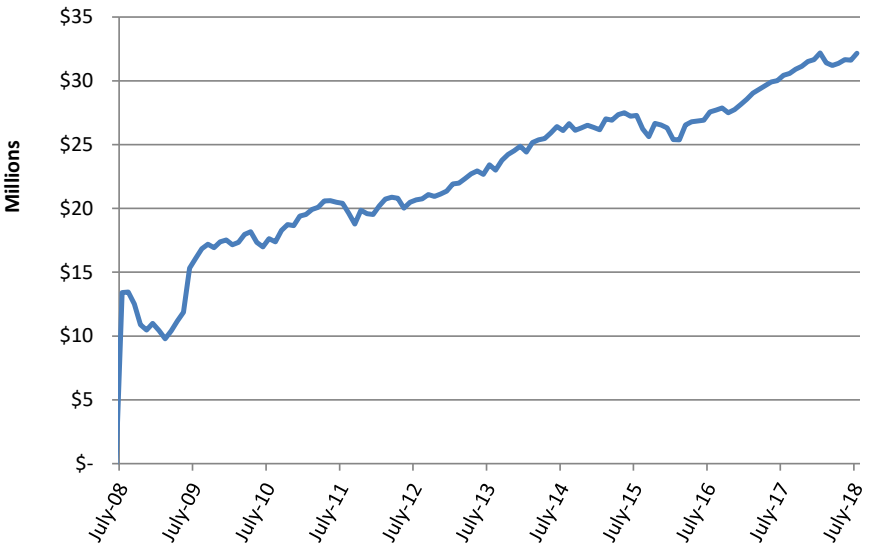
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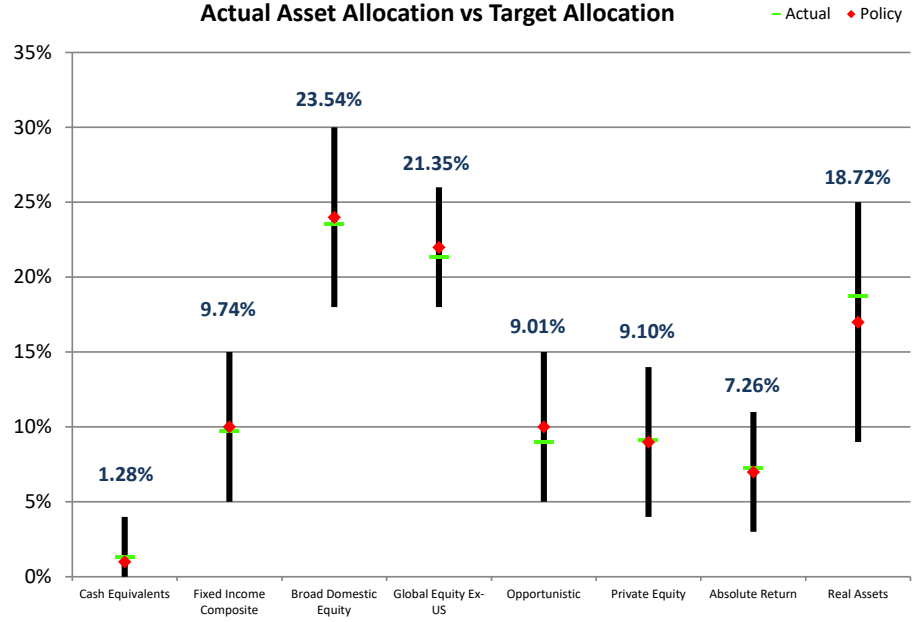
Year-to-date Income by Month



Total Assets History



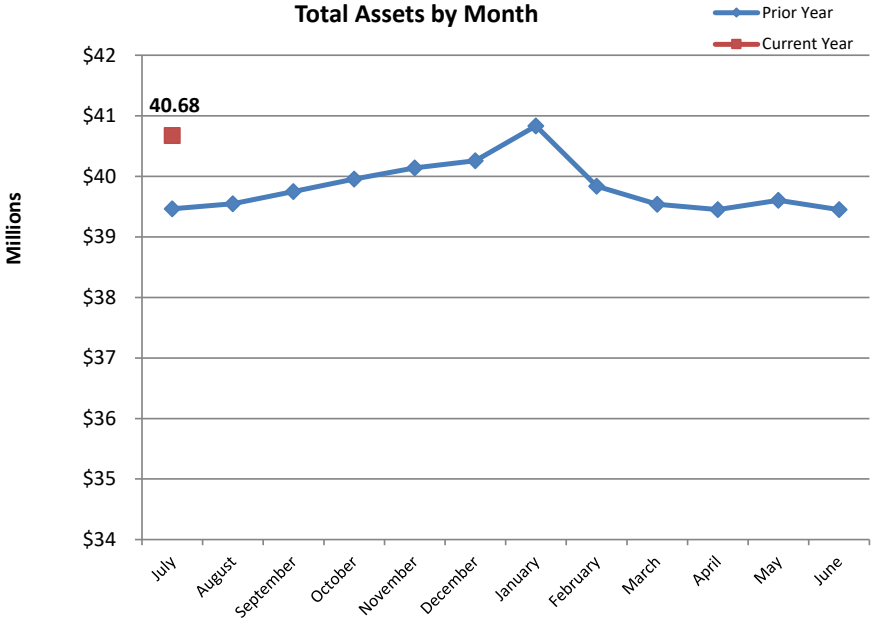
Actual Asset Allocation vs Target Allocation



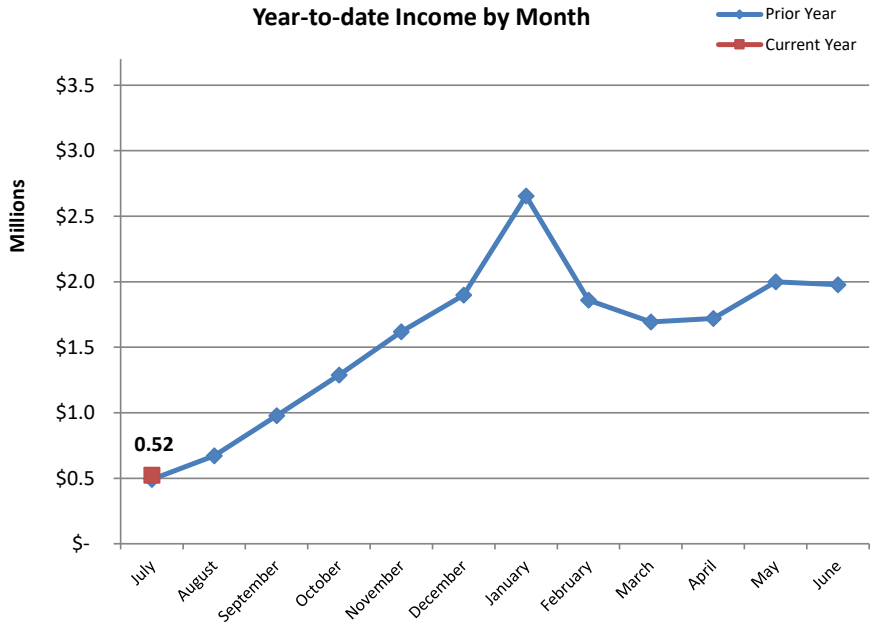
Military Retirement Trust Fund

Fiscal Year-to-Date through July 31, 2018

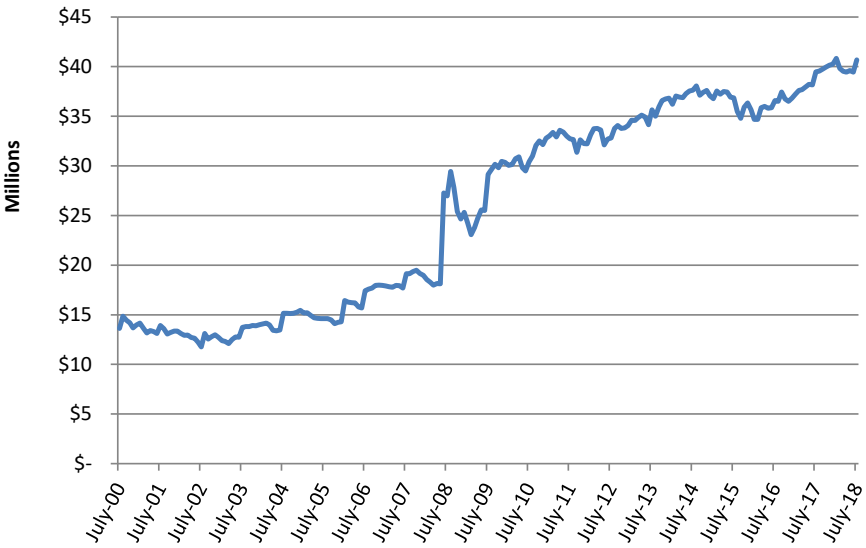
Total Assets by Month



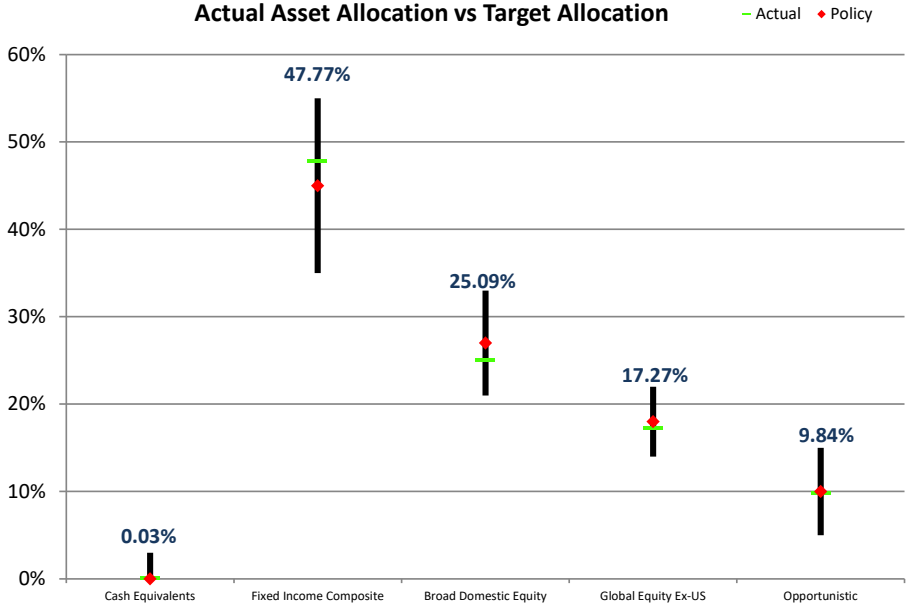
Year-to-date Income by Month



Total Assets History



Actual Asset Allocation vs Target Allocation



ALASKA RETIREMENT MANAGEMENT BOARD

Reporting of Funds by Manager

All Non-Participant Directed Plans

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2018

	Beginning Invested Assets	Investment Income	Net Contributions and (Withdrawals)	Ending Invested Assets	% increase (decrease)	% Change due to Investment Income
Cash						
Short-Term Fixed Income Pool	$ 150,339,384	$ 537,840	$ 94,325,885	$ 245,203,109	63.10%	0.27%
Securities Lending Income	213,072	153,844	(216,866)	150,050	-29.58%	147.02%
Total Cash	150,552,456	691,684	94,109,019	245,353,159	62.97%	0.35%
Fixed Income						
US Treasury Fixed Income	2,388,647,412	(4,507,771)	250,000,000	2,634,139,641	10.28%	-0.18%
Domestic Equities						
Small Cap						
Passively Managed						
ARMB S&P 600	162,372,778	5,108,526	-	167,481,304	3.15%	3.15%
SSgA Russell 2000 Growth	13,630	486	(4,771)	9,345	-31.44%	4.32%
SSgA Russell 2000 Value	166,987	22,532	(12,428)	177,091	6.05%	14.01%
Total Passive	162,553,395	5,131,544	(17,199)	167,667,740	3.15%	3.16%
Actively Managed						
Barrow, Haney, Mewhinney & Strauss	-	-	-	-	-	-
BMO Global Asset Management	54,651,485	1,089,695	77,258	55,818,438	2.14%	1.99%
DePrince, Race & Zollo Inc.- Micro Cap	122,795,116	2,725,077	297,476	125,817,669	2.46%	2.22%
Fidelity (FIAM) Small Company	(315,656)	51	(51)	(315,656)	-	-0.02%
Frontier Capital Mgmt. Co.	103,069,761	2,398,978	214,869	105,683,608	2.54%	2.33%
Jennison Associates, LLC	74,819,389	(295,259)	-	74,524,130	-0.39%	-0.39%
Lord Abbett & Co.- Micro Cap	118,486,583	(3,929,407)	-	114,557,176	-3.32%	-3.32%
Lord Abbett Small Cap Growth Fund	15,349	7,110	(22,578)	(119)	-100.78%	175.12%
SSgA Futures Small Cap	1,871,907	357,297	-	2,229,204	19.09%	19.09%
SSgA Volatility-Russell 2000	158,780	(204)	(162,898)	(4,322)	-102.72%	-0.26%
Transition Account	13,943	(6)	(15,453)	(1,516)	-110.87%	-0.10%
Victory Capital Management	123,313,543	4,371,404	182,020	127,866,967	3.69%	3.54%
Zebra Capital Management	113,588,780	1,433,145	157,058	115,178,983	1.40%	1.26%
Arrowmark	53,264,740	599,371	104,478	53,968,589	1.32%	1.12%
T. Rowe Small Cap Growth	47,095,162	975,756	36,320	48,107,238	2.15%	2.07%
Total Active	812,828,882	9,733,008	868,499	823,430,389	1.30%	1.20%
Total Small Cap	975,382,277	14,864,552	851,300	991,098,129	1.61%	1.52%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2018

Large Cap						
Passively Managed						
ARMB Russell 1000 Growth	1,558,387,889	45,740,607	-	1,604,128,496	2.94%	2.94%
ARMB Russell 1000 Value	1,347,484,658	53,231,039	-	1,400,715,697	3.95%	3.95%
ARMB Russell Top 200	384,737,226	14,736,441	-	399,473,667	3.83%	3.83%
Total Passive	3,290,609,773	113,708,087	-	3,404,317,860	3.46%	3.46%
Actively Managed						
Allianz Global Investors	(6,112)	1,369	6,099	1,356	-122.19%	-44.70%
ARMB Equity Yield	358,430,990	16,444,657	-	374,875,647	4.59%	4.59%
Barrow, Haney, Mewhinney & Strauss	19,180	12	(5,501)	13,691	-28.62%	0.07%
Lazard Freres	329,973,180	13,740,971	-	343,714,151	4.16%	4.16%
McKinley Capital Mgmt.	78	4,781	(78)	4,781	6029.49%	12258.97%
Portable Alpha	430,636,182	18,472,699	(3,613,112)	445,495,769	3.45%	4.31%
Quantitative Management Assoc.	318	89	(318)	89	-72.01%	55.97%
ARMB S&P 500 Equal Weight	365,939,125	11,593,251	-	377,532,376	3.17%	3.17%
ARMB Scientific Beta	371,880,667	13,083,620	54,368	385,018,655	3.53%	3.52%
SSgA Futures large cap	3,373,659	493,572	-	3,867,231	14.63%	14.63%
Transition Account	173,209	2,588	(173,234)	2,563	-98.52%	2.99%
Total Active	1,860,420,476	73,837,609	(3,731,776)	1,930,526,309	3.77%	3.97%
Total Large Cap	5,151,030,249	187,545,696	(3,731,776)	5,334,844,169	3.57%	3.64%
Total Domestic Equity	6,126,412,526	202,410,248	(2,880,476)	6,325,942,298	3.26%	3.30%
Global Equities Ex US						
Small Cap						
Mondrian Investment Partners	193,371,942	(1,896,628)	345,658	191,820,972	-0.80%	-0.98%
Schroder Investment Management	212,259,933	1,191,168	-	213,451,101	0.56%	0.56%
Total Small Cap	405,631,875	(705,460)	345,658	405,272,073	-0.09%	-0.17%
Large Cap						
Allianz Global Investors	1,002,435	24,439	-	1,026,874	2.44%	2.44%
Arrow Street Capital	383,422,563	7,809,113	453,074	391,684,750	2.15%	2.04%
Baillie Gifford Overseas Limited	384,371,499	5,985,090	460,683	390,817,272	1.68%	1.56%
Blackrock ACWI Ex-US IMI	618,759,292	13,349,660	-	632,108,952	2.16%	2.16%
Brandes Investment Partners	803,609,523	20,335,663	665,721	824,610,907	2.61%	2.53%
Cap Guardian Trust Co	571,701,052	12,247,311	-	583,948,363	2.14%	2.14%
Lazard Freres	329,062,794	5,816,485	-	334,879,279	1.77%	1.77%
McKinley Capital Management	360,648,354	6,264,661	555,790	367,468,805	1.89%	1.74%
SSgA Futures International	-	-	-	-	-	-
State Street Global Advisors	997,293,077	21,296,014	-	1,018,589,091	2.14%	2.14%
Total Large Cap	4,449,870,589	93,128,436	2,135,268	4,545,134,293	2.14%	2.09%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2018

Emerging Markets Equity						
Eaton Vance	86,434,437	2,601,310	-	89,035,747	3.01%	3.01%
Lazard Asset Management	398,543,721	11,967,602	-	410,511,323	3.00%	3.00%
DePrince, Race, and Zollo Emerging Markets	273,538,397	11,520,842	-	285,059,239	4.21%	4.21%
Total Emerging Markets	758,516,555	26,089,754	-	784,606,309	3.44%	3.44%
Total Global Equities	5,614,019,019	118,512,730	2,480,926	5,735,012,675	2.16%	2.11%
Opportunistic						
Alternative Equity Strategy						
Alternative Equity Strategies Transition Account	11,878	4	(11,879)	3	-99.97%	0.07%
Analytic Buy Write Account	723,729,280	19,942,266	103,122	743,774,668	2.77%	2.76%
ARMB STOXX Min Var	601,686,795	19,924,824	-	621,611,619	3.31%	3.31%
Quantitative Management Associates MPS	(593,779)	(228,926)	(27,986)	(850,691)	43.27%	37.67%
SSgA Volatility-Russell 1000	106,096	(41)	(106,055)	-	-100.00%	-0.08%
Total Alternative Equity Strategy	1,324,940,270	39,638,127	(42,798)	1,364,535,599	2.99%	2.99%
Opportunistic Fixed Income						
Western Asset Management	106,549,139	32,409	(50,000,000)	56,581,548	-46.90%	0.04%
Guggenheim Partners	-	-	-	-	-	-
Fidelity Institutional Asset Management.	202,330,828	1,423,033	-	203,753,861	0.70%	0.70%
Lazard Emerging Income	164,105,647	306,491	(75,000,000)	89,412,138	-45.52%	0.24%
Mondrian Investment Partners	98,282,637	209,015	-	98,491,652	0.21%	0.21%
MacKay Shields, LLC	156,200,216	1,848,697	-	158,048,913	1.18%	1.18%
Fidelity Inst. Asset Mgmt. High Yield CMBS	152,191,026	480,334	(50,000,000)	102,671,360	-32.54%	0.38%
Total Opportunistic Fixed Income	879,659,493	4,299,979	(175,000,000)	708,959,472	-19.41%	0.54%
Other Opportunities						
Schroders Insurance Linked Securities	337,677,158	(508)	-	337,676,650	0.00%	0.00%
Project Pearl	-	-	10,049,468	10,049,468	-	-
Total Other Opportunities	337,677,158	(508)	10,049,468	347,726,118	2.98%	0.00%
Tactical Allocation Strategies						
Columbia Threadneedle	4,095	-	-	4,095	-	-
Eaton Vance High Yield	303,043	2,713	-	305,756	0.90%	0.90%
Total Tactical Allocation Strategies	307,138	2,713	-	309,851	0.88%	0.88%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2018

Convertible Bond						
Advent Capital	(3,325)	(17,498)	-	(20,823)	526.26%	526.26%
Total Opportunistic	2,542,580,734	43,922,813	(164,993,330)	2,421,510,217	-4.76%	1.79%
Private Equity						
Abbott Capital	933,686,308	2,682,271	4,155,606	940,524,185	0.73%	0.29%
Advent International GPE Fund VIII-B	12,796,294	-	-	12,796,294	-	-
Angelo, Gordon & Co.	63,722	-	-	63,722	-	-
Dyal Capital Partners III	21,976,643	-	(459,330)	21,517,313	-2.09%	-
Glendon Opportunities	37,091,566	-	-	37,091,566	-	-
KKR Lending Partners II	58,789,686	-	-	58,789,686	-	-
Lexington Capital Partners VIII	28,369,084	-	-	28,369,084	-	-
Lexington Partners VII	24,761,473	-	(559,902)	24,201,571	-2.26%	-
Merit Capital Partners	14,025,676	-	(274,168)	13,751,508	-1.95%	-
NB SOF III	30,029,891	-	-	30,029,891	-	-
NB SOF IV	5,417,377	-	-	5,417,377	-	-
New Mountain Partners IV	22,296,847	-	-	22,296,847	-	-
NGP XI	48,910,124	-	-	48,910,124	-	-
Onex Partnership III	13,748,474	-	-	13,748,474	-	-
Pathway Capital Management LLC	1,036,720,661	3,023,397	17,408,737	1,057,152,795	1.97%	0.29%
Resolute Fund III	18,536,564	-	86,102	18,622,666	0.46%	-
Summit Partners GE IX	14,424,388	-	212,000	14,636,388	1.47%	-
Warburg Pincus X	13,788,219	-	-	13,788,219	-	-
Warburg Pincus XI	27,659,858	-	(459,000)	27,200,858	-1.66%	-
Warburg Pincus XII	37,764,750	-	2,599,025	40,363,775	6.88%	-
New Mountain Partners V	12,264,791	-	-	12,264,791	-	-
Glendon Opportunities II	-	-	-	-	-	-
Total Private Equity	2,413,122,396	5,705,668	22,709,070	2,441,537,134	1.18%	0.24%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2018

Absolute Return						
Allianz Global Investors	383,705,143	4,252,427	-	387,957,570	1.11%	1.11%
Crestline Investors, Inc.	445,252,259	6,333,182	20,934,045	472,519,486	6.12%	1.39%
Crestline Specialty Fund	38,409,278	-	-	38,409,278	-	-
Global Asset Management (USA) Inc.	1,317,270	3,158	(1,320,428)	-	-100.00%	0.48%
KKR Apex Equity Fund	98,580,076	206,717	-	98,786,793	0.21%	0.21%
Prisma Capital Partners	423,959,484	(291,394)	(10,000,000)	413,668,090	-2.43%	-0.07%
Zebra Global Equity Advantage Fund	45,412,332	(901,570)	-	44,510,762	-1.99%	-1.99%
Zebra Global Equity Fund	92,878,481	(997,234)	-	91,881,247	-1.07%	-1.07%
Crestline Specialty Lending Fund II	11,338,614	-	(533,360)	10,805,254	-4.70%	-
Man Group Alternative Risk Premia	215,210,772	(4,651,425)	-	210,559,347	-2.16%	-2.16%
JPM Systemic Alpha	181,515,712	(1,478,743)	-	180,036,969	-0.81%	-0.81%
Total Absolute Return Investments	1,937,579,421	2,475,118	9,080,257	1,949,134,796	0.60%	0.13%
Real Assets						
Farmland						
Hancock Agricultural Investment Group	265,260,913	-	-	265,260,913	-	-
UBS Agrivest, LLC	572,318,910	-	-	572,318,910	-	-
Total Farmland	837,579,823	-	-	837,579,823	-	-
Timber						
Hancock Natural Resource Group	96,628,172	-	-	96,628,172	-	-
Timberland Invt Resource LLC	273,374,246	3,138,753	(12,894,468)	263,618,531	-3.57%	1.18%
Total Timber	370,002,418	3,138,753	(12,894,468)	360,246,703	-2.64%	0.86%
Energy						
EIG Energy Fund XD	-	-	-	-	-	-
EIG Energy Fund XIV-A	11,419,436	-	-	11,419,436	-	-
EIG Energy Fund XV	29,160,407	-	(208,593)	28,951,814	-0.72%	-
EIG Energy Fund XVI	58,868,139	-	-	58,868,139	-	-
Total Energy	99,447,982	-	(208,593)	99,239,389	-0.21%	-
REIT						
REIT Transition Account	-	-	-	-	-	-
ARMB REIT	201,814,604	1,214,130	-	203,028,734	0.60%	0.60%
Total REIT	201,814,604	1,214,130	-	203,028,734	0.60%	0.60%
TIPS						
TIPS Internally Managed Account	56,511,564	(271,691)	-	56,239,873	-0.48%	-0.48%
Master Limited Partnerships						
Advisory Research MLP	482,383,682	30,210,336	-	512,594,018	6.26%	6.26%
Tortoise Capital Advisors	525,631,417	29,049,106	592,352	555,272,875	5.64%	5.52%
Total Master Limited Partnerships	1,008,015,099	59,259,442	592,352	1,067,866,893	5.94%	5.88%

Alaska Retirement Management Board
All Non-Participant Directed Plans by Manager
Schedule of Investment Income and Changes in Invested Assets
For the Month Ended July 31, 2018

Infrastructure Private						
IFM Global Infrastructure Fund-Private	393,547,072	7,428,277	-	400,975,349	1.89%	1.89%
JP Morgan Infrastructure Fund-Private	117,126,060	-	-	117,126,060	-	-
Total Infrastructure Private	510,673,132	7,428,277	-	518,101,409	1.45%	1.45%
Infrastructure Public						
Brookfield Investment Mgmt.-Public	106,075,704	1,505,658	-	107,581,362	1.42%	1.42%
Lazard Asset Mgmt.-Public	150,136,027	3,428,915	-	153,564,942	2.28%	2.28%
Total Infrastructure Public	256,211,731	4,934,573	-	261,146,304	1.93%	1.93%
Real Estate						
Core Commingled Accounts						
JP Morgan	256,081,910	1,486,307	(1,874,341)	255,693,876	-0.15%	0.58%
UBS Trumbull Property Fund	154,064,854	2,435,614	(29,836,348)	126,664,120	-17.79%	1.75%
Total Core Commingled	410,146,764	3,921,921	(31,710,689)	382,357,996	-6.78%	0.99%
Core Separate Accounts					-	
LaSalle Investment Management	199,954,069	-	(277,048)	199,677,021	-0.14%	-
Sentinel Separate Account	202,297,110	-	(308,602)	201,988,508	-0.15%	-
UBS Realty	504,947,111	-	(929,539)	504,017,572	-0.18%	-
Total Core Separate	907,198,290	-	(1,515,189)	905,683,101	-0.17%	-
Non-Core Commingled Accounts					-	
Almanac Realty Securities V	2,294,026	-	(295,252)	1,998,774	-12.87%	-
Almanac Realty Securities VII	31,210,741	-	(823,997)	30,386,744	-2.64%	-
Almanac Realty Securities VIII	-	-	-	-	-	-
BlackRock Diamond Property Fund	70,543	(1,166)	-	69,377	-1.65%	-1.65%
BlackRock US Core Property Fund	200,000,000	-	-	200,000,000	-	-
Clarion Ventures 4	22,095,409	-	-	22,095,409	-	-
Colony Investors VIII, L.P.	1,868,151	-	-	1,868,151	-	-
Cornerstone Apartment Venture III	-	-	-	-	-	-
Coventry	249,860	-	-	249,860	-	-
ING Clarion Development Ventures III	6,415,493	-	-	6,415,493	-	-
KKR Real Estate Partners Americas LP.	31,154,149	-	-	31,154,149	-	-
LaSalle Medical Office Fund II	-	-	-	-	-	-
Lowe Hospitality Partners	-	-	-	-	-	-
Silverpeak Legacy Pension Partners II, L.P.	6,183,068	-	-	6,183,068	-	-
Silverpeak Legacy Pension Partners III, L.P.	5,218,533	-	-	5,218,533	-	-
Tishman Speyer Real Estate Venture VI	22,314,113	-	-	22,314,113	-	-
Tishman Speyer Real Estate Venture VII	1,257,966	-	-	1,257,966	-	-
KKR Real Estate Partners Americas II	2,113,390	-	727,314	2,840,704	34.41%	-
Total Non-Core Commingled	332,445,442	(1,166)	(391,935)	332,052,341	-0.12%	0.00%
Total Real Estate	1,649,790,496	3,920,755	(33,617,813)	1,620,093,438	-1.80%	0.24%
Total Real Assets	4,990,046,849	79,624,239	(46,128,522)	5,023,542,566	0.67%	1.60%
Total Assets	$ 26,162,960,813	$ 448,834,729	$ 164,376,944	$ 26,776,172,486	2.34%	1.71%

ALASKA RETIREMENT MANAGEMENT BOARD

Reporting of Funds by Manager

Participant Directed Plans

Supplemental Annuity Plan
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
July 31, 2018

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Stable Value Fund	$ 354,944,941	$ 700,871	$ (1,739,034)	$ 2,010,642	$ 355,917,420	0.27%	0.20%
Small Cap Stock Fund	176,018,489	3,414,877	(85,509)	2,470,213	181,818,070	3.29%	1.93%
Alaska Balanced Trust	1,144,551,123	11,500,858	(3,797,482)	(2,560,878)	1,149,693,621	0.45%	1.01%
Long Term Balanced Fund	683,505,260	12,175,812	(435,631)	(4,501,767)	690,743,674	1.06%	1.79%
AK Target Date 2010 Trust	10,131,251	132,471	(82,599)	43,187	10,224,310	0.92%	1.31%
AK Target Date 2015 Trust	85,914,975	1,312,707	88,825	(1,647,681)	85,668,826	-0.29%	1.54%
AK Target Date 2020 Trust	94,970,306	1,738,665	35,025	(811,175)	95,932,821	1.01%	1.84%
AK Target Date 2025 Trust	76,807,849	1,608,000	(472,050)	18,429	77,962,228	1.50%	2.10%
AK Target Date 2030 Trust	56,394,469	1,321,275	205,865	1,076,423	58,998,032	4.62%	2.32%
AK Target Date 2035 Trust	52,464,109	1,333,090	309,923	540,505	54,647,627	4.16%	2.52%
AK Target Date 2040 Trust	53,122,860	1,428,788	398,916	(11,738)	54,938,826	3.42%	2.68%
AK Target Date 2045 Trust	60,072,944	1,666,131	536,943	(159,751)	62,116,267	3.40%	2.76%
AK Target Date 2050 Trust	68,953,294	1,916,318	539,074	(95,860)	71,312,826	3.42%	2.77%
AK Target Date 2055 Trust	56,103,690	1,568,478	1,073,732	(52,690)	58,693,210	4.62%	2.77%
AK Target Date 2060 Trust	3,263,592	88,891	12,026	94,174	3,458,683	5.98%	2.68%
Total Investments with T. Rowe Price	2,977,219,152	41,907,232	(3,411,976)	(3,587,967)	3,012,126,441		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	41,487,812	62,793	(171,944)	626,012	42,004,673	1.25%	0.15%
S&P 500 Stock Index Fund Series A	455,047,406	16,893,853	(592,857)	(1,394,565)	469,953,837	3.28%	3.72%
Russell 3000 Index	72,632,924	2,424,824	19,798	1,354,855	76,432,401	5.23%	3.31%
US Real Estate Investment Trust Index	34,016,819	189,860	(187,868)	1,048,102	35,066,913	3.09%	0.55%
World Equity Ex-US Index	54,825,399	1,315,645	(24,562)	(426,007)	55,690,475	1.58%	2.41%
Long US Treasury Bond Index	13,398,778	(187,973)	(15,485)	(463,135)	12,732,185	-4.98%	-1.43%
US Treasury Inflation Protected Securities Index	31,699,286	(161,250)	(108,250)	1,798,003	33,227,789	4.82%	-0.50%
World Government Bond Ex-US Index	12,585,190	(51,458)	(19,824)	55,559	12,569,467	-0.12%	-0.41%
Total Investments with SSGA	715,693,614	20,486,294	(1,100,992)	2,598,824	737,677,740		
BlackRock							
Government/Credit Bond Fund	50,441,344	43,999	(314,561)	(248,731)	49,922,051	-1.03%	0.09%
Intermediate Bond Fund	40,064,413	(81,152)	(149,543)	1,349,527	41,183,245	2.79%	-0.20%
Total Investments with BlackRock	90,505,757	(37,153)	(464,104)	1,100,796	91,105,296		
Brandes/Russell (2)							
AK International Equity Fund	69,093,368	762,697	(4,552)	38,357	69,889,870	1.15%	1.10%
RCM							
Sustainable Core Opportunities Fund	53,147,590	1,650,865	63,954	(150,010)	54,712,399	2.94%	3.11%
Total All Funds	$ 3,905,659,481	$ 64,769,935	$ (4,917,670)	$ -	$ 3,965,511,746	1.53%	1.66%

Notes: Source data provided by the record keeper, Empower Retirement.

(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

(2) This investment is comprised of two funds, Brandes International Equity Fund and Russell Investments as an Interim Manager.

Supplemental Annuity Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
July 31, 2018
$ (Thousands)

Invested Assets (at fair value)		**July**
Investments with T. Rowe Price		
Stable Value Fund	**$**	355,917
Small Cap Stock Fund		181,818
Alaska Balanced Trust		1,149,694
Long Term Balanced Fund		690,744
AK Target Date 2010 Trust		10,224
AK Target Date 2015 Trust		85,669
AK Target Date 2020 Trust		95,933
AK Target Date 2025 Trust		77,962
AK Target Date 2030 Trust		58,998
AK Target Date 2035 Trust		54,648
AK Target Date 2040 Trust		54,939
AK Target Date 2045 Trust		62,116
AK Target Date 2050 Trust		71,313
AK Target Date 2055 Trust		58,693
AK Target Date 2060 Trust		3,459
State Street Global Advisors		
State Street Treasury Money Market Fund - Inst.		42,005
S&P 500 Stock Index Fund Series A		469,954
Russell 3000 Index		76,432
US Real Estate Investment Trust Index		35,067
World Equity Ex-US Index		55,690
Long US Treasury Bond Index		12,732
US Treasury Inflation Protected Securities Index		33,228
World Government Bond Ex-US Index		12,569
Investments with BlackRock		
Government/Credit Bond Fund		49,922
Intermediate Bond Fund		41,183
Investments with Brandes/Allianz Institutional		
AK International Equity Fund		69,890
Investments with RCM		
Sustainable Core Opportunities Fund		54,712
Total Invested Assets	**$**	**3,965,512**
Change in Invested Assets		
Beginning Assets	**$**	3,905,659
Investment Earnings		64,770
Net Contributions (Withdrawals)		(4,918)
Ending Invested Assets	**$**	**3,965,512**

Source data provided by the record keeper, Empower Retirement.

Deferred Compensation Plan
Schedule of Invested Assets and Changes in Invested Assets
for the Month Ended
July 31, 2018

	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
Participant Options							
T. Rowe Price							
Interest Income Fund	$ 176,326,159	$ 359,976	$ (1,685,154)	$ 627,678	$ 175,628,659	-0.40%	0.20%
Small Cap Stock Fund	112,136,045	2,189,983	(272,076)	891,563	114,945,515	2.51%	1.95%
Alaska Balanced Trust	29,730,669	300,398	(755,771)	225,377	29,500,673	-0.77%	1.02%
Long Term Balanced Fund	90,335,257	1,606,291	(196,228)	(521,418)	91,223,902	0.98%	1.79%
AK Target Date 2010 Trust	4,037,117	52,928	(4,844)	(33,866)	4,051,335	0.35%	1.32%
AK Target Date 2015 Trust	9,478,906	145,907	(95,666)	11,626	9,540,773	0.65%	1.55%
AK Target Date 2020 Trust	25,855,018	476,106	103,002	(205,248)	26,228,878	1.45%	1.85%
AK Target Date 2025 Trust	17,507,771	363,322	149,382	(550,720)	17,469,755	-0.22%	2.10%
AK Target Date 2030 Trust	11,502,381	265,449	95,062	(119,138)	11,743,754	2.10%	2.31%
AK Target Date 2035 Trust	6,550,542	166,559	83,315	109,574	6,909,990	5.49%	2.51%
AK Target Date 2040 Trust	7,721,249	207,650	82,112	(12,859)	7,998,152	3.59%	2.68%
AK Target Date 2045 Trust	5,476,159	151,220	69,222	(8,122)	5,688,479	3.88%	2.75%
AK Target Date 2050 Trust	3,853,787	107,368	46,905	(50,551)	3,957,509	2.69%	2.79%
AK Target Date 2055 Trust	4,053,976	113,183	63,641	17,580	4,248,380	4.80%	2.76%
AK Target Date 2060 Trust	444,439	12,489	7,006	(65,067)	398,867	-10.25%	3.01%
Total Investments with T. Rowe Price	505,009,475	6,518,829	(2,310,092)	316,409	509,534,621		
State Street Global Advisors							
State Street Treasury Money Market Fund - Inst.	13,838,455	21,015	(50,019)	(156,782)	13,652,669	-1.34%	0.15%
Russell 3000 Index	42,686,135	1,420,595	57,527	(274,260)	43,889,997	2.82%	3.34%
US Real Estate Investment Trust Index	12,529,031	68,609	(29,191)	241,983	12,810,432	2.25%	0.54%
World Equity Ex-US Index	18,120,802	434,862	(92,881)	(89,720)	18,373,063	1.39%	2.41%
Long US Treasury Bond Index	5,351,812	(76,489)	(3,987)	(102,529)	5,168,807	-3.42%	-1.44%
US Treasury Inflation Protected Securities Index	13,045,146	(65,853)	(25,912)	579,368	13,532,749	3.74%	-0.49%
World Government Bond Ex-US Index	4,759,455	(18,765)	(7,740)	(106,918)	4,626,032	-2.80%	-0.40%
Total Investments with SSGA	110,330,836	1,783,974	(152,203)	91,142	112,053,749		
BlackRock							
S&P 500 Index Fund	212,541,329	7,906,344	139,070	113,793	220,700,536	3.84%	3.72%
Government/Credit Bond Fund	27,250,142	23,503	(10,531)	100,672	27,363,786	0.42%	0.09%
Intermediate Bond Fund	22,522,148	(44,607)	(54,156)	(292,668)	22,130,717	-1.74%	-0.20%
Total Investments with BlackRock	262,313,619	7,885,240	74,383	(78,203)	270,195,039		
Brandes/ Russell (2)							
AK International Equity Fund	38,407,226	424,051	(142,427)	(272,123)	38,416,727	0.02%	1.11%
RCM							
Sustainable Core Opportunities Fund	22,745,643	708,509	(5,473)	(57,225)	23,391,454	2.84%	3.12%
Total All Funds	$ 938,806,799	$ 17,320,603	$ (2,535,812)	$ -	$ 953,591,590	1.57%	1.85%

Notes: Source data provided by the record keeper, Empower Retirement.

(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.

(2) This investment is comprised of two funds, Brandes International equity Fund and Russell Investments as Interim Manager.

Deferred Compensation Plan
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
July 31, 2018
$ (Thousands)

Invested Assets (at fair value)		**July**
Investments with T. Rowe Price		
Interest Income Fund	$	175,629
Small Cap Stock Fund		114,946
Alaska Balanced Trust		29,501
Long Term Balanced Fund		91,224
AK Target Date 2010 Trust		4,051
AK Target Date 2015 Trust		9,541
AK Target Date 2020 Trust		26,229
AK Target Date 2025 Trust		17,470
AK Target Date 2030 Trust		11,744
AK Target Date 2035 Trust		6,910
AK Target Date 2040 Trust		7,998
AK Target Date 2045 Trust		5,688
AK Target Date 2050 Trust		3,958
AK Target Date 2055 Trust		4,248
AK Target Date 2060 Trust		399
State Street Global Advisors		
State Street Treasury Money Market Fund - Inst.		13,653
Russell 3000 Index		43,890
US Real Estate Investment Trust Index		12,810
World Equity Ex-US Index		18,373
Long US Treasury Bond Index		5,169
US Treasury Inflation Protected Securities Index		13,533
World Government Bond Ex-US Index		4,626
Investments with BlackRock		
S&P 500 Index Fund		220,701
Government/Credit Bond Fund		27,364
Intermediate Bond Fund		22,131
Investments with Brandes/Allianz		
AK International Equity Fund		38,417
Investments with RCM		
Sustainable Core Opportunities Fund		23,391
Total Invested Assets	$	**953,592**
Change in Invested Assets		
Beginning Assets	$	938,807
Investment Earnings		17,321
Net Contributions (Withdrawals)		(2,536)
Ending Invested Assets	$	**953,592**

Source data provided by the record keeper, Empower Retirement.

Defined Contribution Retirement - Participant Directed PERS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
July 31, 2018

Participant Options	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
T. Rowe Price							
Alaska Money Market	$ 5,243,545	$ 8,659	$ 36,525	$ 96,992	$ 5,385,721	2.71%	0.16%
Small Cap Stock Fund	77,455,627	1,521,863	28,202	(811,912)	78,193,780	0.95%	1.97%
Alaska Balanced Trust	26,748,955	270,394	(9,932)	289,655	27,299,072	2.06%	1.01%
Long Term Balanced Fund	24,486,139	435,201	(23,351)	(113,476)	24,784,513	1.22%	1.78%
AK Target Date 2010 Trust	2,464,201	32,222	14,997	(3,901)	2,507,519	1.76%	1.30%
AK Target Date 2015 Trust	11,698,382	180,210	(11,007)	(8,425)	11,859,160	1.37%	1.54%
AK Target Date 2020 Trust	31,288,664	578,494	252,221	66,714	32,186,093	2.87%	1.84%
AK Target Date 2025 Trust	50,343,716	1,051,757	430,926	(587,897)	51,238,502	1.78%	2.09%
AK Target Date 2030 Trust	53,362,078	1,247,129	370,338	(350,827)	54,628,718	2.37%	2.34%
AK Target Date 2035 Trust	62,721,702	1,590,743	360,200	(68,833)	64,603,812	3.00%	2.53%
AK Target Date 2040 Trust	74,101,813	1,991,339	243,652	31,794	76,368,598	3.06%	2.68%
AK Target Date 2045 Trust	95,205,379	2,643,071	856,210	(496,674)	98,207,986	3.15%	2.77%
AK Target Date 2050 Trust	112,886,966	3,135,024	987,442	(145,669)	116,863,763	3.52%	2.77%
AK Target Date 2055 Trust	92,062,139	2,563,542	1,253,832	(174,613)	95,704,900	3.96%	2.77%
AK Target Date 2060 Trust	776,623	21,627	16,752	18	815,020	4.94%	2.76%
Total Investments with T. Rowe Price	720,845,929	17,271,275	4,807,007	(2,277,054)	740,647,157		
State Street Global Advisors							
Money Market	4,808,404	7,133	(17,650)	(174,704)	4,623,183	-3.85%	0.15%
S&P 500 Stock Index Fund Series A	95,890,573	3,564,839	152,184	(997,126)	98,610,470	2.84%	3.73%
Russell 3000 Index	10,398,415	348,589	68,928	128,073	10,944,005	5.25%	3.32%
US Real Estate Investment Trust Index	16,329,930	86,274	8,660	(159,722)	16,265,142	-0.40%	0.53%
World Equity Ex-US Index	45,598,185	1,107,043	(4,894)	287,190	46,987,524	3.05%	2.42%
Long US Treasury Bond Index	1,171,503	(16,687)	11,364	44,314	1,210,494	3.33%	-1.39%
US Treasury Inflation Protected Securities Index	14,491,878	(72,792)	(86,915)	589,531	14,921,702	2.97%	-0.49%
World Government Bond Ex-US Index	7,241,385	(30,392)	(7,822)	147,344	7,350,515	1.51%	-0.42%
Total Investments with SSGA	195,930,273	4,994,007	123,855	(135,100)	200,913,035		
BlackRock							
Government/Credit Bond Fund	47,943,905	40,854	(47,716)	1,285,426	49,222,469	2.67%	0.08%
Intermediate Bond Fund	22,564,433	(44,479)	(104,511)	(80,732)	22,334,711	-1.02%	-0.20%
Total Investments with BlackRock	70,508,338	(3,625)	(152,227)	1,204,694	71,557,180		
Brandes/Russell (2)							
AK International Equity Fund	43,531,735	491,237	82,240	1,539,334	45,644,546	4.85%	1.11%
RCM							
Sustainable Core Opportunities Fund	10,606,067	327,041	15,124	(331,874)	10,616,358	0.10%	3.13%
Total All Funds	$ 1,041,422,342	$ 23,079,935	$ 4,875,999	$ -	$ 1,069,378,276	2.68%	2.21%

Notes: Source data provided by the record keeper, Empower Retirement.
(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.
(2) This investment is comprised of two funds, Brandes International equity Fund and Russell Investments as Interim Manager.

Defined Contribution Retirement - Participant Directed PERS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
July 31, 2018
$ (Thousands)

Invested Assets (at fair value)		**July**
Investments with T. Rowe Price		
Alaska Money Market	**$**	5,386
Small Cap Stock Fund		78,194
Alaska Balanced Trust		27,299
Long Term Balanced Fund		24,785
AK Target Date 2010 Trust		2,508
AK Target Date 2015 Trust		11,859
AK Target Date 2020 Trust		32,186
AK Target Date 2025 Trust		51,239
AK Target Date 2030 Trust		54,629
AK Target Date 2035 Trust		64,604
AK Target Date 2040 Trust		76,369
AK Target Date 2045 Trust		98,208
AK Target Date 2050 Trust		116,864
AK Target Date 2055 Trust		95,705
AK Target Date 2060 Trust		815
State Street Global Advisors		
Money Market		4,623
S&P 500 Stock Index Fund Series A		98,610
Russell 3000 Index		10,944
US Real Estate Investment Trust Index		16,265
World Equity Ex-US Index		46,988
Long US Treasury Bond Index		1,210
US Treasury Inflation Protected Securities Index		14,922
World Government Bond Ex-US Index		7,351
Investments with BlackRock		
Government/Credit Bond Fund		49,222
Intermediate Bond Fund		22,335
Investments with Brandes/Allianz		
AK International Equity Fund		45,645
Investments with RCM		
Sustainable Core Opportunities Fund		10,616
Total Invested Assets	**$**	**1,069,378**
Change in Invested Assets		
Beginning Assets	**$**	1,041,422
Investment Earnings		23,080
Net Contributions (Withdrawals)		4,876
Ending Invested Assets	**$**	**1,069,378**

Source data provided by the record keeper, Empower Retirement.

Defined Contribution Retirement - Participant Directed TRS
Schedule of Investment Income and Changes in Invested Assets
for the Month Ended
July 31, 2018

	Beginning Invested Assets	Investment Income	Net Contributions (Withdrawals)	Transfers In (Out)	Ending Invested Assets	% Change in Invested Assets	% Change due to Investment Income (1)
Participant Options							
T. Rowe Price							
Alaska Money Market	$ 1,843,098	$ 3,018	$ 19,446	$ 28,093	$ 1,893,655	2.74%	0.16%
Small Cap Stock Fund	34,184,984	671,353	61,032	(492,888)	34,424,481	0.70%	1.98%
Alaska Balanced Trust	11,135,187	112,328	(20,223)	166,592	11,393,884	2.32%	1.00%
Long Term Balanced Fund	10,117,920	180,052	(16,037)	53,193	10,335,128	2.15%	1.78%
AK Target Date 2010 Trust	709,650	10,608	5,940	100,193	826,391	16.45%	1.39%
AK Target Date 2015 Trust	3,307,934	51,043	37,890	-	3,396,867	2.69%	1.53%
AK Target Date 2020 Trust	9,810,538	179,316	91,153	(130,289)	9,950,718	1.43%	1.83%
AK Target Date 2025 Trust	16,400,679	344,038	221,022	(27,674)	16,938,065	3.28%	2.09%
AK Target Date 2030 Trust	19,649,610	459,645	12,055	-	20,121,310	2.40%	2.34%
AK Target Date 2035 Trust	28,685,760	728,742	374,282	(22,890)	29,765,894	3.77%	2.52%
AK Target Date 2040 Trust	30,272,709	817,499	362,632	(43,595)	31,409,245	3.75%	2.69%
AK Target Date 2045 Trust	47,238,904	1,310,042	405,748	(214,869)	48,739,825	3.18%	2.77%
AK Target Date 2050 Trust	65,696,511	1,824,311	641,753	(6,282)	68,156,293	3.74%	2.76%
AK Target Date 2055 Trust	30,583,132	854,122	705,310	(4,174)	32,138,390	5.09%	2.76%
AK Target Date 2060 Trust	162,866	4,661	5,257	5,930	178,714	9.73%	2.77%
Total Investments with T. Rowe Price	309,799,482	7,550,778	2,907,260.00	(588,660)	319,668,860		
State Street Global Advisors							
Money Market	711,943	1,049	7,350	(30,820)	689,522	-3.15%	0.15%
S&P 500 Stock Index Fund Series A	39,981,103	1,487,082	73,097	(413,821)	41,127,461	2.87%	3.74%
Russell 3000 Index	3,490,250	116,747	2,063	11,959	3,621,019	3.75%	3.34%
US Real Estate Investment Trust Index	6,727,738	35,699	7,360	(19,777)	6,751,020	0.35%	0.53%
World Equity Ex-US Index	20,638,945	502,525	42,258	139,018	21,322,746	3.31%	2.42%
Long US Treasury Bond Index	306,706	(4,559)	3,152	1,119	306,418	-0.09%	-1.48%
US Treasury Inflation Protected Securities Index	5,261,475	(26,419)	(20,765)	152,990	5,367,281	2.01%	-0.50%
World Government Bond Ex-US Index	2,745,782	(11,468)	(7,667)	38,563	2,765,210	0.71%	-0.42%
Total Investments with SSGA	79,863,942	2,100,656	106,848.00	(120,769)	81,950,677		
BlackRock							
Government/Credit Bond Fund	19,895,923	16,970	(27,582)	346,248	20,231,559	1.69%	0.08%
Intermediate Bond Fund	8,455,026	(16,636)	(36,945)	(109,749)	8,291,696	-1.93%	-0.20%
Total Investments with BlackRock	28,350,949	334	(64,527.00)	236,499	28,523,255		
Brandes/Russell (2)							
AK International Equity Fund	19,681,660	222,326	62,690.00	652,107	20,618,783	4.76%	1.11%
RCM							
Sustainable Core Opportunities Fund	4,627,018	142,658	23,771.00	(179,177)	4,614,270	-0.28%	3.14%
Total All Funds	$ 442,323,051	$ 10,016,752	$ 3,036,042	$ -	$ 455,375,845	2.95%	2.26%

Notes: Source data provided by the record keeper, Empower Retirement.
(1) Income divided by beginning assets plus half of net contributions/(withdrawals). Actual returns are calculated by Callan and Associates.
(2) This investment is comprised of two funds, Brandes International equity Fund and Russell Investments as Interim Manager.

Defined Contribution Retirement - Participant Directed TRS
Schedule of Invested Assets with
Schedule of Investment Income and Changes in Invested Assets
By Month Through the Month Ended
July 31, 2018
$ (Thousands)

Invested Assets (at fair value)		**July**
Investments with T. Rowe Price		
Alaska Money Market	**$**	1,894
Small Cap Stock Fund		34,424
Alaska Balanced Trust		11,394
Long Term Balanced Fund		10,335
AK Target Date 2010 Trust		826
AK Target Date 2015 Trust		3,397
AK Target Date 2020 Trust		9,951
AK Target Date 2025 Trust		16,938
AK Target Date 2030 Trust		20,121
AK Target Date 2035 Trust		29,766
AK Target Date 2040 Trust		31,409
AK Target Date 2045 Trust		48,740
AK Target Date 2050 Trust		68,156
AK Target Date 2055 Trust		32,138
AK Target Date 2060 Trust		179
State Street Global Advisors		
Money Market		690
S&P 500 Stock Index Fund Series A		41,127
Russell 3000 Index		3,621
US Real Estate Investment Trust Index		6,751
World Equity Ex-US Index		21,323
Long US Treasury Bond Index		306
US Treasury Inflation Protected Securities Index		5,367
World Government Bond Ex-US Index		2,765
Investments with BlackRock		
Government/Credit Bond Fund		20,232
Intermediate Bond Fund		8,292
Investments with Brandes/Allianz		
AK International Equity Fund		20,619
Investments with RCM		
Sustainable Core Opportunities Fund		4,614
Total Invested Assets	**$**	**455,376**
Change in Invested Assets		
Beginning Assets	**$**	442,323
Investment Earnings		10,017
Net Contributions (Withdrawals)		3,036
Ending Invested Assets	**$**	**455,376**

Source data provided by the record keeper, Empower Retirement.

ALASKA RETIREMENT MANAGEMENT BOARD

FINANCIAL REPORT
(Supplement to the Treasury Division Report)

As of July 31, 2018

Prepared by the Division of Retirement & Benefits

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the One Months Ending July 31, 2018

	Contributions				Expenditures				Net
	Contributions EE and ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	Contributions/ (Withdrawals)
Public Employees' Retirement System (PERS)									
Defined Benefit Plans:									
Retirement Trust	$ 31,620,852	$ 135,367,000	$ 627	$ 166,988,479	$ (69,507,810)	$ (692,920)	$ (472,018)	$ (70,672,748)	$ 96,315,731
Retirement Health Care Trust	7,050,222	-	53,392	7,103,614	(34,344,624)	-	(1,264,921)	(35,609,545)	(28,505,931)
Total Defined Benefit Plans	38,671,074	135,367,000	54,019	174,092,093	(103,852,434)	(692,920)	(1,736,939)	(106,282,293)	67,809,800
Defined Contribution Plans:									
Participant Directed Retirement	12,189,732	-	-	12,189,732	-	(5,822,389)	(1,491,344)	(7,313,733)	4,875,999
Health Reimbursement Arrangement [(a)]	3,104,229	-	-	3,104,229	(6,769)	-	(6,840)	(13,609)	3,090,620
Retiree Medical Plan [(a)]	961,578	-	-	961,578	(35,879)	-	(2,172)	(38,051)	923,527
Occupational Death and Disability: [(a)]									
Public Employees	134,182	-	-	134,182	(10,428)	-	(415)	(10,843)	123,339
Police and Firefighters	72,745	-	-	72,745	(20,262)	-	(201)	(20,463)	52,282
Total Defined Contribution Plans	16,462,466	-	-	16,462,466	(73,338)	(5,822,389)	(1,500,972)	(7,396,699)	9,065,767
Total PERS	**55,133,540**	**135,367,000**	**54,019**	**190,554,559**	**(103,925,772)**	**(6,515,309)**	**(3,237,911)**	**(113,678,992)**	**76,875,567**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	7,739,195	128,174,000	3,388	135,916,583	(39,141,715)	(287,954)	(235,698)	(39,665,367)	96,251,216
Retirement Health Care Trust	1,823,653	-	19,870	1,843,523	(11,498,296)	-	(464,651)	(11,962,947)	(10,119,424)
Total Defined Benefit Plans	9,562,848	128,174,000	23,258	137,760,106	(50,640,011)	(287,954)	(700,349)	(51,628,314)	86,131,792
Defined Contribution Plans:									
Participant Directed Retirement	5,167,367	-	-	5,167,367	-	(1,686,815)	(444,510)	(2,131,325)	3,036,042
Health Reimbursement Arrangement [(a)]	917,479	-	-	917,479	(2,580)	-	(2,054)	(4,634)	912,845
Retiree Medical Plan [(a)]	317,486	-	-	317,486	(19,680)	-	(1,095)	(20,775)	296,711
Occupational Death and Disability [(a)]	41	-	-	41	(2,024)	-	(77)	(2,101)	(2,060)
Total Defined Contribution Plans	6,402,373	-	-	6,402,373	(24,284)	(1,686,815)	(447,736)	(2,158,835)	4,243,538
Total TRS	**15,965,221**	**128,174,000**	**23,258**	**144,162,479**	**(50,664,295)**	**(1,974,769)**	**(1,148,085)**	**(53,787,149)**	**90,375,330**
Judicial Retirement System (JRS)									
Defined Benefit Plan Retirement Trust	483,732	4,909,000	-	5,392,732	(1,042,004)	-	(5,892)	(1,047,896)	4,344,836
Defined Benefit Retirement Health Care Trust	50,164	-	137	50,301	(56,278)	-	(3,804)	(60,082)	(9,781)
Total JRS	**533,896**	**4,909,000**	**137**	**5,443,033**	**(1,098,282)**	**-**	**(9,696)**	**(1,107,978)**	**4,335,055**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [(a)]	851,686	-	-	851,686	(137,665)	-	(10,988)	(148,653)	703,033
Other Participant Directed Plans									
Supplemental Annuity Plan	14,992,637	-	-	14,992,637	-	(19,325,545)	(584,762)	(19,910,307)	(4,917,670)
Deferred Compensation Plan	3,635,195	-	-	3,635,195	-	(5,984,136)	(186,871)	(6,171,007)	(2,535,812)
Total All Funds	**91,112,175**	**268,450,000**	**77,414**	**359,639,589**	**(155,826,014)**	**(33,799,759)**	**(5,178,313)**	**(194,804,086)**	**164,835,503**
Total Non-Participant Directed	55,127,244	268,450,000	77,414	323,654,658	(155,826,014)	(980,874)	(2,470,826)	(159,277,714)	164,376,944
Total Participant Directed	35,984,931	-	-	35,984,931	-	(32,818,885)	(2,707,487)	(35,526,372)	458,559
Total All Funds	**$ 91,112,175**	**$ 268,450,000**	**$ 77,414**	**$ 359,639,589**	**$ (155,826,014)**	**$ (33,799,759)**	**$ (5,178,313)**	**$ (194,804,086)**	**$ 164,835,503**

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the Month Ended July 31, 2018

	Contributions				Expenditures				Net
	Contributions EE and ER	State of Alaska	Other	Total Contributions	Benefits	Refunds & Disbursements	Administrative & Investment	Total Expenditures	Contributions/ (Withdrawals)
Public Employees' Retirement System (PERS)									
Defined Benefit Plans:									
Retirement Trust	$ 31,620,852	$ 135,367,000	$ 627	$ 166,988,479	$ (69,507,810)	$ (692,920)	$ (472,018)	$ (70,672,748)	$ 96,315,731
Retirement Health Care Trust	7,050,222	-	53,392	7,103,614	(34,344,624)	-	(1,264,921)	(35,609,545)	(28,505,931)
Total Defined Benefit Plans	38,671,074	135,367,000	54,019	174,092,093	(103,852,434)	(692,920)	(1,736,939)	(106,282,293)	67,809,800
Defined Contribution Plans:									
Participant Directed Retirement	12,189,732	-	-	12,189,732	-	(5,822,389)	(1,491,344)	(7,313,733)	4,875,999
Health Reimbursement Arrangement [(a)]	3,104,229	-	-	3,104,229	(6,769)	-	(6,840)	(13,609)	3,090,620
Retiree Medical Plan [(a)]	961,578	-	-	961,578	(35,879)	-	(2,172)	(38,051)	923,527
Occupational Death and Disability: [(a)]									
Public Employees	134,182	-	-	134,182	(10,428)	-	(415)	(10,843)	123,339
Police and Firefighters	72,745	-	-	72,745	(20,262)	-	(201)	(20,463)	52,282
Total Defined Contribution Plans	16,462,466	-	-	16,462,466	(73,338)	(5,822,389)	(1,500,972)	(7,396,699)	9,065,767
Total PERS	**55,133,540**	**135,367,000**	**54,019**	**190,554,559**	**(103,925,772)**	**(6,515,309)**	**(3,237,911)**	**(113,678,992)**	**76,875,567**
Teachers' Retirement System (TRS)									
Defined Benefit Plans:									
Retirement Trust	7,739,195	128,174,000	3,388	135,916,583	(39,141,715)	(287,954)	(235,698)	(39,665,367)	96,251,216
Retirement Health Care Trust	1,823,653	-	19,870	1,843,523	(11,498,296)	-	(464,651)	(11,962,947)	(10,119,424)
Total Defined Benefit Plans	9,562,848	128,174,000	23,258	137,760,106	(50,640,011)	(287,954)	(700,349)	(51,628,314)	86,131,792
Defined Contribution Plans:									
Participant Directed Retirement	5,167,367	-	-	5,167,367	-	(1,686,815)	(444,510)	(2,131,325)	3,036,042
Health Reimbursement Arrangement [(a)]	917,479	-	-	917,479	(2,580)	-	(2,054)	(4,634)	912,845
Retiree Medical Plan [(a)]	317,486	-	-	317,486	(19,680)	-	(1,095)	(20,775)	296,711
Occupational Death and Disability [(a)]	41	-	-	41	(2,024)	-	(77)	(2,101)	(2,060)
Total Defined Contribution Plans	6,402,373	-	-	6,402,373	(24,284)	(1,686,815)	(447,736)	(2,158,835)	4,243,538
Total TRS	**15,965,221**	**128,174,000**	**23,258**	**144,162,479**	**(50,664,295)**	**(1,974,769)**	**(1,148,085)**	**(53,787,149)**	**90,375,330**
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Defined Benefit Plan Retirement Trust	483,732	4,909,000	-	5,392,732	(1,042,004)	-	(5,892)	(1,047,896)	4,344,836
Defined Benefit Retirement Health Care Trust	50,164	-	137	50,301	(56,278)	-	(3,804)	(60,082)	(9,781)
Total JRS	**533,896**	**4,909,000**	**137**	**5,443,033**	**(1,098,282)**	**-**	**(9,696)**	**(1,107,978)**	**4,335,055**
National Guard/Naval Militia Retirement System (NGNMRS)									
Defined Benefit Plan Retirement Trust [(a)]	851,686	-	-	851,686	(137,665)	-	(10,988)	(148,653)	703,033
Other Participant Directed Plans									
Supplemental Annuity Plan	14,992,637	-	-	14,992,637	-	(19,325,545)	(584,762)	(19,910,307)	(4,917,670)
Deferred Compensation Plan	3,635,195	-	-	3,635,195	-	(5,984,136)	(186,871)	(6,171,007)	(2,535,812)
Total All Funds	**91,112,175**	**268,450,000**	**77,414**	**359,639,589**	**(155,826,014)**	**(33,799,759)**	**(5,178,313)**	**(194,804,086)**	**164,835,503**
Total Non-Participant Directed	55,127,244	268,450,000	77,414	323,654,658	(155,826,014)	(980,874)	(2,470,826)	(159,277,714)	164,376,944
Total Participant Directed	35,984,931	-	-	35,984,931	-	(32,818,885)	(2,707,487)	(35,526,372)	458,559
Total All Funds	**$ 91,112,175**	**$ 268,450,000**	**$ 77,414**	**$ 359,639,589**	**$ (155,826,014)**	**$ (33,799,759)**	**$ (5,178,313)**	**$ (194,804,086)**	**$ 164,835,503**

(a) Employer only contributions.

ALASKA RETIREMENT MANAGEMENT BOARD
SCHEDULE OF NON-INVESTMENT CHANGES BY FUND
(Supplement to the Treasury Division Report)
For the One Months Ending July 31, 2018

PARTICIPANT DIRECTED DISBURSEMENTS BY PLAN AND BY TYPE

	PERS DCR Plan	TRS DCR Plan	Supplemental Annuity Plan	Deferred Compensation	TOTAL	% of Total
Payment to Beneficiary	$ 4,943	$ -	$ 4,400	$ 8,270	$ 17,613	0.1%
Death Benefit	98,507	-	1,236,490	78,820	1,413,817	4.3%
Disability / Hardship	-	-	277	4,170	4,447	0.0%
Minimum Required Distribution	-	2,646	584,720	180,541	767,907	2.3%
Qualified Domestic Relations Order	-	-	513,891	87,008	600,899	1.8%
Separation from Service / Retirement	5,718,939	1,684,169	16,922,552	5,615,951	29,941,611	91.2%
Purchase of Service Credit	-	-	63,215	9,376	72,591	0.2%
Transfer to a Qualifying Plan	-	-	-	-	-	0.0%
TOTAL	$ 5,822,389	$ 1,686,815	$ 19,325,545	$ 5,984,136	$ 32,818,885	100.0%

Notes for the DRB Supplement to the Treasury Report
July 2018

This report is the DRB supplement to the Financial Report presented by the Treasury Division, and expands their "Net Contributions (Withdrawals)" column into contributions and expenditures. It shows contributions received from both employers and employees, contributions from the State of Alaska, and other non-investment income. It also breaks out expenditures into benefits, refunds & disbursements, and administrative & investment expenditures. The net amount of total contributions and total expenditures, presented as "Net Contributions (Withdrawals)", agrees with the same column in the Treasury Division Report. This report shows the year-to-date totals for the first month of Fiscal Year 2019.

Highlights – On page one, for the **month** ending July 31, 2018:

- PERS DB Pension – Employer and employee contributions of $31.6 million; benefit payments of $69.5 million; refunds of $693 thousand; and Administrative and Investment expenditures of $472 thousand (DOR and DRB).
- PERS DB Healthcare – Employer contributions of $7.1 million; other income of $53 thousand; benefit payments of $34.3 million; and Administrative and Investment expenditures of $1.3 million (DOR and DRB).
- PERS DC Pension – Employer and employee contributions of $12.2 million; participant disbursements of $5.8 million; and Administrative and Investment expenditures of $1.5 million (DOR and DRB).
- PERS DC Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently thirty-one (31) benefits are being paid from the Occupational Death & Disability plans; 24 are for Public Employees and 7 are for Police and Firefighters, 29 due to disability and 2 to death. Currently 16 retirees are participating in RMP and 25 are participating in HRA. Administrative and investment expenditures were $18 thousand (DOR and DRB)
- TRS DB Pension - Employer and employee contributions of $7.7 million; benefit payments of $39.1 million; refunds of $288 thousand; and Administrative and Investment expenditures of $236 thousand (DOR and DRB).
- TRS DB Healthcare – Employer contributions of $1.8 million; other income of $20 thousand; benefit payments of $11.5 million; and Administrative and Investment expenditures of $465 thousand (DOR and DRB).
- TRS DC Pension – Employer and employee contributions of $5.2 million per month; participant disbursements of $1.7 million; and Administrative and investment expenditures of $445 thousand (DOR and DRB).

- TRS DC Health – For HRA, RMP, and OD&D, only employer contributions on behalf of participating employees; currently seven (7) benefits are being paid from the Occupational Death & Disability Plan. Currently 11 retirees are participating in RMP and 9 are participating in HRA. Administrative and investment expenditures were $6 thousand (DOR and DRB)

- JRS Pension – Employer and employee contributions of $484 thousand; benefit payments of $1 million; and Administrative and Investment expenditures of $6 thousand (DOR and DRB).

- JRS Healthcare – Employer contributions of $50 thousand; other income of $137; benefit payments of $56 thousand; and Administrative and Investment expenditures of $4 thousand (DOR and DRB).

- NGNMRS – Annual contribution from DMVA in the amount of $852 thousand was received in July 2018; combination of lump-sum and monthly benefit payments of $138 thousand; and Administrative and Investment expenditures of $11 thousand (DOR and DRB).

- SBS – Employer and employee contributions and transfers in of $15 million. Participant disbursements of $19.3 million; and Administrative and Investment expenditures of $585 thousand (DOR and DRB).

- Deferred Compensation – Member-only contributions and transfers in of $3.6 million; participant disbursements of $6 million; and Administrative and Investment expenditures of $187 thousand (DOR and DRB).

If you have any questions or comments, please let me know.

Buck

State of Alaska Retirement Systems

Presentation to the Actuarial Committee and ARMB

2017 Experience Study: Proposed Changes to Economic and Demographic Assumptions and Funding Methods

September 19/20, 2018

Agenda

Topic	Slide Number
Recap of 2017 Experience Study Discussions	3-4
Proposed Economic Assumptions	5-11
Proposed Demographic Assumptions	12-36
Proposed Funding Method Changes	37-39
Cost Effects of Proposed Changes (PERS and TRS)	40-47

Buck

Recap of 2017 Experience Study Discussions

Recap of 2017 Experience Study Discussions

- December 6, 2017 meeting – Detailed discussion of economic assumptions
- March 28, 2018 meeting – Discussion of funding method considerations
- May 3, 2018 meeting – Detailed discussion of demographic assumptions
- June 20, 2018 meeting – Additional discussion of economic assumptions
- Today's meeting
  - Bringing it all together
  - June 30, 2017 cost effects and Additional State Contribution projections reflecting proposed changes to economic/demographic assumptions and funding methods (PERS and TRS)
  - Changes adopted by the ARMB will be implemented for all plans beginning with the June 30, 2018 valuations (and will impact the Additional State Contributions beginning in FY21)

Proposed Economic Assumptions

Proposed Economic Assumptions

Based on previous analyses and meetings, the proposed economic assumptions are shown below (items in green are based on decisions made at the June ARMB meeting):

Assumption	Current	Proposed
Inflation Rate	3.12%	2.50%
Real Rate of Return	4.88%	4.88%
Investment Return	8.00% net of all expenses	7.38% net of investment expenses*
Payroll Growth Rate	3.62% (inflation+50 bp)	2.75% (inflation+25 bp)
Salary Increase Rates	See slide 7	See slide 7**
Trend Rates	See slides 8-9	See slides 8-9

* Proposed investment return does not apply to NGNMRS (which currently uses 7.0% net of investment expenses).
** These reflect recent experience and the 2.5% inflation rate.

Salary Increase Rates

	PERS – P/F		PERS – Others		TRS	
Years of Service	Current	Proposed	Current	Proposed	Current	Proposed
0	9.66%	7.75%	8.55%	6.75%	8.11%	6.75%
1	8.66%	7.25%	7.36%	6.25%	7.51%	6.25%
2	7.16%	6.75%	6.35%	5.75%	6.91%	5.75%
3	7.03%	6.25%	6.11%	5.25%	6.41%	5.25%
4	6.91%	5.75%	5.71%	4.75%	6.11%	4.75%
5	6.41%	5.25%	Age based	4.25%	6.11%	4.25%
6	5.66%	4.75%	Age based	3.75%	5.90%	3.75%
7	4.92%	4.25%	Age based	3.65%	5.69%	3.65%
8	4.92%	3.75%	Age based	3.55%	5.55%	3.55%
9	4.92%	3.65%	Age based	3.45%	5.40%	3.45%
10	4.92%	3.55%	Age based	3.35%	5.26%	3.35%
11	4.92%	3.45%	Age based	3.25%	5.11%	3.25%
12	4.92%	3.35%	Age based	3.15%	4.96%	3.15%
13	4.92%	3.25%	Age based	3.05%	4.84%	3.05%
14	4.92%	3.15%	Age based	2.95%	4.72%	2.95%
15	4.92%	3.05%	Age based	2.85%	4.60%	2.85%
16	4.92%	2.95%	Age based	2.75%	4.49%	2.75%
17	4.92%	2.85%	Age based	2.75%	4.37%	2.75%
18	4.92%	2.75%	Age based	2.75%	4.27%	2.75%
19	4.92%	2.75%	Age based	2.75%	4.17%	2.75%
20+	4.92%	2.75%	Age based	2.75%	4.07%*	2.75%

* Current assumption is 3.97% at 21 years of service and 3.87% at 22+ years of service.

Trend Rates (FY2018-FY2030)*

	Current					Proposed				
Fiscal Year	Medical Pre-65	Medical Post-65	Prescription Drugs	RDS/EGWP	Retiree Contributions	Medical Pre-65	Medical Post-65	Prescription Drugs/EGWP	RDS	Retiree Contributions
2018	8.0%	5.5%	9.0%	6.5%	8.0%	8.0%	5.5%	9.0%	4.7%	8.0%
2019	7.5%	5.5%	8.5%	6.2%	7.6%	7.5%	5.5%	8.5%	4.7%	7.6%
2020	7.0%	5.4%	8.0%	6.0%	7.2%	7.0%	5.4%	8.0%	4.7%	7.2%
2021	6.5%	5.4%	7.5%	5.7%	6.8%	6.5%	5.4%	7.5%	4.6%	6.8%
2022	6.3%	5.4%	7.1%	5.5%	6.5%	6.3%	5.4%	7.1%	4.6%	6.5%
2023	6.1%	5.4%	6.8%	5.4%	6.3%	6.1%	5.4%	6.8%	4.6%	6.3%
2024	5.9%	5.4%	6.4%	5.2%	6.0%	5.9%	5.4%	6.4%	4.6%	6.0%
2025	5.8%	5.4%	6.1%	5.0%	5.9%	5.8%	5.4%	6.1%	4.6%	5.9%
2026	5.6%	5.4%	5.7%	4.8%	5.6%	5.6%	5.4%	5.7%	4.6%	5.6%
2027	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2028	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2029	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2030	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%

* Proposed changes are shown in red

Buck

Trend Rates (FY2031-FY2050+)*

	Current					Proposed				
Fiscal Year	Medical Pre-65	Medical Post-65	Prescription Drugs	RDS/EGWP	Retiree Contributions	Medical Pre-65	Medical Post-65	Prescription Drugs/EGWP	RDS	Retiree Contributions
2031	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2032	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2033	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2034	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2035	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2036	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2037	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2038	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2039	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2040	5.4%	5.4%	5.4%	4.7%	5.4%	5.4%	5.4%	5.4%	4.5%	5.4%
2041	5.2%	5.2%	5.2%	4.6%	5.2%	5.3%	5.3%	5.3%	4.5%	5.3%
2042	5.1%	5.1%	5.1%	4.5%	5.1%	5.2%	5.2%	5.2%	4.5%	5.2%
2043	5.0%	5.0%	5.0%	4.5%	5.0%	5.1%	5.1%	5.1%	4.5%	5.1%
2044	4.8%	4.8%	4.8%	4.4%	4.8%	5.1%	5.1%	5.1%	4.5%	5.1%
2045	4.7%	4.7%	4.7%	4.3%	4.7%	5.0%	5.0%	5.0%	4.5%	5.0%
2046	4.5%	4.5%	4.5%	4.2%	4.5%	4.9%	4.9%	4.9%	4.5%	4.9%
2047	4.4%	4.4%	4.4%	4.2%	4.4%	4.8%	4.8%	4.8%	4.5%	4.8%
2048	4.3%	4.3%	4.3%	4.1%	4.3%	4.7%	4.7%	4.7%	4.5%	4.7%
2049	4.1%	4.1%	4.1%	4.0%	4.1%	4.6%	4.6%	4.6%	4.5%	4.6%
2050+	4.0%	4.0%	4.0%	4.0%	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%

Buck

* Proposed changes are shown in red

Trend Rates – Rationale for Changes

- Ultimate trend rate increase from 4.00% to 4.50% is based on the following:

Assumption	Current	Proposed
Inflation Rate	3.12%	2.50%
Real GDP Growth	0.88%	2.00%
Ultimate Trend Rate (Getzen Model)	4.00%	4.50%

- Change in RDS trend incorporates updated projections from the 2018 Medicare Trustees report (current assumption is based on 2017 Trustees report)
- EGWP trend now aligned with prescription drug trend rather than RDS
  - RDS payments are more constrained by limit thresholds than EGWP subsidies, which are expected to be a level percentage of prescription drug costs over time

Trend Rates – Rationale for Changes (cont'd)

Support for proposed Real GDP Growth assumption of 2.00%

- PWC report The World in 2050 projects real GDP growth of 1.8% between now and 2050[1]
- Federal Open Market Committee June 2018 forecast projects longer run range of 1.7% - 2.1%[2]
- Congressional Budget Office April 2018 10-year projection of 1.9%[3]
- Callan presentation at June Board meeting (page 14) projected real GDP rate of 2.0% - 2.5% over the next 10 years and 3.0% over the long-term (Equilibrium expectations)

[1] https://www.pwc.com/gx/en/issues/economy/the-world-in-2050.html

[2] https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20180613.pdf

[3] https://www.cbo.gov/sites/default/files/recurringdata/51137-2018-04-potentialgdp.xlsx

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Proposed Demographic Assumptions

(no changes from May meeting)

Current vs. Proposed Demographic Assumptions*

PERS/TRS - Pre-termination Mortality (Healthy)

	Current	Proposed
PERS P/F and Others	60% (male) and 65% (female) of post-termination healthy mortality rates A/E Ratio: - male: 108% - female: 99% - overall: 104%	100% (male) and 100% (female) of RP-2014 employee with MP-2017 generational improvement A/E Ratio: - male: 78% - female: 99% - overall: 85%
TRS	68% (male) and 60% (female) of post-termination healthy mortality rates A/E Ratio: - male: 133% - female: 96% - overall: 113%	100% (male) and 100% (female) of RP-2014 white collar employee with MP-2017 generational improvement A/E Ratio: - male: 104% - female: 69% - overall: 85%

* All DCR assumptions are the same as corresponding DB assumptions, unless DCR assumptions are shown separately.

Current vs. Proposed Demographic Assumptions

PERS/TRS - Post-termination Mortality (Healthy)

	Current	Proposed
PERS P/F and Others	96% of RP-2000, 2000 Base Year projected to 2018 with Scale BB A/E Ratio: - male: 99% - female: 105% - overall: 101%	91% (male) and 96% (female) of RP-2014 healthy annuitant with MP-2017 generational improvement A/E Ratio: - male: 98% - female: 99% - overall: 98%
TRS	94% (male) and 97% (female) of RP-2000, 2000 Base Year projected to 2018 with Scale BB, with setbacks of 3 years (male) and 4 years (female) A/E Ratio: - male: 105% - female: 114% - overall: 109%	93% (male) and 90% (female) of RP-2014 white collar healthy annuitant with MP-2017 generational improvement A/E Ratio: - male: 92% - female: 90% - overall: 91%

Current vs. Proposed Demographic Assumptions

PERS/TRS - Post-retirement Mortality (Disabled)

	Current	Proposed
PERS P/F and Others	RP-2000 Disabled Retiree Table, 2000 Base Year projected to 2018 with Scale BB A/E Ratio: - male: 94% - female: 219% - overall: 125%	RP-2014 disabled with MP-2017 generational improvement A/E Ratio: - male: 130% - female: 211% - overall: 156%
TRS	RP-2000 Disabled Retiree Table, 2000 Base Year projected to 2018 with Scale BB A/E Ratio: - male: 0% - female: 404% - overall: 219%	RP-2014 disabled with MP-2017 generational improvement A/E Ratio: - male: 0% - female: 382% - overall: 239%

Current vs. Proposed Demographic Assumptions

PERS/TRS - Retirement (Unreduced)

	Current	Proposed
PERS Others	sex distinct rates from ages 50 to 90 (100% at age 90) A/E Ratio male: 118% female: 118% overall: 118%	male: increase all rates by 10% (100% at age 80) female: increase all rates by 10% (100% at age 80) A/E Ratio male: 107% female: 107% overall: 107%
PERS P/F	sex distinct rates from ages 50 to 70 (100% at age 70) A/E Ratio male: 115% female: 101% overall: 112%	male: increase all rates by 10% (100% at age 70) female: no change (100% at age 70) A/E Ratio male: 104% female: 101% overall: 104%
TRS	sex distinct rates from ages 45 to 85 (100% at age 85) A/E Ratio male: 98% female: 108% overall: 105%	male: no change (100% at age 80) female: increase all rates by 5% (100% at age 80) A/E Ratio male: 98% female: 103% overall: 101%

Current vs. Proposed Demographic Assumptions

PERS/TRS - Retirement (Reduced)

	Current	Proposed
PERS Others	unisex rates from ages 50 to 59 <u>A/E Ratio</u> male: 121% female: 112% overall: 116%	male: 6% at all ages except 52-53 (9%), 54 (20%), 59 (15%) female: 8% at ages 50-53, 15% at age 54, 6% at ages 55-58, 20% at age 59 <u>A/E Ratio</u> male: 100% female: 102% overall: 101%
PERS P/F	unisex rates from ages 50 to 59 <u>A/E Ratio</u> male: 92% female: 128% overall: 100%	male: 7% at all ages except 50-51 (5%), 59 (20%) female: 5% at age 50, 7% at ages 51-53, 35% at age 54, 8% at ages 55-58, 20% at age 59 <u>A/E Ratio</u> male: 99% female: 108% overall: 101%
TRS	unisex rates from ages 50 to 59 <u>A/E Ratio</u> male: 116% female: 88% overall: 95%	male: 10% at all ages except age 55 (15%) female: 10% at ages 50-52, 12% at ages 53-54, 8% at ages 55-59 <u>A/E Ratio</u> male: 98% female: 102% overall: 100%
PERS DCR	unisex rates from ages 50 to 70 no credible experience to review since so few retirees	no change
TRS DCR	unisex rates from ages 54 to 70 no credible experience to review since so few retirees	no change

Current vs. Proposed Demographic Assumptions

PERS/TRS - Retirement (Deferred Vested)

	Current	Proposed
PERS Others	earliest age eligible for unreduced retirement benefit	no change
PERS P/F	earliest age eligible for unreduced retirement benefit	no change
TRS	earliest age eligible for unreduced retirement benefit	no change

Current vs. Proposed Demographic Assumptions

PERS/TRS - Withdrawal (Select)

	Current	Proposed
PERS Others	sex distinct rates in first 5 years of service, different rates if hired before or after age 35 no credible experience to review since almost everyone has > 5 years of service	no change
PERS P/F	sex distinct rates in first 5 years of service no credible experience to review since almost everyone has > 5 years of service	no change
TRS	sex distinct rates in first 8 years of service no credible experience to review since almost everyone has > 8 years of service	no change
PERS DCR Others	sex distinct rates in first 5 years of service A/E ratios male: 106% female: 106%	increase all rates by 5% A/E ratios male: 101% female: 101%
PERS DCR P/F	sex distinct rates in first 5 years of service A/E ratios male: 106% female: 131%	increase male rates by 5% and female rates by 25% A/E ratios male: 101% female: 106%
TRS DCR	sex distinct rates in first 5 years of service A/E ratios male: 104% female: 98%	no change

Current vs. Proposed Demographic Assumptions

PERS/TRS - Withdrawal (Ultimate)

	Current	Proposed
PERS Others	sex distinct age-based rates after 5 years of service A/E Ratio — Male — Female < age 40 — 125% — 96% age 40-49 — 111% — 105% age 50-54 — 95% — 108% overall — 106% — 106%	sex-distinct age-based at all years of service - male: increase < age 40 by 20%, increase age 40-49 by 10%, decrease age 50-54 by 5% - female decrease < age 40 by 5%, increase age 40-49 by 5%, increase age 50-54 by 7% A/E Ratio — Male — Female overall — 101% — 101%
PERS P/F	sex distinct age-based rates after 5 years of service A/E Ratio — Male — Female < age 40 — 119% — 85% age 40-49 — 94% — 97% age 50-54 — 108% — 227% overall — 103% — 120%	sex-distinct age-based at all years of service - male: increase < age 40 by 15%, decrease age 40-49 by 5%, increase age 50-54 by 6% - female: decrease < age 40 by 15%, decrease age 40-49 by 3%, increase age 50-54 by 100% A/E Ratio — Male — Female overall — 101% — 112%
TRS	sex distinct age-based rates after 8 years of service A/E Ratio — Male — Female < age 40 — 86% — 104% age 40-49 — 65% — 74% age 50-54 — 124% — 128% overall — 84% — 94%	sex-distinct age-based at all years of service - male rates: decrease < age 40 by 15%, decrease age 40-49 by 25%, increase age 50-54 by 20% - female rates: increase < age 40 by 3%, decrease age 40-49 by 24%, increase age 50-54 by 26% A/E Ratio — Male — Female overall — 101% — 101%
PERS DCR Others	sex distinct age-based rates after 5 years of service Male — Female A/E Ratio: — 131% — 115%	increase male rates by 25% and female rates by 10% Male — Female A/E Ratio: — 104% — 105%
PERS DCR P/F	sex distinct age-based rates after 5 years of service Male — Female A/E Ratio: — 119% — 150%	increase male rates by 15% and female rates by 40% Male — Female A/E Ratio: — 104% — 107%
TRS DCR	sex distinct age-based rates after 5 years of service Male — Female A/E Ratio: — 154% — 130%	increase male rates by 50% and female rates by 25% Male — Female A/E Ratio: — 108% — 111%

Current vs. Proposed Demographic Assumptions

PERS/TRS - Disability

	Current	Proposed
PERS Others	sex distinct age-based rates (0% upon retirement eligibility) <u>A/E Ratio</u> male: 162% female: 246% overall: 200%	sex-distinct age-based rates (0% upon retirement eligibility) - male: increase all rates by 50% - female: increase all rates by 100% <u>A/E Ratio</u> male: 108% female: 123% overall: 116%
PERS P/F	unisex age-based rates (0% upon retirement eligibility) <u>A/E Ratio</u> male: 80% female: 38% overall: 75%	sex-distinct age-based rates (0% upon retirement eligibility) - male: decrease all rates by 20% - female: decrease all rates by 50% <u>A/E Ratio</u> male: 100% female: 76% overall: 98%
TRS	unisex age-based rates (0% upon retirement eligibility) <u>A/E Ratio</u> male: 56% female: 100% overall: 86%	sex-distinct age-based rates (0% upon retirement eligibility) - male: decrease all rates by 45% - female: no change <u>A/E Ratio</u> male: 102% female: 100% overall: 101%

Current vs. Proposed Demographic Assumptions

PERS/TRS - Occupational-Related Death and Disability

		Current	Proposed
Death	PERS Others	50%	40%
	PERS P/F	70%	75%
	TRS	15%	no change
Disability	PERS Others	50%	40%
	PERS P/F	70%	75%
	TRS	15%	no change

Current vs. Proposed Demographic Assumptions

PERS/TRS - Withdrawal of Contributions at Termination

	Current	Proposed
PERS Others	10%	5%
PERS P/F	15%	10%
TRS	5%	0%

Note: In all cases, assumption is 100% if the member is not vested at termination.

Current vs. Proposed Demographic Assumptions

PERS/TRS - Dependent Assumptions

		Current		Proposed	
		Male	**Female**	**Male**	**Female**
Percent Covering Dependent Spouse at Retirement Without Dual Coverage*	PERS Others	75%	70%	65%	60%
	PERS P/F	85%	60%	75%	50%
	TRS	85%	75%	65%	60%
Age Difference	All	3 years older	3 years younger	no change	2 years younger

* The proposed assumption is set to include an allowance for future covered children. The proposed change only applies to healthcare benefits (no change to current marriage assumption for pension benefits).

Current vs. Proposed Demographic Assumptions

PERS/TRS - Alaska Residency and Part-Time Service

		Current	Proposed
Alaska Residency for COLA	PERS Others	70%	no change
	PERS P/F	65%	no change
	TRS	60%	no change
Part-time Service Earned During the Year	PERS Others	0.65	0.75
	PERS P/F	1.00	no change
	TRS	0.75	no change

Current vs. Proposed Demographic Assumptions

PERS/TRS - Healthcare Participation (DB)

	Current	Proposed
If System-Paid*	100% when first eligible	no change
If Non-System Paid*	10% when first eligible	20% when first eligible

* PERS and TRS pay the entire cost of healthcare coverage for the member and spouse depending on the member's age, service and tier.

Current vs. Proposed Demographic Assumptions

PERS/TRS - Healthcare Participation (DCR)

	Current	Proposed
If retire directly from disability	<age 56: 73.00% age 56: 77.50% age 57: 79.75% age 58: 82.00% age 59: 84.25% age 60: 86.50% age 61: 88.75% age 62: 91.00% age 63: 93.25% age 64: 95.50% age 65+: 94.40%	<=age 55: 75.0% age 56: 77.5% age 57: 80.0% age 58: 82.5% age 59: 85.0% age 60: 87.5% age 61: 90.0% age 62: 92.5% age 63: 95.0% age 64: 97.5% age 65+: 100.0%
If retire directly from employment – Before age 65	age 55: 40% age 56: 50% age 57: 55% age 58: 60% age 59: 65% age 60: 70% age 61: 75% age 62: 80% age 63: 85% age 64: 90%	Combination of proposed service-based rates if retire from employment at age 65+ and the following age-based rates: age 55: 50% age 56: 55% age 57: 60% age 58: 65% age 59: 70% age 60: 75% age 61: 80% age 62: 85% age 63: 90% age 64: 95% age 65: 100%
If retire directly from employment – Age 65+	< 15 years of service: 70.5% 15-19 years of service: 75.2% 20-24 years of service: 79.9% 25-29 years of service: 89.3% 30+ years of service: 94.0%	< 15 years of service: 75% 15-19 years of service: 80% 20-24 years of service: 85% 25-29 years of service: 90% 30+ years of service: 95%

Current vs. Proposed Demographic Assumptions

PERS/TRS - Healthcare Morbidity

	Current	Proposed
Medical	Age < 45: 2.0% Age 45-54: 2.5% Age 55-64: 3.5% Age 65-74: 4.0% Age 75-84: 1.5% Age 85-95: 0.5% Age 96+: 0.0%	Age < 45: 2.0% Age 45-54: 2.5% Age 55-64: 2.5% Age 65-74: 3.0% Age 75-84: 2.0% Age 85-94: 0.3% Age 95+: 0.0%
Prescription Drugs	Age < 45: 4.5% Age 45-54: 3.5% Age 55-64: 3.0% Age 65-74: 1.5% Age 75-84: 0.5% Age 85+: 0.0%	Age < 45: 4.5% Age 45-54: 3.5% Age 55-64: 1.5% Age 65-74: 2.0% Age 75-84: (0.5)% Age 85-94: (2.5)% Age 95+: 0.0%

Current vs. Proposed Demographic Assumptions

PERS/TRS - Rehires

- The current assumption was set based on a weighted average of rehire losses for the 5-year period ending June 30, 2015, and was first applied beginning with the 2016 valuations. Current Normal Cost loads are:
  - PERS
    - Pension: 14.23%
    - Healthcare: 17.24%
  - TRS
    - Pension: 18.49%
    - Healthcare: 10.39%
- A similar approach was used, except we considered the rehire losses for the 5-year period ending June 30, 2017 (same weighting was applied). Proposed Normal Cost loads are:
  - PERS
    - Pension: 18.77%
    - Healthcare: 17.09%
  - TRS
    - Pension: 15.57%
    - Healthcare: 12.03%

Current vs. Proposed Demographic Assumptions

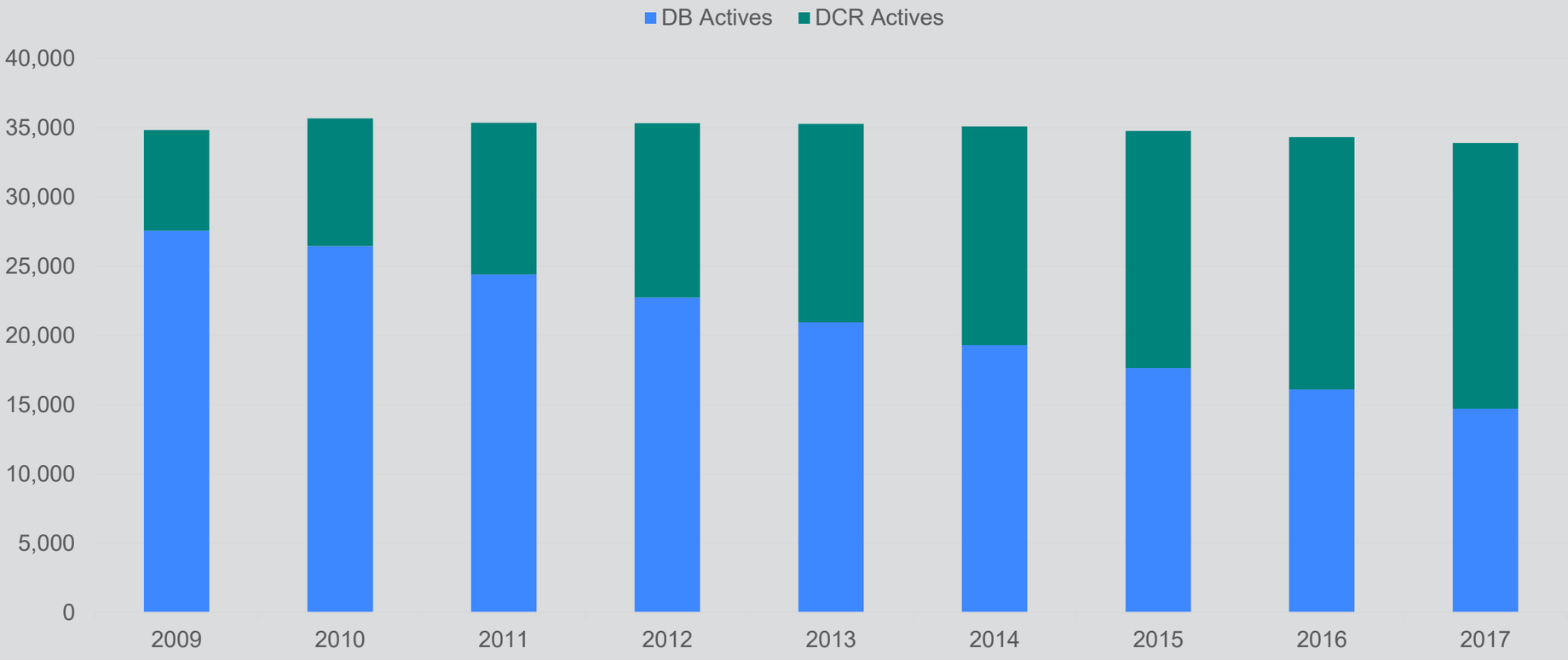
PERS/TRS - Miscellaneous

- Number of Dependent Children (PERS and TRS)
  - Current assumption: Benefits valued only for members currently covering dependent children. Coverage for dependent children is assumed through age 23 (unless disabled, in which case coverage is assume through the disabled child's life).
  - Proposed assumption: no change

- Number of Unused Sick Days (TRS only)
  - Current Assumption: 4.5 days for each year of service
  - Proposed assumption: no change

Active Population Growth

PERS



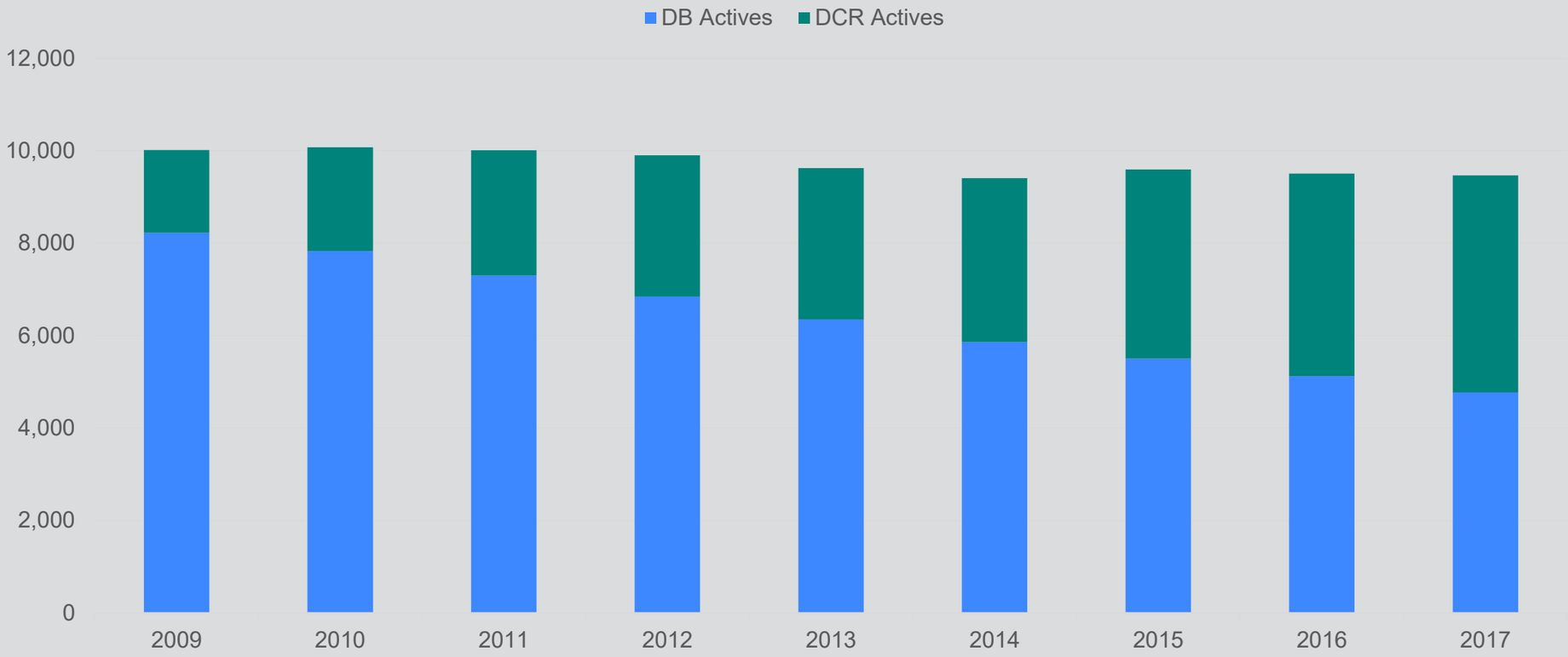
	2010	2011	2012	2013	2014	2015	2016	2017
Annual percentage increase	2.45%	(0.89)%	(0.09)%	(0.16)%	(0.49)%	(0.97)%	(1.26)%	(1.25)%

8-Year Geometric Average: (0.34)%
Most recent 4-Year Geometric Average: (0.99)%

The current overall active population growth assumption reflected in the projections is 0%. We propose no change.

Active Population Growth

TRS



Annual percentage increase	0.60%	(0.66)%	(1.09)%	(2.81)%	(2.24)%	2.01%	(0.95)%	(0.42)%

8-Year Geometric Average: (0.71)%
Most recent 4-Year Geometric Average: (0.41)%

The current overall active population growth assumption reflected in the projections is 0%. We propose no change.

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Current vs. Proposed Demographic Assumptions

JRS

	Current	Proposed
Pre-termination Mortality (Healthy)	same as current TRS	same as proposed TRS
Post-termination Mortality (Healthy)	same as current TRS	same as proposed TRS
Post-retirement Mortality (Disabled)	same as current TRS	same as proposed TRS
Retirement	Age / Rate <59 / 3% 59 / 10% 60-61 / 20% 62-64 / 10% 65-66 / 20% 67-69 / 10% 70 / 100%	no change
Withdrawal	Years of Service / Rate <10 / 3% 10+ / 1%	no change

Current vs. Proposed Demographic Assumptions

JRS

	Current	Proposed
Deferred Vested Age at Retirement	age 60	no change
Disability	unisex rates ranging from 0.017% at age 20 to 0.180% at age 59	no change
Withdrawal of Contributions at Termination	0% (100% if not vested)	no change
Percent Married	male - 90% female – 70%	no change
Age Difference	males 4 years older than females	no change
Healthcare Participation	100%	no change
Healthcare Morbidity	same as current PERS/TRS	same as proposed PERS/TRS

Current vs. Proposed Demographic Assumptions

NGNMRS

	Current	Proposed
Pre-termination Mortality (Healthy)	same as current PERS	same as proposed PERS
Post-termination Mortality (Healthy)	same as current PERS	same as proposed PERS
Post-retirement Mortality (Disabled)	same as current PERS	same as proposed PERS
Retirement	unisex rates Age / Rate <51 10% 51-52 10% 53 12% 54 15% 55 20% 56 25% 57 30% 58 35% 59 40% 60 45% 61-64 50% 65 100% AE ratio male: 133% female: 135% overall: 133%	unisex rates Age / Rate <51 13% 51-52 13% 53 15% 54 20% 55 25% 56 35% 57 40% 58 45% 59 50% 60 55% 61-64 60% 65 100% AE ratio male: 104% female: 106% overall: 104%

Current vs. Proposed Demographic Assumptions

NGNMRS

	Current	Proposed
Withdrawal	unisex service-based during first 5 years of service 1: 20% 2-5: 10% A/E ratio: male: 84% female: 114% overall: 89% unisex age-based after 5 years of service age 30: 7.4% age 40: 6.1% age 50: 3.3% age 60: 2.3% A/E ratio: male: 154% female: 193% overall: 161%	no change to rates during first 5 years of service sex-distinct age-based rates after 5 years of service male: increase rates by 50% female: increase rates by 90% A/E ratio: male: 103% female: 102% overall: 102%
Deferred Vested Age at Retirement	age 50	no change
Disability	same as current PERS	same as proposed PERS
Form of Payment	100% of actives assumed to elect a lump sum 100% of DV's assumed to elect an annuity	70% of all assumed to elect a lump sum

Proposed Funding Method Changes

(no changes from March meeting)

Proposed Funding Method Changes

- Healthcare Normal Cost and Actuarial Accrued Liability
  - Current: Level dollar
  - Proposed: Level % of pay
- Administrative Expense Load to Normal Cost
  - Current: None (investment return is assumed to be net of investment and administrative expenses)
  - Proposed*: Include the average of 2 most recent years of administrative expenses paid from the trust. Future amounts are assumed to stay level as % of the non-loaded Normal Cost.

	Initial Amount	% of non-loaded NC
PERS - pension	$7,293,200	5.3%
PERS – healthcare	$15,464,300**	14.3%
TRS - pension	$2,785,000	5.5%
TRS – healthcare	$5,693,500**	19.0%
PERS DCR – occupational death/disability	$40,500	1.1%
PERS DCR – retiree medical	$27,000	0.2%
TRS DCR – occupational death/disability	$29,500	12.8%
TRS DCR – retiree medical	$29,500	1.0%

* NGNMRS currently includes an administrative expense load to Normal Cost equal to the average of 2 most recent years of administrative expenses.
** These amounts may include ASO fees that are also included in the underlying per capita costs, in which case these administration expense loads should be lower.

Proposed Funding Method Changes

- Amortization of Unfunded Actuarial Accrued Liability (UAAL)
  - Current: 25-year closed period established June 30, 2014
  - Proposed*: Consider adopting a layered approach for future changes in UAAL

* This is not reflected in cost effects of proposed changes shown on subsequent slides.

Cost Effects of Proposed Changes (PERS and TRS)

Cost Effects of Proposed Changes as of June 30, 2017

PERS

($ in thousands)

	Pension		Healthcare		Total	
	Current	**Proposed**	**Current**	**Proposed**	**Current**	**Proposed**
Actuarial Accrued Liability	$13,832,130	$14,329,968	$ 8,049,265	$ 8,810,122	$ 21,881,395	$23,140,090
Actuarial Value of Assets (AVA)	9,229,703	9,229,703	7,557,068	7,557,068	16,786,771	16,786,771
Unfunded Actuarial Accrued Liability	$ 4,602,427	$ 5,100,265	$ 492,197	$ 1,253,054	$ 5,094,624	$ 6,353,319
Funded Ratio (AVA basis)	66.7%	64.4%	93.9%	85.8%	76.7%	72.5%
Total Normal Cost	$ 170,816	$ 169,280	$ 73,519	$ 141,986	$ 244,335	$ 311,266
Employer Normal Cost Rate*	3.95%	4.00%	3.21%	6.30%	7.16%	10.30%
Past Service Cost Rate*	13.63%	15.72%	1.46%	3.86%	15.09%	19.58%
Total Employer/State Contribution Rate*	17.58%	19.72%	4.67%	10.16%	22.25%	29.88%**

* As % of total (DB and DCR) pay
** 28.87% without the administrative expense load

Cost Effects of Proposed Changes as of June 30, 2017

TRS

($ in thousands)

	Pension		Healthcare		Total	
	Current	**Proposed**	**Current**	**Proposed**	**Current**	**Proposed**
Actuarial Accrued Liability	$7,217,525	$7,224,735	$2,927,093	$3,009,360	$10,144,618	$10,234,095
Actuarial Value of Assets (AVA)	5,476,835	5,476,835	2,836,802	2,836,802	8,313,637	8,313,637
Unfunded Actuarial Accrued Liability	$1,740,690	$1,747,900	$ 90,291	$ 172,558	$ 1,830,981	$ 1,920,458
Funded Ratio (AVA basis)	75.9%	75.8%	96.9%	94.3%	82.0%	81.2%
Total Normal Cost	$ 64,961	$ 60,938	$ 19,541	$ 39,241	$ 84,502	$ 100,179
Employer Normal Cost Rate*	3.73%	3.32%	2.59%	5.29%	6.32%	8.61%
Past Service Cost Rate*	15.67%	16.35%	0.81%	1.61%	16.48%	17.96%
Total Employer/State Contribution Rate*	19.40%	19.67%	3.40%	6.90%	22.80%	26.57%**

* As % of total (DB and DCR) pay
** 25.42% without the administrative expense load

Cost Effects of Proposed Changes as of June 30, 2017

PERS DCR

($ in thousands)

	Occupational Death/Disability		Retiree Medical		Total	
	Current	Proposed	Current	Proposed	Current	Proposed
Actuarial Accrued Liability	$ 7,540	$ 6,683	$ 109,703	$ 99,382	$ 117,243	$ 106,065
Actuarial Value of Assets (AVA)	26,944	26,944	81,559	81,559	108,503	108,503
Unfunded Actuarial Accrued Liability	$(19,404)	$(20,261)	$ 28,144	$ 17,823	$ 8,740	$ (2,438)
Funded Ratio (AVA basis)	357.3%	403.2%	74.3%	82.1 %	92.5%	102.3%
Total Normal Cost (NC)	$ 3,565	$ 3,889	$ 12,860	$ 12,939	$ 16,425	$ 16,828
Employer Normal Cost Rate*	0.32%	0.35%	1.14%	1.16%	1.46%	1.51%
Past Service Cost Rate*	(0.12)%	(0.13)%	0.18%	0.12%	0.18%	0.12%
Total Employer/State Contribution Rate (not less than NC Rate)*	0.32%	0.35%	1.32%	1.28%	1.64%	1.63%

* As % of DCR pay

Buck

Cost Effects of Proposed Changes as of June 30, 2017

TRS DCR

($ in thousands)

	Occupational Death/Disability		Retiree Medical		Total	
	Current	Proposed	Current	Proposed	Current	Proposed
Actuarial Accrued Liability	$ 26	$ 17	$ 33,681	$ 25,715	$ 33,707	$ 25,732
Actuarial Value of Assets (AVA)	3,588	3,588	30,998	30,998	34,586	34,586
Unfunded Actuarial Accrued Liability	$ (3,562)	$ (3,571)	$ 2,683	$ (5,283)	$ (879)	$ (8,854)
Funded Ratio (AVA basis)	13800.0%	21105.9%	92.0%	120.5%	102.6%	134.4%
Total Normal Cost (NC)	$ 259	$ 265	$ 3,358	$ 2,962	$ 3,617	$ 3,227
Employer Normal Cost Rate*	0.08%	0.08%	1.02%	0.92%	1.10%	1.00%
Past Service Cost Rate*	(0.08)%	(0.08)%	0.07%	(0.09)%	0.07%	(0.17)%
Total Employer/State Contribution Rate (not less than NC Rate)*	0.08%	0.08%	1.09%	0.92%	1.17%	1.00%

* As % of DCR pay

Percentage Impact of Proposed Changes on Actuarial Accrued Liability as of June 30, 2017

PERS and TRS

	PERS	TRS
Actuarial Accrued Liability - Pension		
- Demographic Assumptions	3.1%	(1.6)%
- Salary Increase Rates	(2.6)%	(1.1)%
- Inflation Rate (impact on COLA-related benefits only)	(3.7)%	(3.7)%
- Investment Return	7.1%	6.7%
- All*	3.6%	0.1%
Actuarial Accrued Liability - Healthcare		
- Demographic Assumptions	1.4%	(5.3)%
- Trend Rates	2.2%	2.4%
- Investment Return	8.3%	8.6%
- Level % of Pay Funding Method	(2.6)%	(2.4)%
- All*	9.5%	2.8%

* The combined effect of all changes is not additive.

Percentage Impact of Proposed Changes on Normal Cost as of June 30, 2017

PERS and TRS

	PERS	TRS
Normal Cost - Pension		
- Demographic Assumptions	2.9%	1.3%
- Salary Increase Rates	(20.1)%	(18.5)%
- Inflation Rate (impact on COLA-related benefits only)	(3.4)%	(3.1)%
- Investment Return	14.9%	14.7%
- Rehire Load	4.0%	(2.5)%
- Administrative Expense Load	4.5%	4.8%
- All*	(0.9)%	(6.2)%
Normal Cost - Healthcare		
- Demographic Assumptions	0.3%	(7.2)%
- Trend Rates	3.5%	4.1%
- Investment Return	17.9%	20.2%
- Level % of Pay Funding Method	40.8%	45.7%
- Rehire Load	(0.2)%	1.5%
- Administrative Expense Load	12.2%	17.0%
- All*	93.1%	100.8%

* The combined effect of all changes is not additive.

Cost Effects of Proposed Changes on Projected Additional State Contributions for FY20-FY39*

($ in thousands)

	PERS			TRS		
Fiscal Year	Current	Proposed	Increase/(Decrease)	Current	Proposed	Increase/(Decrease)
2020	158,815	353,967	195,152	141,839	168,281	26,442
2021	162,928	354,535	191,608	148,487	173,217	24,730
2022	153,047	341,112	188,065	147,022	169,342	22,320
2023	154,760	341,137	186,377	151,497	171,578	20,081
2024	157,691	342,100	184,409	156,430	173,894	17,464
2025	161,294	343,276	181,982	161,559	176,276	14,717
2026	166,167	346,280	180,114	167,032	179,037	12,005
2027	171,847	349,433	177,586	172,849	181,940	9,091
2028	179,245	354,888	175,643	179,635	185,683	6,048
2029	186,654	359,706	173,052	186,114	189,074	2,960
2030	194,344	365,507	171,163	192,782	192,658	(124)
2031	204,009	372,894	168,885	199,901	196,285	(3,616)
2032	213,786	380,560	166,775	207,288	200,498	(6,790)
2033	224,757	389,954	165,197	215,178	204,936	(10,242)
2034	237,367	400,261	162,894	223,373	209,504	(13,869)
2035	251,280	411,791	160,511	232,026	214,530	(17,496)
2036	267,124	424,398	157,275	240,685	219,704	(20,981)
2037	284,569	439,027	154,458	249,985	225,173	(24,812)
2038	306,776	456,240	149,464	259,374	230,865	(28,509)
2039	365,504	500,803	135,298	275,918	241,856	(34,062)
Total	4,201,964	7,627,871	3,425,908	3,908,974	3,904,331	(4,643)

Notes:

1. FY20 amounts are shown for illustrative purposes only. FY20 amounts will not be affected by the assumptions and method changes since they are determined based on the June 30, 2017 valuations under current assumptions and methods.
2. The FY20 amounts shown in the "current" column are estimates assuming assets earn 8% in FY18 and FY19. The actual FY20 amounts will be determined reflecting actual asset returns in FY18.
3. The increases in projected Additional State Contributions for PERS are due to two reasons:
(i) The proposed assumptions and method changes increase the Normal Cost and unfunded liability amortization amounts.
(ii) The proposed salary increase rates reduce projected payroll figures, thereby increasing the contribution rates when expressed as a % of total (DB and DCR) pay.

* If the proposed changes had been in effect as of June 30, 2017. Amounts may not add due to rounding.

Buck

Certification

Except as noted herein, the results in this report are based on the data, assumptions, methods, and plan provisions shown in the June 30, 2017 actuarial valuation reports for PERS (DB & DCR) and TRS (DB & DCR), JRS and NGNMRS.

The results were prepared under the direction of David Kershner who meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. Scott Young is responsible for all assumptions related to the average annual per capita health claims cost and the health care cost trend rates, and hereby affirms his qualification to render opinions in such matters, in accordance with the Qualification Standards of the American Academy of Actuaries. The results have been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about them.

Where presented, references to “funded ratio” and “unfunded accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law.

David Kershner
FSA, EA, MAAA, FCA
Principal, Wealth

Scott Young
FSA, EA, MAAA
Director, Health

Buck

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ALASKA RETIREMENT MANAGEMENT BOARD

Actuarial Committee

SUBJECT: Acceptance of Experience Analysis

ACTION: X

DATE: September 19, 2018

INFORMATION: ____

BACKGROUND:

AS 37.10.220(a)(9) prescribes that the Alaska Retirement Management Board (Board) "review actuarial assumptions prepared and certified by a member of the American Academy of Actuaries and conduct experience analyses of the retirement systems not less than once every four years".

In addition, under AS 37.10.220(a)(9), "the results of all actuarial assumptions prepared under this paragraph shall be reviewed and certified by a second member of the American Academy of Actuaries before presentation to the board".

STATUS:

Buck has completed the following experience analyses and the reports have been presented to the Board:

(1) an experience analysis of the Public Employees' Retirement System and Teachers' Retirement System Defined Benefit Retirement Plans for the period July 1, 2013 to June 30, 2017;
(2) an experience analysis of the Public Employees' Retirement System and Teachers' Retirement System Defined Contribution Retirement Plans for the period July 1, 2013 to June 30, 2017;
(3) an experience analysis of the Judicial Retirement System for the period July 1, 2013 to June 30, 2017; and
(4) an experience analysis of the National Guard and Naval Militia Retirement System for the period July 1, 2013 to June 30, 2017.

Gabriel Roeder Smith & Company (GRS), the Board's actuary, has reviewed these experience analyses and has provided their report to the Board.

RECOMMENDATION:

That the Alaska Retirement Management Board approves Resolution 2018-19, accepting the experience analyses prepared by Buck, as well as the assumption and methods changes recommended therein.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the actuarial experience analysis for the Public Employees' Retirement System, Teachers' Retirement System, Judicial Retirement System, and Alaska National Guard and Naval Militia Retirement System

Resolution 2018-19

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for the funds of the Public Employees' Retirement System, Teachers' Retirement System, Judicial Retirement System, and Alaska National Guard and Naval Militia Retirement System; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220(a)(8) requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios, and to certify to the appropriate budgetary authority of each employer in the system an appropriate contribution rate for normal costs and an appropriate contribution rate for liquidating any past service liability;

WHEREAS, AS 37.10.220(a)(9) requires the Board to conduct an experience analyses of the retirement systems not less than once every four years, except for health cost assumptions which shall be reviewed annually, and that the results of all actuarial assumptions prepared under this paragraph shall be reviewed and certified by a second actuary before presentation to the board;

NOW THEREFORE BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, that the Public Employees' Retirement System's, Teachers' Retirement System's, Judicial Retirement System's, and Alaska National Guard and Naval Militia Retirement System's Actuarial Experience Analysis as of June 30, 2017, as well as the assumption and method changes recommended therein, prepared by Buck be approved.

DATED at Anchorage, Alaska this 20th day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: History of PERS / TRS Employer Contribution Rates

ACTION: _____

DATE: September 20, 2018

INFORMATION: X

Below is a history of employer contribution rates adopted by the Alaska Retirement Management Board for Fiscal Years 2011 through 2019, as well as the proposed FY 2020 contribution rates.

ARM BOARD ADOPTED RATES											
	FY11	FY12 (a)	FY13	FY14 (c)	FY15 (b)	FY15 (c)	FY16	FY17	FY18	FY19	PROPOSED FY20
Public Employees' Retirement System (PERS)											
DB Employer Contribution Rate	27.96%	33.49%	35.84%	35.68%	44.03%	31.90%	27.19%	26.14%	25.01%	27.58%	28.62%
DCR - Retiree Medical Plan	0.55%	0.51%	0.48%	0.48%	1.66%	1.66%	1.68%	1.18%	1.03%	0.94%	1.32%
DCR - OD&D - All Others	0.31%	0.20%	0.14%	0.20%	0.22%	0.22%	0.22%	0.17%	0.16%	0.26%	0.26%
DCR - OD&D - Peace Officer/Fire Fighter	1.18%	0.97%	0.99%	1.14%	1.06%	1.06%	1.05%	0.49%	0.43%	0.76%	0.72%
Teachers' Retirement System (TRS)											
DB Employer Contribution Rate	38.56%	45.55%	52.67%	53.62%	70.75%	48.69%	29.27%	28.02%	26.78%	28.90%	30.47%
DCR - Retiree Medical Plan	0.68%	0.58%	0.49%	0.47%	2.04%	2.04%	2.04%	1.05%	0.91%	0.79%	1.09%
DCR - OD&D	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.08%

a) Beginning in Fiscal Year 2012, the defined benefit employer contribution rates for both PERS and TRS incorporated the normal cost of the Defined Contribution Retirement Plan.

b) As noted in the June 30, 2012 actuarial valuation reports, "The Board changed the amortization method used for funding from the level percentage of payroll method to the level dollar method in June 2012, effective June 30, 2012."

c) During the FY 2014 legislative session, HB 385 enacted certain changes into law. In AS 37.10.220(a), item (a)(8)(B) was amended to define that "an appropriate contribution rate for liquidating the past service liability of the defined benefit retirement plan under AS 14.25.009 - 14.25.220 or the past service liability of the defined benefit retirement plan under AS 39.35.095 - 39.35.680 must be determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years;" The PERS DB and TRS DB Employer Contribution Rates for FY 2015 were updated to the level percentage of pay methodology from the previously determined rates that were prepared using the level dollar methodology, and have been done so going forward.

d) Beginning in Fiscal Year 2019, employer contribution rates for plans which have no past service liability as determined by the actuarial valuation process will not reflect a contribution rate for liquidating past service liability under AS 37.10.220(a)(8)(B). In this case, the contribution rate equals the Normal Cost rate.

ALASKA RETIREMENT MANAGEMENT BOARD

Actuarial Committee

SUBJECT: FY 20 PERS Employer Contribution Rate
Tier I - III

ACTION: X

DATE: September 19, 2018

INFORMATION: ____

BACKGROUND:

AS 37.10.220(a)(8) sets forth the responsibility of the Alaska Retirement Management Board (Board) to annually certify to each employer in the system contribution rates for normal costs and for liquidating any past service liability:

> *(8) coordinate with the retirement system administrator to have an annual actuarial valuation of each retirement system prepared to determine system assets, accrued liabilities, and funding ratios and to certify to the appropriate budgetary authority of each employer in the system*
>
> *(A) an appropriate contribution rate for normal costs; and*
>
> *(B) an appropriate contribution rate for liquidating any past service liability; in this subparagraph, the appropriate contribution rate for liquidating the past service liability of the defined benefit retirement plan under AS 14.25.009 - 14.25.220 or the past service liability of the defined benefit retirement plan under AS 39.35.095 - 39.35.680 must be determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years;*

AS 39.35.270 requires that the amount of each Public Employees' Retirement System (PERS) employer's contribution to the system shall be determined by applying the employer's contribution rate, as certified by the Alaska Retirement Management Board (Board), to the total compensation paid to the active employee. Statutory employer contribution and additional state contribution are established under the following two sections of Alaska Statute:

Sec. 39.35.255. Contributions by employers. (a) Each employer shall contribute to the system every payroll period an amount calculated by applying a rate of 22 percent of the greater of the total of all base salaries

(1) paid by the employer to employees who are active members of the system, including any adjustments to contributions required by AS 39.35.520; or

(2) paid by the employer to employees who were active members of the system during the corresponding payroll period for the fiscal year ending June 30, 2008."

and:

Sec. 39.35.280. Additional state contributions. In addition to the contributions that the state is required to make under AS 39.35.255 as an employer, the state shall contribute to the plan each July 1 or, if funds are not available on July 1, as soon after July 1 as funds become available, an amount for the ensuing fiscal year that, when combined with the total employer contributions that the administrator estimates will be allocated under AS 39.35.255(c), is sufficient to pay the plan's past service liability at the contribution rate adopted by the board under AS 37.10.220 for that fiscal year.

STATUS:

The Division of Retirement & Benefits' actuary, Buck, has completed the FY 20 Allocation of the Additional State Contributions as shown in their letter dated September 12, 2018 based on the June 30, 2017 valuation report. This valuation report has been reviewed by the Board's actuary, Gabriel, Roeder, Smith & Co.

RECOMMENDATION:

That the Alaska Retirement Management Board set the Fiscal Year 2020 PERS actuarially determined contribution rate attributable to employers consistent with its fiduciary duty, as set out in the attached form of Resolution 2018-07.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2020 Employer Contribution Rate
For the Public Employees' Retirement System

Resolution 2018-07

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220(a)(8) requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios, and to certify to the appropriate budgetary authority of each employer in the system an appropriate contribution rate for normal costs and an appropriate contribution rate for liquidating any past service liability determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years; and

WHEREAS, AS 39.35.255 establishes a statutory employer contribution rate of 22.00 percent and AS 39.35.280 requires additional state contribution to make up the difference between 22.00 percent and the actuarially determined contribution rate; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 20" letter dated September 12, 2018 determines that the actuarially determined contribution rate for pension benefits is 18.29 percent composed of the normal cost rate of 3.29 percent and past service rate of 15.00 percent; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 20" letter dated September 12, 2018 determines that the actuarially determined contribution rate for postemployment healthcare benefits is 4.89 percent composed of the normal cost rate of 2.45 percent and past service rate of 2.44 percent; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 20" letter dated September 12, 2018 presents the employer rate incorporating the normal cost of the Defined Contribution Retirement Plan of 5.44 percent;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, that the Fiscal Year 2020 actuarially determined contribution rate attributable to employers participating in the Public Employees' Retirement System is set at 28.62 percent, composed of the contribution rate for defined benefit pension of 18.29 percent, the contribution rate for postemployment healthcare of 4.89 percent, and the contribution rate for defined contribution pension of 5.44 percent.

DATED at Anchorage, Alaska this 20th day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 2020 PERS Retiree Major Medical and Occupational Death & Disability

ACTION: X

DATE: September 20, 2018

INFORMATION:

BACKGROUND:

The Alaska Retirement Management Board (Board) establishes rates for the Public Employees' Retirement System (PERS) Tier IV Defined Contribution Retirement Plan (DCR) for the following plans: 1) Retiree Major Medical Insurance (RMMI) and 2) Occupational Death & Disability (OD&D) under the following two sections in Alaska Statute:

Retiree Major Medical Insurance
AS 39.35.750 (b) requires that "An employer shall also contribute an amount equal to a percentage, as adopted by the board, of each member's compensation from July 1 to the following June 30 to pay for retiree major medical insurance."

Occupational Death & Disability
AS 39.35.750 (e) requires that "An employer shall make annual contributions to the plan in an amount determined by the board to be actuarially required to fully fund the cost of providing occupational disability and occupational death benefits under AS 39.35.890 and 39.35.892. The contribution required under this subsection for peace officers and fire fighters and the contribution required under this subsection for other employees shall be separately calculated based on the actuarially calculated costs for each group of employees."

STATUS:

The Division of Retirement & Benefits' actuary, Buck, has completed the actuarial valuation of the PERS DCR Plan as of June 30, 2017. The valuation has been reviewed by the Board's actuary, Gabriel, Roeder, Smith & Co. (GRS).

According to the PERS DCR Plan actuarial valuation report, and confirmed by GRS, the Fiscal Year 2020 actuarially determined contribution rates attributable to employers for the Retiree Major Medical Insurance (RMMI) should be 1.32 percent; for the peace officer/firefighter Occupational Death & Disability (OD&D) benefit should be 0.72 percent; and for "all other" OD&D benefit should be 0.26 percent.

RECOMMENDATION:

That the Alaska Retirement Management Board set Fiscal Year 2020 PERS DCR Retiree Major Medical Insurance and Occupational Death & Disability Benefit rates as set out in the following resolutions:

1. Resolution 2018-08: Public Employees' DCR Plan Retiree Major Medical Insurance Rate

2. Resolution 2018-09: Public Employees' DCR Plan Occupational Death & Disability Benefit Rate

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2020 Employer Contribution Rate
For Public Employees' Defined Contribution Retirement Plan
Retiree Major Medical Insurance Rate

Resolution 2018-08

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220 requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios; and

WHEREAS, AS 39.35.750(b) requires the Board to approve an amount equal to a percentage of each member's compensation from July 1 to the following June 30 to pay for retiree major medical insurance; and

WHEREAS, the June 30, 2017 PERS Defined Contribution actuarial valuation report determines that the actuarially determined contribution rate for retiree major medical insurance is 1.32 percent, composed of the normal cost rate of 1.14 percent and past service rate of 0.18 percent;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, the Fiscal Year 2020 employer contribution rate for the retiree major medical insurance for the Public Employees' Defined Contribution Retirement Plan is set at 1.32 percent.

DATED at Anchorage, Alaska this 20th day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2020 Employer Contribution Rate
For Public Employees' Defined Contribution Retirement Plan
Occupational Death & Disability Benefit Rates

Resolution 2018-09

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220 requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios; and

WHEREAS, AS 39.35.750(e) requires the Board to determine an actuarially sound amount required to fully fund the cost of providing occupational disability and occupational death benefits under AS 39.35.890 and 39.35.892, and that such contribution for peace officers and fire fighters, and the contribution for other employees shall be calculated separately; and

WHEREAS, the June 30, 2017 PERS Defined Contribution actuarial valuation report determines that the actuarially determined contribution rate for peace officer / firefighter occupational death & disability is 0.72 percent, which is the normal cost rate, and the actuarially determined contribution rate for "all other" is 0.26 percent, which is the normal cost rate; and

WHEREAS, there is no past service liability as determined by the annual actuarial valuation of the PERS Defined Contribution occupational death & disability, so no contribution rate for liquidating past service liability is appropriate under AS 37.10.220(a)(8)(B);

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, the Fiscal Year 2020 employer contribution rate for public employees' occupational death and disability benefit rate is set at 0.72 percent for peace officers / fire fighters, and at 0.26 percent for all other Public Employees' Defined Contribution Retirement Plan employees.

DATED at Anchorage, Alaska this 20th day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

Actuarial Committee

SUBJECT:	FY 20 TRS Employer Contribution Rate Tier I - II	ACTION:	X
DATE:	September 19, 2018	INFORMATION:	

BACKGROUND:

AS 37.10.220(a)(8) sets forth the responsibility of the Alaska Retirement Management Board (Board) to annually certify to each employer in the system contribution rates for normal costs and for liquidating any past service liability:

> *(8) coordinate with the retirement system administrator to have an annual actuarial valuation of each retirement system prepared to determine system assets, accrued liabilities, and funding ratios and to certify to the appropriate budgetary authority of each employer in the system*
>
> *(A) an appropriate contribution rate for normal costs; and*
>
> *(B) an appropriate contribution rate for liquidating any past service liability; in this subparagraph, the appropriate contribution rate for liquidating the past service liability of the defined benefit retirement plan under AS 14.25.009 - 14.25.220 or the past service liability of the defined benefit retirement plan under AS 39.35.095 - 39.35.680 must be determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years;*

AS 14.25.070 requires that the amount of each Teachers' Retirement System (TRS) employer's contribution to the system shall be determined by applying the employer's contribution rate, as certified by the Alaska Retirement Management Board (ARMB), to the total compensation paid to the active employee. Statutory employer contribution and additional state contribution are established under the following two sections of Alaska Statute:

Sec. 14.25.070. Contributions by employers. (a) Each employer shall contribute to the system every payroll period an amount calculated by applying a rate of 12.56 percent to the total of all base salaries paid by the employer to active members of the system, including any adjustments to contributions required by AS 14.25.173(a).

and:

Sec. 14.25.085. Additional state contributions. In addition to the contributions that the state is required to make under AS 14.25.070 as an employer, the state shall contribute to the plan each July 1 or, if funds are not available on July 1, as soon after July 1 as funds become available, an amount for the ensuing fiscal year that, when combined with the total employer contributions that the administrator estimates will be allocated under AS 14.25.070(c), is sufficient to pay the plan's past service liability at the contribution rate adopted by the board under AS 37.10.220 for that fiscal year.

STATUS:

The Division of Retirement & Benefits' actuary, Buck, has completed the FY 20 Allocation of the Additional State Contributions as shown in their letter dated September 12, 2018 based on the June 30, 2017 valuation report. This valuation report has been reviewed by the Board's actuary, Gabriel, Roeder, Smith & Co. (GRS).

RECOMMENDATION:

That the Alaska Retirement Management Board set the Fiscal Year 2020 TRS actuarially determined contribution rate attributable to employers consistent with its fiduciary duty, as set out in the attached form of Resolution 2018-10.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2020 Employer Contribution Rate
For the Teachers' Retirement System

Resolution 2018-10

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220(a)(8) requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios, and to certify to the appropriate budgetary authority of each employer in the system an appropriate contribution rate for normal costs and an appropriate contribution rate for liquidating any past service liability determined by a level percent of pay method based on amortization of the past service liability for a closed term of 25 years; and

WHEREAS, AS 14.25.070 establishes a statutory employer contribution rate of 12.56 percent and AS 14.25.085 requires additional state contribution to make up the difference between 12.56 percent and the actuarially determined contribution rate; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 20" letter dated September 12, 2018 determines that the actuarially determined contribution rate for pension benefits is 20.71 percent composed of the normal cost rate of 3.09 percent and past service rate of 17.62 percent; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 20" letter dated September 12, 2018 determines that the actuarially determined contribution rate for postemployment healthcare benefits is 3.91 percent composed of the normal cost rate of 2.05 percent and past service rate of 1.86 percent; and

WHEREAS, the "PERS, TRS, and JRS - Allocation of the Additional State Contributions for FY 20" letter dated September 12, 2018 presents the employer rate incorporating the normal cost of the Defined Contribution Retirement Plan of 5.85 percent;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, that the Fiscal Year 2020 actuarially determined contribution rate attributable to employers participating in the Teachers' Retirement System is set at 30.47 percent, composed of the contribution rate for defined benefit pension of 20.71 percent, the contribution rate for postemployment healthcare of 3.91 percent, and the contribution rate for defined contribution pension of 5.85 percent.

DATED at Anchorage, Alaska this 20th day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 2020 TRS Retiree Major Medical and Occupational Death & Disability

ACTION: X

DATE: September 20, 2018

INFORMATION:

BACKGROUND:

The Alaska Retirement Management Board (Board) establishes rates for the Teachers' Retirement System (TRS) Tier III Defined Contribution Retirement Plans for the following plans: 1) Retiree Major Medical Insurance (RMMI) and 2) Occupational Death & Disability (OD&D) under the following two sections in Alaska Statute:

Retiree Major Medical Insurance

AS 14.25.350 (b) requires that "An employer shall also contribute an amount equal to a percentage, as approved by the board, of each member's compensation from July 1 to the following June 30 to pay for retiree major medical insurance."

Occupational Death & Disability

AS 14.25.350 (e) requires that "An employer shall make annual contributions to a trust account in the plan, applied as a percentage of each member's compensation from July 1 to the following June 30, in an amount determined by the board to be actuarially required to fully fund the cost of providing occupational disability and occupational death benefits under AS 14.25.310 - 14.25.590. The contribution required under this subsection for peace officers and fire fighters and the contribution required under this subsection for other employees shall be separately calculated based on the actuarially calculated costs for each group of employees."

STATUS:

The Division of Retirement & Benefits' actuary, Buck, has completed the actuarial valuation of the TRS DCR Plan as of June 30, 2017. The valuation has been reviewed by the Board's actuary, Gabriel, Roeder, Smith & Co. (GRS).

According to the TRS DCR Plan actuarial valuation report, and confirmed by GRS, the Fiscal Year 2020 actuarially determined contribution rate attributable to employers for the Retiree Major Medical Insurance (RMMI) should be 1.09 percent and for the Occupational Death & Disability (OD&D) Benefit should be 0.08 percent.

RECOMMENDATION:

That the Alaska Retirement Management Board set Fiscal Year 2020 TRS DCR Retiree Major Medical Insurance and Occupational Death & Disability Benefit rates as set out in the following resolutions:

1. Resolution 2018-11: Teachers' DCR Plan Retiree Major Medical Insurance Rate

2. Resolution 2018-12: Teachers' DCR Plan Occupational Death & Disability Benefit Rate

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2020 Employer Contribution Rate
For Teachers' Defined Contribution Retirement Plan
Retiree Major Medical Insurance Rate

Resolution 2018-11

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220 requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios; and

WHEREAS, AS 14.25.350(b) requires the Board to approve an amount equal to a percentage of each member's compensation from July 1 to the following June 30 to pay for retiree major medical insurance; and

WHEREAS, the June 30, 2017 TRS Defined Contribution actuarial valuation report determines that the actuarially determined contribution rate for retiree major medical insurance is 1.09 percent composed of the normal cost rate of 1.02 percent and past service rate of 0.07 percent;

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, the Fiscal Year 2020 employer contribution rate for the retiree major medical insurance for the Teachers' Defined Contribution Retirement Plan is set at 1.09 percent.

DATED at Anchorage, Alaska this 20th day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2020 Employer Contribution Rate
For Teachers' Defined Contribution Retirement Plan
Occupational Death & Disability Benefit Rate

Resolution 2018-12

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220 requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios; and

WHEREAS, AS 14.25.350 (e) requires the Board to determine an actuarially sound amount required to fully fund the cost of providing occupational disability and occupational death benefits under AS 14.25.310 – 14.25.590; and

WHEREAS, the June 30, 2017 TRS Defined Contribution actuarial valuation report determines that the actuarially determined contribution rate for occupational death & disability is 0.08 percent, which is the normal cost rate; and

WHEREAS, there is no past service liability as determined by the annual actuarial valuation of the TRS Defined Contribution occupational death & disability, so no contribution rate for liquidating past service liability is appropriate under AS 37.10.220(a)(8)(B);

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, the Fiscal Year 2020 employer contribution rate for teachers' occupational death and disability benefit rate is set at 0.08 percent for all Teachers' Defined Contribution Retirement Plan employees.

DATED at Anchorage, Alaska this 20th day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: FY 2020 Alaska National Guard and Naval Militia Contribution Amount

ACTION: X

DATE: September 20, 2018

INFORMATION:

BACKGROUND:

AS 26.05.226 requires that "(a) The Department of Military and Veterans' Affairs (DMVA) shall contribute to the Alaska National Guard and Alaska Naval Militia retirement system the amounts determined by the Alaska Retirement Management Board as necessary to (1) fund the system based on the actuarial requirements of the system as established by the Alaska Retirement Management Board; and (2) administer the system. (b) The amount required for contributions from the Department of Military and Veterans' Affairs under (a) of this section shall be included in the annual appropriations made to the Department of Military and Veterans' Affairs."

STATUS:

The Division of Retirement & Benefits' (Division's) actuary, Buck, has completed the roll-forward actuarial valuation of the Alaska National Guard and Naval Militia Retirement System (NGNMRS) as of June 30, 2017. The actuarial valuation has been reviewed by the Alaska Retirement Management Board's (Board's) actuary, Gabriel, Roeder, Smith & Co. (GRS) and then certified and accepted by the Board.

According to the NGNMRS June 30, 2017 actuarial valuation report, and confirmed by GRS, the Fiscal Year 2020 actuarially determined contribution amount should be $860,686.

The Actuarial Committee met September 19, 2018, and passed a motion recommending that the Board adopt Resolution 2018-13 setting the FY 2020 NGNMRS contribution amount at $860,686.

RECOMMENDATION:

That the Alaska Retirement Management Board set the Fiscal Year 2020 NGNMRS annual contribution amount consistent with its fiduciary duty, as set out in the attached form of Resolution 2018-13.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to the Fiscal Year 2020 Contribution Amount
For the Alaska National Guard and Naval Militia Retirement System

Resolution 2018-13

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, AS 37.10.220(a)(8) requires the Board to coordinate with the retirement system administrator to conduct an annual actuarial valuation of each retirement system to determine system assets, accrued liabilities and funding ratios, and to certify to the appropriate budgetary authority of each employer in the system an appropriate contribution rate for normal costs and an appropriate contribution rate for liquidating any past service liability; and

WHEREAS, the June 30, 2017 Alaska National Guard and Naval Militia Retirement System roll-forward actuarial valuation report determines that the actuarially determined contribution amount is $860,686, composed of the normal cost of $610,686, and expense load cost of $250,000; and

WHEREAS, there is no past service liability as determined by the actuarial valuation of the Alaska National Guard and Naval Militia Retirement System, so no contribution amount for liquidating past service liability is appropriate under AS 37.10.220(a)(8)(B);

NOW THEREFORE, BE IT RESOLVED BY THE ALASKA RETIREMENT MANAGEMENT BOARD, that the Fiscal Year 2020 contribution amount for the State of Alaska, Department of Military and Veterans' Affairs to the Alaska National Guard and Naval Militia Retirement System is set at $860,686.

DATED at Anchorage, Alaska this 20th day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

Actuarial Committee

SUBJECT: FY 2020 JRS Employer Contribution Rate

ACTION: _____

DATE: September 19, 2018

INFORMATION: X

BACKGROUND:

AS 22.25.046 states in part that:

(a) The state court system shall contribute to the judicial retirement system at the rate established by the commissioner of administration. The contribution rate shall be based on the results of an actuarial valuation of the judicial retirement system. The results of the actuarial valuation shall be based on actuarial methods and assumptions adopted by the commissioner of administration.

(b) The contribution rate shall be a percentage which, when applied to the covered compensation of all active members of the judicial retirement system, will generate sufficient money to support, along with contributions from members, the benefits of the judicial retirement system.

(c) Employer contributions shall be separately computed for benefits provided by AS 22.25.090 and shall be deposited in the Alaska retiree health care trust established under AS 39.30.097(a)."

STATUS:

The Division of Retirement & Benefits' (Division's) actuary, Buck, has completed the roll-forward actuarial valuation of the Alaska Judicial Retirement System (JRS) as of June 30, 2017. The actuarial valuation has been reviewed by the Alaska Retirement Management Board's (Board's) actuary, Gabriel, Roeder, Smith & Co. (GRS) and then certified and accepted by the Board.

According to the JRS roll-forward actuarial valuation as of June 30, 2017, the recommended Fiscal Year 2020 employer contribution rate is 74.42 percent based on the following table:

	Pension	Post-employment Health Care	Total
Normal Cost Rate	38.14%	4.32%	42.46%
Past Service Cost Rate	31.96%	-5.07%	31.96%
Total Employer Contribution Rate	70.10%	4.32%	74.42%

The Alaska Legislature has established operating budget language that explicitly addresses JRS past service costs separate from the normal costs. Normal costs as a percentage are charged to the Alaska Court System's operating budget and past service cost in dollars is funded separately in retirement section language like PERS and TRS. The computed JRS Past Service Contribution amount is $5,010,000 as shown on page 2 of the Buck letter dated September 12, 2018. The contribution amount should be reflected in the operating budget language section and should be deposited in the JRS pension benefit trust during FY 2020.

Callan

September 21, 2018

Alaska Retirement Management Board

McKinley Capital Management, LLC: “Global Healthcare Transformation”

Andy Iseri, CFA
Global Manager Research

Paul Erlendson
Fund Sponsor Consulting

Steve Center, CFA
Fund Sponsor Consulting

The Goals

1. To review the Diversified Public Portfolio of the Global Healthcare Transformation ("GHT") strategy managed by McKinley Capital.

2. To present results and findings to the Alaska Retirement Management Board at its September 2018 meeting.

The Process

Critical evaluation considerations

1. Soundness of the firm
2. Team structure
3. Investment Premise and Viability
4. Characteristics of the strategy
5. Potential merits and considerations of the strategy, and
6. Possible placement within the ARMB portfolio

The Process

Decision considerations

A. Addressed sequentially, the “critical evaluation considerations” provide a useful and proven approach for evaluating the utility of an investment strategy.

B. The goal is to provide an objective framework whereby a reasonable person can reach an informed decision as to whether or not it is prudent to maintain or add an investment strategy to one’s portfolio.

C. To the extent an investment strategy or firm meets or exceeds the “critical evaluation considerations,” such determination can be used to support adoption or continuation of an investment strategy.

D. To the extent an investment strategy or firm fails to meet one or more of the critical evaluation considerations, such failure may present a rationale to terminate or exclude a strategy.

1. Soundness of the firm

McKinley Capital Management, LLC

- McKinley Capital Management was founded in 1990 by Robert (Bob) B. Gillam (SEC registered in 1991)
- The firm remains majority owned by Gillam
- 32 professionals participate in the Employee Incentive Stock Option program
- Firm-wide assets under management was $4.6 billion at June 30, 2018
  - Firm-wide asset under management were three-times higher at the end of 2007 ($16.3 billion).
  - The firm is near break-even profitability based on current AUM. Recent cost containment efforts include headcount reductions.
- Strategies and AUM ($mm):
  - Non-U.S. Growth ($1,980)
  - Global Growth ($1,714)
  - Non-U.S. Developed Growth ($428)
  - Emerging Markets Growth ($150)
  - U.S. Large Cap Growth ($71)
  - U.S. Small Cap Growth ($11)
  - Other ($291)

	Jun-18	Mar-18	Dec-17	Sep-17	Jun-17	Mar-17	Dec-16	Dec-15	Dec-07
Total Firm-Wide Headcount	47	53	55	61	62	64	65	66	93
Investment Professionals	18	18	18	20	21	21	21	21	18
Portfolio Managers	9	9	10	8	8	8	8	9	8
Analysts	6	6	5	8	9	9	9	8	7
Traders	3	3	3	4	4	4	4	4	3
Firm-wide AUM ($ bn)	4.6	5.2	5.7	6.6	7.0	6.9	6.8	7.0	16.3

2. Team Structure

Professional	Title	Years of Experience	Years with McKinley
Rob Gillam	Chief Investment Officer	24	24
John Guerard Jr.	Director of Quantitative Research	13	31
Kenneth Lenhart	Senior Quantitative Research Analyst	7	17
Ziwei (Elaine) Wang	Senior Quantitative Research Analyst	5	5
Xi (Lexi) Wang	Quantitative Research Analyst	2	2
Stefanus Winarto	Quantitative Research Analyst	<1	<1
Chen (Miranda) Chang	Quantitative Research Analyst	<1	<1
Rachel Waters	Data Scientist	3	15
Andrew Dahlin	Data Scientist	1	10
Jason Murray	Data Steward	5	18
Martino Boffa	Director of Investments Alternative Structures	8	27
Flora Kim	Director of Investments	11	16
Sheldon Lien	Portfolio Manager	23	23
Brandon Rinner	Portfolio Manager	21	21
M. Forrest Badgley	Portfolio Manager	14	25
Shierley Widjaja	Portfolio Manager	8	8
Grant McGregor	Portfolio Manager	8	8
Joseph Dobrzynski	Head Trader	11	23
Jeremy Lobb	Senior Trader	18	18
Claudia Jackson	Trader	12	20

- Scientific Advisory Board: Ten member team led by Harry M. Markowitz
- Global Healthcare Transformation was developed in conjunction with McKinley Healthcare Partners
  - Daniel Lubin
  - Gillian Sandler

2.1 Team Structure

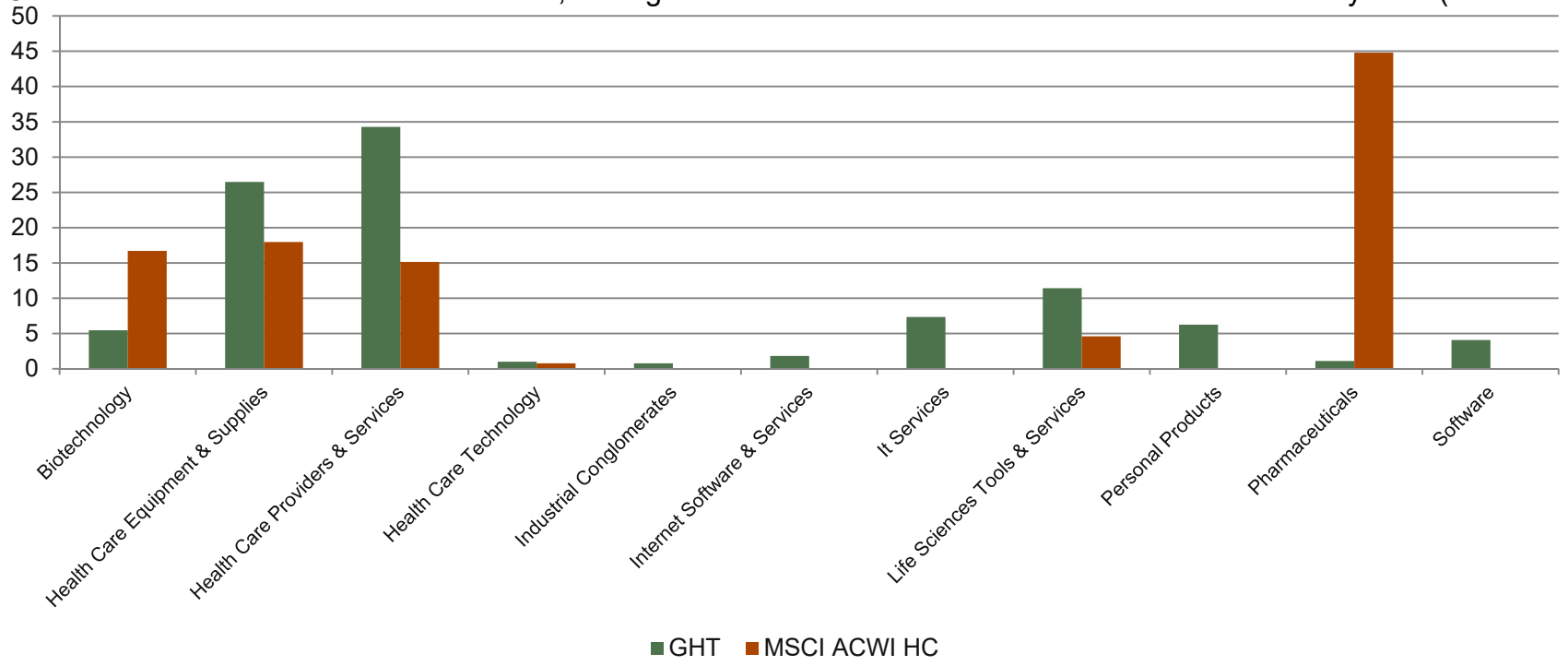
- McKinley has a Scientific Advisory Board which provides guidance and support for the research team. It is made up of ten individuals and led by **Harry M. Markowitz**.
- In addition to the core investment staff and Scientific Advisory Board, the Firm has partnered with **Daniel Lubin** and **Gillian Sandler** to form McKinley Healthcare Partners.
- McKinley Healthcare Partners were instrumental in identifying long-term structural needs of the health care infrastructure which formed the basis of the areas of investment opportunity for the strategy.
- Daniel Lubin
  - Lubin is chairman of his family office built from years of investing in the healthcare industry as well as co-founder of Radius Ventures, a New York-based venture capital organization that invests in late stage venture health and life sciences companies.
  - Lubin is a Senior Investment Manager at McKinley and is involved in the day-to-day management of the strategy.
- Gillian Sandler
  - Sandler is an activist investor in healthcare with 20 years of experience. She currently serves on the boards of Invicro, life sciences research, the Columbia Zuckerman Mind Brain Institute, Arc Fusion, a biosciences think tank, and Johns Hopkins University Engineering and Science.
  - Sandler provides strategic input and is involved on an as-needed basis.

3. Investment Premise and Viability

- McKinley Global Healthcare Transformation (GHT) seeks to exploit the rapid adoption of innovative solutions which seek to address unsustainable cost increases for healthcare delivery.
- As global healthcare systems adopt solutions to control costs, such as enhancing uses of technology and precision analytics, opportunity may exists for companies successfully achieving market penetration and value creation.
- The strategy invests primarily in the Healthcare sector, but avoids “old model” healthcare companies such as pharmaceuticals, biotechnology, and managed care. It should be considered as a sector/theme strategy, but more diversified than your typical healthcare strategy.
- Callan believes that this theme is viable although the sustainability of the theme is uncertain.
- The disruptive nature of companies aligned with this theme exhibit attributes well aligned with McKinley’s investment approach – namely positive fundamental and earnings momentum.

4. Characteristics of the strategy

- McKinley Global Healthcare Transformation brings the following characteristics
  - All cap exposure with significant bias towards smaller and mid-sized companies.
  - Growth characteristics emphasizing medium-term momentum.
  - Over exposure to emerging markets relative to MSCI ACWI IMI Healthcare and MSCI ACWI IMI indices.
  - Concentration within the Healthcare sector, but higher diversification within the sector at the sub-industry level (as seen below).



Source: McKinley as of June 30, 2018

5. Potential merits and considerations

Merits

- McKinley Healthcare Partners was established in conjunction with the development of the strategy.
- Expert knowledge was used to identify market segments which uniquely identify healthcare cost solutions.
- The fundamentals of companies offering innovative solutions to the healthcare cost crisis align with McKinley's firm-wide approach to investing: to identify companies with accelerating earnings and/or fundamentals.
- Historical backtests support the strategy in terms of risk and return.

5.1 Potential merits and considerations

Considerations

- McKinley GHT is more narrowly defined relative to the broader market – attention is needed to ensure the thematic approach remains robust (through monitoring of “new ideas”) given the inability to rotate away from the theme.
- McKinley’s investment universe for GHT is different than the Healthcare sector; the latter very concentrated in large pharmaceuticals and biotechnology companies. GHT is under exposed to these traditional healthcare industries. Although GHT is more diversified than your typical Healthcare sector fund, it is still concentrated with approximately 60% of its exposure in two sub-industries (healthcare providers and services and healthcare equipment and suppliers).
- Historical performance, risk, and characteristics represent a simulated backtest – actual results may differ significantly.
- McKinley strategies, including GHT, have benefited from a 10-year rally in momentum/growth factors.
- ARMB must be aware of their overall exposure to McKinley Capital Management LLC as a firm.
- Applying McKinley’s firm-wide approach to a narrow starting universe is likely sub-optimal. Their standard approach should have identified these same companies if the constrained starting universe offered the best opportunities to leverage McKinley’s process.

6. Possible placement within the ARMB portfolio

- **Based on the findings from this evaluation process and materials provided by the Firm to Callan, we believe an allocation to McKinley Global Healthcare Transformation with a $250 million/2% of public equity allocation is not appropriate for the public equity portfolio. We do, however, believe it is viable as an opportunistic allocation within the defined benefit plans.**
- Our recommendation is based on the following:
  - Callan does not typically recommend tilting the public equity portfolio to specific themes, sectors, or factors without understanding the long-term risk/return implications. Any deviation from broadly diversified all-cap, all-country exposure strays from the assumptions used in asset/liability, asset allocation, and asset structure exercises. GHT concentrates exposures to the global healthcare cost crisis theme, to the Healthcare sector - despite it being more diversified than your typical Healthcare sector fund, and maintains outsized exposures to momentum factors.
  - We recognize the opportunistic nature of GHT and the potential for outsized returns afforded by this theme over the intermediate term. We've also experienced that every theme eventually ends or evolves. An opportunistic mandate is more appropriate for this type of investment. We believe that GHT, and all single theme strategies, require a tactical mindset.

Research Results and Findings

1. Soundness of the firm
   - McKinley Capital Management LLC is a globally recognized firm based primarily on quantitative techniques within the growth style of investing.
   - While still profitable and successful, asset under management have been declining.
2. Team structure
   - The strategy will rely both on internal experienced McKinley staff as well as on crucial input from McKinley Healthcare Partners.
3. Investment Premise and Viability
   - The idea that underlies the strategy, as described by McKinley, is that companies providing solutions to rising healthcare delivery costs can achieve outsized returns relative to the broader market.
   - The theme is viable/sound. Duration of the theme is uncertain.
   - McKinley's investment process aligns well with the characteristics exhibited by companies successfully leveraged to the theme.

Research Results and Findings (continued)

4. Characteristics of the strategy
   - The product as proposed for ARMB will invest in global, publicly-traded equity securities.
   - The strategy brings biases of Healthcare sector concentration, smaller capitalization, higher emerging market, growth, and momentum factor exposures.
5. Potential merits and weakness of the strategy
   - Merits of the strategy include;
     - Strong theme with alignment of investment process and company characteristics.
     - Expertise used to develop strategy.
   - Weaknesses/considerations of the strategy include:
     - Narrow exposure (sector/theme concentration).
     - Concentration to McKinley (firm risk).
     - Recent market environment tailwinds.
6. Possible placement within the ARMB portfolio
   - Less appropriate as an allocation within public equity structure due to biases.
   - Potential inclusion as an opportunistic allocation within the DB plans.



TOWNSEND GROUP

Alaska Retirement Management Board

Portfolio and Manager Performance Report

June 30, 2018

TOWNSEND GROUP

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A. Alaska Retirement Management Board Portfolio Overview as of Second Quarter 2018

B. Portfolio Detail

C. Real Assets Fiscal Year Plans and Policies – Real Estate

D. Real Estate Market Overview

E. Performance Flash Report



ARMB Portfolio Overview

TOWNSEND GROUP



Funding Status

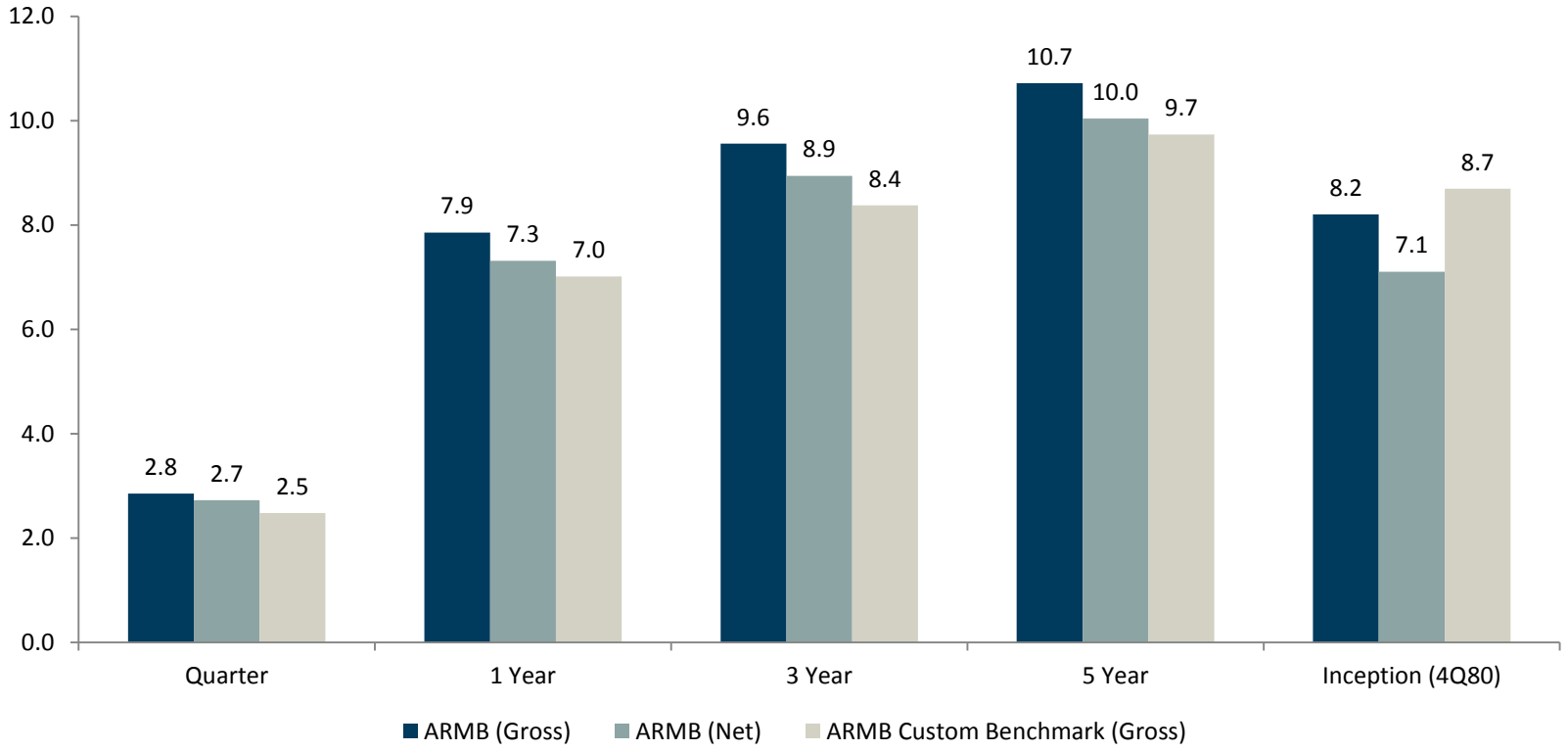
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AS OF JUNE 30, 2018

$26.1 B TOTAL PLAN ASSETS	
$4.4 B REAL ASSETS TARGET	REAL ASSETS TARGET (17% OF TOTAL PLAN)
$1.6 B REAL ESTATE TARGET	REAL ESTATE TARGET (35% OF REAL ASSETS TARGET)
$1.9 B REAL ESTATE MARKET VALUE	42% OF TARGET REAL ASSETS FUNDED TO REAL ESTATE
$314 M DOLLARS ABOVE/ (BELOW) TARGET	ABOVE REAL ESTATE TARGET

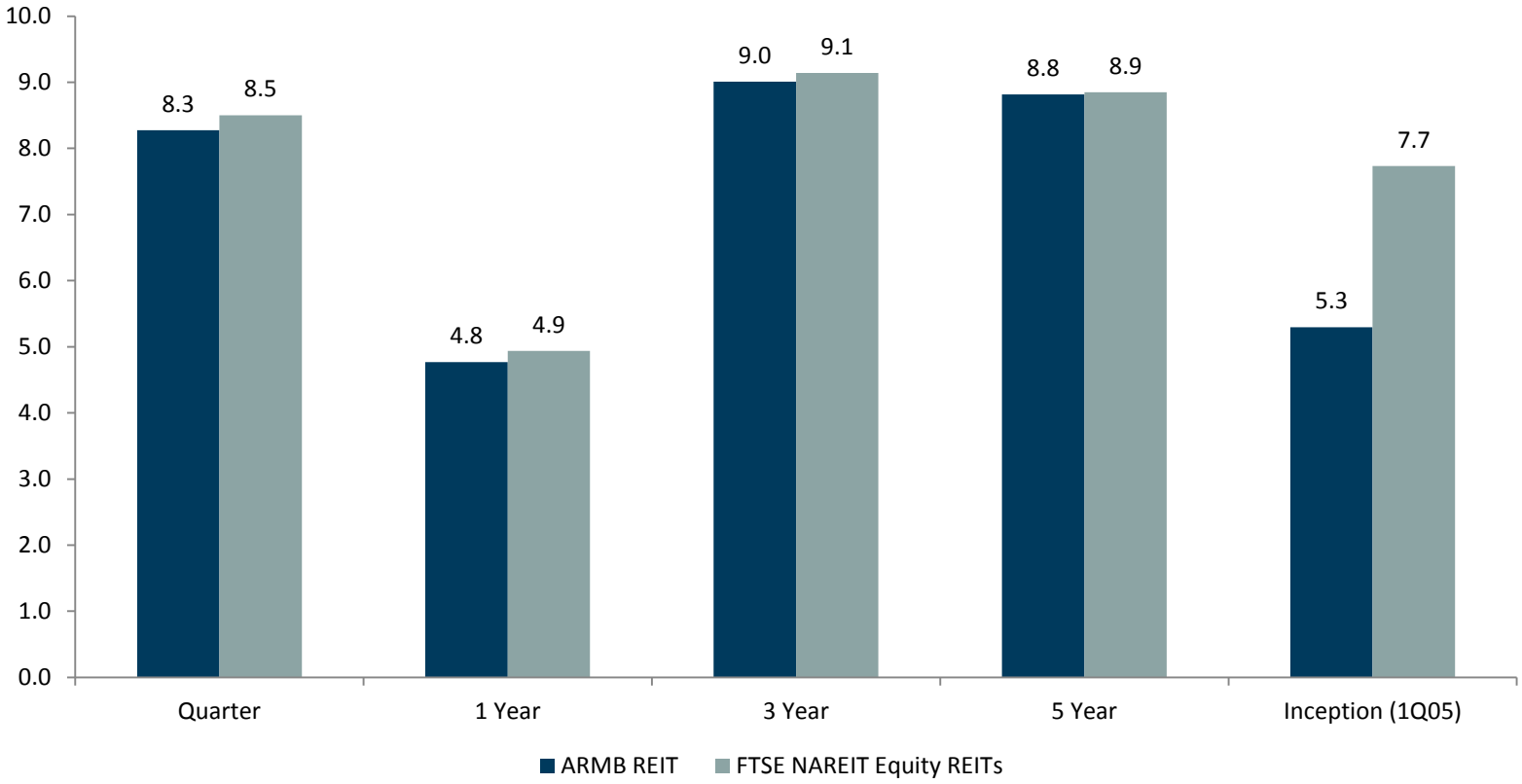
- As of June 30, 2018, real estate comprised 42% of the real assets portfolio, above the 35% targeted allocation.
- Overfunding will continue to be addressed several ways, including through additional allocations to other real assets and self liquidating funds within the real estate portfolio.
- Additional commitments will need to be made in order to maintain appropriate vintage year diversification and the Plan's 35% target to real estate over longer term periods.

Total Portfolio Time-Weighted Returns – June 30, 2018



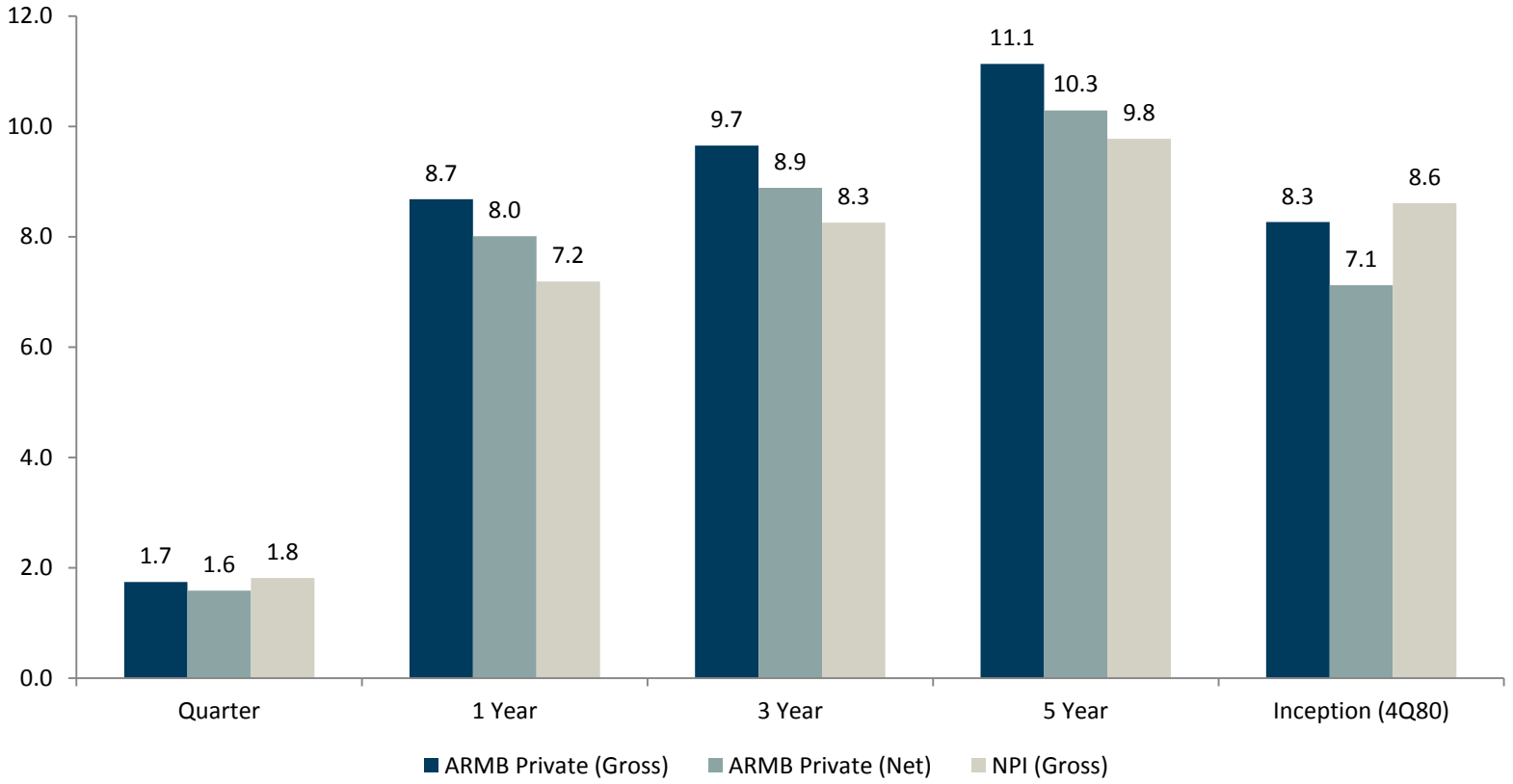
- ARMB performance remains strong, with returns exceeding those of the gross Custom Benchmark over all time periods except the since inception period. This is the third quarter of consecutive outperformance.
- The relatively low fee drag is due to the significant presence of Core investments and separate accounts, which charge lower fees than higher risk commingled fund offerings.
- Since inception underperformance is attributable to the impact of poor vintage year performers selected preceding the GFC in 2005-2008.

Public Portfolio Time-Weighted Returns – June 30, 2018



- The ARMB public portfolio continues to perform in line with the benchmark, exhibiting strong absolute returns over the medium term (three and five year periods) and the most recent quarter.
- Since Inception underperformance reflects prior investment strategies while the five year demonstrates the successful changes made by Staff.

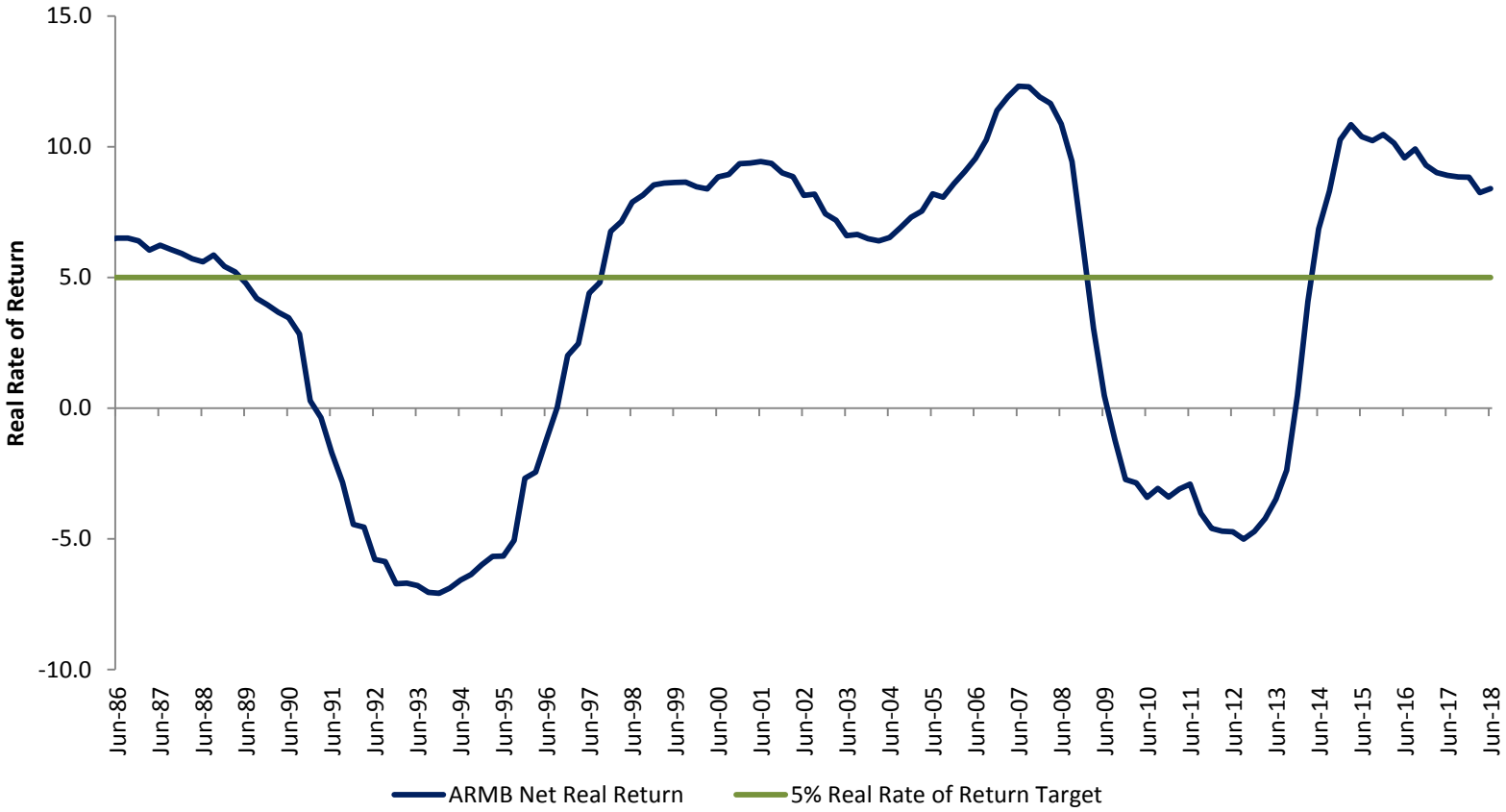
Private Portfolio Time-Weighted Returns – June 30, 2018



- The private portfolio outperforms the benchmark (gross to gross) over most time periods except since inception period and the most recent quarter.
- Since inception returns are diluted by the lower performance in the non-core portfolio.
- It is important to note that income generation has been consistently strong at an annualized 4.5% over the trailing 5 years.

Real Rate of Return Objective

Rolling 5 Years - Inception through June 30, 2018



- The portfolio continues to exceed the 5% real rate of return target bolstered by a strong market recovery as well as low inflation.
- However, real returns continue to moderate as the cycle matures

Portfolio Compliance – Funded

TOWNSEND GROUP

Portfolio Component	Strategic Limits	Portfolio June 30, 2018
Investment Risk Style/Category		
Core	50% - 100%	82.2%
Non-Core	0% - 50%	7.0%
Public Equity	0% - 50%	10.8%
Public and Private Debt	0%	0%
Control Mechanisms		
Non-Controlled Investments (180 days)	50%	7.0%
Single Manager Limits	45%	Largest Manager 35.8% (UBS)
Diversification		
Geographic, MSA, Economic	Per Consultant	Compliant
Ex-United States	20%	0.9%
Single Property	10%	Compliant
Property Type	40%	Compliant
Leverage		
Core Allocations	35%	9.9%
Non-Core Allocations	65%	35.0%



Portfolio Detail

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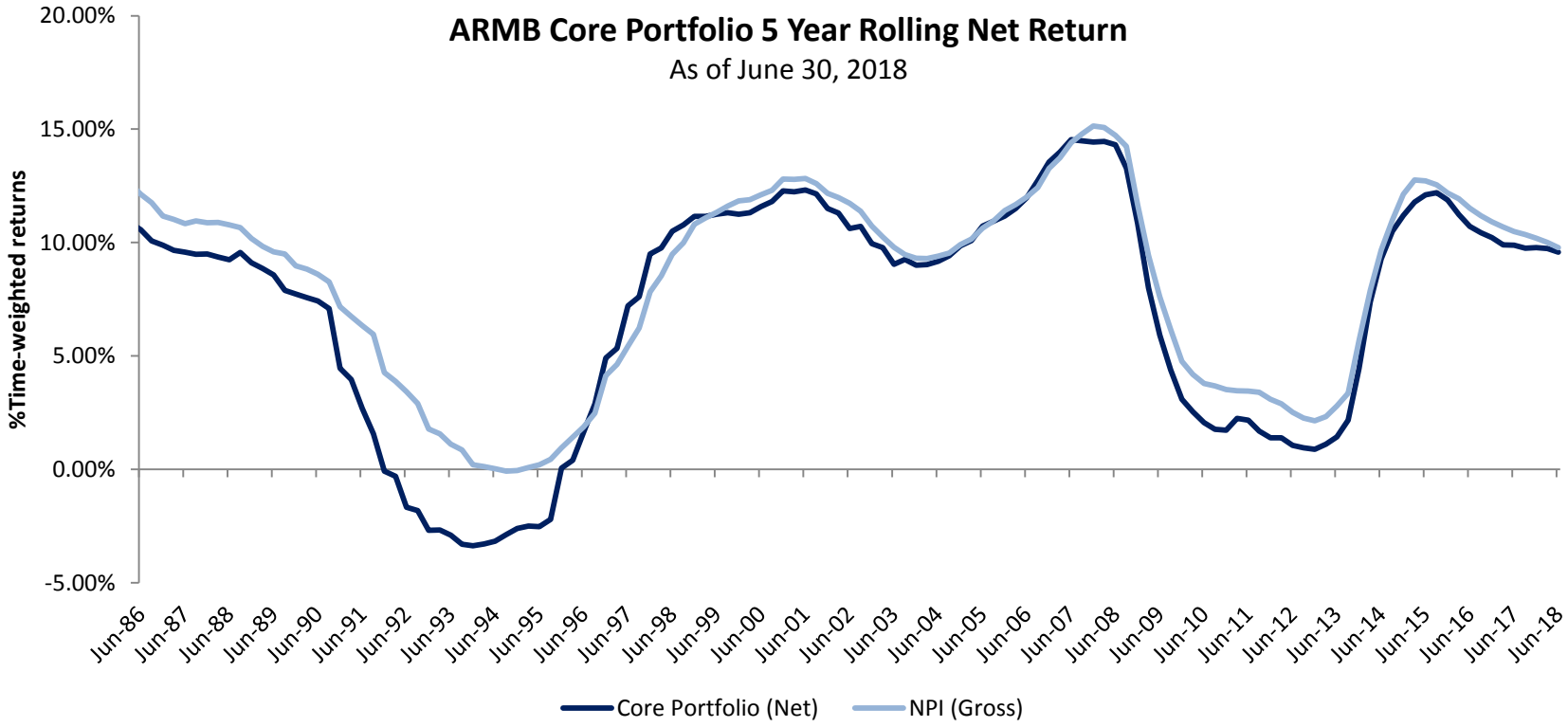
Core Portfolio Time-Weighted Returns – June 30, 2018

	3 Year Gross	+/- NPI	5 Year Gross	+/- NPI	SI Gross	+/- NPI
Core Funds						
BlackRock US Core Property Fund	N/A		N/A		1.8%	**0.0%**
JP Morgan Strategic Property Fund	8.9%	**0.6%**	10.8%	**1.0%**	9.6%	**0.2%**
UBS Trumbull Property Fund	8.0%	**0.3%**	9.4%	**0.4%**	8.6%	**0.0%**
Core IMA's						
LaSalle	7.4%	**0.9%**	6.9%	**2.9%**	7.9%	**1.1%**
Sentinel	11.3%	**3.0%**	11.1%	**1.3%**	10.2%	**1.4%**
UBS Realty	11.4%	**3.1%**	13.7%	**3.9%**	10.0%	**0.7%**
Core Total Portfolio	9.2%	**0.9%**	10.3%	**0.5%**	8.6%	
NPI Benchmark	8.3%		9.8%		Various	

- On a gross basis, JP Morgan Strategic Property Fund, the Sentinel IMA and the UBS Realty IMA have outperformed the NPI over the three-year, five-year and since inception time periods.
- UBS Trumbull Property Fund and the LaSalle IMA have underperformed the index over nearly all periods shown.

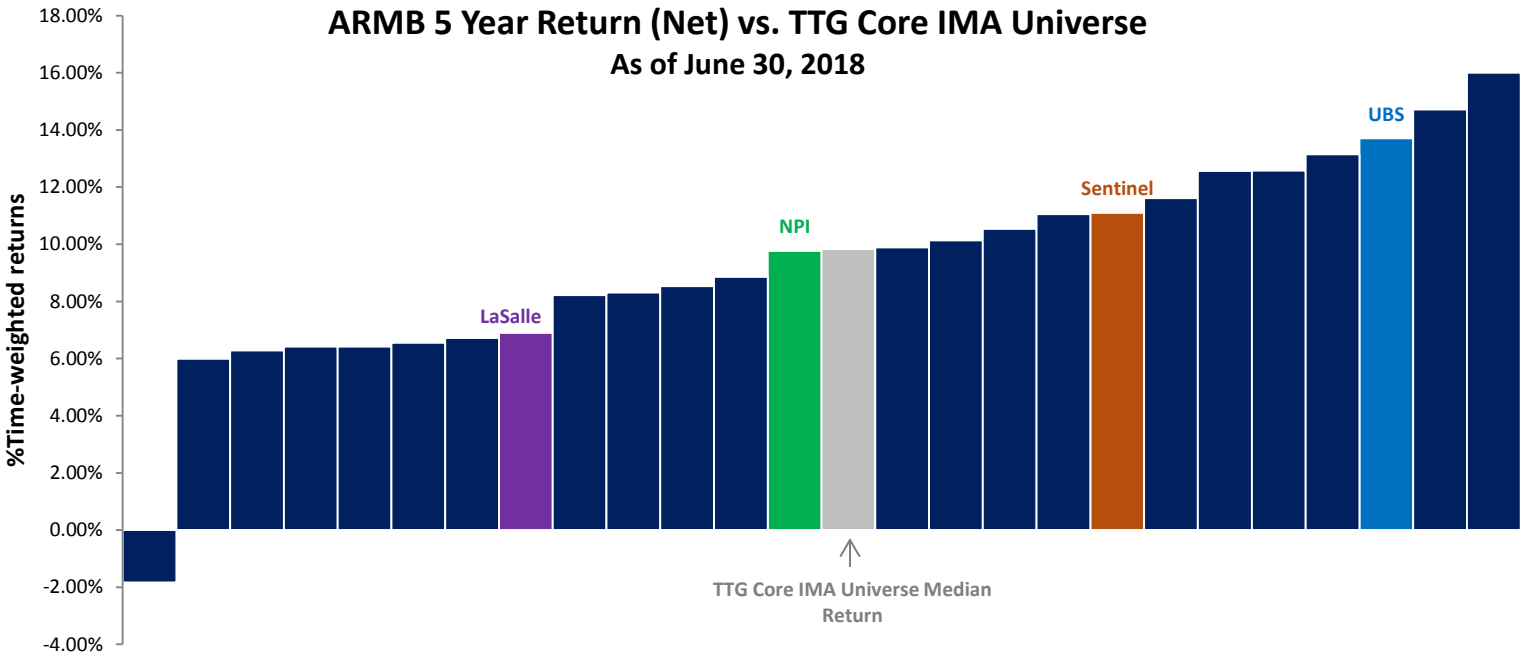
Rolling Five Year Analysis – Nominal Returns

- The ARMB Core portfolio has slightly underperformed the NPI over most rolling five year periods.
- Please note that the NPI is an unleveraged, gross-of-fees index, whereas the ARMB Core portfolio has an LTV of 9.9%, as of June 30, 2018.



IMA Manager 5 Year Net Returns Vs. Townsend Core IMA Universe

- For the five year period ending June 30, 2018, UBS and Sentinel exceeded both the NPI index and the median return for the Townsend Core IMA Universe, while LaSalle underperformed.



*NOTE, The IMA Universe is for comparison purposes only, as differing goals/objectives, leverage, and inception dates are present within the universe. The IMA Universe is not Risk Adjusted. All ARMB IMAs remain unlevered, consistent with the NPI.

Open End Fund Selection

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- For the five-year period ending June 30, 2018, ARMB's investment in JP Morgan Strategic Property Fund performed in line with many comparable funds, while the investment in UBS Trumbull Property Fund provided relatively lower returns.
- Over longer periods, JP Morgan SPF performed better than most peers and UBS TPF performed in line with its peers.
- BlackRock US Core Property Fund outperformed most of its peers over the trailing five years, but was the worst performing fund over the trailing ten years. However, ARMB did not invest in this fund until 2018.

Core OCEF Universe 5 Year Performance Ranking

2Q18 Annualized Returns	5 Year	
	TGRS	TNET
Core Diversified		
Jamestown Premier Property Fund	14.8%	11.6%
Prime Property Fund	12.9%	11.6%
RREEF America REIT II	11.7%	10.8%
Lion Properties Fund	11.7%	10.7%
BlackRock US Core Property Fund, L.P.	11.3%	10.6%
L&B Core Income Partners, L.P.	11.3%	10.6%
Smart Markets Fund, LP	11.3%	10.5%
PRISA SA	11.4%	10.5%
Principal U.S. Property Account	11.8%	10.5%
LaSalle Property Fund	11.1%	10.5%
Heitman HART	11.2%	10.4%
INVESCO Core Real Estate	11.0%	10.1%
JP Morgan Strategic Property Fund	10.8%	9.9%
ASB Allegiance Real Estate Fund	10.7%	9.7%
AEW Core Property Trust	10.5%	9.6%
Multi-Employer Property Trust	10.6%	9.6%
Madison Core Property Fund LLC	10.5%	9.5%
American Core Realty Fund	10.5%	9.4%
Barings Core Property Fund LP	10.1%	9.1%
UBS Trumbull Property Fund	9.4%	8.3%
NFI-ODCE	**11.0%**	**10.0%**

Core OCEF Universe 10 Year Performance Ranking

2Q18 Annualized Returns	10 Year	
	TGRS	TNET
Core Diversified		
Heitman HART	7.6%	6.9%
Prime Property Fund	6.9%	5.8%
AEW Core Property Trust	6.0%	5.3%
ASB Allegiance Real Estate Fund	6.2%	5.2%
JP Morgan Strategic Property Fund	5.8%	4.9%
RREEF America REIT II	5.6%	4.8%
Madison Core Property Fund LLC	5.7%	4.7%
Principal U.S. Property Account	5.8%	4.6%
INVESCO Core Real Estate	5.4%	4.6%
UBS Trumbull Property Fund	5.5%	4.5%
Barings Core Property Fund LP	5.2%	4.3%
PRISA SA	4.8%	3.9%
American Core Realty Fund	4.8%	3.8%
Multi-Employer Property Trust	4.3%	3.4%
Lion Properties Fund	4.2%	3.2%
BlackRock US Core Property Fund, L.P.	2.5%	1.8%
NFI-ODCE	**5.3%**	**4.3%**

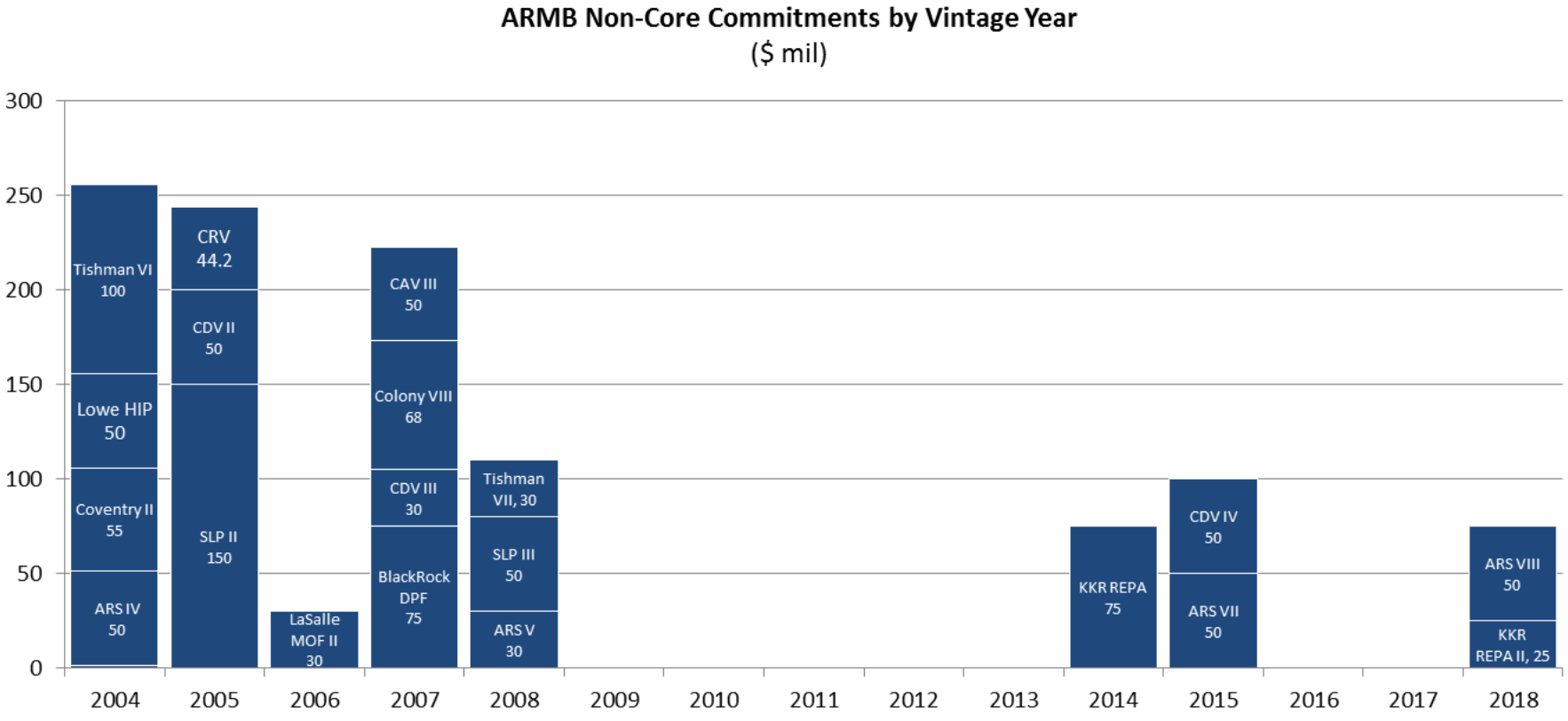
Non-Core Portfolio

- ARMB's Non-Core Portfolio was negatively impacted by heavy exposure to challenging vintage years.
- However, performance has improved significantly over recent years, with the Non-Core Portfolio outperforming the NPI over the quarter, as well as the one-, three-, and five-year time periods.
- This has been driven primarily by accretive new commitments rather than improvements in legacy funds, which continue to struggle.

Returns (%) As of June 30, 2018	Quarter		Variance to NPI	1 Year		Variance to NPI	3 Year		Variance to NPI	5 Year		Variance to NPI	Since Inception		
	TGRS	TNET		TGRS	TNET		TGRS	TNET		TGRS	TNET		TGRS	TNET	Multiple
Non-Core Portfolio															
Almanac Realty Securities V, LP	1.3	1.0	-0.5	31.1	29.0	23.9	17.2	15.6	8.9	17.0	15.5	7.2	14.2	11.0	1.5
Almanac Realty Securities VII	6.5	6.1	4.7	23.9	21.8	16.7	18.8	14.1	10.5				18.8	14.1	1.2
BlackRock Diamond Property Fund	N/A	N/A		N/A	N/A		N/A	N/A		N/A	N/A		N/A	N/A	0.4
Clarion Development Ventures III	1.5	1.5	-0.3	5.6	5.6	-1.6	45.5	45.5	37.2	42.0	41.4	32.2			1.8
Clarion Development Ventures IV	5.7	5.4	3.9	-3.2	-3.8	-10.4	6.0	5.5	-2.3				5.2	4.6	1.1
Colony Investors VIII	-12.4	-12.4	-14.2	-0.7	-1.2	-7.9	-9.5	-10.7	-17.8	0.8	-1.0	-9.0	-14.2	-17.1	0.4
Coventry Real Estate Fund II	N/A	N/A		N/A	N/A		N/A	N/A		N/A	N/A		N/A	N/A	0.4
KKR Real Estate Partners Americas	1.7	1.8	-0.1	7.8	7.1	0.6	10.8	8.6	2.5				12.8	9.3	1.3
KKR Real Estate Partners Americas II	30.7	27.4	28.9										30.7	27.4	1.1
Silverpeak Legacy Partners II (Lehman)	0.6	-0.1	-1.2	-13.5	-14.6	-20.7	4.7	3.1	-3.6	12.4	10.9	2.6	7.6	5.8	1.3
Silverpeak Legacy Partners III (Lehman)	1.7	1.5	-0.1	-2.2	-3.1	-9.4	-1.2	-3.0	-9.5	-1.2	-3.1	-11.0	-12.3	-14.8	0.4
Tishman Speyer Real Estate Venture VI	-0.6	-0.7	-2.4	8.9	8.3	1.7	11.5	10.9	3.2	13.4	12.7	3.6	2.7	2.1	1.2
Tishman Speyer Real Estate Venture VII	-0.1	-1.0	-1.9	1.7	-0.6	-5.5	7.8	6.0	-0.5	18.4	16.6	8.6	-14.3	-19.8	1.1
Total Non-Core Portfolio	**3.1**	**2.9**	**1.3**	**8.3**	**7.2**	**1.1**	**12.1**	**10.6**	**3.8**	**14.8**	**13.2**	**5.0**	**7.3**	**5.6**	
NPI	**1.8**			**7.2**			**8.3**			**9.8**			**8.6**		

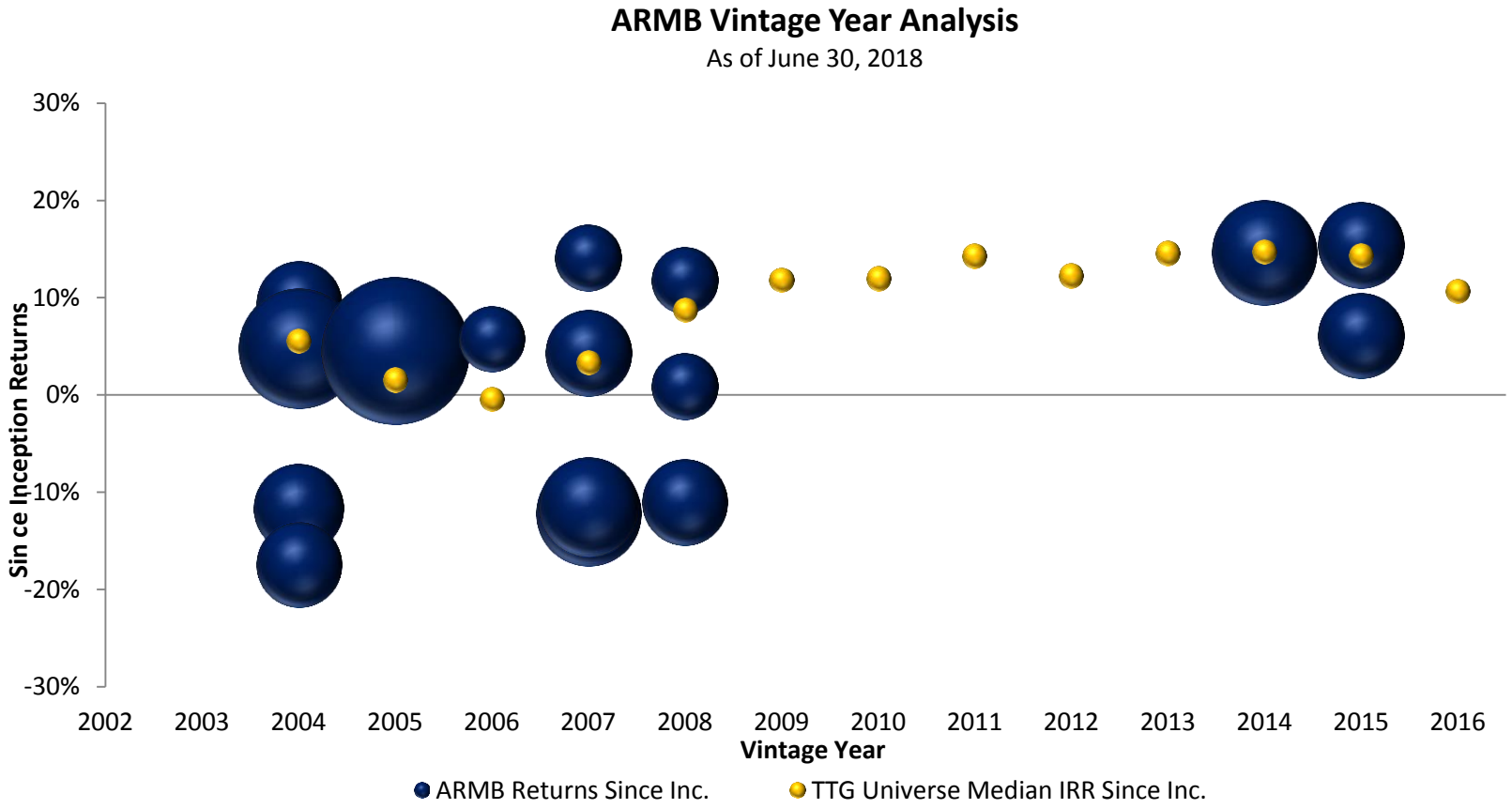
Non-Core Vintage Year Commitments

- Most of ARMB's Non-Core commitments were made prior to the Global Financial Crisis.
- No investments were made during the recovery between 2009 and 2013.



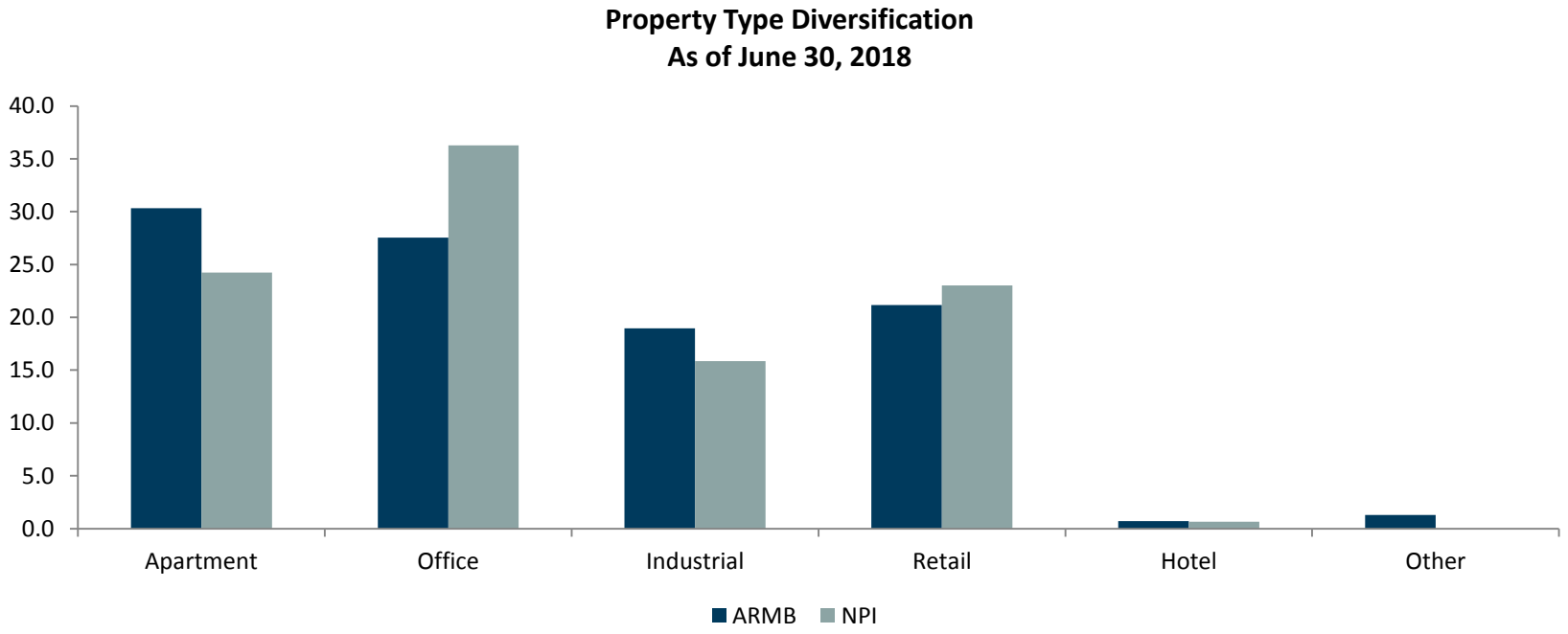
Impact of Vintage Year Allocations on Non-Core Performance

- The vintage year of an investment, along with the relative weighting of any single investment allocation within each vintage year and across the portfolio, will have a significant role in its return profile and portfolio impact.
- ARMB's non-core fund commitments are concentrated in peak vintage years and recovery within the ARMB portfolio has been muted due to limited investments in key recovery vintage years (2009-2013). Townsend has recommended more measured and consistent vintage year commitments going forward.



ARMB Private Real Estate Portfolio - Property Type Diversification

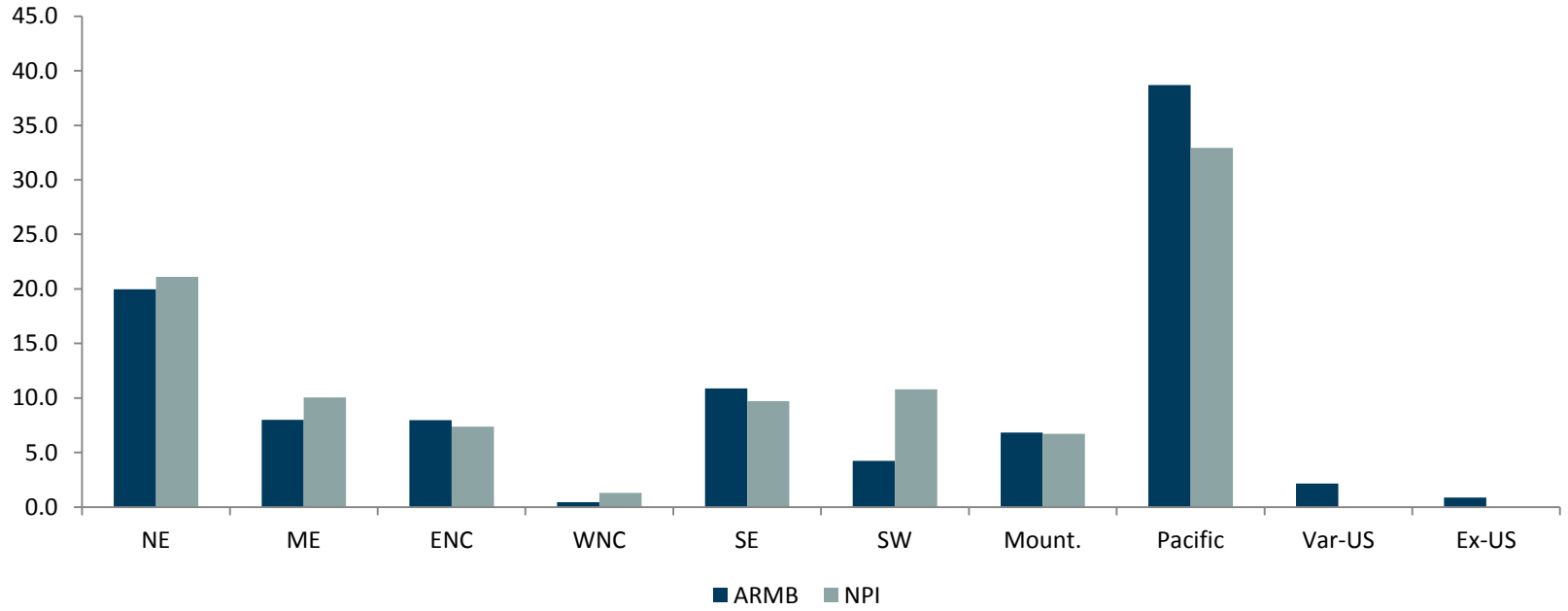
- ARMB's Private Real Estate Portfolio is well diversified by property type.
- Current portfolio allocations reflect Townsend's views today to overweight Industrial and underweight Retail assets. Townsend is also generally supportive of the underweighting Office in favor of Apartment exposure given the maturing market cycle.



ARMB Private Real Estate Portfolio - Geographic Diversification

- ARMB's Private Real Estate Portfolio is well diversified by geography.
- The most significant different to the benchmark's diversification is a 6% overweight to the Pacific region.
- While the NPI is a U.S.-only index, ARMB has some international exposure through global funds such as Colony VIII, KKR Real Estate Partners Americas, and Silverpeak Legacy Partners II and III.

Geographic Diversification
As of June 30, 2018



Real Assets Fiscal Year Plans and Policies – Real Estate

TOWNSEND GROUP



Fiscal 2018 Real Estate Plans and Policies

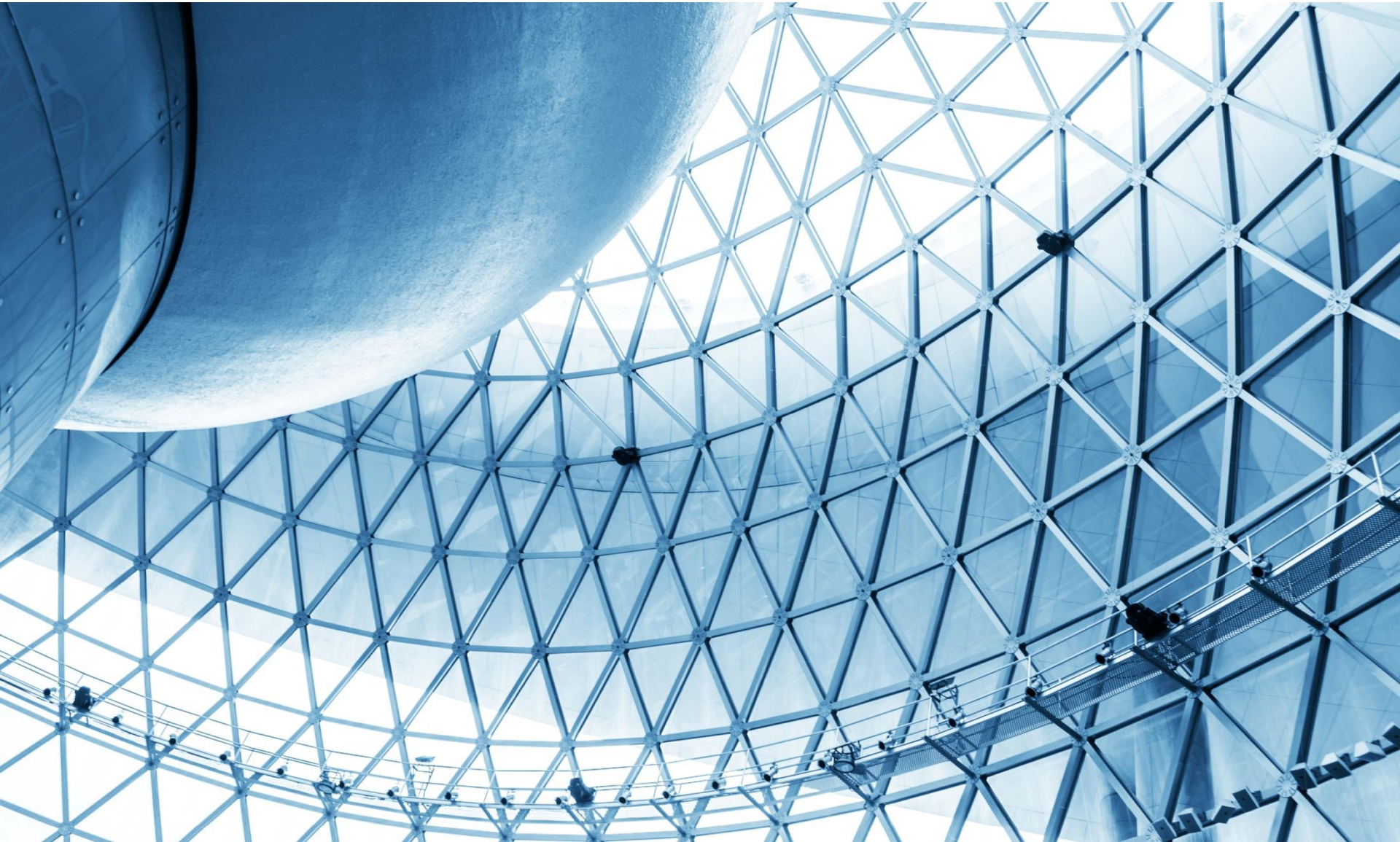
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Staff Recommendations As proposed to ARMB	Consultant Comments
Decrease Core Real Estate allocation and transition IMA assets into open-ended commingled funds	Townsend supports decreasing the Core Real Estate target allocation (currently at 90%) in order to achieve higher returns for the program. Transitioning IMA assets to open-ended funds will lead to better diversification and higher quality assets. The tradeoff of some control for these improvements while maintaining attractive fees and reasonably strong liquidity is a prudent move.
Increase REIT allocation	An increased REIT allocation is in line with the average range of Public Real Estate allocations within the peer group (0-20%). REITs will help to offset reduced liquidity from new non-core investments.
Increase Non-Core Real Estate allocation by committing to new commingled Value Add and Opportunistic real estate funds	New commitments will be necessary to reach the new target exposures to Non-Core real estate. We continue to favor offerings that are somewhat defensive in nature or structure (e.g., strong income/cash flow and pre-seeded portfolios). Selectivity and vintage year diversification will be key. We expect this new allocation to take several years to execute.
Adopt a new benchmark to better reflect the opportunity set and peer universe	Townsend concurs that the current benchmark, the NCREIF Property Index, is not the most suitable for ARMB's program. Multiple attributes of the levered, fund-level NCREIF Fund Index – Open-End Diversified Equity (NFI-ODCE) benchmark make this a superior gauge of Core performance.



Real Estate Market Overview

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United States Real Estate Market Update (2Q18)

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General

- The S&P 500 produced a gross total return of 3.4% during the Quarter, as markets rebounded from tightening monetary policy and trade war rhetoric on the back of strong economic data. The MSCI US REIT index produced a return of -10.1%. REITS outperformed the broader equities market for the Quarter, but continue to lag by 10.8% over the TTM period. Consumer Sentiment declined slightly during the Quarter to 98.2.

- Macro indicators for U.S. real estate continue to be positive; GDP grew at an annualized rate of 2.8% in the Second Quarter and headline CPI rose by 2.7% YoY, above the Fed's 2% target. As of Quarter-end, the economy has now experienced 93 consecutive months of job growth. The Federal Reserve has continued to tighten their policy, and, in June 2018, raised base rates to 1.75-2.0%. In 2018, consensus expectations have increased to four rate hikes.

Commercial Real Estate

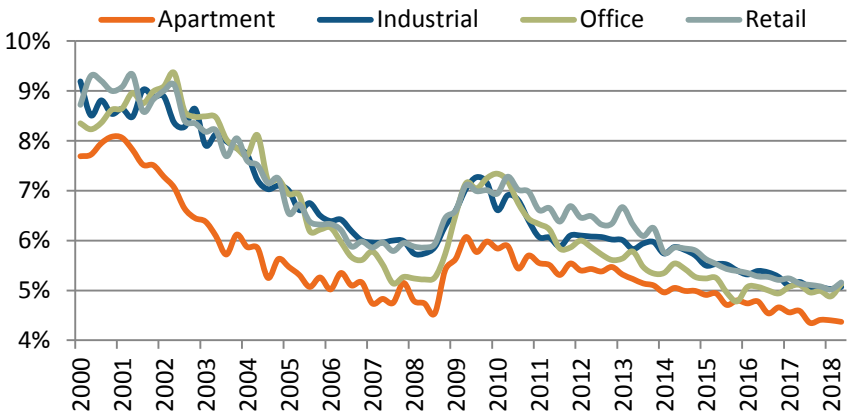
- Private Real Estate Market values have remained flat for another quarter. Transaction cap rates (5.49%) contracted 16 bps on average during the Second Quarter of 2018. At the same time, current valuation cap rates were primarily flat across property sectors, with the exception of office and retail cap rates expanding 25 bps and 14 bps, respectively.

- NOI growth by sector continued to deviate during the Quarter, with retail NOI growth continuing to lag other sectors. Positive momentum continued in the industrial sector, benefiting from e-commerce and global trade growth. The sector experienced 8.3% NOI Growth over the last year.

- In the First Quarter of 2018, $32bn of aggregate capital was raised by US Real Estate Funds. To date in 2018, Private Equity Real Estate Funds have raised $78.5bn.

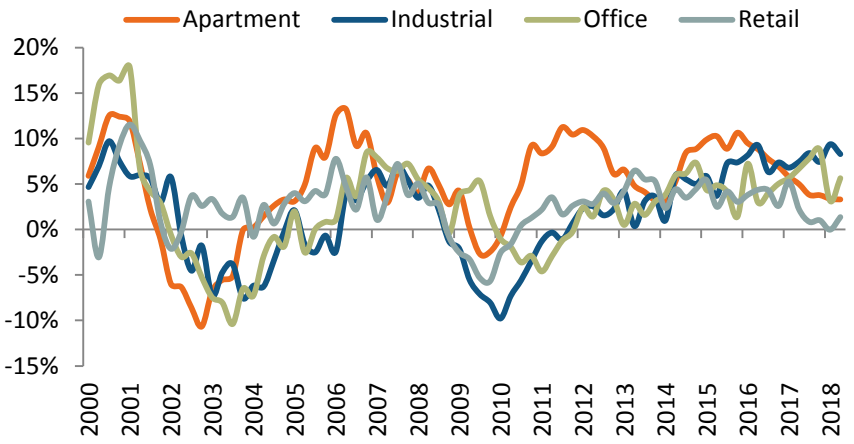
- 10 year treasury bond yields expanded 12 bps to 2.86% during the quarter and, subsequent to quarter end have essentially remained flat. A combination of expansionary fiscal policy and tightening monetary policy have led to increasing short-term interest rates and a flattening yield curve.

Current Value Cap Rates by Property Type



Source: NCREIF

4 Qtr Rolling NOI Growth



Source: NCREIF

Sources: Bureau of Economic Analysis, U.S. Census Bureau, Federal Reserve Board, NCREIF, Cushman and Wakefield, Real Capital Analytics, Bloomberg LP., Preqin, University of Michigan, Green Street

United States Property Matrix (2Q18)

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INDUSTRIAL

- As of 2Q18, industrial properties returned 3.6% and outperformed the NPI by 179 bps.
- Net absorption increased to 64.1 million sqft in 2Q18, up 4.9% from the second quarter of 2017. Net absorption as a % of inventory was 1.9%
- Transaction volumes reached $30.5 billion, marking a 20% year-over-year increase. Large-scale portfolio sales are expected make 2018 the largest overall historic year in terms of total activity.
- New deliveries were 48.9 million sqft for the quarter, with the active pipeline increasing by 3.0% quarter-over-quarter to 239.1 million sqft.
- Vacancy remained stable quarter-over-quarter at 4.8% continuing to be at an all-time historic low. Strong demand has pushed asking rents up 6.2% year-over-year.

MULTIFAMILY

- The apartment sector delivered a 1.5% return during the Quarter, underperforming the NPI by 27 bps.
- Sales volumes decreased 4.8% compared to the second quarter of 2017, totaling $32.6 billion. The drop in volume was due to a 52.2% reduction in portfolio transactions. Transaction volume is 10.2% higher on an annualized basis.
- Primary market transaction activity represented 42.5% of activity, down from 43.0% in 2017. The decrease is a result of the continued growth of capital flows into secondary and tertiary markets with a combined share increasing from 43.3% to 57.5%.
- Private investors continue to dominate the investment activity accounting for 62.5% of transactions whereas REITs have seen their proportion of transaction activity fall to 6%, less than half of their share four years ago.
- Annual rent growth rose to 2.4% percent during the second quarter of 2018, a 10 bps increase after three quarters of no change. Vacancy increased a modest 7 bps over the 12-month period ending 2Q18.

OFFICE

- The office sector returned 1.5% in 2Q18, 27bps below the NPI return over the period.
- Occupancy growth increased with net absorption totaling 12.9 million sqft. Although net absorption improved in the second quarter, it is expected to be one-third lower in 2018 than in 2017.
- Total vacancy rose by 10 bps to 14.9% quarter-over-quarter due to the rising deliveries. Class A CBD vacancy declined by 30 bps to 11.6%, while vacancy in Class A suburban office increased 30 bps to 16.9%.
- Construction activity has remained strong with 27.4 million square feet delivered in the first two quarters and 36 million square feet to be delivered by year's end. In 2019, the office market will continue to see top-quality space delivered as 57.4 million square feet of deliveries is scheduled for completion.
- Asking rents increased 2.3% to $33.82/sqft. This was driven by suburban rent growth of 3.7%, while CBD remained virtually unchanged. Concession packages continue to increase leading to an overall decline in effective rents.

RETAIL

- As of 1Q18, the retail sector delivered a quarterly return of 1.3%, performing 49 bps below the NPI.
- Transaction volumes for the first half of 2018 declined 3.6% year-over-year to $28.7 billion. REIT acquisition activity declined 17.9% year-over-year, remaining net sellers and divesting both non-strategic and underperforming assets.
- Despite the continued announcement of store closures, 12-month rental growth was 5.4%, largely driven by grocery-anchored centers.
- Average cap rates remain at 4.3%. Premier assets continue to trade aggressively, driven by foreign demand, while mall and lifestyle centers struggle to agree on terms.
- Vacancy declined to 4.5%, a compression of 10 bps compared to the first quarter of 2018. Investors are starting to apply more stringent underwriting standards and evaluating shopping center tenants more cautiously.

Sources: Real Capital Analytics, Bloomberg LP, Green Street, US Census Bureau, NCREIF, Jones Lang LaSalle, REIS, Cushman and Wakefield



Global Real Estate Market Update (2Q18)

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GLOBAL

- Global investment activity during 2Q 2018 totaled $173 billion, representing a 10% increase as compared to 2Q 2017 levels. Total first half 2018 activity was $341 billion, a 13% increase from first half 2017 and the highest first half volume since 2007. Investors' demand for real estate has remained strong, with a growing number increasing their real estate allocations due to its defensive nature and steady income returns. Further, shifting demographics and technological trends are driving an increased demand for the logistics and alternatives sectors. 2018 global investment commercial real estate volumes are projected to approximately match 2017 volumes of $715 billion. London held the top global investment position for the quarter, followed by New York and Hong Kong in second and third place, respectively.

Direct Commercial Real Estate Investment - Regional Volumes, 2017 - 2018

$ US Billions	Q1 2018	Q2 2018	% Change Q1 18 - Q2 18	Q2 2017	% Change Q2 17 - Q2 18	H1 2017	H1 2018	% Change H1 17 - H1 18
Americas	69	63	-9%	64	-2%	122	132	8%
EMEA	61	67	10%	61	10%	117	128	9%
Asia Pacific	39	42	8%	33	27%	63	81	29%
Total	169	172	2%	158	9%	302	341	13%

Source: Jones Lang LaSalle, July 2018

EUROPE

- European investment totaled $67.5 billion in 2Q 2018, an 11% increase from the prior quarter. First half 2018 volumes totaled $128.1 billion, marking the highest half-year volumes recorded in the current cycle. 2Q 2018 volumes were up from 2017 volumes in the UK, Germany, and France by 21%, 30%, and 114%, respectively. The Benelux countries saw mixed performance during the quarter, with the Nordics' volume down 17% and Southern Europe volumes down 28%. While Central and Eastern Europe's 2Q 2018 volumes declined by 22%, the region's strong first quarter enabled it to still show positive investment growth for the first half 2018. Exchange rates continued to affect European investment volumes as relative dollar weaknesses have driven up the level of investing.

ASIA

- Asia Pacific saw strong y/y performance, with volumes increasing 26% and reaching $41.7 billion during 2Q 2018. First half 2018 activity totaled $81.0 billion, a 29% increase y/y and the highest level on record. The growth was largely driven by the following: a 17% y/y increase in Australia, a 234% y/y increase in Hong Kong, a 155% y/y increase in New Zealand, a 108% y/y increase in South Korea, and a 231% y/y increase in Taiwan. However, China and Japan overall saw a decrease in total first half 2018 volumes, with 47% and 14% decreases, respectively. Specifically, Tokyo accounted for only 46% of Japanese transaction volumes this quarter, with most of the activity coming from smaller surrounding cities. Australian investment volumes totaled $5.7 billion in 2Q 2018, a 17% y/y increase. Cross-border investment activity accounted for 27% of total transaction volumes.

Global Outlook - GDP (Real) Growth % pa, 2017-2019

	2017	2018	2019
Global	**3.7**	**3.8**	**3.6**
Asia Pacific	**5.5**	**5.5**	**5.2**
Australia	2.2	2.8	2.5
China	6.9	6.4	6.1
India	6.2	7.5	7.1
Japan	1.7	1.2	1.1
North America	**2.0**	**2.5**	**2.4**
US	2.3	3.0	2.3
MENA*	**1.8**	**2.9**	**3.2**
European Union	**3.1**	**2.4**	**2.0**
France	2.3	1.7	1.6
Germany	2.5	2.0	1.8
UK	1.7	1.3	1.4

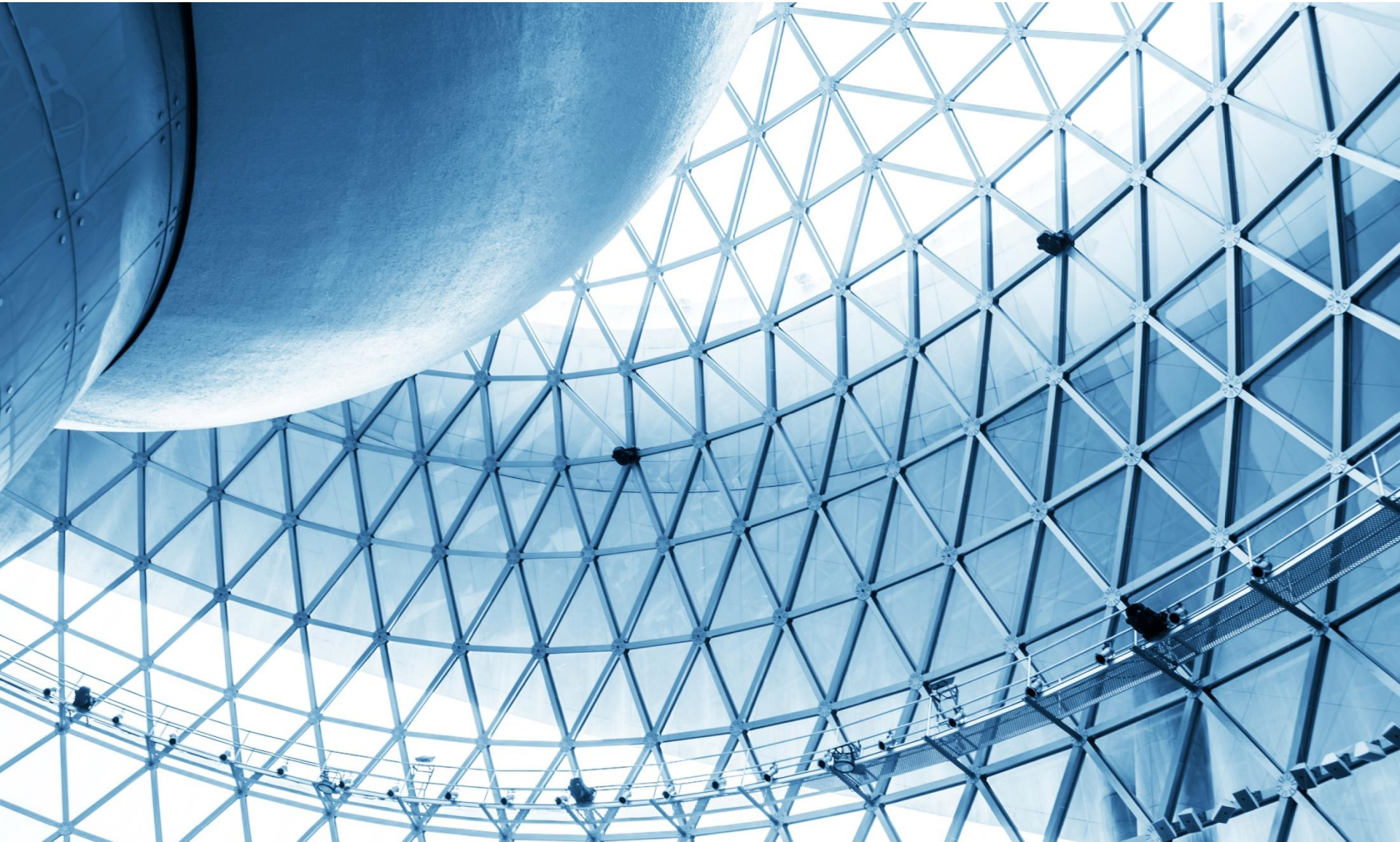
*Middle East North Africa

Source: Jones Lang LaSalle (Oxford Economics), July 2018

Sources: Jones Lang LaSalle Research, Bloomberg LP

Performance Flash Report

TOWNSEND GROUP



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ARMB Real Estate Portfolio

Second Quarter 2018

Portfolio Composition ($)								
Total Plan Assets	**Allocation**		**Market Value**		**Unfunded Commitments**		**Remaining Allocation**	
26,125,575,391	1,554,471,736	6.0%	1,868,477,360	7.2%	134,092,083	0.5%	-448,097,707	-1.7%

Performance Summary	Quarter (%)		1 Year (%)		3 Year (%)		5 Year (%)	
	TGRS	**TNET**	**TGRS**	**TNET**	**TGRS**	**TNET**	**TGRS**	**TNET**
ARMB Real Estate Portfolio	2.8	2.7	7.9	7.3	9.6	8.9	10.7	10.0
NCREIF Property Index "NPI"	1.8		7.2		8.3		9.8	

Funding Status ($)	Investment Vintage Year	Commitment Amount	Funded Amount	Unfunded Commitments	Capital Returned	Market Value	Market Value (%)	Market Value + Unfunded Commitments (%)
Core Portfolio								
BlackRock US Core Property Fund, L.P.	2018	200,000,000	200,000,000	0	2,034,515	201,418,071	10.8	10.1
JP Morgan Strategic Property Fund*	1999	85,000,000	110,376,102	0	110,064,515	257,568,217	13.8	12.9
LaSalle I.M.A.	2003	0	345,680,243	0	338,701,781	201,730,769	10.8	10.1
Sentinel I.M.A.	2000	105,000,000	213,716,877	0	195,790,851	205,141,266	11.0	10.2
Sentinel I.M.A. (Takeover 2014)	2014	0	46,119,758	0	35,359,917	0	0.0	0.0
UBS Realty I.M.A. - ARMB 1997*	1998	305,000,000	401,424,941	0	393,077,787	512,789,428	27.4	25.6
UBS Trumbull Property Fund*	1980	45,000,885	145,004,072	0	153,334,142	156,796,699	8.4	7.8
Core Portfolio	**1980**	**740,000,885**	**1,462,321,994**	**0**	**1,228,363,508**	**1,535,444,451**	**82.2**	**76.7**
Non-Core Portfolio								
Almanac Realty Securities V, LP	2008	30,000,000	35,250,734	0	48,933,240	2,316,130	0.1	0.1
Almanac Realty Securities VII	2015	50,000,000	32,536,131	21,189,612	7,334,646	33,133,219	1.8	2.7
BlackRock Diamond Property Fund	2007	75,000,000	75,023,221	0	26,191,152	69,377	0.0	0.0
Clarion Development Ventures III	2007	30,000,000	31,075,733	960,000	52,556,984	2,482,225	0.1	0.2
Clarion Ventures 4	2015	50,000,000	52,901,630	8,487,846	34,073,470	23,108,222	1.2	1.6
Colony Investors VIII	2007	68,000,000	72,248,907	2,551,093	30,863,885	1,637,059	0.1	0.2
Coventry Real Estate Fund II	2004	55,000,000	61,984,715	0	23,986,576	265,083	0.0	0.0
KKR Real Estate Partners Americas	2014	75,000,000	63,432,536	35,757,081	51,979,901	30,888,509	1.7	3.3
KKR Real Estate Partners Americas II	2018	25,000,000	2,247,691	22,752,309	0	2,542,498	0.1	1.3
Silverpeak Legacy Partners II	2005	150,000,000	154,005,289	15,509,277	190,752,907	6,091,338	0.3	1.1
Silverpeak Legacy Partners III	2008	50,000,000	22,634,384	26,470,234	3,234,150	5,266,269	0.3	1.6
Tishman Speyer Real Estate Venture VI	2004	100,000,000	180,453,152	0	192,637,820	22,158,201	1.2	1.1
Tishman Speyer Real Estate Venture VII	2008	30,000,000	30,037,851	414,631	30,376,958	1,242,369	0.1	0.1
Non-Core Portfolio	**1998**	**788,000,000**	**813,831,974**	**134,092,083**	**692,921,689**	**131,200,500**	**7.0**	**13.2**
ARMB Private Real Estate Portfolio	**1980**	**1,528,000,885**	**2,276,153,967**	**134,092,083**	**1,921,285,197**	**1,666,644,950**	**89.2**	**89.9**
ARMB Private Real Estate Portfolio w/o JPM SPF	**1980**	**1,443,000,885**	**2,165,777,865**	**134,092,083**	**1,811,220,682**	**1,409,076,733**	**75.4**	**77.1**
Public Investments								
ARMB REIT*	2004	0	567,683,027	0	372,951,298	201,832,409	10.8	10.1
Public Investments	**2005**	**0**	**567,683,027**	**0**	**372,951,298**	**201,832,409**	**10.8**	**10.1**
Total Current Portfolio								
ARMB Real Estate Portfolio	**1980**	**1,528,000,885**	**2,843,836,994**	**134,092,083**	**2,294,236,496**	**1,868,477,360**	**100.0**	**100.0**

* Hardcoded Data

Funding Status

Returns (%)[1,2]	Market Value ($)	Quarter				1 Year				3 Year				5 Year				Inception		TWR Calculation Inception	Net IRR[6]	Equity Multiple
		INC	APP	TGRS	TNET	INC	APP	TGRS	TNET	INC	APP	TGRS	TNET	INC	APP	TGRS	TNET	TGRS	TNET			
Core Portfolio																						
BlackRock US Core Property Fund, L.P.	201,418,071	0.9	0.9	1.8	1.7													1.8	1.7	2Q18	7.3	1.0
JP Morgan Strategic Property Fund*	257,568,217	1.0	1.0	1.9	1.7	4.1	3.7	7.9	7.0	4.4	4.4	8.9	8.0	4.8	5.8	10.8	9.9	9.6	8.7	1Q98	9.3	3.3
LaSalle I.M.A.	201,730,769	1.0	0.0	1.0	0.9	4.8	5.4	10.4	9.8	4.5	2.9	7.4	6.8	4.4	2.4	6.9	6.3	7.9	7.2	4Q03	7.4	1.6
Sentinel I.M.A.	205,141,266	1.3	0.2	1.5	1.4	5.4	4.9	10.5	10.0	5.5	5.6	11.3	10.8	5.4	5.5	11.1	10.5	10.2	9.6	4Q00	9.4	1.9
UBS Realty I.M.A. - ARMB 1997*	512,789,428	1.3	0.3	1.6	1.5	4.9	3.2	8.2	7.8	4.8	6.4	11.4	10.9	5.0	8.4	13.7	13.1	10.0	9.3	2Q98	9.2	2.3
UBS Trumbull Property Fund*,[7]	156,796,699	1.2	0.6	1.7	1.5	4.6	2.9	7.7	6.8	4.7	3.2	8.0	7.0	4.9	4.3	9.4	8.3	8.6	7.6	4Q80	8.0	2.1
Core Portfolio[8]	**1,535,444,451**	**1.1**	**0.5**	**1.6**	**1.5**	**4.8**	**3.9**	**8.7**	**8.1**	**4.7**	**4.4**	**9.2**	**8.6**	**4.8**	**5.3**	**10.3**	**9.6**	**8.6**	**7.5**	**4Q80**		
Non-Core Portfolio																						
Almanac Realty Securities V, LP	2,316,130	15.4	-14.1	1.3	1.0	71.9	-29.0	31.1	29.0	33.8	-15.0	17.2	15.6	23.1	-6.7	17.0	15.5	14.2	11.0	2Q08	11.8	1.5
Almanac Realty Securities VII	33,133,219	1.8	4.7	6.5	6.1	6.6	16.5	23.9	21.8	9.0	9.2	18.8	14.1					18.8	14.1	3Q15	15.4	1.2
BlackRock Diamond Property Fund	69,377	-0.8	-0.9	-1.7	-1.7	2.8	65.2	63.5	63.5	0.7	19.8	19.2	18.9	1.4	11.0	11.8	11.1	-2.0	-3.1	1Q07	-12.2	0.4
Clarion Development Ventures III[3]	2,482,225	0.9	0.6	1.5	1.5	-4.7	10.3	5.6	5.6	-5.6	52.5	45.5	45.5	1.7	39.0	42.0	41.4			3Q09	14.1	1.8
Clarion Ventures 4	23,108,222	0.5	5.3	5.7	5.4	-3.4	0.3	-3.2	-3.8	-0.7	6.7	6.0	5.5					5.2	4.6	2Q15	6.1	1.1
Colony Investors VIII	1,637,059	0.1	-12.5	-12.4	-12.4	2.2	-2.7	-0.7	-1.2	1.7	-11.1	-9.5	-10.7	1.8	-1.1	0.8	-1.0	-14.2	-17.1	4Q07	-11.5	0.4
Coventry Real Estate Fund II[4]	265,083	2.1	4.0	6.1	6.1	0.3	8.1	8.2	8.2	-0.3	11.4	10.9	9.7	-0.3	6.5	6.2	4.4			2Q04	-11.6	0.4
KKR Real Estate Partners Americas	30,888,509	3.2	-1.5	1.7	1.8	10.3	-2.3	7.8	7.1	7.9	2.8	10.8	8.6					12.8	9.3	2Q14	14.7	1.3
KKR Real Estate Partners Americas II	2,542,498	-1.2	31.9	30.7	27.4													30.7	27.4	2Q18	71.6	1.1
Silverpeak Legacy Partners II	6,091,338	-0.8	1.4	0.6	-0.1	-1.8	-11.9	-13.5	-14.6	-0.3	5.1	4.7	3.1	0.8	11.6	12.4	10.9	7.6	5.8	4Q05	4.6	1.3
Silverpeak Legacy Partners III	5,266,269	0.3	1.4	1.7	1.5	2.3	-4.4	-2.2	-3.1	1.6	-2.8	-1.2	-3.0	1.2	-2.3	-1.2	-3.1	-12.3	-14.8	2Q08	-11.0	0.4
Tishman Speyer Real Estate Venture VI	22,158,201	-0.1	-0.5	-0.6	-0.7	-0.2	9.2	8.9	8.3	-0.3	11.9	11.5	10.9	-0.3	13.8	13.4	12.7	2.7	2.1	1Q05	4.8	1.2
Tishman Speyer Real Estate Venture VII	1,242,369	-0.4	0.3	-0.1	-1.0	-0.9	2.6	1.7	-0.6	-0.1	7.9	7.8	6.0	0.1	18.3	18.4	16.6	-14.3	-19.8	2Q08	0.9	1.1
Non-Core Portfolio[8]	**131,200,500**	**1.6**	**1.6**	**3.1**	**2.9**	**4.3**	**3.9**	**8.3**	**7.2**	**3.6**	**8.3**	**12.1**	**10.6**	**3.5**	**11.0**	**14.8**	**13.2**	**7.3**	**5.6**	**1Q98**		
ARMB Private Real Estate Portfolio[8]	**1,666,644,950**	**1.2**	**0.6**	**1.7**	**1.6**	**4.7**	**3.8**	**8.7**	**8.0**	**4.6**	**4.9**	**9.7**	**8.9**	**4.5**	**6.4**	**11.1**	**10.3**	**8.3**	**7.1**	**4Q80**		
ARMB Private Real Estate Portfolio w/o JPM SPF[8]	**1,409,076,733**	**1.2**	**0.5**	**1.7**	**1.6**	**4.8**	**3.9**	**8.8**	**8.2**	**4.6**	**5.0**	**9.8**	**9.1**	**4.5**	**6.5**	**11.2**	**10.4**	**8.2**	**7.1**	**4Q80**		
Public Investments																						
ARMB REIT*	201,832,409			8.3	8.3			4.8	4.8			9.0	9.0			8.8	8.8	5.3	5.3	1Q05	0.4	1.0
Public Investments	**201,832,409**			**8.3**	**8.3**			**4.8**	**4.8**			**9.0**	**9.0**			**8.8**	**8.8**	**5.3**	**5.3**	**1Q05**	**0.4**	**1.0**
Total Portfolio																						
ARMB Real Estate Portfolio[8]	**1,868,477,360**			**2.8**	**2.7**			**7.9**	**7.3**			**9.6**	**8.9**			**10.7**	**10.0**	**8.2**	**7.1**	**4Q80**		
Indices																						
NCREIF Property Index "NPI"				1.8				7.2				8.3				9.8		8.6		4Q80		
ARMB Custom Benchmark				2.5				7.0				8.4				9.7		8.7		4Q80		
Idx: FTSE NAREIT Equity REITs				8.5				4.9				9.1				8.9		11.7		4Q80		

TOWNSENDGROUP

ARMB Real Estate Portfolio

Second Quarter 2018

Quarterly Cash Flow Activity ($)	Beginning Market Value	Contributions	Distributions	Withdrawals	Gross Income	Manager Fees	Appreciation	Ending Market Value	LTV (%)
Core Portfolio									
BlackRock US Core Property Fund, L.P.	0	200,000,000	2,034,515	0	1,829,420	120,113	1,743,279	201,418,071	21.8
JP Morgan Strategic Property Fund*	255,145,829	0	1,965,063	0	2,438,429	549,216	2,498,239	257,568,217	23.4
LaSalle I.M.A.	200,911,026	551,655	1,508,610	0	2,067,419	251,558	-39,163	201,730,769	0.0
Sentinel I.M.A.	204,284,554	0	1,987,444	0	2,618,855	242,157	467,458	205,141,266	0.0
Sentinel I.M.A. (Takeover 2014)	29,413	0	0	29,413	0	0	0	0	0.0
UBS Realty I.M.A. - ARMB 1997*	543,855,718	0	16,534,389	22,374,218	6,724,007	611,846	1,730,157	512,789,428	0.0
UBS Trumbull Property Fund*	206,190,811	0	1,707,274	50,000,000	1,817,563	418,683	914,282	156,796,699	17.4
Core Portfolio	**1,410,417,351**	**200,551,655**	**25,737,295**	**72,403,631**	**17,495,693**	**2,193,573**	**7,314,251**	**1,535,444,451**	**9.9**
Non-Core Portfolio									
Almanac Realty Securities V, LP	2,294,026	0	0	0	354,242	7,993	-324,145	2,316,130	0.0
Almanac Realty Securities VII	31,800,805	-241,200	348,864	0	564,217	126,279	1,484,540	33,133,219	1.3
BlackRock Diamond Property Fund	70,543	0	0	0	-566	0	-600	69,377	0.0
Clarion Development Ventures III	6,415,491	0	4,029,306	0	59,537	0	36,502	2,482,225	0.0
Clarion Ventures 4	18,634,405	3,461,005	0	0	87,050	58,670	984,432	23,108,222	0.0
Colony Investors VIII	1,868,151	0	0	0	2,084	0	-233,176	1,637,059	0.0
Coventry Real Estate Fund II	249,860	0	0	0	5,286	0	9,937	265,083	0.0
KKR Real Estate Partners Americas	32,963,810	124,928	995,306	1,772,330	1,011,021	-28,336	-471,950	30,888,509	61.0
KKR Real Estate Partners Americas II	504,696	1,608,694	0	0	-18,174	51,877	499,159	2,542,498	67.0
Silverpeak Legacy Partners II	6,183,067	0	0	86,817	-50,470	43,409	88,967	6,091,338	41.1
Silverpeak Legacy Partners III	5,218,531	0	0	28,766	16,729	14,383	74,158	5,266,269	7.6
Tishman Speyer Real Estate Venture VI	22,314,427	0	0	0	-17,585	32,868	-105,773	22,158,201	35.0
Tishman Speyer Real Estate Venture VII	1,550,505	0	292,539	0	-6,761	13,710	4,874	1,242,369	0.0
Non-Core Portfolio	**130,068,318**	**4,953,427**	**5,666,015**	**1,887,913**	**2,006,610**	**320,853**	**2,046,926**	**131,200,500**	**35.0**
ARMB Private Real Estate Portfolio	**1,540,485,669**	**205,505,082**	**31,403,310**	**74,291,544**	**19,502,304**	**2,514,427**	**9,361,177**	**1,666,644,950**	**12.5**
ARMB Private Real Estate Portfolio w/o JPM SPF	**1,285,339,840**	**205,505,082**	**29,438,247**	**74,291,544**	**17,063,875**	**1,965,210**	**6,862,938**	**1,409,076,733**	**10.2**
Public Investments									
ARMB REIT*	339,943,640	2,784,792	2,784,792	0	0	0	28,128,060	201,832,409	0.0
Public Investments	**339,943,640**	**2,784,792**	**2,784,792**	**0**	**0**	**0**	**28,128,060**	**201,832,409**	**0.0**
Total Portfolio									
ARMB Real Estate Portfolio	**1,880,429,308**	**208,289,874**	**34,188,102**	**74,291,544**	**19,502,304**	**2,514,427**	**37,489,237**	**1,868,477,360**	**11.3**

TOWNSENDGROUP

ARMB Real Estate Portfolio

Second Quarter 2018

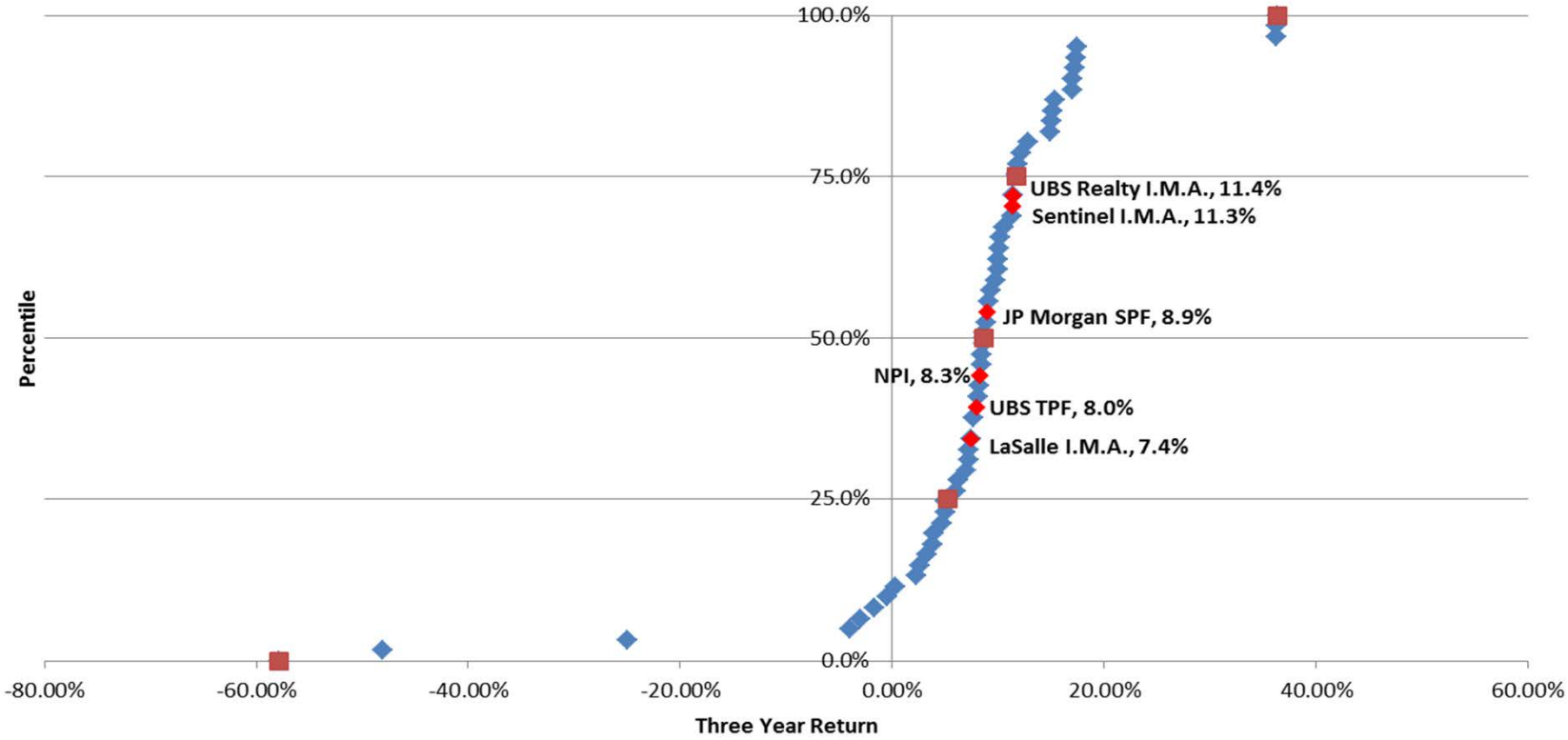
Property Type Diversification (%)	Apartment	Office	Industrial	Retail	Hotel	Other
Core Portfolio						
BlackRock US Core Property Fund, L.P.	30.9	28.8	19.8	19.6	-	0.9
JP Morgan Strategic Property Fund	22.1	39.8	10.9	25.8	-	1.4
LaSalle I.M.A.	-	36.2	-	63.8	-	-
Sentinel I.M.A.	100.0	-	-	-	-	-
UBS Realty I.M.A. - ARMB 1997	20.5	27.0	39.4	13.1	-	-
UBS Trumbull Property Fund	29.9	30.1	14.8	22.6	2.6	-
Core Portfolio	**31.0**	**27.3**	**19.1**	**22.0**	**0.3**	**0.3**
Non-Core Portfolio						
Almanac Realty Securities V, LP	-	48.9	51.1	-	-	-
Almanac Realty Securities VII	30.7	9.7	38.8	3.8	3.6	13.3
BlackRock Diamond Property Fund	100.0	-	-	-	-	-
Clarion Development Ventures III	-	-	-	-0.2	2.7	97.4
Clarion Ventures 4	40.1	24.2	28.4	7.3	-	-
Colony Investors VIII	-	-	-	3.2	-	96.8
Coventry Real Estate Fund II	-	-	-	-	-	-
KKR Real Estate Partners Americas	17.6	21.2	-	30.0	17.5	13.7
KKR Real Estate Partners Americas II	26.0	18.7	6.5	-	-	48.8
Silverpeak Legacy Partners II	-	22.8	-	5.5	26.2	45.5
Silverpeak Legacy Partners III	-	69.5	-	27.7	-	2.8
Tishman Speyer Real Estate Venture VI	-	89.4	-	-	-	10.6
Tishman Speyer Real Estate Venture VII	-	11.6	-	-	-	88.4
Non-Core Portfolio	**21.8**	**30.9**	**17.0**	**11.4**	**6.1**	**12.7**
ARMB Private Real Estate Portfolio	**30.3**	**27.6**	**18.9**	**21.2**	**0.7**	**1.3**
NCREIF Property Index "NPI"	**24.2**	**36.3**	**15.9**	**23.0**	**0.6**	**-**

Property Type Diversification

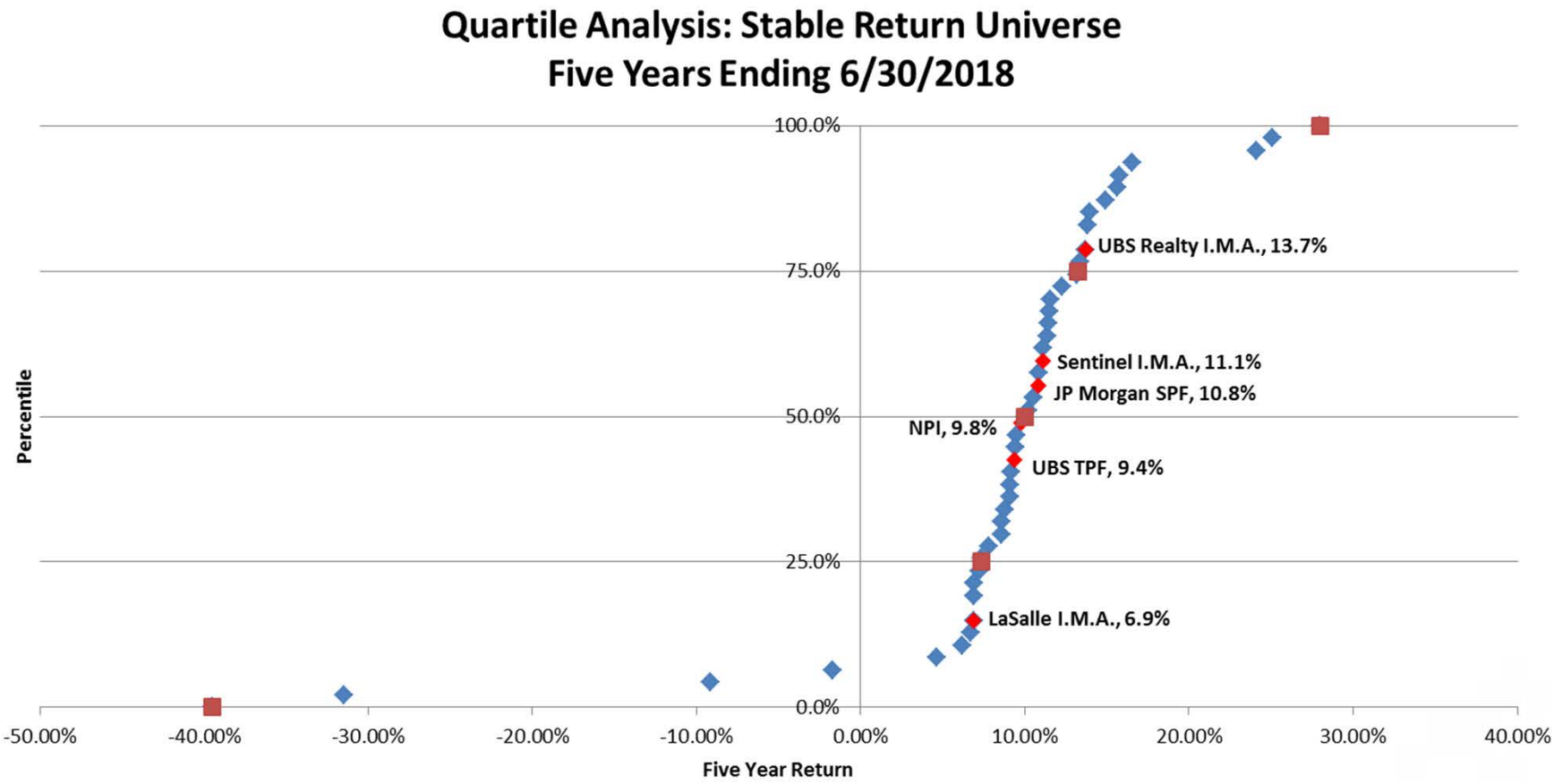
Geographic Diversification (%)	North East	Mid East	East North Central	West North Central	South East	South West	Mountain	Pacific	Various US	Ex-US
Core Portfolio										
BlackRock US Core Property Fund, L.P.	32.4	10.5	6.6	2.6	4.4	8.8	0.8	33.7	-	-
JP Morgan Strategic Property Fund	23.3	7.7	4.7	0.0	5.9	13.8	2.8	41.7	-	-
LaSalle I.M.A.	-	36.2	25.5	-	14.3	-	-	24.0	-	-
Sentinel I.M.A.	37.3	-	-	-	28.4	-	-	34.3	-	-
UBS Realty I.M.A. - ARMB 1997	13.8	-	7.0	-	9.6	-	16.3	53.2	-	-
UBS Trumbull Property Fund	25.0	9.7	11.8	0.8	8.2	6.9	9.1	28.7	-	-
Core Portfolio	**20.3**	**8.4**	**8.6**	**0.4**	**11.3**	**4.1**	**7.0**	**39.8**	-	**-**
Non-Core Portfolio										
Almanac Realty Securities V, LP	-	-	-	-	-	-	-	-	100.0	-
Almanac Realty Securities VII	-	-	-	-	-	-	-	-	100.0	-
BlackRock Diamond Property Fund	-	-	100.0	-	-	-	-	-	-	-
Clarion Development Ventures III	6.2	-	-	-	93.8	-	-	-	-	-
Clarion Ventures 4	56.4	-	-	-	-	-	24.2	19.4	-	-
Colony Investors VIII	0.2	-	-	-	-	-	-	86.9	-	12.9
Coventry Real Estate Fund II	-	-	-	-	-	-	-	-	-	-
KKR Real Estate Partners Americas	14.0	2.7	1.5	2.2	11.3	21.3	-	15.6	-	31.3
KKR Real Estate Partners Americas II	10.0	-	-	-	51.7	-	-	38.3	-	-
Silverpeak Legacy Partners II	12.3	3.8	-	-	25.7	-	-	19.6	-	38.7
Silverpeak Legacy Partners III	18.7	-	-	-	-	-	-	-	-	81.3
Tishman Speyer Real Estate Venture VI	-	10.6	-	-	-	-	-	89.4	-	-
Tishman Speyer Real Estate Venture VII	-	11.3	0.2	-	-	-	-	88.4	-	-
Non-Core Portfolio	**16.3**	**2.5**	**0.4**	**0.6**	**5.5**	**5.7**	**4.9**	**24.7**	**27.9**	**11.5**
ARMB Private Real Estate Portfolio	**20.0**	**8.0**	**8.0**	**0.4**	**10.9**	**4.2**	**6.8**	**38.7**	**2.1**	**0.9**
NCREIF Property Index "NPI"	**21.1**	**10.1**	**7.4**	**1.3**	**9.7**	**10.8**	**6.7**	**32.9**	-	**-**

Geographic Diversification

Quartile Analysis: Stable Return Universe
Three Years Ending 6/30/2018



3 Year CDF


Quartile Analysis: Stable Return Universe
Five Years Ending 6/30/2018
Percentile
100.0%
75.0%
50.0%
25.0%
0.0%
-50.00%
-40.00%
-30.00%
-20.00%
-10.00%
0.00%
10.00%
20.00%
30.00%
40.00%
Five Year Return
UBS Realty I.M.A., 13.7%
Sentinel I.M.A., 11.1%
JP Morgan SPF, 10.8%
NPI, 9.8%
UBS TPF, 9.4%
LaSalle I.M.A., 6.9%

5 Year CDF

Metropolitan Statistical Area Diversification

As of June 30, 2018

ARMB Total Portfolio: Largest Metro Concentrations		
MSA Title%	**% of Current NAV**	**NCREIF Weight**
CA - Los Angeles	11.8%	7.6%
CA - San Francisco	9.6%	4.6%
IL - Chicago	7.8%	5.9%
MA - Boston	7.2%	3.9%
DC - Washington	7.0%	7.6%
CO - Denver	6.1%	2.9%
NY - New York	6.0%	11.6%
PA - Philadelphia	4.6%	0.4%
CA - Sacramento	4.2%	0.3%
FL - Tampa	3.5%	0.4%

ARMB I.M.A. Portfolio: Largest Metro Concentrations		
MSA Title%	**% of Current NAV**	**NCREIF Weight**
CA - Los Angeles	15.1%	7.6%
CA - San Francisco	14.5%	4.6%
IL - Chicago	9.5%	5.9%
CO - Denver	9.1%	2.9%
PA - Philadelphia	8.3%	0.4%
DC - Washington	8.0%	7.6%
MA - Boston	7.7%	3.9%
CA - Sacramento	7.6%	0.3%
FL - Tampa	6.3%	0.4%
GA - Atlanta	3.1%	2.6%

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NOTES:

1) Does not include partial periods.

2) Private real estate performance calculated quarterly. Public performance provided from State Street and calculated monthly.

3) Clarion Development Ventures III ("CDV III') reported performance in Q3 2009 that resulted in a negative market value. Based on industry reporting standards, a Fund level negative market value ends a time weighted series. The first quarter with a positive market value begins a new inception period, but returns may not be immediately meaningful therefore since inception returns are not displayed. The analysis of this fund should be done on an IRR basis.

4) Coventry Real Estate Fund II began investing in 2Q04 and suffered significant value losses beginning in 4Q08. At the request of ARMB, Fund II was written down to $0 in 2Q09. ARMB has requested that the Fund II values be adjusted and added back into the portfolio as of 2Q11 due to Fund II recovery. As a result, Coventry Real Estate Fund II has a series of returns from 2Q04-4Q08, a stub quarter to add the Fund value back into the portfolio and a series of returns beginning in 2Q11 which will reflect actual quarterly returns. All quarterly returns are included in the total Portfolio but they are not meaningful due to the gaps in quarterly returns.

5) 90% NPI/10% NAREIT since 1/1/2005, 100% NPI back to inception.

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

7) Townsend calculates performance data and investment values based on actual cash flows, rather than accruals. UBS TPF reflects management fees payable to the manager within capital account statements as accrued fees in the quarter in which they are earned. Quarterly fees are typically paid in arrears within the following quarter. Thus, the NAV shown in Townsend's report may differ from the capital account statements provided by the manager. One additional quarter of management fees would also need to be recognized within the Townsend data if the position were fully liquidated.

8) IRR and equity multiple figures are unavailable for these composites due to missing historic cash flow data within several legacy funds.

* Hardcoded data

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Advisory Disclosures and Definitions

Disclosure
Trade Secret and Confidential.

Past performance is not indicative of future results.

Investing involves risk, including the possible loss of principal.

Returns are presented on a time weighted basis and shown both gross and net of underlying third party fees and expenses and may include income, appreciation and/or other earnings. In addition, investment level Net IRR's and equity multiples are reported.

The Townsend Group, on behalf of its client base, collects quarterly limited partner/client level performance data based upon inputs from the underlying investment managers. Data collection is for purposes of calculating investment level performance as well as aggregating and reporting client level total portfolio performance. Quarterly limited partner/client level performance data is collected directly[1] from the investment managers via a secure data collection site.

[1]In select instances where underlying investment managers have ceased reporting limited partner/client level performance data directly to The Townsend Group via a secure data collection site, The Townsend Group may choose to input performance data on behalf of its client based upon the investment managers quarterly capital account statements which are supplied to The Townsend Group and the client alike.

Benchmarks
The potential universe of available real asset benchmarks are infinite. Any one benchmark, or combination thereof, may be utilized on a gross or net of fees basis with or without basis point premiums attached. These benchmarks may also utilize a blended composition with varying weighting methodologies, including market weighted and static weighted approaches.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Real Assets Investment Plan — ACTION: X

DATE: September 21, 2018 — INFORMATION: ____

BACKGROUND

Staff prepares an Annual Real Assets Investment Plan to review performance, structure, objectives, and strategy of the portfolio. The plan establishes the Board-approved plan for the portfolio.

STATUS

Staff, with the assistance of The Townsend Group and Callan, has developed the Real Assets Annual Investment Plan.

RECOMMENDATION

The ARMB approve Resolution 2018-14 which adopts the Real Assets Annual Investment Plan.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Real Assets Annual Investment Plan

Resolution 2018-14

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investments in Real Assets for the Public Employees' Retirement System, Teachers' Retirement System, and Judicial Retirement System, including investments for those systems in the State of Alaska Retirement and Benefits Plans Trust; and

WHEREAS, the Board will establish and on an annual basis review an investment plan for Real Assets asset class.

NOW THEREFORE BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopt the Real Assets Annual Investment Plan, attached hereto and made a part hereof.

DATED at Anchorage, Alaska this ___ day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

ALASKA RETIREMENT MANAGEMENT BOARD

Annual Real Assets Investment Plan

Bob Mitchell, CFA
Nicholas Orr, CFA

Board Actions

The existing set of Real Assets Resolutions will remain in force until repealed and replaced:

- Resolution 2017-14 Real Estate Investment Guidelines
- Resolution 2017-15 Farmland Investment Guidelines
- Resolution 2017-16 Timberland Investment Guidelines
- Resolution 2017-17 Infrastructure Investment Guidelines

Adopt changes to the objectives, strategy and return expectations for Real Assets.

Terminate the TIPS portfolio, liquidate the fund, and transfer the proceeds to cash.

Accept recommended changes to the Real Estate and Infrastructure guidelines as informational items for further consideration.

Real Asset Characteristics

	Core Real Estate	Non-Core Real Estate	REITs	Timber	Farmland	Infrastructure	MLPs	TIPS
Objectives								
Attractive Returns	✓	✓	✓	X	✓	✓	✓	X
Low Volatility	✓	X	X	✓	✓	✓	X	✓
High Income	✓	X	✓	X	✓	✓	✓	X
Strategy								
Lower Risk / Lower Return	✓	X	X	✓	✓	✓	X	✓
Low Leverage	✓	X	X	✓	✓	X	X	✓
High Quality Assets	✓	X	✓	✓	✓	✓	✓	✓
Performance Expectations								
5% Real	X	✓	X	X	X	✓	✓	X

Role of Real Assets

Objectives

- Existing Objective:
  - The primary role of Real Assets is to generate attractive returns in assets which provide portfolio diversification and inflation hedging to ARMB's total portfolio. Many of the asset sectors have historically exhibited low volatility and a high income component of total return.
- Proposed Objective:
  - Diversify the portfolio while providing attractive total returns, inflation sensitivity, and income.

Strategy

- Existing Strategy:
  - Lower risk, lower return approach. Conservative strategy employing low leverage and focusing on higher quality assets producing stable returns.
- Proposed Strategy:
  - Seek to establish exposure to real assets through both public and private securities in core, stabilized investments as well as non-core, value-add / opportunistic investments.

Return Expectations

- Existing Return Expectation:
  - Long term performance expectations for real assets are to exceed a 5% net real return over rolling 5 year periods.
- Proposed Return Expectation:
  - Long term performance expectations for real assets are to have net-of-fee performance between public equities and fixed income over rolling 6-year periods.

TIPS

- Terminate the TIPS portfolio, liquidate the fund, and transfer the proceeds to cash.
- TIPS are unlikely to meet return objectives.



Real Estate - Recommendations

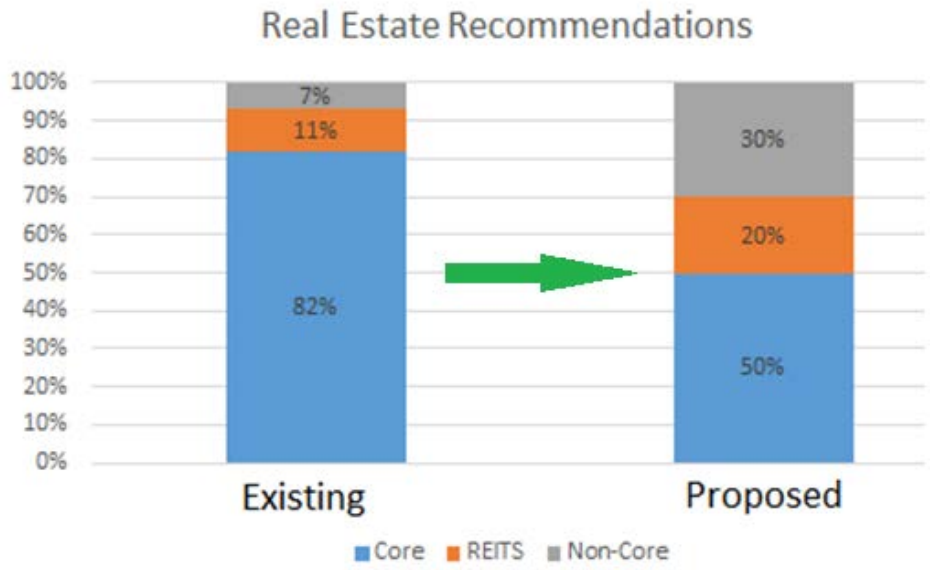
	Current Weight	Current Target	Proposed Target
Real Estate	42%	35%	35%
Private Core Real Estate	82%	90%	50%
REITs	11%	10%	20%
Non-Core	7%	0%	30%
Benchmark		NCREIF NPI / NAREIT	NFI-ODCE / NAREIT

- Recommendation: re-weight current allocation, no change in overall allocation.
- Transition separate accounts to commingled funds. This will increase diversification and management focus with no anticipated impact to returns.
- Increase REIT allocation to improve liquidity, diversification, and net of fee returns.
- Increase non-core allocation to generate additional returns while diversifying portfolio.
- Change the benchmark to better reflect opportunity set and peer group.

Real Estate – Recommendations

Decrease Core Real Estate allocation

- Shift existing core assets / capital into open-end commingled funds
  - Improve quality of assets.
  - Improve quality of management attention.
  - Improve diversification.
  - Maintain overweight to multi-family.



Increase internally-managed REIT allocation

- Allows for liquidity, access to trophy properties not held in the private space, and emerging real estate sectors (self-storage, health care, data centers, etc.).

Increase Non-core allocation

- Value-add
  - Investments that take on moderate additional risk to achieve a higher return
    - Examples include: leasing, re-development, exposure to non-traditional property types, or moderate leverage.
- Opportunistic
  - Investments that take on additional risk in order to achieve a higher return.
    - Examples include: development, land investing, international exposure, distressed properties, or high leverage.

Real Estate – Recommendations (core)

Separate Account: Sentinel

- Explore transferring Sentinel separate account assets to the Sentinel Real Estate Fund (SREF), or similar commingled fund.
- SREF's strategy and investments are substantially similar to those of the ARMB separate account, albeit with modest use of leverage.
- ARMB would be gaining diversification with no change in strategy.
- SREF focuses on apartments and has outperformed both the NFI-ODCE Index as well as the NCREIF Apartment Sub-index over the 1, 3, 5, and 10 year time periods.

Separate Account: UBS

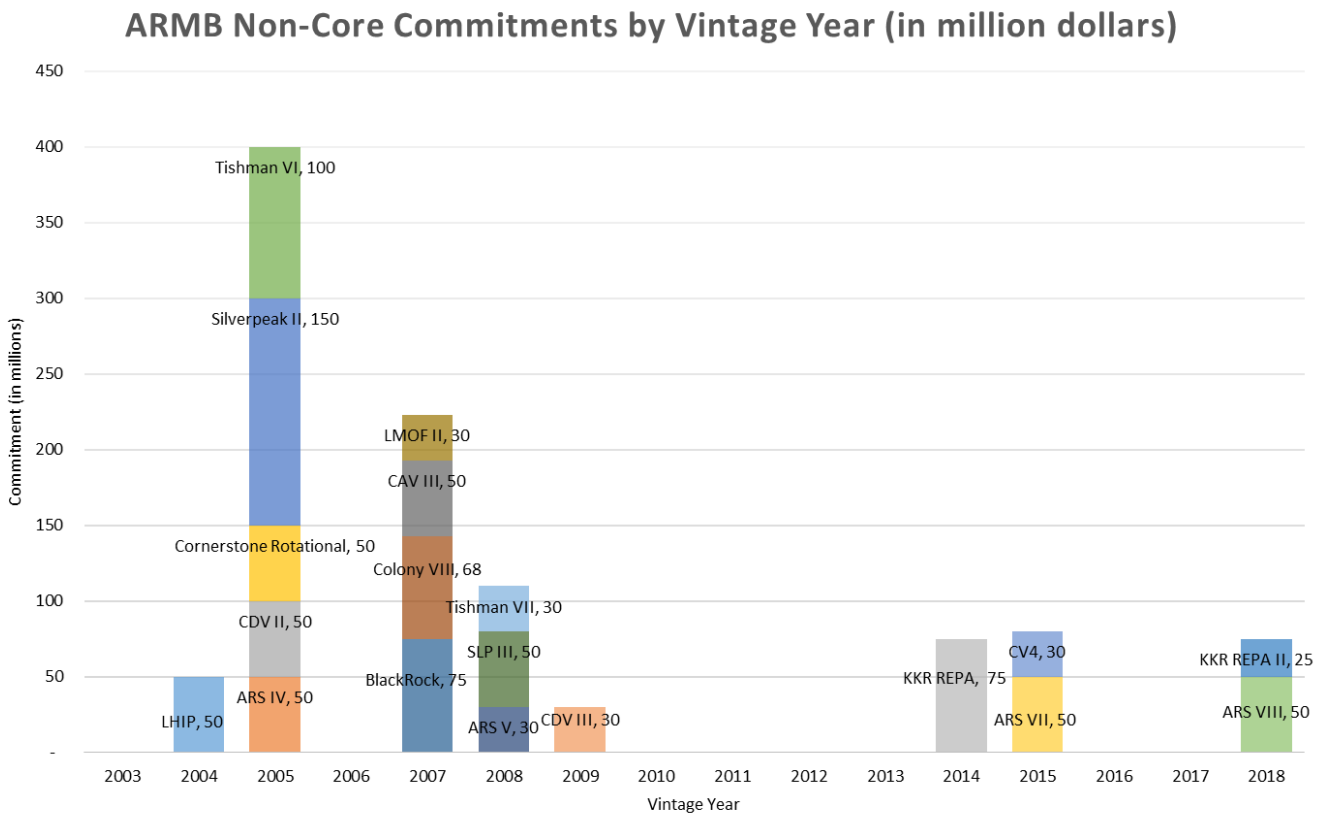
- Liquidate the account as necessary over the next several years to fund the increase in the non-core allocation.
- Transfer two multi-family assets to SREF.

Separate Account: LaSalle

- LaSalle is currently in the process of selling two of its four assets for market reasons.
- Explore transferring remaining two assets to BlackRock US Core Property Fund.
    - If BlackRock declines transfer of assets, direct LaSalle to sell remaining assets.

Real Estate – Recommendations (non-core)

- Pace annual commitments so as to maintain vintage year investment diversification.
- Increase collaboration with consultant to improve due diligence and investment selection.



Infrastructure- Recommendations

	Current Weight	Current Target	Proposed Target
Infrastructure / Energy Infrastructure	29%	30%	30%
Private Infrastructure	28%	40%	40%
Public Infrastructure	13%	20%	20%
Energy	59%	40%	40%
Benchmark		S&P Global Infrastructure Index / Alerian MLP Index	CPI + 4 / S&P Global Infrastructure Index / Alerian MLP Index

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Real Assets Investment Guidelines Policies, Procedures and Guidelines	ACTION:	X
DATE:	September 21, 2018	INFORMATION:	

BACKGROUND

As part of the annual planning process for Real Assets, proposed changes to the Real Estate and Infrastructure Policies, Procedures and Guidelines (Guidelines) are recommended by staff.

STATUS

The Real Estate Guidelines have been revised to:

- Clarify that investment in private debt is permitted.
- Modify the total return requirements from 5% real return over rolling 5 year periods to a net-of-fee total return between public equities and fixed income over rolling 6 year periods.
- Change the target weights for Private Core Real Estate, REITs and Non-Core Private Real Estate from 90%/10%/0% to 50%/20%/30%.
- Change the benchmark from 90% NCREIF Property Index / 10% NAREIT Equity Index to 80% NFI-ODCE Index / 20% NAREIT Equity Index.
- Remove requirement for a minimum of 3 separate account managers.

The Infrastructure Guidelines have been revised to:

- Modify the total return requirements from 5% real return over rolling 5 year periods to a net-of-fee total return between public equities and fixed income over rolling 6 year periods.
- Change benchmark to reflect the addition of CPI + 4 and the Alerian MLP Index the Infrastructure benchmark composite. Defined inflation index as the CPI All Urban Index.

RECOMMENDATION

The ARMB approve:

Resolution 2018-15 which adopts the revised Real Estate Investment Guidelines; and,

Resolution 2018-16 which adopts the revised Infrastructure Investment Guidelines.

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Real Estate Investment Guidelines

Resolution 2018-15

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investment in real estate assets for the Public Employees' Retirement System, Teachers' Retirement System, and Judicial Retirement System, including investments for those systems in the State of Alaska Retirement and Benefit Plans Trust; and

WHEREAS, the Board establishes and from time to time as necessary, modifies investment policies, procedures, and guidelines for real estate;

NOW THEREFORE, BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopts the revised Real Estate Investment Guidelines, attached hereto and made a part hereof. This resolution repeals and replaces Resolution 2017-14.

DATED at Anchorage, Alaska this _____ day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

ALASKA RETIREMENT MANAGEMENT BOARD
REAL ESTATE INVESTMENT
POLICIES, PROCEDURES AND GUIDELINES

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ATTACHMENTS

Attachment 1 – Delegation of Responsibilities

ALASKA RETIREMENT MANAGEMENT BOARD
REAL ESTATE INVESTMENT
POLICIES, PROCEDURES AND GUIDELINES

I. INVESTMENT OBJECTIVES

A. Investments in Real Estate and Other Real Estate Related Assets

The Alaska Retirement Management Board (ARMB) will invest in real estate with the goals of portfolio diversification and attaining the optimum return on the portfolio, consistent with the assumption of prudent risk and safety of principal. ARMB recognizes the need to use active investment management in order to obtain the highest attainable total investment return (measured as income plus appreciation) within ARMB's framework of prudence and managed risk.

ARMB will select Real Estate Investment Managers who have the discretion to invest in publicly traded equity, privately placed debt, and/or privately placed equity sectors, subject to ARMB's approval of an Annual Strategic/Tactical Plan and an Annual Investment Plan. In order for real estate investments to be considered, the Investment Manager must demonstrate that it is able to: add value through its real estate knowledge, experience and strategy; underwrite the risks of the investment which is contemplated; and at the time of investment, comply with the intent of the Real Estate Investment Policies, Procedures and Guidelines **(Guidelines)**.

Single property and multi property strategies will be considered as well as "pooled/commingled" fund investment vehicles.

B. Asset Allocation

The ARMB allocation to real estate investments shall be determined by the Board of Trustees and reviewed annually. Allocated capital to Investment Managers will be defined as invested capital based on ARMB's cost.

C. Portfolio Return Objective

1. **Total Return**
   Over rolling six-~~5~~ year periods, the ~~equity~~ ARMB real estate investment portfolio is expected to generate- a net-of-fee total return between public equities and fixed-income ~~a minimum total real rate of return (net of investment management fees) of 5% using a time-weighted rate of return calculation~~. ~~The inflation index used to calculate the actual real rate of return is the CPI All Urban.~~

2. **Income Return**
   Income, which is defined as cash distributed to ARMB, is expected to produce 50-60% of the total return over rolling five-year periods.

3. **Index**

   The overall portfolio is expected to exceed the target index. The target index is composed of ~~90% NCREIF Property Index~~ 80% NFI-ODCE and ~~10%~~20% NAREIT Equity Index.

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II. PROGRAM RISK MANAGEMENT AND IMPLEMENTATION

The selection and management of assets in the real estate portfolio of the ARMB will be guided by the principles of preserving investment capital, attaining the optimum return on the portfolio consistent with the assumption of prudent risk, generating current income, being sensitive to inflation, maintaining diversification of assets and diversification of management responsibility.

In real estate investment, there is an inherent risk that the actual income and return of capital will vary from the amounts expected. The ARMB will manage the investment risk associated with real estate in several ways:

A. Institutional Quality

All assets must be of institutional investment quality as evidenced by a precedent of institutional investment in similar properties; expert analysis which supports the economic viability of the market; high quality construction and design features; and a potential competitive position within the property's immediate market area.

B. Diversification

The real estate portfolio will be diversified as to style group, property type, industry sector, life cycle, economic driver, investment manager and geographical location. Diversification reduces the impact on the portfolio of any one investment or any single manager's investment style to the extent that an adversity affecting any one particular area will not impact a disproportionate share of the total portfolio. Portfolios for core investment managers and non-core or value added investment managers will carry the diversification characteristics set forth in the allocations and definitions set out below. Diversification compliance will be monitored on a quarterly basis for compliance with ARMB's Guidelines by staff and the real estate consultant.

For purposes of calculating diversification compliance, the overall real estate portfolio size will be considered the product of the greater of projected or target real estate allocation times the projected fiscal year-end overall plan assets as established in the Annual Investment Plan. The projected fiscal year-end overall plan assets will take into account the target allocations and projected returns of all asset classes in which plan assets are invested, and estimated net pay-outs to plan beneficiaries. Unless exceptional circumstances justify a deviation, the maximum percentage of the real estate portfolio investment for each of the identified categories is as follows:

Non-Controlled Investments: (ARMB cannot liquidate within 180 days)	50%
Non-Core Investments (See definition below):	50%
Single Manager Limit: *(value of both Separate Account and Commingled Fund combined, if applicable)*	45 %
~~Public Equity:~~	~~50 %~~
~~Public Debt:~~	~~0 %~~
~~Private Equity:~~	~~100 %~~
~~Private Debt:~~	~~0 %~~

Geographic:

ARMB will avoid over-concentration in areas of similar real estate performance. The consultant will monitor ARMB's concentrations in this area, considering indicators such as NCREIF sub-region, metropolitan areas and economic drivers. The consultant will report its conclusions regarding the acceptability of ARMB's concentration limits quarterly.

Outside United States:	20 %
Single Property Investment: *(acquisition cost plus projected capital additions and improvements)*	5 %
Single-Tenant (any one firm):	10 %
Property Type:	40 %

Manager Allocation – It is understood that Separate Account Investment Managers may exceed their Board-approved allocations by up to 5% for the purposes of capital improvements on existing assets and/or for the completion of an acquisition. A core Separate Account Investment Manager's portfolio may be invested up to 15% in core-plus style properties to assemble a core portfolio. A value-added Separate Account Investment Manager's portfolio shall include 70%-100% in value-added style properties, and may include up to 30% in opportunistic style properties.

Subject to CIO approval, upon the sale of a property held by a Separate Account Investment Manager in which the net sales proceeds are in excess of the property's cumulative basis, the advisor's allocation will increase in an amount equal to the lesser of the excess of the net sales proceeds over the property's cumulative basis or the aggregate

portfolio net asset value over the aggregate portfolio cumulative basis adjusted to reflect actual sale proceeds. The CIO will also consider whether an allocation increase should be adjusted for any past realized losses incurred by the Separate Account Investment Manager. The intent of this provision is to allow a Separate Account Investment Manager to reinvest realized gains but only to the extent gains are greater than losses which have been experienced in other property investments in the Separate Account Investment Manager's portfolio.

Exceptional circumstances justifying a deviation – When circumstances arise of a temporary nature, such as an unexpected re-valuation of assets, a transfer of assets among managers, or an event in which it would be in the fiduciary interest of the ARMB to do so, the limits set forth in paragraph II.B of ARMB Policies may be exceeded provided that ARMB concurs.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

a) To increase or decrease existing separate account allocations and investments in open-end funds;

b) To commit to new investment funds up to $100 million for each fund; and,

c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

Definitions

Core Investments

Primary Characteristics:

- Fully or substantially leased (85% occupancy or greater)
- Inconsequential turnover near term
- Inconsequential physical issues or renovation required
- Credit tenants
- Primary markets
- Quality property
- Income produces 50% or more of expected return
- Typically longer term holds
- Properties in markets with stable or improving economic conditions

Core-plus Investments

Primary Characteristics:

- Limited renovation, primarily deferred maintenance, limited physical issues or repositioning needed
- Modest near term lease roll over; modest vacant lease up
- Expected growth through increasing rents
- Poor prior management
- A- to B- quality
- Income produces 50% or more of expected return

Non-Core Investments

Value-Added Investments

Primary Characteristics:

- Asset renovation – lobbies, corridors, deferred maintenance
- Intermediate term (6-9 months) physical issues
- Current vacancies or rent loss
- Near term roll over exposure
- Repositioning, re-tenanting
- Distressed prior management
- Purchase of adjacent land to develop
- Alternative, turnaround markets and property types
- Income produces 50% or less of total return

Opportunistic Investments – These investments involve significant redevelopment risk, high leasing risk, and high development risk.

Primary Characteristics:

- Empty Buildings
- High near term turnover
- New development – spec or limited pre-leasing
- Significant rehabilitation and leasing, redevelopment into alternative uses
- Capital displacement in maligned markets: lack of investment capital due to level of risk
- Non-traditional asset type (mezzanine debt, land, etc.)
- Wide ranging investment structures

- Investing in non-performing notes
- Cross-border investing
- Holding periods typically 1 to 5 years
- Income produces less than 50% of total return

Note: *Properties within a multi-property investment will be categorized as either core or non-core.*

C. Implementation Approach

~~The ARMB will implement an investment process for real estate which will, over time, include a minimum of three (3) qualified Separate Account Investment Managers who have been selected on a competitive basis. The ARMB will endeavor to allocate specific funds to qualified managers on a separate account basis. Selected managers will seek real estate investment opportunities in publicly traded equity and/or privately placed equity sectors. Investments will be made on a discretionary basis subject to Staff approval of the Annual Strategic/Tactical Plans prepared by Separate Account Investment Managers and ARMB's approval of the Annual Investment Plan prepared by Staff. In addition to separate accounts, ARMB will selectively consider investments in "pooled/commingled" investment vehicles.~~

All allocation of funds to a manager (including additional investment with existing accounts) and investment strategy must be recommended to ARMB by Staff and the Real Estate Consultant and be accompanied by an investment report which, at a minimum, includes the following: market information; investment alternatives; fee structure and comparison to other alternatives; demonstration of compliance with Guidelines and the then current Annual Investment Plan; historical performance of Separate Account Investment Manager (cash–based internal rates of return and industry standard); projected returns (income and appreciation); and positive and negative attributes of the investment strategy.

On a selective basis, a member of ARMB may visit the site of a real estate investment for the purpose of rendering a report to ARMB supplementing reports provided by Staff, the Real Estate Consultant, or others**.**

D. Prudent Leverage

The total amount of leverage placed on the aggregate separate account assets will not exceed thirty five percent (35%) of the total market value of the real estate separate account portfolio. Directly-owned properties will not be leveraged by the Separate Account Investment Manager. Property encumbered by debt at the time of purchase, if justified on a risk-return basis by the Separate Account Investment Manager, may be acquired subject to Chief Investment Officer approval. With authorization by the ARMB, the Chief Investment Officer may place leverage on a pool of existing core real estate assets held in ARMB's separate account portfolio in a manner consistent with the ARMB's Guidelines.

The total amount of fund level leverage, at the time of investment, will not exceed 35% for core commingled funds investing in a core equity diversified asset strategy. The total amount of fund level leverage, at the time of investment, will not exceed 65% for non-

core commingled funds investing in a value-add or opportunistic ~~equity~~ diversified asset strategy.

E. Lease Structure

Multi-tenant and single tenant properties will be considered. When acquiring single tenant properties, consideration will be given to avoid multiple single-tenant exposure to any firm if those single tenant properties constitute more than 10% of the portfolio. A staggered lease structure for commercial properties will be emphasized.

F. Separate Account Investment Manager Business Plan; Annual Strategic/Tactical Plan; Disposition/Exit Strategy

A Business Plan (including property operating budgets) will be completed by each Separate Account manager for each asset under its management. The Business Plan will identify the current and anticipated competitive position for each property in order to set tactical and strategic objectives and will prescribe in appropriate detail a disposition and exit strategy respecting the particular investments. Part of this process is to evaluate the potential timing of dispositions. A property is considered for sale when it is believed that the equity in the existing investment can achieve a higher return in another real estate investment of similar risk. The Annual Strategic/Tactical Plan will describe the expectation of the manager with respect to acquisitions and dispositions.

G. Fee Structure

Involvement in any venture will be done on a fee basis that is competitive. The preferred method of calculating manager fees will be based upon a formula, which considers both 1) the cost basis of assets under management and 2) investment performance. All fee structures will be approved by ARMB. For core managers, the return-based portion of a fee will emphasize actual cash available for distribution to ARMB.

H. Single Asset Ownership Structure (Applies to Separate Accounts Only)

Provided that the goals of these guidelines are followed, ARMB may invest in separate, specific real estate assets. However, such investments will be undertaken in a fashion structured to limit ARMB's liability to the amount of its investment.

I. Reporting System

Staff and the Real Estate Consultant will develop and implement a comprehensive and responsive reporting and monitoring system for the entire portfolio, individual investments and individual managers. The reporting and monitoring system will endeavor to identify under-performing investments, controlled portfolio diversification deficiencies and inherent conflicts of interest, thereby facilitating active portfolio management. A cash-based internal rate of return (IRR) will be used when evaluating the long-term performance of an investment. Time- weighted returns will be used to measure comparative performance.

J. Distribution of Current Income

All separate account income will be distributed immediately to ARMB or its designee and not automatically reinvested in the account.

K. Lines of Responsibility

Well defined lines of responsibility and accountability will be required of all participants in ARMB's real estate investment program. Participants are identified as:

ARMB – The fiduciaries appointed by the Governor to represent the beneficiaries' interest which shall retain final authority over all real estate investment decisions.

Staff – Investment professionals on the staff of the Department of Revenue and assigned ARMB responsibilities who will assist in the Real Estate equity investment program's design, policy implementation and administration.

Real Estate Consultant – Professionals retained to support Staff and ARMB through the provision of expert real estate strategic planning, implementation and performance monitoring support.

Separate Account Investment Managers – Qualified entities who provide institutional real estate investment management services and maintain a discretionary relationship with ARMB subject to Staff's approval of Annual Business Plans and Annual Strategic/Tactical plans, prepared by Separate Account Investment Managers, and ARMB's approval of the Annual Investment Plan.

Commingled Fund Managers – Qualified entities who provide institutional real estate investment management services through open-end and closed-end real estate pools and other pooled/commingled vehicles.

III. CONFLICTS OF INTEREST

In real estate investment, separate and distinct from other asset classes, the Manager of a Separate Account or Commingled Fund may have direct or significant control over the operations of the assets. This inherent or potential conflict of interest if openly described and regulated may contribute to the lower volatility associated with the asset class, but it also creates a need for a higher oversight standard by the plan sponsor. Staff and ARMB will maintain this oversight in at least the following ways:

A. Property Valuation

The Separate Account Investment Manager will provide ARMB with annual appraisal valuations for all properties for which it has asset management responsibility as of the quarter ending March 31. Unless otherwise directed by ARMB, the appraisal will be prepared by a qualified independent third party entity in accordance with industry standards. Staff may waive the appraisal requirement for recent acquisitions or pending dispositions following a recommendation by the Separate Account Investment Manager that such appraisal would not be a cost effective exercise. For development assets, appraisals are to be conducted in the manner described above after substantial completion

payment by ARMB is made. In addition, the Separate Account Investment Manager will mark each asset to market each quarter based on asset conditions and leasing, operations and capital market conditions for comparable properties in that market.

B. Property Management

The selection of on-site property management will generally be left to the discretion of the Separate Account Investment Manager. It is expected that the Separate Account Investment Manager will retain the highest caliber, market rate property management service either through a third party fee manager or the Separate Account Investment Manager's affiliated property management division. This business relationship will be periodically reviewed by Staff, the Real Estate Consultant and ARMB.

IV. INSURANCE COVERAGE

The Separate Account Investment Manager will obtain insurance for the physical properties and assets under its control. The coverage will be in such amounts and against such risks as, in the Separate Account Investment Manager's professional judgment, shall be in accordance with sound institutional practices applicable to such properties or assets in the specific geographic area. It is expected that such insurance will include, but not be limited to, casualty loss, including where deemed appropriate by the Separate Account Investment Manager, earthquake, flood and any other disaster-type insurance coverage; comprehensive general liability; and title insurance. Separate Account Investment Managers will provide proof of insurance to Staff annually.

V. UNRELATED BUSINESS INCOME TAX

Prior to entering into any transaction, the Manager will assess whether income generated from the property under consideration could qualify as unrelated business taxable income. If this risk exists, the Manager will provide ARMB with an opinion of counsel satisfactory to ARMB that the transaction will not generate unrelated business taxable income under the federal income tax law or any other tax provisions that could affect ARMB's tax-exempt status existing at the time. The Manager shall investigate as to whether ARMB shall be entitled to any property tax exemptions. Managers will provide letters of opinion on UBIT and property tax exemptions to Staff.

VI. ENVIRONMENTAL EVALUATIONS

As a standard procedure during the pre-acquisition analysis, the Separate Account Investment Manager will initiate a formal evaluation for each property through the selection of an environmental consultant. In carrying out the review, appropriate procedures based on standards of the locale and conditions known to exist in the locale shall be undertaken and such procedures should at a minimum include:

- Appointment of an environmental consultant with specific experience in testing and removal of asbestos and other environmental hazards.
- A site survey will be conducted to determine from the available evidence whether hazardous chemicals or environmentally dangerous materials exist or have existed on the subject property, including, at a minimum, a Phase I report.

ARMB may invest in properties, which contain asbestos and other toxic substances, only if the following conditions are met:

- The substance and potential risks are thoroughly disclosed.
- The property is not in violation of any federal, state or local law, ordinance, or regulation relating to the property's environmental condition.
- The estimated cost of the removal or containment programs will be reflected in the purchase assumptions.
- The substance can be properly contained or removed in accordance with the then current Environmental Protection Agency Standards.
- The leasing rollover pattern in the property will accommodate a removal program in the future.

Separate Account Investment Managers will provide the environmental evaluation reports to staff

VII. PROCEDURES FOR INVESTMENT

A. Delegation of Responsibilities

The real estate investment program will be implemented and monitored through the coordinated efforts of the ARMB, Staff, the Real Estate Consultant, and the qualified Manager(s). Delegation of responsibilities for each participant is described in the following sections: A summary of the delegation is attached:

1. ARMB

ARMB will retain final authority over all real estate investment strategy decisions except for Business Plan variances as set forth in the Guidelines Section VIII; approve the Guidelines, the Annual Investment Plan and any periodic revisions to these documents which ARMB deems to be appropriate and prudent for the investment of ARMB assets; retain qualified investment managers and real estate consultants; and set investment limits.

2. Staff

Staff will coordinate program compliance among all participants and communicate the investment policies, objectives and performance criteria to the Separate Account Investment Managers and monitor diversification compliance on a quarterly basis. Staff will also coordinate the receipt and distribution of capital. Staff, in cooperation with the Real Estate Consultant, will periodically review the Separate Account Investment Managers' and portfolio's performance in relation to target returns; review and approve the Separate Account Investment Manager's Annual Business Plan and Annual Strategic/Tactical Plan; review and recommend investments in commingled vehicles; prepare and recommend an Annual Investment Plan; and recommend revisions to the Real Estate Investment Policy Procedures and Guidelines. Staff will also review and approve the detailed property operating budgets prior to the start of each fiscal year and revisions to the property operating budgets in accordance with Section VIII of these Guidelines.

3. Real Estate Consultant

In cooperation with Staff and as deemed appropriate by ARMB, the Real Estate Consultant will ensure program compliance; assist in the implementation of a multiple manager program; review all program documentation and management relationships; conduct manager searches when requested; provide performance measurement analysis of the portfolio; review the Annual Investment Plan as set forth in the Investment Procedures outlined below; and provide special project research pertaining to technical real estate issues.

The Real Estate Consultant will, as requested by ARMB, provide periodic reports for the real estate program including a performance evaluation of the total portfolio to include both ARMB's commingled fund investments and ARMB's separate account investments. The analysis will include both income and capital accounting; comparison to industry performance benchmarks (such as NCREIF); Manager reviews, and effects of "Pooled Leverage" on the real estate portfolio. The Real Estate Consultant will prepare a quarterly performance analysis report which will provide after-fee realized and unrealized gains/losses; monitor and report quarterly diversification compliance and the geographic concentration limits; time weighted returns including both current quarter returns and annualized returns since portfolio inception; and internal rates of return since inception based on actual cash flow from and to ARMB.

Additional responsibilities may include developing selection criteria in manager search efforts, coordinating/conducting manager searches, conducting manager reviews, and other special projects.

4. Managers

Separate Account Investment Managers will acquire and manage real estate investments on behalf of ARMB and in accordance with the then current and approved Annual Business, Annual Strategic/Tactical Plans, and the objectives set forth in the Annual Investment Plan and the Guidelines. Managers will prepare Annual Business (including property operating budgets) and Annual Strategic/Tactical Plans for Staff review and approval.

Commingled fund investment managers will acquire and manage real estate investments on behalf of ARMB and in accordance with the terms of any and all agreements between each respective Manager and ARMB.

B. Investment Procedure

Real estate investments, in compliance with ARMB's Policies, shall be acquired through the following process:

1. Separate Accounts:

Annually, Staff will prepare an Investment Plan after reviewing the Annual Business and Strategic/Tactical Plans of the Separate Account Investment Managers. This document will recommend, as appropriate, revisions to the ARMB Guidelines, additional allocations to existing managers, and revisions to the Annual Business and Strategic/Tactical Plans of each respective Separate Account Investment Manager. Any searches that may be recommended will be outlined. The Investment Plan will then be reviewed by the consultant and submitted to ARMB for final approval. Staff

and the Real Estate Consultant shall review the Separate Account Investment Manager's Annual Business Plans and Annual Strategic/Tactical Plans for consistency with the Annual Investment Plan. Staff will approve all Plans prepared by Separate Account Investment Managers.

Investments will be made on a discretionary basis by Separate Account Investment Managers in accordance with their approved Annual Business and Strategic/Tactical Plans. Separate Account Investment Managers must provide staff with copies of their internal "Investment Committee" reports for each asset purchased on ARMB's behalf.

2. Commingled Funds:

Investments in commingled funds will be recommended by Staff and the Real Estate Consultant on an individual fund basis in accordance with the Annual Investment Plan and the ARMB Guidelines.

VIII. DELEGATION OF AUTHORITY

ARMB shall delegate authority to Staff to approve the following:

- Each Separate Account Investment Manager's detailed property operating budgets for each fiscal year;
- Annual Business Plans and Annual Tactical/Strategic Plans prepared by ARMB's Separate Account Investment Managers;
- Revised property operating budgets and variances in approved Annual Business Plans for unanticipated, significant leasing activity; and
- Line item variances in approved capital expenditure budgets in amounts up to $300,000 with a cumulative fiscal year maximum of $3,000,000 per Separate Account Investment Manager for other capital expenditures not related to leasing activity (such as repairs for building damage or defects).

IX. CONFIDENTIALITY

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by Manager(s) or Consultant(s) which is reasonably designated by Manager(s) or Consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to Part II section I (Reporting System) of these Guidelines shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by Manager(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of Manager(s) or ARMB to manage, lease, market or sell such property or Assets.

X. REVISIONS

This document replaces and consolidates the policies, procedures, and guidelines as of ~~September 29, 2016~~October 5, 2017. This document is to be reviewed no less than annually and revised as appropriate.

XI. REAL ESTATE SEPARATE ACCOUNT INVESTMENT MANAGERS

The following investment managers acquire institutional-grade properties on a discretionary basis for the Alaska Retirement Management Board:

UBS Realty Investors LLC
Property type – Core/apartments, industrial, retail and office
Contact - Jeffrey G. Maguire
Managing Director
10 State House Square
Hartford, CT 06103-3604
Telephone: 860-616-9086
Fax: 860-616-9104
E-mail: jeffrey.maguire@ubs.com
Web site: www.ubs.com

LaSalle Investment Management
Property type – Core/apartments, industrial, retail and office (includes Takeover Assets)
Attn: ~~George Duke~~Julie Manning
Managing Director
333 West Wacker Drive, Suite 2300
Chicago, IL 60606
~~100 East Pratt Street, 20th Floor~~
~~Baltimore, MD 21202~~
Telephone: ~~(410) 878-4810~~ (312) 897-4052
~~*Facsimile:* (410) 878-4910~~
E-mail:
~~George.Duke@lasalle.com~~julie.manning@lasalle.com
Web site: www.lasalle.com

Sentinel Realty Advisors Corp.
Property type – Core/apartments only
Contact – George Tietjen
Managing Director
1251 Avenue of the Americas
New York, NY 10020
Telephone: 212-408-2929
Fax: 212-603-5961
E-mail: ~~weiner@sentinelcorp.com~~
tietjen@sentinelcorp.com
Web site: www. sentinelcorp.com

XII. REAL ESTATE COMMINGLED ACCOUNT INVESTMENT MANAGERS

UBS Realty Investors LLC
Contact: Thomas J. Anathan,
Managing Director
10 State House Square
Hartford, CT 06103-3604
Telephone: 860-616-9128;
Facsimile: 860-616-9104
E-mail: thomas.anathan@ubs.com

J.P. Morgan Asset Management
Contact: Ann Cole, Managing Director Portfolio Manager; Kimberly Adams, Managing Director Portfolio Manager, Strategic Property Fund
270 Park Avenue, 7th Floor
New York, NY 10017
Telephone: (AC) 212-648-2152
Telephone: (KA) 312-732-6366
Facsimile: 917-464-7449

ann.e.cole@jpmorgan.com
kimberly.a.adams@jpmorgan.com

Clarion Partners
Contact: Richard Schaupp
Director
230 Park Avenue
New York, NY 10169
Telephone: 212-883-2716
Facsimile: 212-883-2806
*E-mail:*richard.schaupp@clarionpartners.com

Tishman Speyer Properties
Contact: Julie Lurie
45 Rockefeller Plaza, 7th Floor
New York, NY 10020
Telephone: 212-715-0329
Facsimile: 212-895-0129
E-mail: JRLurie@tishmanspeyer.com

Almanac Realty Investors, LLC
Contact: Matt Kaplan, Managing Partner
1140 Avenue of the Americas, 17th Floor New York, NY 10036
Telephone: 212-403-3522
Facsimile: 212-403-3520
E-mail: matthew.kaplan@almanacrealty.com

ColonyCapital, LLC
Contact: Andrea Nicholas
515 S. Flower Street, 44th Floor
Los Angeles, CA 90071
Telephone: 310-552-7191
Facsimile: 310-407-7391
E-mail: ANicholas@colonyinc.com

LaSalle Investment Management *Contact:*
Steve Bolen, President
100 East Pratt Street, 20th Floor
Baltimore, MD 21202
Telephone: 410-347-0660
Facsimile: 410-347-0612 fax
E-mail: steve.bolen@lasalle.com

KKR & Co. L.P.
Contact: Dan McLaughlin, Director
555 California Street

Silverpeak Legacy Partners
Contact: Colleen Fennerty
Managing Director
40 West 57th Street, 29th Floor
New York, NY 10019
Telephone: 212-716-2064
Facsimile: (646) 285-9271
E-mail: investorrelations@silverpeakre.com

Barings Real Estate Advisers LLC
Contact: Patrick T. Kendall, Vice President
One Financial Plaza, Suite 1700
Hartford, CT 06103
Telephone: 310-234-2525
Facsimile: 949-852-9804
E-mail: pkendall@barings.com

Coventry Real Estate Fund II, LLC
Contact: Peter Henkel
1 East 52nd Street, 4th Floor
New York, NY 10022
Telephone: 212-699-4109
Facsimile: 212-699-4124
E-mail: phenkel@coventryadvisors.com

BlackRock, Inc.
Contact: Ted Koros, Managing Director
50 California Street, Suite 300
San Francisco, CA 94111
Telephone: 415-670-6210
Facsimile: 646-521-4982
E-mail: theodore.koros@blackrock.com

~~**Lowe Hospitality Investment Partners, LLC**~~
~~*Contact*: Bleecker P. Seaman, Executive VP~~
~~11777 San Vicente Boulevard, Suite 900~~
~~P.O. Box 49021~~
~~Los Angeles, CA 90049-6615~~
~~*Telephone*: 310-571-4263~~
~~*Facsimile*: 310-207-1132~~
~~bseaman@loweenterprises.com~~

San Francisco, CA 94101
Telephone: 415-315-6573
E-mail: dan.mclaughlin@kkr.com

Attachment 1

REAL ESTATE INVESTMENT POLICY and PROCEDURES - Delegation of Responsibilities Attachment					
	Frequency	**Separate Account Investment Managers**	**Consultant**	**Staff**	**Board**
Real Estate Investment Policy, Procedures, and Guidelines			R	P&R	A
Review and Revise	Annually		R	R	A
Separate Account Investment **Manager Selection**	Periodically		G&R	G&R	A
Request For Proposal (RFP)			P&R	P&R	A
Real Estate **Consultant Selection**	Tri-Annually			G&R	A
Request For Proposal (RFP)				P&R	A
Commingled Fund Selection**	Periodically		R	R	A
Real Estate Investment Plan**	Annually		R	P&R	A
Separate Account Business Plan**	Annually	P	R	R&A	
Detailed Property Operating Budget	Annually	P	R	R&A	
Separate Account Strategic/Tactical Plan**	Annually	P	R	R&A	RT
Quarterly Performance	Quarterly		P	RT	RT
Portfolio/Property Diversification Compliance	Quarterly		M	M	
Geographic Concentration Limit	Quarterly		M	RT	

A = Approves RT = Reported To * Grade Semi-finalists only
G = Grade M = Monitor ** Investment Decision (Shaded)
P = Prepares
R = Recommends

State of Alaska
ALASKA RETIREMENT MANAGEMENT BOARD
Relating to Infrastructure Investment Guidelines

Resolution 2018-16

WHEREAS, the Alaska Retirement Management Board (Board) was established by law to serve as trustee to the assets of the State's retirement systems; and

WHEREAS, under AS 37.10.210-220, the Board is to establish and determine the investment objectives and policy for each of the funds entrusted to it; and

WHEREAS, AS 37.10.071 and AS 37.10.210-220 require the Board to apply the prudent investor rule and exercise the fiduciary duty in the sole financial best interest of the funds entrusted to it and treat beneficiaries thereof with impartiality; and

WHEREAS, the Board contracts an independent consultant to provide experience and expertise in asset allocation and other investment matters to come before the Board; and

WHEREAS, the Board has established an asset allocation for the funds that considers earnings and liabilities on a current as well as a future basis; and

WHEREAS, the Board has authorized investment in real estate assets for the Public Employees' Retirement System, Teachers' Retirement System, and Judicial Retirement System, including investments for those systems in the State of Alaska Retirement and Benefit Plans Trust; and

WHEREAS, the Board establishes and from time to time as necessary, modifies investment policies, procedures, and guidelines for real estate;

NOW THEREFORE, BE IT RESOLVED THAT THE ALASKA RETIREMENT MANAGEMENT BOARD adopts the Infrastructure Investment Guidelines, attached hereto and made a part hereof.

This resolution repeals and replaces Resolution 2017-17.

DATED at Anchorage, Alaska this _____ day of September, 2018.

_____
Chair

ATTEST:

_____
Secretary

Infrastructure

ARMB Investment Guidelines

In addition to the Infrastructure Guidelines, public infrastructure investments shall comply with ARMB's Investment Guidelines for Domestic, International and Alternative Equities.

Section 1. Investment Objective

To develop a diversified portfolio of infrastructure investments with a focus on total return which will seek to produce a ~~minimum 5% net real total rate of return~~ net-of-fee total return between public equities and fixed income over rolling six~~five~~-year periods. Portfolio risk shall reflect the lowest expected risk profile required to achieve the return objectives. Each ARMB infrastructure advisor will place an emphasis on the preservation of capital and diversify the infrastructure investments to minimize risk. To the extent return objectives can be met, current income shall be given preference over appreciation.

Section 2. ARMB Infrastructure Advisor Selection

ARMB will select qualified investment managers who have the discretion to invest in infrastructure. In order for entities to be considered, the entity must demonstrate that it is able to add value through its infrastructure knowledge, experience and strategy; evaluate the risks of each infrastructure investment which is contemplated; and comply with these ARMB Infrastructure Investment Guidelines.

ARMB will implement an investment process for infrastructure which will, over time, include a minimum of two private investment advisors who have been selected on a competitive basis. Each ARMB infrastructure investment advisor will provide services according to an agreed upon investment management agreement (contract) and the ARMB Investment Guidelines. ARMB will endeavor to allocate specific funds to each ARMB infrastructure investment advisor. ARMB infrastructure advisors will invest funds on a discretionary basis in infrastructure investment opportunities to the extent of its specific allocation.

Compensation for investment management services will be done on a fee basis that is competitive. The preferred method of calculating ARMB infrastructure investment advisor fees will be based upon a formula, which considers 1) the cost basis of assets under management and 2) market value of the assets under management.

Section 3. Allocation

ARMB's allocation to infrastructure investments shall be determined by the Board of Trustees and reviewed annually.

CIO Discretionary Investment Authority – The CIO shall have the following discretionary investment authority:

a) To increase or decrease existing separate account allocations and investments in open-end funds;

b) To commit to new investment funds up to $100 million for each fund; and,

c) To engage consultants and take other action as may be necessary to ensure sufficient due diligence is performed on all investments under consideration.

The CIO shall exercise this discretion within Board approved asset allocations, investment plans, and guidelines as they may apply.

The CIO will provide prior notification to the Chair of ARMB before committing to any investments under this authority. All discretionary CIO investment actions shall be reported to the Board.

Section 4. Performance Benchmark

The benchmark for the total infrastructure portfolio will be ~~the~~CPI + 4%, the S&P Global Infrastructure Index, and the Alerian MLP Index. Investment managers for public stock portfolios will be allowed to use their preferred infrastructure benchmark. Private investment advisors will be evaluated based on the income and total return objectives of their strategies. The inflation index used to calculate the actual real rate of return is the CPI All Urban.

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Section 5. Investment Constraints

(a) Private infrastructure investment strategies shall be constrained by the partnership agreements and other agreements establishing the contractual arrangement with ARMB's infrastructure investment advisors.

(b) Location: No more than 10% of ARMB's infrastructure investments shall be located in emerging markets.

(c) Strategy: No more than 20% of ARMB's infrastructure investments shall be focused on development of infrastructure assets.

(d) Diversification and Concentration: Each ARMB infrastructure advisor shall ensure that the infrastructure investments under its control are adequately diversified in the context of its investment strategy.

(e) Leverage: The total amount of leverage utilized by private infrastructure managers shall not exceed 75% of the value of the asset as measured at the time the leverage is placed on the asset. Public infrastructure investment managers shall not use leverage.

Section 6. Ownership Structure

Private infrastructure investments will be owned in a structure designed to limit ARMB's liability to the amount of its investment and, where feasible, to recognize and preserve tax-exempt status.

Section 7. Reporting System

Staff will develop and implement a comprehensive and responsive reporting and monitoring system for each ARMB infrastructure advisor.

Section 8. Lines of Responsibility

The infrastructure investment program will be implemented and monitored through the coordinated efforts of the ARMB, staff, and the ARMB infrastructure advisors. A description of the program participants and their general responsibilities are as follows:

ARMB – The statutorily created board which is the fiduciary for the retirement trust funds, comprised of trustees appointed by the Governor to represent the beneficiaries' interest. ARMB hires qualified infrastructure investment advisors and consultants, approves the ARMB Investment Guidelines and revisions to them, and approves the Annual Investment Plan prepared by staff.

Staff - Investment professionals on staff at the Department of Revenue assigned to ARMB infrastructure investments, which will assist in the program's design, policy implementation, and administration. Staff will recommend revisions to the Infrastructure Investment Guidelines as may be necessary from time to time to ARMB.

Annually, staff will prepare an Annual Investment Plan. This document will recommend, as appropriate, revisions to the overall infrastructure investment strategy, revisions to the Infrastructure Investment Guidelines, and make recommendations for additional allocations as may be desirable.

ARMB Infrastructure Advisors – Qualified entities selected by ARMB that provide institutional infrastructure investment management services to ARMB. ARMB Infrastructure Advisors will invest and manage the portfolios in accordance with their contracts.

Section 9. Confidentiality

Pursuant to 15 AAC 112.770, ARMB shall withhold from other persons all information furnished to it by ARMB Infrastructure Advisor(s) or consultant(s) which is reasonably designated by ARMB Infrastructure Advisor(s) or consultant(s) as being confidential or proprietary, within the meaning of Alaska Statutes regarding rights to public information, except to the extent that the information is needed by ARMB in order to adequately report on the status and performance of the portfolio, or to comply with a court subpoena or with an official criminal investigation.

Those portions of reports provided pursuant to the Agreement with ARMB Infrastructure Advisor(s) shall be considered confidential pursuant to 15 AAC 112.770 to the extent that information is reasonably designated by ARMB Infrastructure Advisor(s) as being confidential or proprietary, or to the extent the disclosure of which would unfairly prejudice the ability of ARMB Infrastructure Advisor(s) or ARMB to manage, lease, market or sell such property or assets.

Section 10. Revisions

The ARMB Investment Guidelines are to be reviewed no less than annually and revised as appropriate.

Section 11. ARMB Infrastructure Advisors

The following entities have been selected and appointed as ARMB Infrastructure Advisors to acquire infrastructure investments on a discretionary basis for the Alaska Retirement Management Board:

IFM Investors 114 West 47th Street New York, NY 10036 Phone: 212-784-2260 www.ifminvestors.com	**Lazard Asset Management LLC** 30 Rockefeller Plaza, 57th Floor New York, NY 10112 Phone: 212-632-6519 www.lazardnet.com
JPMorgan Asset Management 270 Park Avenue, 7th Floor, NY1-K141 New York, NY 10017 Phone: 212-648-2219 www.jpmorgan.com	**Brookfield Investment Management Inc.** 250 Vesey Street New York, NY 10281-1023 Phone: 212-978-1794 www.brookfieldim.com

Pathway Capital Management

Mandate: Private Equity **Hired:** 2002

Firm Information

Founded in 1991, Pathway creates and manages private equity separate accounts and funds of funds for institutional investors worldwide. Pathway manages capital on behalf of some of the largest corporate and public pension plans, government entities, and financial institutions around the globe. The firm manages assets of $49.0 billion.

Pathway is registered as an investment advisor with the SEC in the United States and as a portfolio manager and exempt market dealer in Ontario, Quebec, and Saskatchewan, Canada. Pathway's wholly owned UK subsidiary is regulated in the UK by the Financial Services Authority. Pathway's wholly owned Hong Kong subsidiary is regulated in Hong Kong by the Securities and Futures Commission.

Key Executives:
Jim Chambliss, Managing Director
Canyon Lew, Managing Director

Investment Approach

Pathway's decision-making process uses a team approach; no one individual has authority to make decisions regarding portfolio management without the input of other senior professionals.

Final investment decisions are made by the Investment Committee comprised of four senior managing directors and four managing directors.

Pathway is extremely selective in choosing private equity investment funds. Every partnership must meet rigid standards regarding the overall quality of the investment opportunity, such as:

- Target markets that can support private equity investing;
- Long-term and proven private equity business model;
- Stable management team operating under a consistent firm culture;
- Proven access to high-quality investment opportunities and resources;
- Strong track record.

Benchmark: Russell 3000 +350 basis points and the Cambridge vintage year peer comparison.

Total ARMB Mandate

Assets Under Management: 03/31/2018
Market Value: $1,037 million

Concerns: None

Performance

The since inception internal rate of return (IRR) for ARMB's Pathway portfolio is 13.8% through 03/31/2018, which compares favorably with the public market equivalent return for the Russell 3000 of 8.9%.

In Callan's vintage year comparison of the Pathway portfolio and the Cambridge database from 2001 through 2012, the Pathway portfolio is in the top quartile for 4 years and in the second quartile for 6 years.

Presentation Prepared For

Alaska Retirement Management Board

SEPTEMBER 2018

PATHWAY®
CAPITAL MANAGEMENT

AGENDA

PATHWAY®
CAPITAL MANAGEMENT

- Pathway Update
- Private Market Environment
- 2018 Tactical Plan
- Portfolio Update
- Appendix

©2018 Pathway Capital Management, LP

Pathway Update

Pathway at a Glance



PRIVATE MARKET SPECTRUM		GLOBAL REACH		FULL-SERVICE MODEL
Founded in **1991**	**100%** owned by its 19 principals	**153** Staff	**>$51 billion** in global AUM[b]	**22 years'** average investment experience[c]

[a]Strategic alliance with Tokio Marine Asset Management. [b]Represents roll-forward market value plus undrawn capital as of June 30, 2018. [c]Represents Pathway's 17 investment partners.

Organizational Chart

Partners

Douglas K. Le Bon — Senior Managing Director
James H. Reinhardt — Senior Managing Director
Karen J. Jakobi — Senior Managing Director & CIO
Alex M. Casbolt‡ — Managing Director
James R. Chambliss — Managing Director
Vincent P. Dee, CFA — Managing Director
James E. Heath†§ — Managing Director
Jason C. Jenkins, CFA — Managing Director
Canyon J. Lew — Managing Director
Matthew M. Lugar* — Managing Director
Richard S. Mazer — Managing Director
Terrence G. Melican — Managing Director
Derrek I. Ransford, CFA — Managing Director
Valerie A. Ruddick — Managing Director
Wayne D. Smith, CFA* — Managing Director
Pete Veravanich — Managing Director
Milt M. Best, CFA — Director & CCO
Curtis P. Gerlach, CPA (inactive) — Director & CFO
Simon Y.S. Lau‡ — Director–Head of Hong Kong

Investing & Reporting

Paul J. de Groot, CFA — Sr. Vice President
Justin C. Maney, CFA — Vice President
Melanie Z. McKinley — Investment Closing Manager
Timothy D. Berry — Investment Analyst
Ashlie L. Wong — Investment Analyst
Stefan Goettl† — Sr. Vice President
Hiral G. Savani, CPA — Vice President
Olga V. Biedak — Sr. Investment Analyst
John T. Carpenter — Investment Analyst
Bryan P. Nelson, CFA — Sr. Vice President
Jason K. Yu‡ — Vice President
Francesca Cortazar — Sr. Investment Analyst
Jean-François L. Casanova† — Investment Analyst
John T. Ruggieri, CFA* — Sr. Vice President
Adam A. Belkairous — Associate
Brenton W. Croteau — Sr. Investment Analyst
Adrian J. Gonzalez — Investment Analyst
Mikael Sand, CFA† — Sr. Vice President
Wyatt H. Geiger, CFA — Associate
Jun Tae Park‡ — Sr. Investment Analyst
Matthew T. Hagerty* — Investment Analyst
Nicholas J. Siemsen, CFA — Sr. Vice President
Matthew T. Kahn — Associate
M. Hunain Riaz — Sr. Investment Analyst
Sabeen W. Jameeli — Investment Analyst
Kevin W. Bland — Vice President
Petros Krappas† — Associate
Matthew R. Spader* — Sr. Investment Analyst
Taylor V. Pijl — Investment Analyst
Jeffrey L. Buress* — Vice President
Trisha A. Mandalia† — Associate
Richard L. Wang — Sr. Investment Analyst
Jack Pong‡ — Investment Analyst
Mitchell T. Clemente — Vice President
Benjamin Pittsley* — Associate
Brandon M. Young — Sr. Investment Analyst
Pascal R. Su, CPA — Investment Analyst
Blessie Hwang, CFA — Vice President
Brett W. Richardson, CFA — Associate
Johnathan P. Beaudette — Investment Analyst
Christopher M. Thompson — Investment Analyst

Fund Accounting

Raquel J. Nicolas, CPA — Sr. Vice President–Finance
Jason Jung Sup Lee, CPA — Fund Accounting Mgr.
Theodore D. Kim — Fund Accountant
Micah B. Montiel — Sr. Operations Specialist
Won C. Chung, CPA (inactive) — Vice President–Finance
Masato Omukai, CPA — Fund Accounting Mgr.
Soyeon Kim — Fund Accountant
Rochele L. Porpora — Sr. Operations Specialist
Katie Doan, CPA (inactive) — Vice President–Finance
Ryne L. Staback, CPA — Fund Accounting Mgr.
Raymond Nguyen — Fund Accountant
Lynn B. Huang — Operations Specialist
Kenneth Y. Loh, CPA (inactive) — Vice President–Finance
Armando Giles — Sr. Fund Accountant
Kristine N. Sangalang, CPA — Fund Accountant
Christin S. Zontek — Operations Specialist
Maulin S. Dixit, CPA (inactive) — Controller
Lauren C. Lopez — Sr. Fund Accountant
Raj S. Sarkar — Fund Accountant
Bryan C. Burgonio — Cash Accountant
Mark V. Alviz, CPA (inactive) — Fund Accounting Mgr.
Jennifer Moreno — Sr. Fund Accountant
Ryan P. Skelton — Fund Accountant
Andrew I. Chu — Cash Accountant
Jason A. Delos Reyes, CPA — Fund Accounting Mgr.
Carolyne P. Truong — Sr. Fund Accountant
Benjamin D. Gunther, CPA — Investment Operations Mgr.
Katherine M. Dabu — Cash Accountant
Patrick Y. Kim, CPA — Fund Accounting Mgr.
Steve B. He — Fund Accountant
Sandra G. Fontal — Sr. Operations Specialist
Lailan Kok — Cash Accountant

Corporate Accounting

Benjamin S. Brewster, CPA — Sr. Vice President–Corporate Finance
Stacey A. Jaswell — Corporate Accounting Manager
Mitzi Ledesma — Sr. Payroll Administrator
Angel A. Aguilar Jr., CPA — Controller–Corporate Finance
Eric A. Thomson, CPA (inactive) — Sr. Corp. Accountant
Lori L. Espinosa — Asst. Controller–Corporate Finance
Nora L. Johnson — Corp. Accountant

Tax

Rose L. Carter, CPA — Vice President–Tax
Erik Gonzalez, CPA — Sr. Tax Accountant
Michael L. Wintroub — Sr. Tax Accountant
Dustin T. Hankins, JD, CPA — Vice President–Tax
Karen T. Pham — Sr. Tax Accountant
Allison M. Coombes — Sr. Tax Administrator

Legal

Ashok K. Tripathi, Esq. — Sr. VP & General Counsel
Jeffrey M. Hayes, Esq. — Asst. General Counsel
Jennifer L. Tanaka, Esq. — Counsel
Camille L. Pedigo, Esq. — VP & Asst. General Counsel
Sunna Choi, Esq. — Senior Counsel
Patricia C. Kilmann — Mgr.–Legal Administration
James A. Dee, Esq. — Asst. General Counsel
Michael J. Reynolds, Esq. — Counsel

Client Services

Gerard R. Branka* — Sr. Vice President
Teri C. Noble — Sr. Vice President
Chelsea T. Cole — Marketing Coordinator
John V. Brescia* — Sr. Vice President
Martin J. Wing — Vice President
Megan J. Daley — Marketing Coordinator

Compliance

Stefanie A. Karp — Vice President
Isabel M. Rosser — Sr. Compliance Specialist

Systems Admin.

Brian M. Leyran — Systems Administration Mgr.
4 Staff

Software Development

Michael C. Long — Mgr.–Software Development
4 Staff

Editorial & Production

Christopher M. Lopez — Editor & Production Manager
3 Staff

HR & Admin.

David J. Tosches — Vice President of HR
22 Staff

*Rhode Island staff. †London staff. ‡Hong Kong staff. §Expected to retire at the end of 2018.

Private Market Environment

Overview

- Private markets have continued to perform well, driven by strong underlying operating performance and robust M&A exit market activity.
- Investment activity has increased but remains below prior market peaks; general partners are cautious and disciplined in the face of relatively high valuations and strong competition.
- Global IPO issuance has increased in 2018 from 2017; PE-backed companies continue to account for a large proportion of IPO activity.
- Venture capital investment activity remains strong, driven by "mega-round" financings; venture capital–backed exit activity through 1H18 is on pace to match an active 2017.
- Indicators of distress in non-investment-grade credit markets remain at low levels: the TTM U.S. high-yield default rate finished 2Q18 at 2.8%.
- Dry powder (uninvested capital) in buyout markets has increased in recent years but *years-to-deploy* ratio remains reasonable.
- Periodic episodes of volatility and market dislocation continue to generate attractive opportunities for general partners to deploy capital.

2018 Tactical Plan

2018 Tactical Plan Review and Progress

At August 29, 2018

	2018 Plan	Actual to Date[a]
Commitments	$210 million	$197.3 million
Number of Investments	Up to 20 partnerships and up to 12 co-investments	15 primary partnerships, 12 co-investments
Size of Investments	$10–$25 million (primaries)	$11.6 million avg. commitment (primaries)
Investment Strategies	Buyouts, Venture Capital, Special Situations, Restructuring, and Co-investments	Buyouts (8), Venture Capital (4), Special Situations (3), Restructuring (0), Co-investments (12)

	2018 Plan		Commitments to Date	
Strategy	No. of Inv.	Targeted Commitments ($MM)	No. of Inv.	Commitments ($MM)
Buyouts	Up to 10	Up to 125	8	92.0
Venture Capital	Up to 10	Up to 100	4	45.8
Special Situations	Up to 8	Up to 75	3	27.5
Restructuring	Up to 6	Up to 50	0	0.0
Co-investments	Up to 12	Up to 32	12	32.0
Total		**Up to 210**	**27**	**197.3**

NOTE: Amounts may not foot due to rounding.

[a]Includes two primary commitments that have been approved by Pathway's investment committee but have not yet closed.

Portfolio Update

Portfolio Overview

At August 29, 2018

($ in millions)

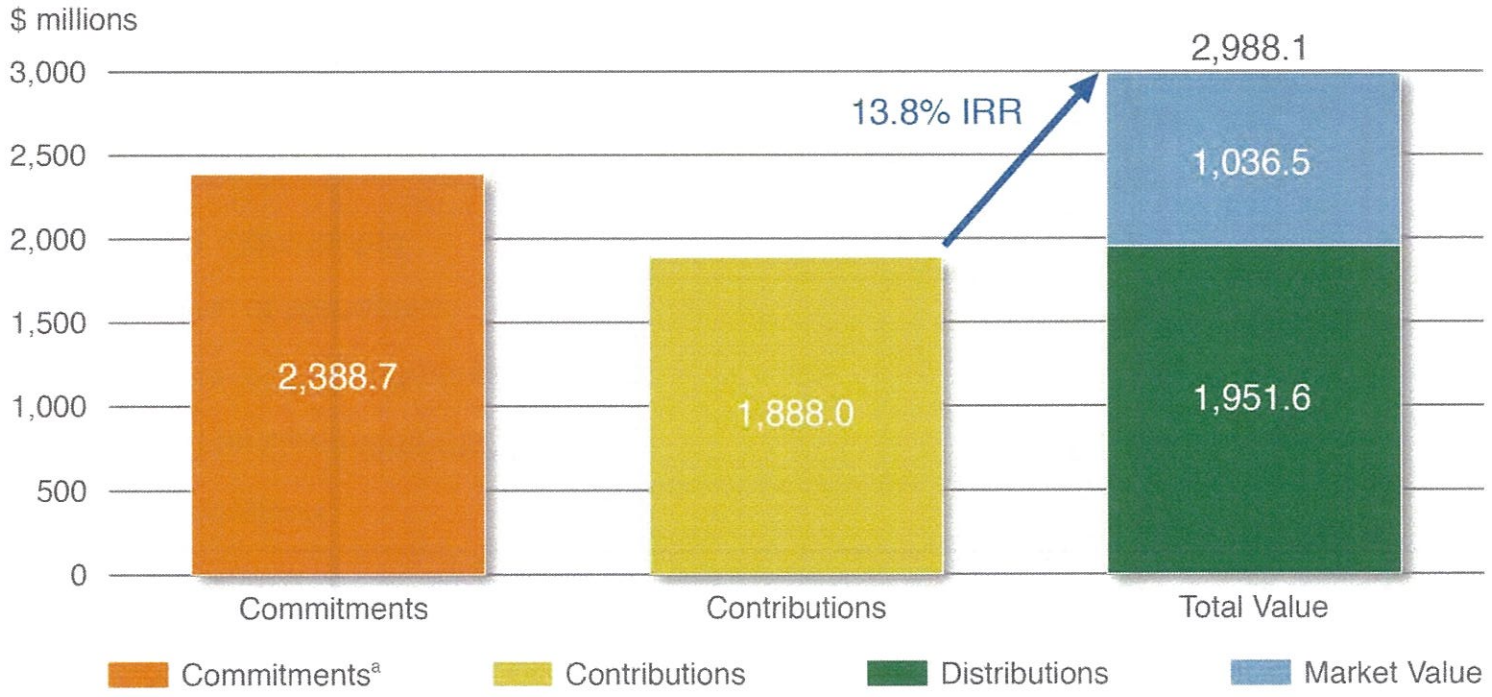
Inception	2002
Total Commitments[a,b]	$2,484.8
No. of Commitments[b]	219
No. of Managers	73
% Contributed	81%
Weighted Avg. Age (Years)	6.5
Current Companies[c]	2,608
S-I Net IRR[c]	13.8%
DPI	1.03x

[a]Commitments to non-USD-denominated partnerships are accounted for by multiplying unfunded commitments by the most recent quarter-ending exchange rate, then adding the result to cumulative capital contributions, causing commitments to non-USD-denominated partnerships to fluctuate quarterly.
[b]Includes two primary commitments which have been approved by Pathway's investment committee but have not yet closed.
[c]As of March 31, 2018.

Performance Summary

At March 31, 2018

FINANCIAL SUMMARY

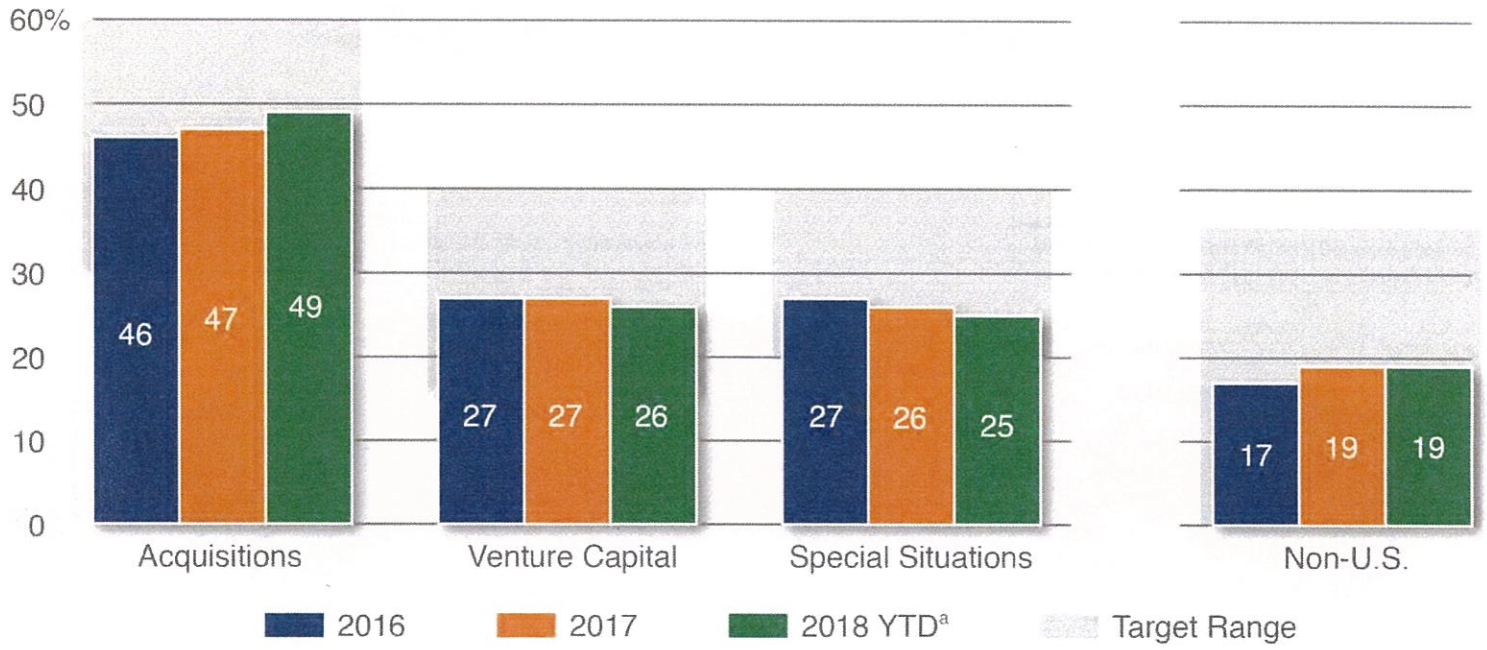


[a]Commitments to non-USD-denominated partnerships are accounted for by multiplying unfunded commitments by the quarter-ending exchange rate, then adding the result to cumulative capital contributions, causing commitments to non-USD-denominated partnerships to fluctuate quarterly.

Investment Strategy Diversification

As a % of Partnership Market Value plus Unfunded Commitments

At August 29, 2018



NOTE: Based on partnership market values and unfunded partnership commitments at December 31 of each year.

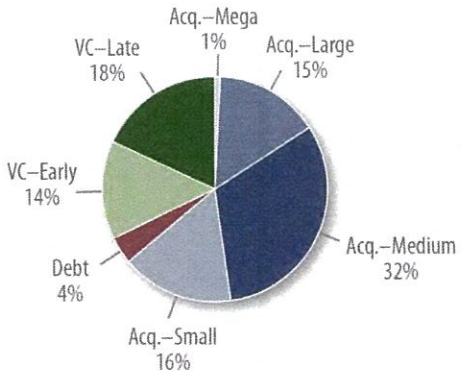
[a]Based on partnership market values and unfunded partnership commitments at March 31, 2018, plus new commitments made or approved through August 29, 2018.

Portfolio Diversification

As a % of Company Market Value—2,608 Investments

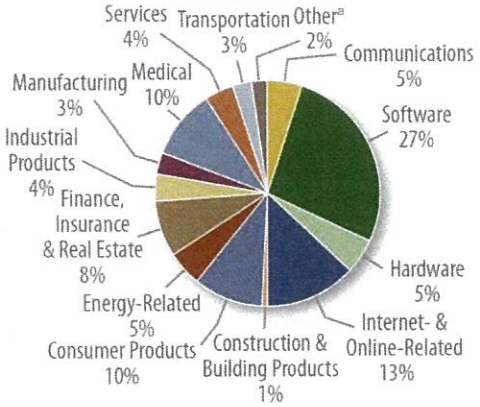
At March 31, 2018

STRATEGY



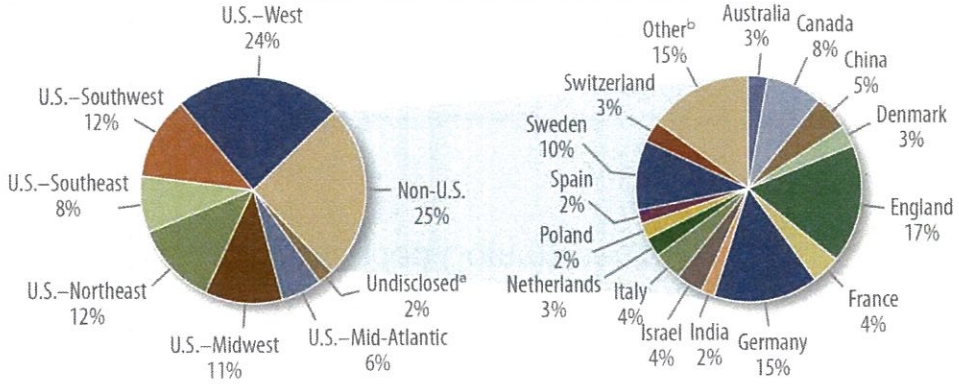
NOTES: Acquisition substrategies are based on the following ranges of total enterprise values: Mega >$10 billion, Large $1–$10 billion, Medium $200 million–$1 billion, and Small <$200 million. Excludes investments for which the general partners have not provided investment strategy classifications.

INDUSTRY



[a]Comprises agriculture-, forestry-, and fishing-related, as well as investments for which the general partners have not provided industry classifications.

GEOGRAPHIC REGION

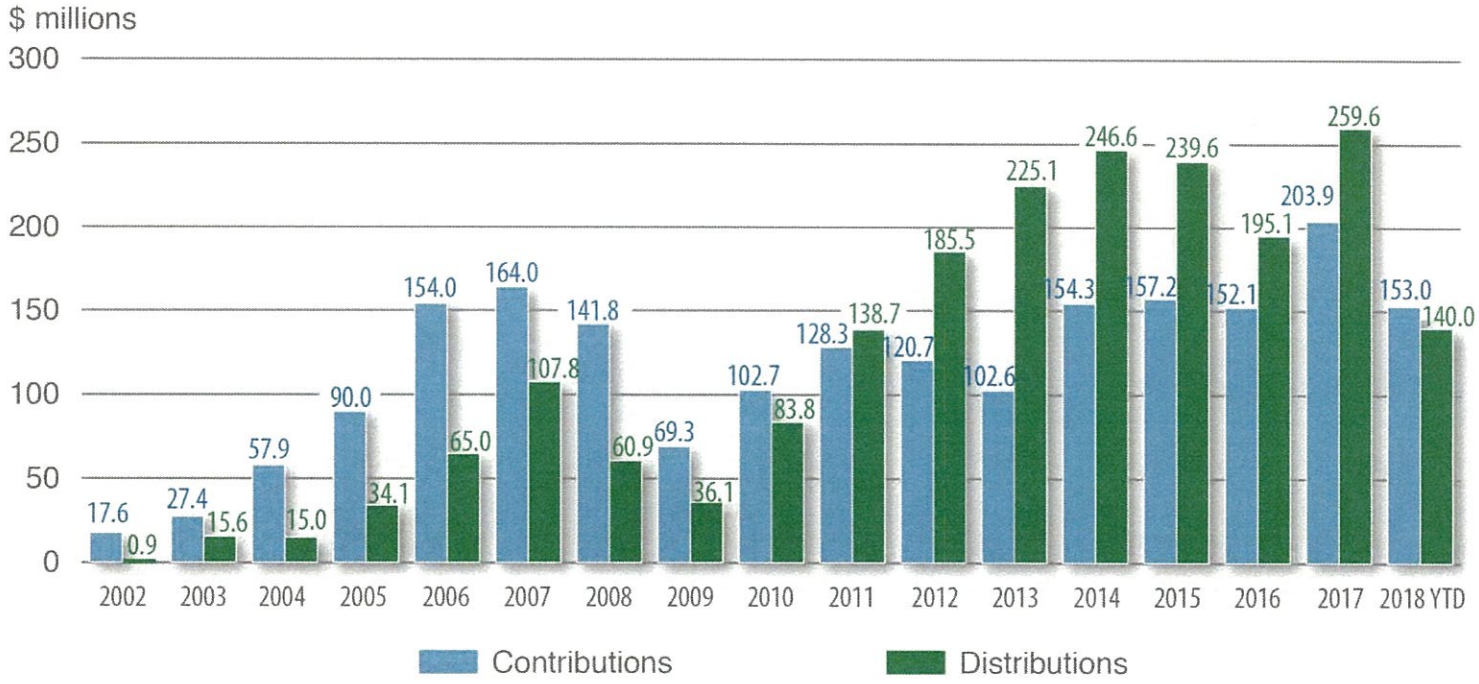


[a]Comprises investments for which the general partners have not provided geographic classifications.
[b]Comprises regions that each account for less than 2% of the portfolio's non-U.S. market value.

Contribution and Distribution Activity

At August 29, 2018

ANNUAL CASH FLOWS SINCE INCEPTION



- Distributions during 2017 totaled $260 million, which represents the largest annual distribution total since the inception of the program.
- ARMB's private equity portfolio has generated positive net cash flow of $458 million since the start of 2011.
- Cumulative distributions, as of August 29, 2018, totaled $2.0 billion, or 103% of cumulative contributions.

Portfolio Performance

At March 31, 2018

($ in millions)

	No. of Investments	Commitments[a]	Contributions[b]	Distributions	Market Value	Total Value	Gain/ Loss	Since-Incep. Net IRR
Mar 31, 2018	202	$2,388.7	$1,888.0	$1,951.6	$1,036.5	$2,988.1	$1,100.1	13.8%
Mar 31, 2017	176	2,143.3	1,685.7	1,699.5	919.8	2,619.3	933.6	13.5%
YOY Change	**26**	**$245.5**	**$202.3**	**$252.0**	**$116.7**	**$368.7**	**$166.4**	**0.3%**

NOTE: Amounts may not foot due to rounding.

[a]Commitments to non-USD-denominated partnerships are accounted for by multiplying the unfunded commitments by the quarter-ending exchange rate, then adding the result to cumulative capital contributions, causing commitments to non-USD-denominated partnerships to fluctuate.

[b]Includes capital contributed for management fees called outside the total commitment.

- Performance during the 1-year period ended March 31, 2018, was strong: the portfolio generated a gain of $166.4 million and a 1-year return of 18.6%.
  - The portfolio generated a quarterly return of 3.5% or greater during each quarter of the 1-year period.
  - 7 of the portfolio's vintage years posted 1-year returns in excess of 20%.
  - 125 of the portfolio's 167 partnerships active for at least 1 year posted positive 1-year returns, including 35 partnerships that generated 1-year returns in excess of 30%.
  - The portfolio outperformed the Russell 3000 and the MSCI World Index by approximately 480 basis points and 440 basis points, respectively.

Recent Significant Events within the ARMB Portfolio



Co-investment Portfolio Overview

At August 29, 2018

($ in millions)

Inception	May 2016
Annual Target	Up to 15% of annual allocation
Total Commitments[a]	$82.5
No. of Commitments	28
No. of Managers	17

[a]Commitments to non-USD-denominated partnerships are accounted for by multiplying unfunded commitments by the most recent quarter-ending exchange rate, then adding the result to cumulative capital contributions, causing commitments to non-USD-denominated partnerships to fluctuate quarterly.

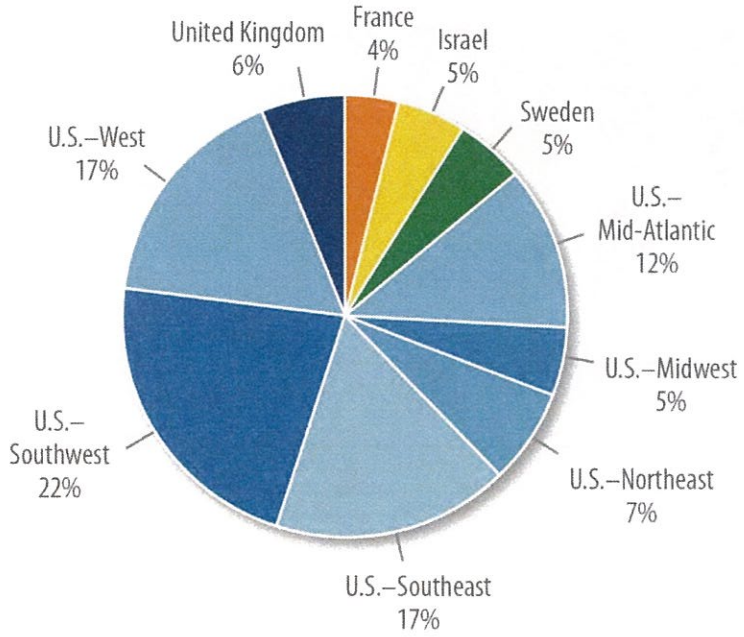
- The co-investment program is off to a promising start and is achieving its objectives:
  - No carried interest or ongoing management fees on co-investments completed to date. Commitments to the co-investment portfolio have generated estimated management-fee and carried-interest savings of $0.9 million and $2.5 million, respectively, as of March 31, 2018.
  - Since-inception IRR of 33.7% and gain of $13.4 million, as of March 31, 2018.
  - 2 attractive early exits experienced to date, which in aggregate have generated a multiple of 2.4 times invested capital and distributions of $15.6 million.

Co-investment Portfolio Diversification

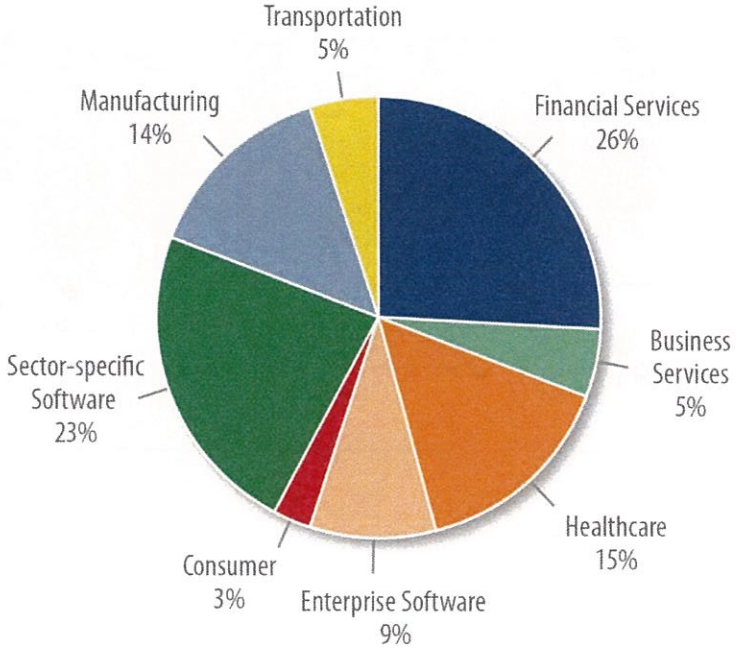
As a % of Total Commitments

At August 29, 2018

GEOGRAPHIC DIVERSIFICATION



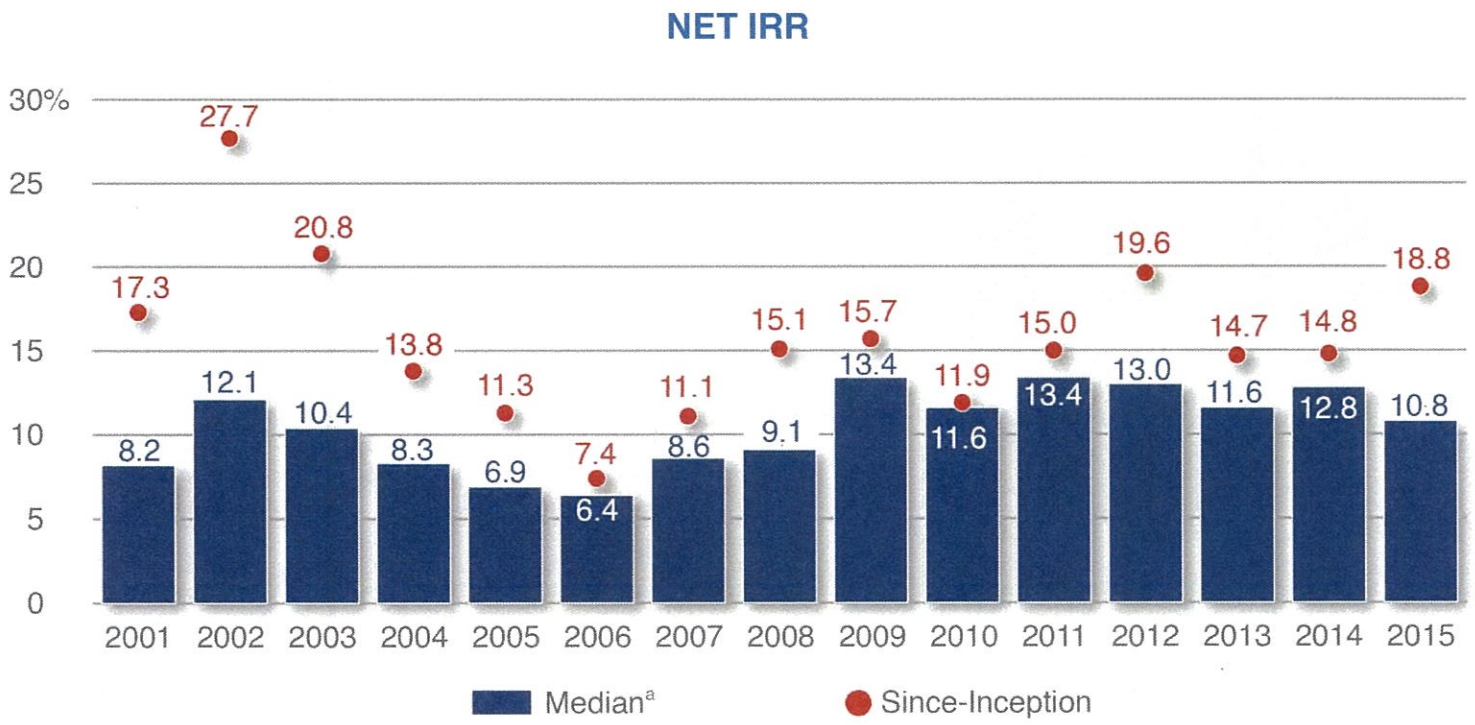
INDUSTRY DIVERSIFICATION



- ARMB currently has access to co-investment deal flow from 60 managers from Pathway's portfolio whose strategies span a variety of sectors, regions, and transaction sizes.

Vintage Year Performance vs. Industry Benchmarks

At March 31, 2018

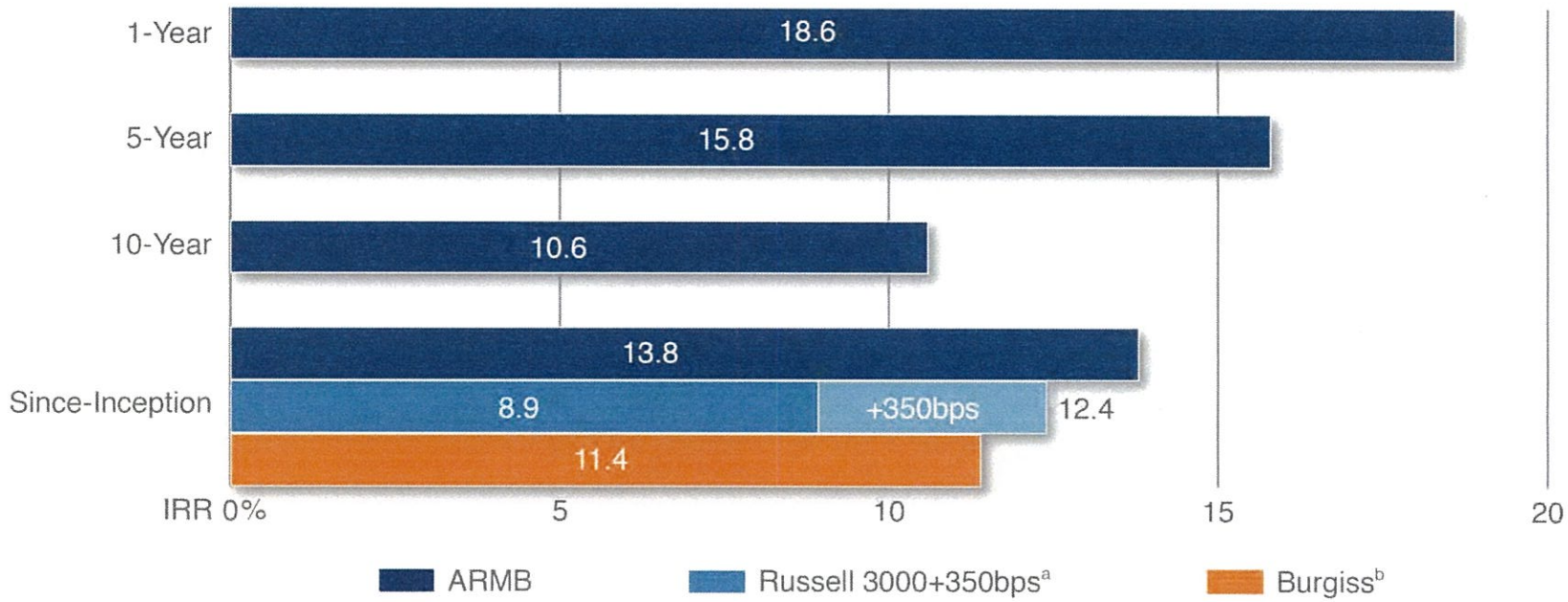


[a]Burgiss Private iQ global all private equity median return benchmark, as of March 31, 2018, as produced using Burgiss data.

- All 15 of ARMB's more-mature vintages (2001–2015) rank in the top half of performers for their vintages, collectively exceeding their median benchmarks by an average of 520 basis points.

Net Performance vs. Public and Private Market Indices

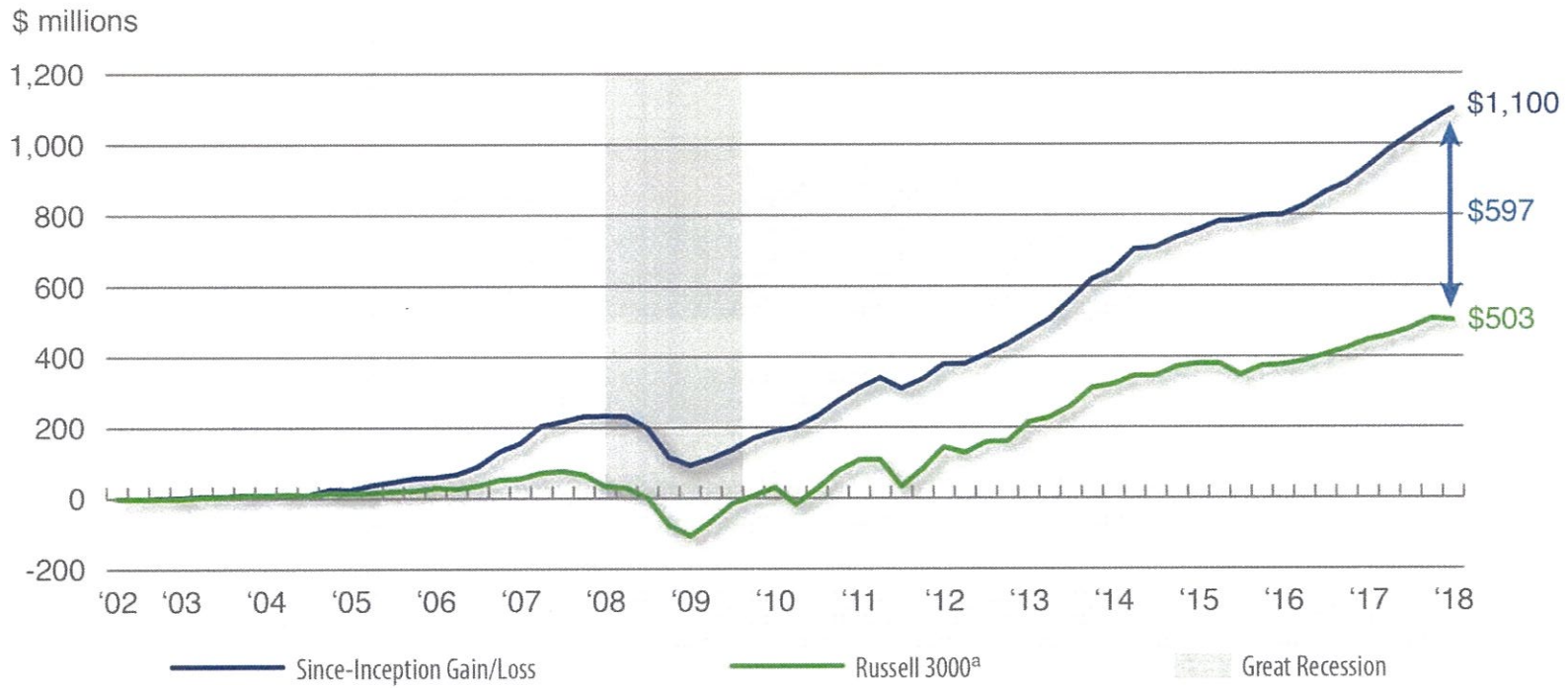
At March 31, 2018



[a]Represents the dollar-weighted return of the Russell 3000 index. Performance was derived by applying ARMB's cash inflows and outflows to the index's daily returns.
[b]Burgiss Private iQ global all private equity pooled horizon return for 2001- through 2018-vintage funds, as of March 31, 2018, as produced using Burgiss data.

Historical Since-Inception Net Gain

At March 31, 2018



[a]Represents the dollar-weighted Russell 3000.

- The portfolio's outperformance of the Russell 3000 has resulted in $597 million of incremental gains above the index since the program's inception.

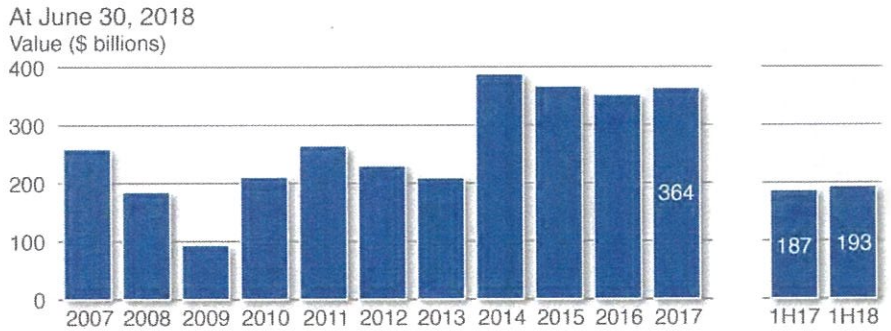
Appendix

M&A and IPO Exit Markets

M&A market activity continues to be robust; global IPO activity has increased since a weak 2016, and exit markets remain accommodative overall.

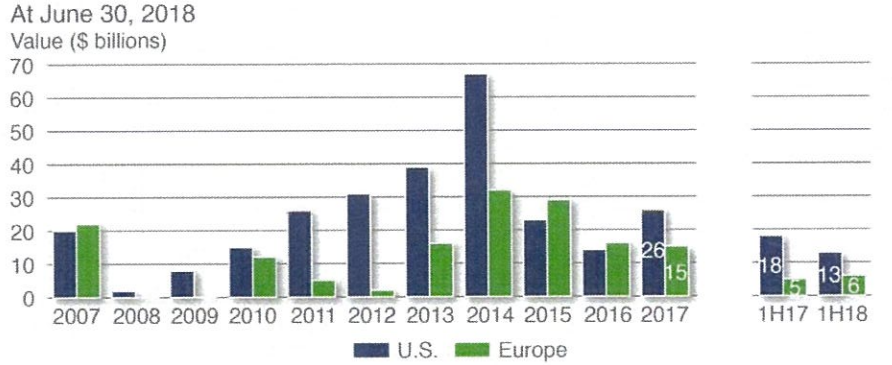
- M&A exit activity for PE-backed companies totaled $193bn in 1H18, up 4% from 1H17.
  - Strategic acquirers with record-high cash balances and access to attractive financing continue to seek acquisitions for growth and scale.
- Notable M&A exits during 1H18 include BMC Software (acquired by KKR for $8.3bn), GitHub (acquired by Microsoft for $7.5bn), and MuleSoft (acquired by Salesforce for $6.5bn)
- Global IPO markets were stronger overall in the first half of 2018 compared with the prior year, but investor sentiment and activity continue to be impacted by volatility and uncertainty, particularly outside the U.S.
  - In the U.S., 4 IPOs raised at least $1.0bn in 1H18, compared with just 2 in all of 2017.
  - Notable private equity–backed listings during 1H18 included Apollo-backed ADT and venture-backed technology companies Dropbox and DocuSign.

Global PE-Backed M&A Exit Activity



SOURCE: Mergermarket.

Global PE-Backed IPO Issuance



SOURCE: Bloomberg, Thomson Reuters, PwC, and Pathway Research.

Buyout Markets

Buyout investment activity has increased but remains meaningfully below the prior cycle peak; general partners continue to take a cautious approach in the current market environment.

- Buyout investment activity in the U.S. increased in 1H18, but remains moderate overall as a result of uncertainty regarding geopolitical and macroeconomic concerns, high valuations, and strong competition in the marketplace.
  - In Europe, investment activity in 1H18 increased by 6% relative to the strong pace in 1H17.
  - Areas of interest for GPs include corporate carveouts, public-to-private transactions, technology, and energy.
- Average purchase-price multiples in the U.S. remain relatively high, partly as a result of a larger proportion of technology-related buyouts in recent periods.
  - Purchase-price multiples in the U.S. declined to 9.8x in 1H18, down from 10.6x in all of 2017.
  - GPs are maintaining discipline and are structuring their transactions prudently overall.
- Buyout firms are focused on high-conviction opportunities in which they believe they can create value organically and/or through add-on acquisitions.

U.S. Buyout Investment Activity



SOURCE: Thomson Reuters, Pathway Research, and S&P LCD.
[a]Average PPM (as a multiple of trailing EBITDA) of all LBOs.

European Buyout Investment Activity



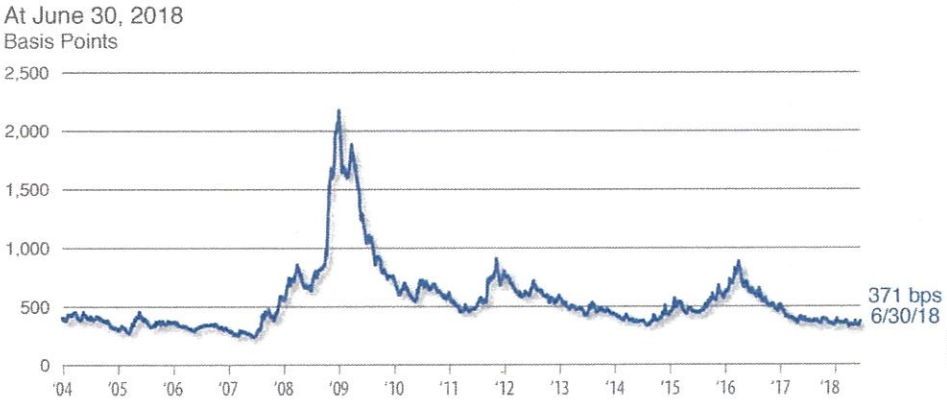
SOURCE: CMBOR, Ernst & Young, Equistone Partners Europe, and S&P LCD.
[a]Average PPM (as a multiple of trailing EBITDA) of LBOs with EV of €500 million or more.

Non-Investment-Grade Credit Markets

Leveraged credit markets are currently accommodative overall.

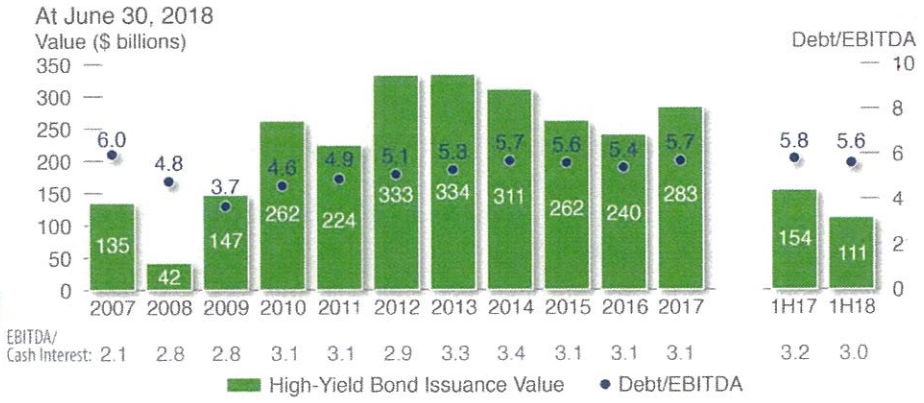
- Credit spreads increased to their highest levels since 2011 in 1Q16 but have declined considerably since then.
  - Spreads for U.S. high-yield bonds rose to 887 bps in February 2016 but ended 2Q18 at 371 bps.
  - Average yield for LSTA 100 B/BB index reached 7.14% in February 2016 but ended 2Q18 at 5.20%.
- Non-investment-grade debt issuance increased notably in 2017 after a year-over-year decline in 2016.
  - In 1H18, high-yield issuance in the U.S. totaled $111bn, a decrease of 28% from 1H17.
  - In Europe, high-yield issuance rose to record levels during 2017 as a result of bond spreads dropping to record lows. The €94bn in high-yield issuance during the year equated to an increase of 58% over the annual average of the past 5 years.
- Borrower-friendly structures are prevalent, particularly at the upper end of the market.
  - Cov-lite loans account for 80% of current leveraged loan issuance, a substantial increase from 25% in 2007.

High-Yield Bond Spreads Over U.S. Treasuries



SOURCE: BofA Merrill Lynch.

U.S. High-Yield Issuance



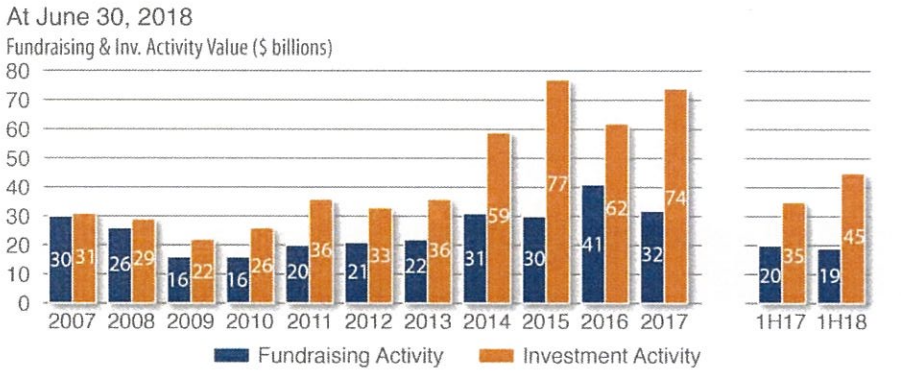
SOURCE: SIFMA and S&P LCD.

U.S. Venture Capital

Technological advancements are driving opportunities in venture capital.

- Investment activity has remained elevated through 1H18, largely due to an increase in the volume of "mega" financings and the emergence of Softbank Group's $93bn Vision Fund as a source of capital for later-stage technology companies.
  - U.S. venture capital investment activity totaled $23.0 billion in 2Q18, a 2% increase from the prior quarter and the largest quarterly total since 4Q00. Activity was driven by a record 45 mega-financings (i.e. deals with financings rounds of greater than $100 million).
- The rapid pace of innovation and adoption in multiple disciplines is driving returns and opportunities in venture capital.
  - Areas of opportunity and interest are constantly shifting in response to technological advancements and adoption rates.
- M&A exit markets for venture-backed companies remain favorable; venture capital-backed IPO activity has increased in recent periods following a slow 2016.
  - Venture-backed IPO activity showed positive momentum throughout much of 2017 and early 2018, led by several notable listings by unicorns, including the $3.9bn IPO of Snap in March 2017 and the $756m listing of Dropbox in March 2018.

U.S. Venture Capital—Fundraising & Investment Activity



SOURCE: PwC and CB Insights' MoneyTree™ Report, Thomson Reuters, and Pathway Research.

U.S. Venture Capital—IPO Activity



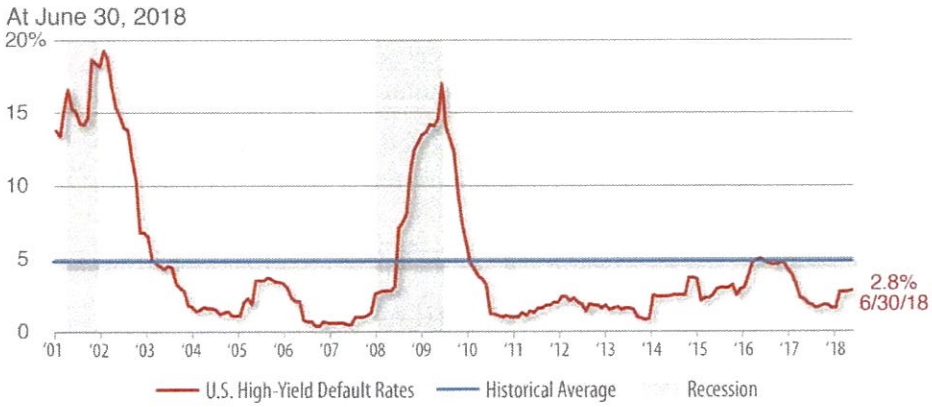
SOURCE: Bloomberg, Thomson Reuters, and Pathway Research.

Distressed Debt Markets

Indicators of distress remain at low levels outside of the media and retail sectors.

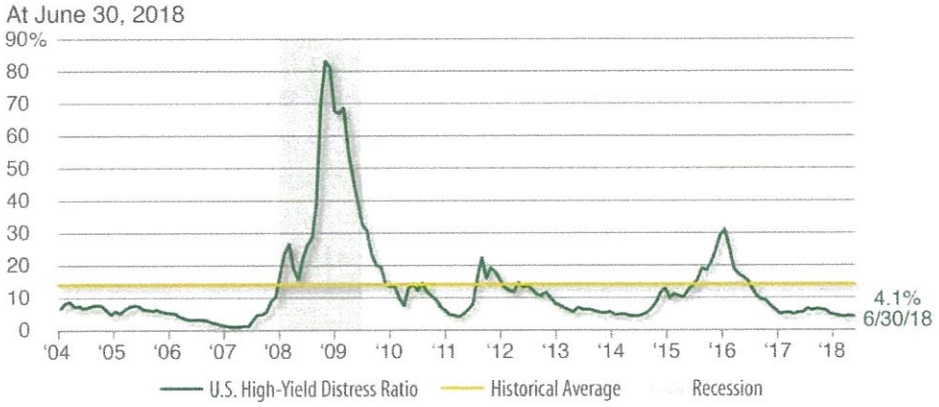
- Traditional distressed debt opportunity set (e.g., corporate bonds, bank loans) is a fraction of what it was in 2009.
  - U.S. high-yield default rate was 2.8% at the end of 2Q18 vs. prior cycle peak of 17.0% in November 2009.
  - Companies have exhibited stable operating performance and have benefited from relatively strong credit markets in the U.S.
- High-yield distress ratio has declined since 1Q16 and is now well below the long-term average level.
  - Distress ratio (percentage of high-yield bonds with spreads of 1,000 bps or higher over U.S. Treasuries) was 4.1% as of June 2018, down from 31.1% in February 2016.
- European distressed-related investment activity is increasing.
  - The ECB has prioritized initiatives to help reduce the level of non-performing loans (NPLs) held by European banks; however, most transactions have been underwritten at non-distressed levels.
  - Total value of NPLs held by European banks is estimated to be approximately €800bn, according to Bloomberg, down from €1.1tn in 1Q15.

U.S. High-Yield Default Rate



SOURCE: Fitch Ratings and National Bureau of Economic Research.

U.S. High-Yield Distress Ratio



SOURCE: Fitch Ratings and National Bureau of Economic Research.

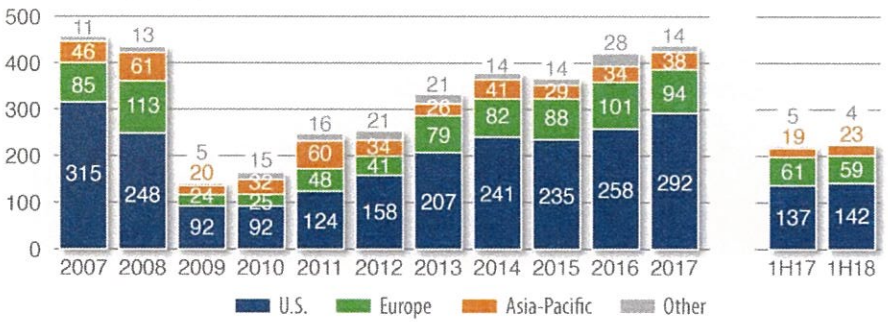
Private Equity Fundraising Activity

The fundraising market remains selective overall.

- Global PE fundraising activity has increased since 2009 as a result of attractive performance industry wide and an increase in distributions and investment activity; however, the market remains highly selective overall.
  - Global PE fundraising activity during 1H18 totaled $227bn, up slightly from 1H17.
  - Asia-focused funds raised $23bn during 1H18, the largest half-year figure in nearly four years.
- Prominent and long-standing general partners have seen success in replenishing their capital bases at increasing fund sizes.
  - Notable funds raised during 1H18 included Carlyle Partners VII ($15.6bn), EQT VIII (€10.8bn), Carlyle Asia Partners V ($6.6bn), Bain Capital Europe Fund V (€4.5bn), and Clearlake Capital Partners V ($3.6bn).
- Dry powder, or uninvested capital, has increased in recent years; however, *years-to-deploy* ratio remains reasonable.

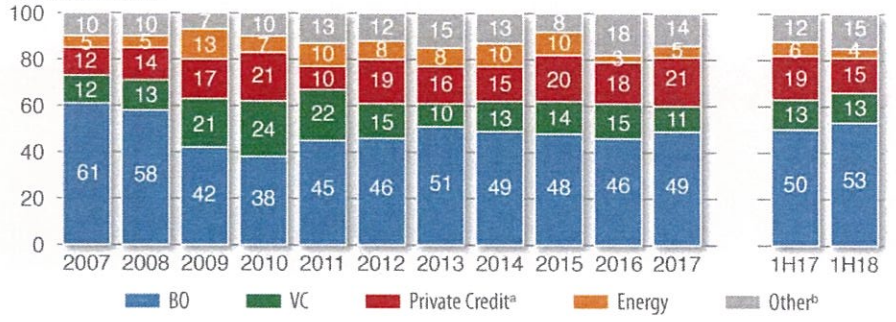
Worldwide Private Equity Fundraising

By Region



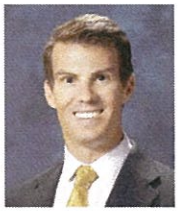
SOURCE: Thomson Reuters, Preqin, and Pathway Research.
NOTES: Fundraising amounts are based on net amounts raised, which are adjusted for fund size reductions.
Comprises buyout, venture capital, private credit, energy, infrastructure, and other fund strategies.
Data is continuously updated and is therefore subject to change.

By Strategy



SOURCE: Thomson Reuters, Preqin, and Pathway Research.
NOTES: Fundraising amounts are based on net amounts raised, which are adjusted for fund-size reductions.
Data is continuously updated and is therefore subject to change.
[a]Comprises distressed debt, subordinated debt, and senior direct lending strategies.
[b]Comprises infrastructure, special situations, and other fund strategies not classified as buyout-, venture capital–, credit-, or energy-focused.

Biographies



James R. Chambliss

Managing Director

Mr. Chambliss joined Pathway in 1994 and is a managing director in the California office. He is responsible for investment analysis and conducting due diligence on primaries, secondaries, and co-investments; negotiating and reviewing investment vehicle documents; and client servicing. Mr. Chambliss is a member of various Pathway committees, including the firm's Management Committee and Investment Committee. Mr. Chambliss also serves on the advisory boards of several private market partnerships.

Mr. Chambliss received a BS in business administration, with an emphasis in finance, from Loyola Marymount University and an MBA from the Marshall School at the University of Southern California.



Canyon J. Lew

Managing Director

Mr. Lew joined Pathway in 2004 and is a managing director in the California office. He is responsible for investment analysis and conducting due diligence on primaries, secondaries, and co-investments; negotiating and reviewing investment vehicle documents; and client servicing. Mr. Lew is co-head of Pathway's co-investment team and is a member of the firm's Co-investment Investment Subcommittee. Mr. Lew also serves on the advisory boards of several private market partnerships.

Prior to joining Pathway, Mr. Lew worked for Fleet Fund Investors as an associate, where he monitored investments within Fleet Bank's private equity portfolio and reviewed new investment opportunities. Mr. Lew received an AB in economics and engineering from Brown University and an MS, with high honors, in investment management from Boston University.

Pathway Contact Information

California
Pathway Capital Management, LP
18575 Jamboree Road, 7th Floor
Irvine, CA 92612
Tel: 949-622-1000
Teri Noble–Senior Vice President

Rhode Island
Pathway Capital Management, LP
500 Exchange Street
Suite 1100, 11th Floor
Providence, RI 02903
Tel: 401-589-3400
Jerry Branka–Senior Vice President
John Brescia–Senior Vice President

London
Pathway Capital Management (UK) Limited
15 Bedford Street
London WC2E 9HE
Tel: +44 (0) 20 7438 9700
Alex Casbolt–Managing Director

Hong Kong
Pathway Capital Management (HK) Limited
Champion Tower, Level 44
3 Garden Road
Central, Hong Kong
Tel: +852-3798-2580
Simon Lau—Director–Head of Hong Kong

Tokyo
Strategic Alliance With
Tokio Marine Asset Management Co., Ltd.
Tekko Building
1-8-2 Marunouchi
Chiyoda-ku, Tokyo 100-0005
Japan
Tel: +81 (0) 3 3212 8103
Soichi "Sam" Takata–Head of Private Equity

Website
pathwaycapital.com

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No representation is being made that a prospective investor will or is likely to have access to funds such as the funds referenced herein. The reference to such funds was made with the benefit of hindsight based on historical rates of return of such manager and on specific investments made by such funds. Accordingly, performance results of specified funds inevitably show positive rates of return or investment results.

Callan

September 21, 2018

ARMB Board Meeting

Asset/Liability Study Overview

Paul Erlendson
Senior Vice President

Steve Center, CFA
Senior Vice President

Proposed Scope of the Project

Asset/Liability Study

- Phase 1
  - Review ARMB current investment program
    - *Strategic allocation to broad asset classes*
    - *Refine definition of asset class categories*
    - *Important to distinguish between "strategy" (i.e.—the target asset class/benchmark) and "implementation" (i.e.—the way the manager constructs the portfolio)*
  - Set asset class, portfolio expectations
    - *Return, risk, correlation, and other considerations*
    - *Evaluate potential new asset classes/strategies*
- Phase 2
  - Build integrated asset-liability model:
    - *Reflect most recent valuation results; confirm model assumptions, review with actuary*
    - *Deterministic projections – assume valuation assumptions are achieved*
    - *Simulation – insert capital market uncertainty, evaluate alternative investment strategies*
- Phase 3
  - Develop preliminary asset-liability results
    - *Confirm decision variables; ascertain risk tolerance and effective investment time horizon*
    - *Callan internal peer review of the study's results. Ongoing review and interaction with staff*
  - Develop the final asset-liability study
    - *Present finalized asset-liability results to ARMB Trustees*
    - *ARMB selects an appropriate asset allocation and liquidity profile*

Proposed Timeline

- September 2018
  - Callan presentation: Overview of study process, review of current program, set capital market expectations, evaluate potential new strategies, refine asset class categorization (Phase 1)
  - Start construction of liability model in ProVal, using most recent valuation results
- October/November 2018
  - Complete liability model, integrate asset mixes and develop projections and simulations (Phase 2)
  - Integrate any valuation updates into asset-liability model
  - Review results with staff, actuary
- December 2018
  - Internal peer review
  - Callan presentation: Deliver preliminary asset-liability study results for discussion with Board, focus on liability modeling (Phase 3)
- January/February/March 2019
  - Refine study to incorporate feedback from staff, board
  - Callan presentation: Deliver refined asset-liability study results; consider alternative asset mixes
- April 2019
  - Complete study, adoption by Board

Investment Policy Overview

- Trustees' most important function is to develop a well-conceived investment policy
- Investment policy is a combination of philosophy and long-range planning
  - Philosophical Statements
    - *What is the purpose of the fund?*
    - *How do we define success?*
    - *How do we define risk?*
    - *How much risk of failure should we assume?*
  - Long-range Planning
    - *Establishes the guidelines and procedures that direct the long-term management of the plans' assets*
    - *Based on long-term estimates of capital market opportunities and the plans' obligations*
    - *Allows decision-makers to observe a range of potential outcomes to prevent surprises and avoid panics*
- Investment policy succeeds not because of unique insights, but because of a focus on long-term goals and a continuity of applied strategies
- There is no one correct answer
  - Different financial circumstances of sponsoring organizations
  - Different sources and uses of the assets
  - Different temperaments of decision-makers

Why Conduct an Asset and Liability Study?

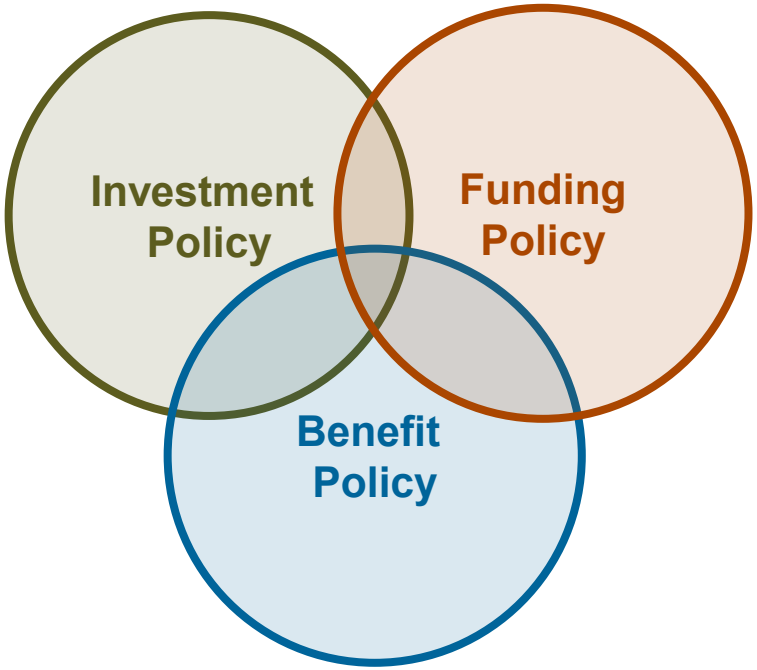
- The cornerstone of a prudent process for pension plan, endowment, and foundation trustees (and any individual investor) is a careful and thorough examination of their long-term strategic plan.
- Explicitly acknowledge change and uncertainty in the capital markets.
- Establish reasonable rate-of-return and risk expectations.
- Incorporate material changes in strategic policies
  - Substantial changes in funding policy, benefit formula, eligibility, early retirement, COLA
- Reflect changes in regulations
  - Public pension: GASB 67 and 68
- Project and evaluate impact on assets, liabilities and funded status.
- Confirm an investment policy to meet return and risk objectives in relation to funding, accounting and policy goals.
- If no material changes have occurred, an asset allocation review should still be conducted every 3 – 5 years.

Interaction of Three Key Policies

Three strategic policies govern every pool of assets

Investment Policy

- How should the assets be invested?
- What are the risk and return objectives?
- How are the cash flows managed?
- What asset classes?



Funding Policy

- How are the benefits accrued?
- When are the benefits funded?
- What are the actuarial assumptions?
- How are unfunded liabilities recognized and amortized?

Benefit Policy – Plan Design

- What types of benefits are offered?
- What are the dollar values of the benefits?
- When are the benefits paid?
- Open to new participants

Defined Benefit Pension Finance



Fram Oil Filter Motto: ***Pay me now or pay me later***

Capital Markets Research Team



Jay Kloepfer
Director, and Co-Manage Capital Markets Research
Shareholder
(20/32)



Julia Moriarty, CFA
Co-manager Capital Markets Research
Shareholder
(28/28)



James Van Heuit
Consultant
Shareholder
(25/29)



Karen Harris, ASA, CFA
Consultant
Shareholder
(18/30)



Jason Ellement, FSA, CFA, MAAA
Consultant
Shareholder
(16/24)



John Pirone, CFA, FRM, CAIA
Consultant
(3/22)



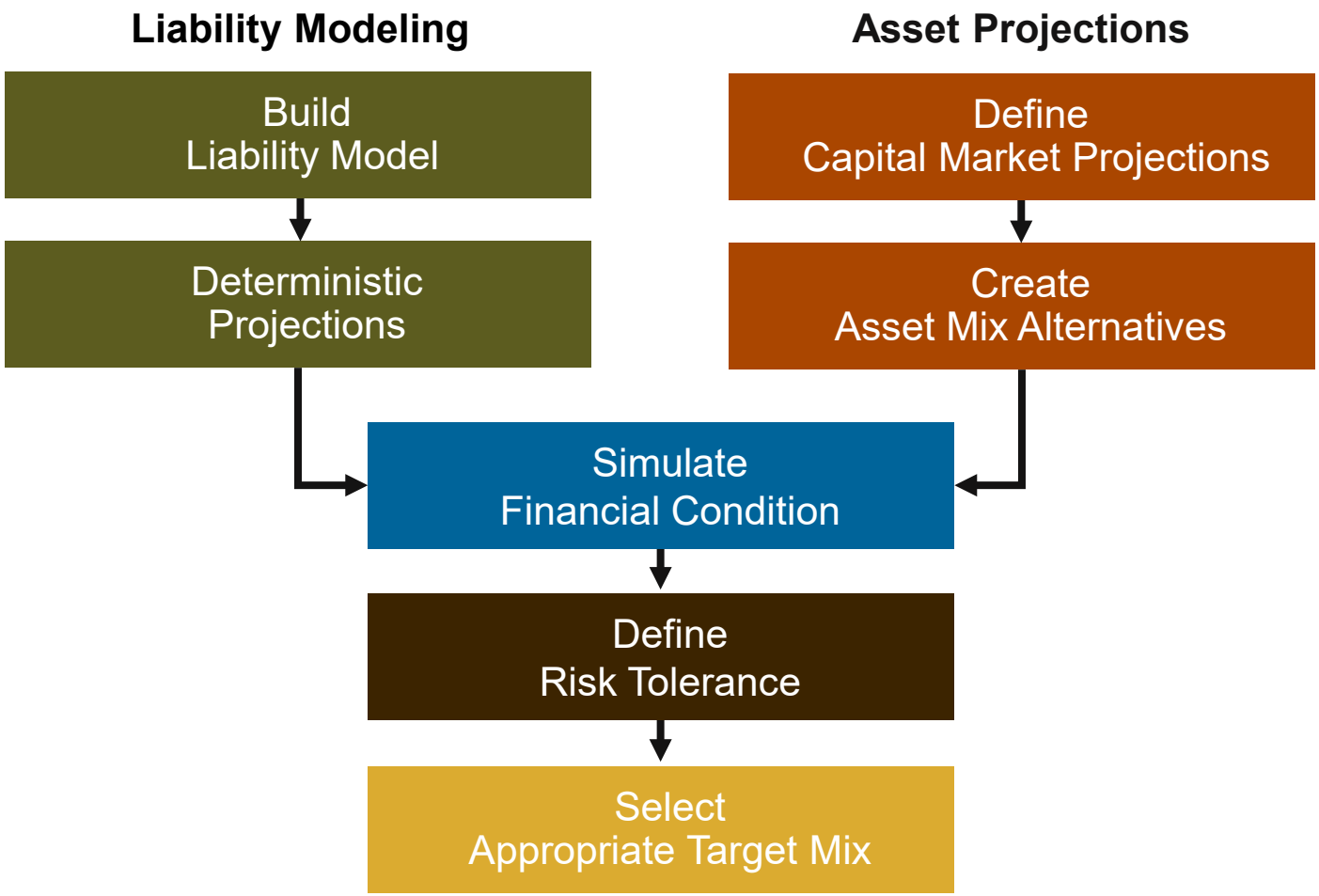
Gary Chang, CFA
Consultant
(5/11)

Years (with Callan/in Industry)

- Provide capital market research – all asset classes, all strategies
- Develop proprietary capital market expectations
- Conduct asset allocation and scenario analysis
- Review investment manager structure
- Provides custom client research and education
- Research papers, surveys, blogs, conference presentations
- Team with GMR, Private Markets, Real Assets, TAG, data base and CRS
- CPRC - Oversight committee for Capital Markets Research projects

30	Full asset/liability or spending studies conducted each year
20	Asset allocation-only studies conducted each year
20	Investment structure studies conducted each year
50	Custom research projects conducted each year

Callan's Asset/Liability Study Process



Investment Policy Process

Broad Definitions are Most Appropriate for Asset Allocation Policy Analysis

- Investment policy study is focused on capital market risk and return
  - *Asset allocation policy is based on acceptable asset classes and acceptable level of investment uncertainty*
- An asset class is a group of securities or investment strategies that have similar financial characteristics; behave similarly in response to market conditions; and behave differently from the securities (or strategies) contained in other asset classes

Equity	Fixed Income	Real Assets	Absolute Return
US Equity Non-US Equity Private Equity	Bonds Short Term Cash	Private Public	Private Public
US Large Cap US Mid/Small Cap Non-US Developed Non-US Emerging Private Equity	US Investment Grade Global Fixed Income	Private Real Estate Public Real Assets: REITs Commodities TIPS Nat Resource Equity	Hedge Funds Multi-Asset Class Strategies Liquid Alternatives

2018 Capital Market Expectations—Return and Risk

Summary of Callan's Standard Long-Term Capital Market Projections (2018 – 2027)

		PROJECTED RETURN			PROJECTED RISK		
Asset Class	**Index**	**1-Year Arithmetic**	**10-Year Geometric***	**Real**	**Standard Deviation**	**Sharpe Ratio**	**Projected Yield**
Equities							
Broad Domestic Equity	Russell 3000	8.30%	6.85%	4.60%	18.25%	0.332	2.00%
Large Cap	S&P 500	8.05%	6.75%	4.50%	17.40%	0.333	2.10%
Small/Mid Cap	Russell 2500	9.30%	7.00%	4.75%	22.60%	0.312	1.55%
Global ex-US Equity	MSCI ACWI ex USA	8.95%	7.00%	4.75%	21.00%	0.319	3.10%
International Equity	MSCI World ex USA	8.45%	6.75%	4.50%	19.70%	0.315	3.25%
Emerging Markets Equity	MSCI Emerging Markets	10.50%	7.00%	4.75%	27.45%	0.301	2.65%
Fixed Income							
Short Duration	Bloomberg Barclays 1-3 Yr G/C	2.60%	2.60%	0.35%	2.10%	0.167	2.85%
Domestic Fixed	Bloomberg Barclays Aggregate	3.05%	3.00%	0.75%	3.75%	0.213	3.50%
Long Duration	Bloomberg Barclays Long G/C	3.50%	3.00%	0.75%	10.95%	0.114	4.45%
TIPS	Bloomberg Barclays TIPS	3.10%	3.00%	0.75%	5.25%	0.162	3.35%
High Yield	Bloomberg Barclays High Yield	5.20%	4.75%	2.50%	10.35%	0.285	7.75%
Non-US Fixed	Bloomberg Barclays Glbl Agg xUSD	1.80%	1.40%	-0.85%	9.20%	-0.049	2.50%
Emerging Market Debt	EMBI Global Diversified	4.85%	4.50%	2.25%	9.60%	0.271	5.75%
Other							
Real Estate	Callan Real Estate Database	6.90%	5.75%	3.50%	16.35%	0.284	4.75%
Private Equity	TR Post Venture Capital	12.45%	7.35%	5.10%	32.90%	0.310	0.00%
Hedge Funds	Callan Hedge FoF Database	5.35%	5.05%	2.80%	9.15%	0.339	2.25%
Commodities	Bloomberg Commodity	4.25%	2.65%	0.40%	18.30%	0.109	2.25%
Cash Equivalents	90-Day T-Bill	2.25%	2.25%	0.00%	0.90%	0.000	2.25%
Inflation	CPI-U		2.25%		1.50%		

** Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).*

ARMB Adjusted Capital Market Projections: 2018-2027

Returns and Risks

- The process begins by using Callan's standard set of asset class projections (see previous slide)
- ARMB's customized projections reflect tilts that ARMB has introduced to its specific asset class structures:
  - Intermediate Treasuries
  - Opportunistic Assets
    - *Combination of alternative equities, non-Treasury fixed income and potential opportunities*
  - Real Assets
    - *Combination of component asset classes*
  - Private Equity
    - *Return/risk adjusted to reflect ARMB experience in the asset class*
    - *Return reflects a 2% per year compound premium over broad public market equity, at a risk comparable to that of small cap stocks*

AssetClass	Projected Arithmetic Return	10 Yr. Geometric Mean Return	Projected Standard Deviation
Broad Domestic Equity	8.30%	6.85%	18.25%
Large Cap	8.05%	6.75%	17.40%
Small/Mid Cap	9.30%	7.00%	22.60%
International Equity	8.45%	6.75%	19.70%
Emerging Markets Equity	10.50%	7.00%	27.45%
Global ex US Equity	8.96%	7.00%	21.00%
Intermediate Treasuries	2.85%	2.80%	3.60%
Domestic Fixed	3.05%	3.00%	3.75%
Opportunistic	6.05%	5.65%	10.40%
Real Estate	6.90%	5.70%	16.35%
Timberland	7.35%	6.00%	17.40%
Farmland	7.40%	6.15%	16.90%
Infrastructure	8.00%	6.40%	18.95%
MLPs	8.50%	6.60%	20.70%
Real Assets	7.45%	6.40%	15.79%
Absolute Return	5.35%	5.05%	9.15%
Private Equity	11.10%	8.85%	22.90%
Cash Equivalents	2.25%	2.25%	0.90%
Inflation	2.25%	2.25%	1.50%

Capital Market Projections: 2018-2027

Correlation

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 Broad Domestic Equity	1.000																		
2 Large Cap	0.996	1.000																	
3 Small/Mid Cap	0.966	0.940	1.000																
4 International Equity	0.840	0.840	0.800	1.000															
5 Emerging Markets Equity	0.866	0.860	0.845	0.865	1.000														
6 Global ex-US Equity	0.874	0.872	0.839	0.987	0.936	1.000													
7 Intermediate Treasuries	-0.164	-0.150	-0.200	-0.170	-0.210	-0.188	1.000												
8 Domestic Fixed	-0.110	-0.100	-0.135	-0.110	-0.160	-0.130	0.880	1.000											
9 Opportunistic	0.985	0.990	0.924	0.828	0.840	0.857	-0.024	0.044	1.000										
10 Real Estate	0.732	0.730	0.705	0.660	0.650	0.677	-0.040	-0.030	0.729	1.000									
11 Timber	0.584	0.580	0.570	0.520	0.510	0.533	-0.030	-0.020	0.580	0.800	1.000								
12 Farmland	0.554	0.550	0.540	0.490	0.480	0.502	-0.050	-0.050	0.545	0.750	0.600	1.000							
13 Infrastructure	0.673	0.670	0.650	0.660	0.640	0.674	-0.200	-0.100	0.658	0.680	0.800	0.650	1.000						
14 MLPs	0.855	0.850	0.830	0.830	0.830	0.855	-0.250	-0.115	0.837	0.670	0.760	0.600	0.600	1.000					
15 Real Assets	0.763	0.759	0.739	0.706	0.694	0.724	-0.108	-0.058	0.754	0.912	0.956	0.729	0.853	0.816	1.000				
16 Absolute Return	0.802	0.800	0.770	0.730	0.755	0.761	0.060	0.080	0.815	0.605	0.605	0.460	0.600	0.740	0.691	1.000			
17 Private Equity	0.948	0.945	0.915	0.895	0.910	0.927	-0.220	-0.200	0.920	0.715	0.715	0.570	0.600	0.880	0.795	0.780	1.000		
18 Cash Equivalents	-0.043	-0.030	-0.080	-0.010	-0.100	-0.040	0.400	0.100	-0.016	-0.060	-0.060	-0.050	0.150	0.090	0.001	-0.070	0.000	1.000	
19 Inflation	-0.010	-0.020	0.020	0.000	0.030	0.010	-0.250	-0.280	-0.061	0.100	0.174	0.150	0.090	0.180	0.150	0.200	0.060	0.000	1.000

PERS Asset Mix Alternatives

Current PERS Target and Five Alternative Asset Mixes

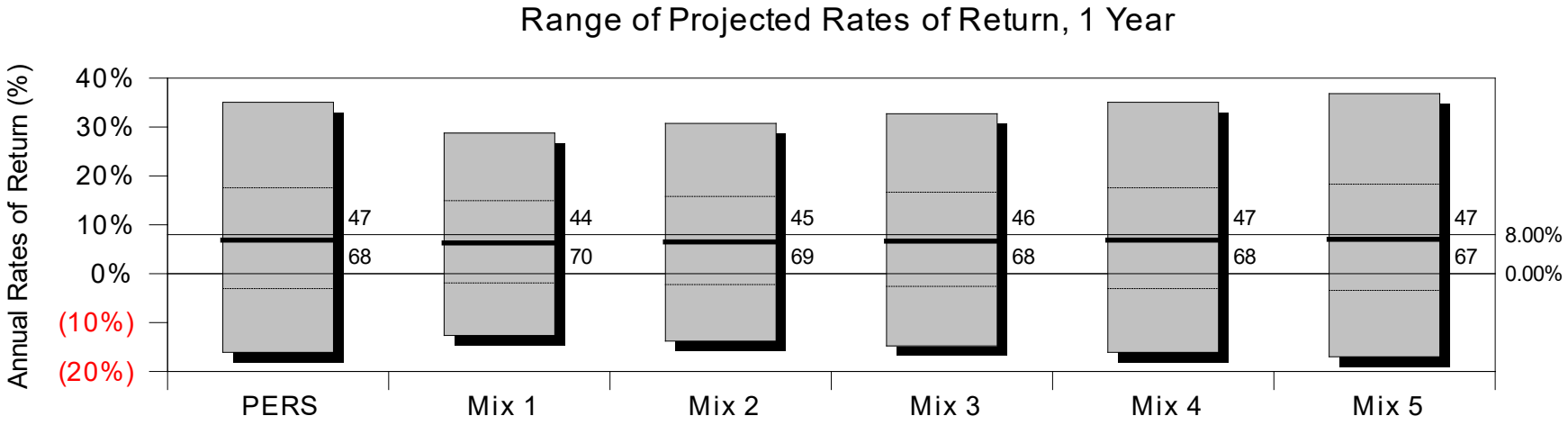
Asset Classes	PERS	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Broad Domestic Equity	24%	18%	20%	22%	24%	26%
Global ex US Equity	22%	15%	17%	19%	22%	23%
Intermediate Treasuries	10%	25%	20%	15%	10%	5%
Opportunistic	10%	8%	9%	10%	10%	12%
Real Assets	17%	17%	17%	17%	17%	17%
Absolute Return	7%	7%	7%	7%	7%	7%
Private Equity	9%	9%	9%	9%	9%	9%
Cash Equivalents	1%	1%	1%	1%	1%	1%
Totals	100%	100%	100%	100%	100%	100%
Uncompounded Return	7.5%	6.7%	7.0%	7.2%	7.5%	7.8%
10-Year Compounded Return	6.6%	6.2%	6.3%	6.5%	6.6%	6.8%
Risk (Standard Deviation)	14.7%	12.0%	12.8%	13.7%	14.7%	15.4%
10-Year Real Return	4.3%	3.8%	4.0%	4.1%	4.3%	4.4%
Public Equity	46%	33%	37%	41%	46%	49%
Public Fixed	10%	25%	20%	15%	10%	5%
Alternatives	16%	16%	16%	16%	16%	16%

Notes to table:

- "Alternatives" category in the bottom box includes illiquid assets – Absolute Return and Private Equity – but does not include Real Assets
- "Real Assets" reflects an investment structure composed of 31% Real Estate, 10% Timber, 25% Agriculture, 17.5% Global Infrastructure, 12.5% MLPs and 4% REITs
- Fixed income defined as 100% Intermediate Treasuries
- "Opportunistic " benchmarked to 60% Large Cap/40% Broad Domestic Fixed Income (Bloomberg Barclays Aggregate). Exposures to Public Fixed and Public Equity in the table above understate effective exposures gained through Opportunistic implementation
- "Private Equity" is held at a minimum of 9% for all asset mixes; Absolute Return held to a maximum of 7%
- Mix 4 has the same return/risk profile as the PERS Target Asset Mix

PERS Range of Projected Returns

One-Year Projection Period

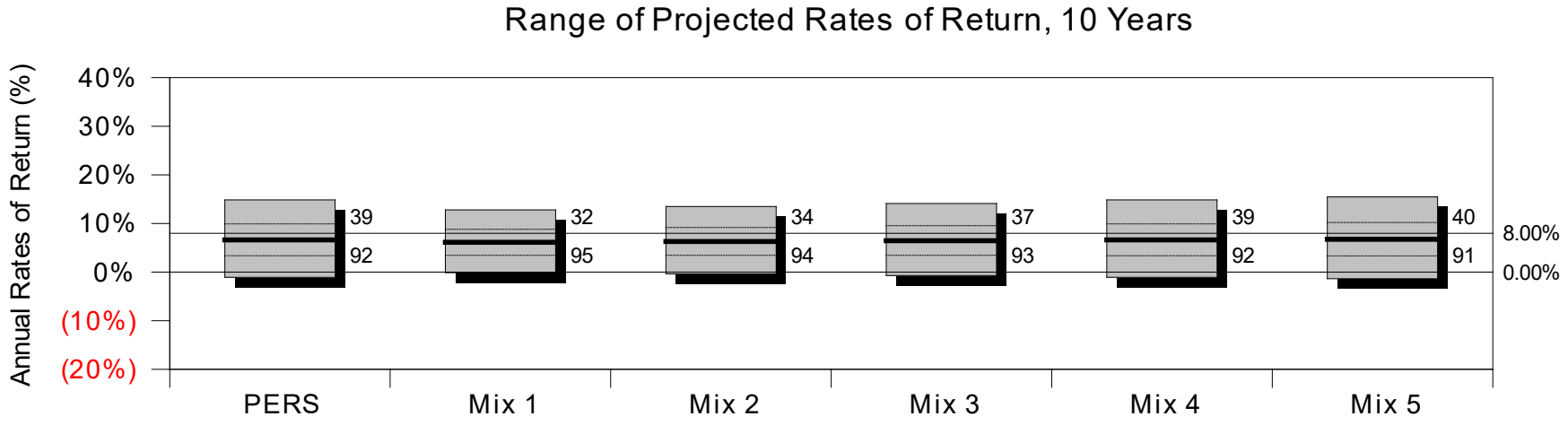


	PERS	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Average	6.9%	6.3%	6.5%	6.7%	6.9%	7.0%
5th Percentile	35.1%	28.8%	30.8%	32.7%	35.1%	36.9%
25th Percentile	17.6%	14.9%	15.8%	16.7%	17.6%	18.3%
Median	6.8%	6.2%	6.4%	6.6%	6.8%	6.9%
75th Percentile	(3.0%)	(1.9%)	(2.2%)	(2.6%)	(3.0%)	(3.4%)
95th Percentile	(16.1%)	(12.6%)	(13.8%)	(14.8%)	(16.1%)	(17.0%)
Prob > 8.00%	46.7%	43.8%	44.9%	45.8%	46.7%	47.2%
Prob > 0.00%	67.7%	69.6%	69.1%	68.4%	67.7%	67.2%

- Subdued Expectations Across the Range of Capital Markets

PERS Range of Projected Returns

Ten-Year Projection Period



	PERS	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Average	6.6%	6.1%	6.3%	6.5%	6.6%	6.8%
5th Percentile	14.9%	12.8%	13.5%	14.1%	14.9%	15.5%
25th Percentile	9.9%	8.8%	9.2%	9.6%	9.9%	10.2%
Median	6.6%	6.2%	6.3%	6.5%	6.6%	6.8%
75th Percentile	3.4%	3.5%	3.5%	3.5%	3.4%	3.4%
95th Percentile	(1.1%)	(0.1%)	(0.4%)	(0.7%)	(1.1%)	(1.3%)
Prob > 8.00%	38.9%	31.5%	34.3%	36.6%	38.9%	40.4%
Prob > 0.00%	91.8%	94.6%	93.7%	92.8%	91.8%	90.9%

- Alternative Mixes 1 – 5 reflect the composition of mixes shown on slides 9 and 10

Asset/Liability Study Process

Liability Model and Projected Cash Flows

- Pension Plan Equation: Benefits + Expenses = Investment Return + Contributions
- Callan builds the liability model (s)
  - Uses data from plan actuary
  - ALM study will model PERS and TRS, and include both pension and post-retirement medical benefits for both plans. Actuary integrates pension and health plan in determination of contribution in the valuation reports.
  - Can model alternative funding and amortization policies - current closed period vs. rolling periods
- Liability Assumptions
  - Funding Policy
    - *Employee contributions*
    - *Employer contributions*
  - Benefit Policy
    - *Benefit formulas*
    - *Cost of living increases*
  - Demographics
    - *Ratio of Active vs Retirees*
    - *Average age*
    - *Population growth*
    - *Salary increases*
    - *Mortality table – longevity risk management*
    - *Discount rate*

Asset/Liability Study

Simulate Financial Condition

- Asset mixes are compared and evaluated on both absolute and relative basis
  - Absolute measures are used to evaluate objectives: returns, funded ratios
  - Relative measures compare probable outcomes across asset mixes
- Asset mixes are analyzed through the use of simulated returns
  - Values are based on 5,000 simulated returns over a 10-year projection time period
  - Median results represent the mid point of the simulated outcomes (2,500 returns worse, 2,500 better)
  - 95th percentile results represent the highest return of the worst 5% of simulations
  - Forecast range of returns is used to show the probable ranges of contributions and funded status
- Observe patterns of results across Asset Mixes
  - Focus is on Median and 95th percentile market values, returns and funded ratios

After the Modeling – How to Make a Decision?

- Potential decision variables include:
  - The range of actuarial liability
  - Present value of future contributions
  - Range of the market (or actuarial) value of Plans' assets
  - Funded Ratio
  - Liquidity and cash flow needs
  - Present value of future unfunded liability
  - Ultimate Net Cost
    - *Ultimate net cost combines contributions paid in over the planning horizon plus the value of the unfunded liability at the end of the projection period.*
- A discussion of goals and objectives for the plans' financial future will inform all three major policies: benefits, funding and investments

Summary Comments

Considerations in the selection of the Investment Policy

- Financial strength of the Plan Sponsor
  - Contribution volatility
- Financial strength of the Plan
  - Funded Status: Assets/Liabilities
- Investment goals & objectives
  - Absolute return
  - Relative return
  - Funded status
- Time Horizon
- Liquidity needs
- Risk tolerance of decision makers
  - Volatility of short term results

Defining Risk Tolerance

Factor	Public Pension and Taft-Hartley	Corporate Pension	Endowment and Foundation
Investment Goal	✓	✓	✓
Time Horizon	✓	✓✓	✓
Liquidity Needs	✓	✓	✓
Willingness to take Risk	✓	✓	✓
Size of Plan/Fund relative to Sponsor	✓	✓✓	✓
Financial Strength of Sponsor	✓	✓✓	✓
Absolute Return Target	✓✓✓		✓✓✓
Projected Funded Status	✓✓	✓	
Contribution Volatility	✓✓	✓	
Liability Characteristics	✓	✓✓	
Financial Statement Sensitivity		✓	
Permissible Investments	✓		
Spending Volatility			✓
Peer Group Comparison	✓	✓	✓

Summary

- The asset/liability study will enable ARMB to evaluate the financial condition of the pension plans for which it invests under alternative investment scenarios into the future.
- Substantial changes have been made to funding and benefit policies since the last asset/liability study in 2009; study will fully incorporate these changes and reflect the valuation and projection results of the actuary
- Key actuarial assumptions may need to be reviewed as Callan develops our liability projection model
  - Mortality/longevity
  - Salary growth
  - Assumed rate of return
- The modeling process can begin using whatever valuation is available, and updated or rolled-forward to match new valuation results should they become available during the conduct of the project

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This report may consist of statements of opinion, which are made as of the date they are expressed and are not statements of fact.

Reference to or inclusion in this report of any product, service or entity should not be construed as a recommendation, approval, affiliation or endorsement of such product, service or entity by Callan.

Past performance is no guarantee of future results.

The statements made herein may include forward-looking statements regarding future results. The forward-looking statements herein: (i) are best estimations consistent with the information available as of the date hereof and (ii) involve known and unknown risks and uncertainties such that actual results may differ materially from these statements. There is no obligation to update or alter any forward-looking statement, whether as a result of new information, future events or otherwise. Undue reliance should not be placed on forward-looking statements.

IFM Investors

Mandate: **IFM Global Infrastructure Fund** **Hired: 2015**

Firm Information	Investment Approach	Total ARMB Mandate
IFM Investors, established in 1995, is a global fund manager owned by 27 Australian pension funds. IFM has a global team of more than 350 staff, including more than 70 investment professionals on the infrastructure team in offices across the globe. As of 6/30/2018, the firm's total assets under management were approximately $78.9 billion across infrastructure (equity), debt, listed equities, and private equity asset classes. As of 6/30/2018, the net asset value of the IFM Global Infrastructure Fund ("the Fund") was $12.5 billion. **Key Executives:** ***Kyle Mangini,*** Global Head of Infrastructure ***Julio Garcia,*** Head of Infrastructure – North America ***Christian Seymour,*** Head of Infrastructure – Europe ***Michael Hanna,*** Head of Infrastructure – Australia	IFM constructs a professionally managed portfolio of infrastructure assets to provide long-term institutional investors with significant benefits including diversification, inflation protection, participation in economic growth, and portfolio risk management. IFM seeks to invest in assets with strong market positions, predictable regulatory environments, high barriers to entry, limited demand elasticity, and long lives. The Fund utilizes an open-end structure that suits the long-lived nature of the assets. The Fund's foreign currency exposure is hedged, to the extent that it is reasonably practicable and prudent, against currency movements. **Target Portfolio Return:** 8-12% per annum, net of fees	Assets Under Management: 6/30/2018: $400,975,349

Concerns: None

6/30/2018 Performance

	Last Quarter	1-Year	3-Years Annualized
Manager Net	1.01%	15.28%	10.88%
S&P Global Infra Benchmark	2.60%	1.82%	5.98%

Strictly Confidential



IFM Global Infrastructure Fund

IFM (US) Securities, LLC

US June 2018

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Risks of IFM Investors' investment programs typically include: assets of IFM Investors funds may have limited liquidity; distributions are uncertain, a return on your investment is not guaranteed and you may lose all or a substantial amount of your investment; unfavorable economic conditions in the markets in which IFM Investors funds operate could adversely affect your investment; assets acquired with leverage have risks including loss of value and limits on flexibility needed if there are changes in the business or industry.

Liquidity- An investment in the Partnership provides limited liquidity since withdrawal rights are not unqualified and Interests may not be transferred without the prior written consent of the General Partner, which generally may be withheld in its absolute discretion. Although the portfolio investments may generate some current income, they are expected to be generally illiquid.

Valuation- Most of the portfolio investments will be highly illiquid, and will most likely not be publicly traded or readily marketable.

Economic conditions- Interest rates, general levels of economic activity, the price of securities and participation by other investors in the financial markets may affect the value of portfolio investments made by the Master Fund or considered for prospective investment.

Liquidity- An investment in the Partnership provides limited liquidity since withdrawal rights are not unqualified and Interests may not be transferred without the prior written consent of the General Partner, which generally may be withheld in its absolute discretion. Although the portfolio investments may generate some current income, they are expected to be generally illiquid.

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Economic conditions- Interest rates, general levels of economic activity, the price of securities and participation by other investors in the financial markets may affect the value of portfolio investments made by the Master Fund or considered for prospective investment.

Leverage- Portfolio investments may include businesses whose capital structures may have significant leverage.

An infrastructure investment is subject to certain risks including: the burdens of ownership of infrastructure; local, national and international economic conditions; the supply and demand for services from and access to infrastructure; the financial condition of users and suppliers of infrastructure assets; changes in interest rates and the availability of funds which may render the purchase, sale or refinancing of infrastructure assets difficult or impractical; changes in environmental and planning laws and regulations, and other governmental rules; environmental claims arising in respect of infrastructure acquired with undisclosed or unknown environmental problems or as to which inadequate reserves have been established; changes in energy prices; changes in fiscal and monetary policies; negative economic developments that depress travel; uninsured casualties; force majeure acts, terrorist events, under insured or uninsurable losses; and other factors beyond reasonable control. Please consult the constituent documents for more information on risks specific to infrastructure investing.

An investment in any of these investment programs should be made only after careful review of the risk factors described in the related offering documents. This Information may contain material provided by third parties for general reference or interest. While such third party sources are believed to be reliable, IFM Investors does not assume any responsibility for the accuracy or completeness of such information. This Information does not constitute investment, legal, accounting, regulatory, taxation or other advice and the Information does not take into account your investment objectives or legal, accounting, regulatory, taxation or financial situation or particular needs. You are solely responsible for forming your own opinions and conclusions on such matters and for making your own independent assessment of the Information. This Information is confidential and should not be distributed or provided to any other person without the written consent of IFM Investors.

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3	Performance	13



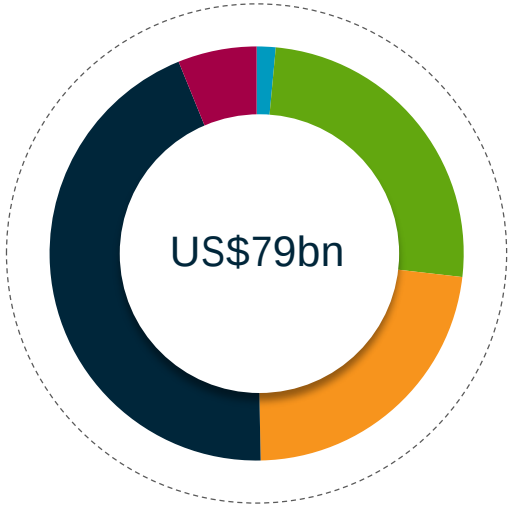
IFM Investors
Firm Overview

Firm Overview

Established & owned by pension funds

USD$79 billion across four asset classes

8 strategic global locations



- Private Equity $1bn
- Debt $18bn
- Infrastructure Debt $5bn
- Listed Equities $20bn
- Infrastructure $35bn



New York | Berlin | Melbourne | Tokyo
London | Sydney | Hong Kong | Seoul

Independent Board & Management

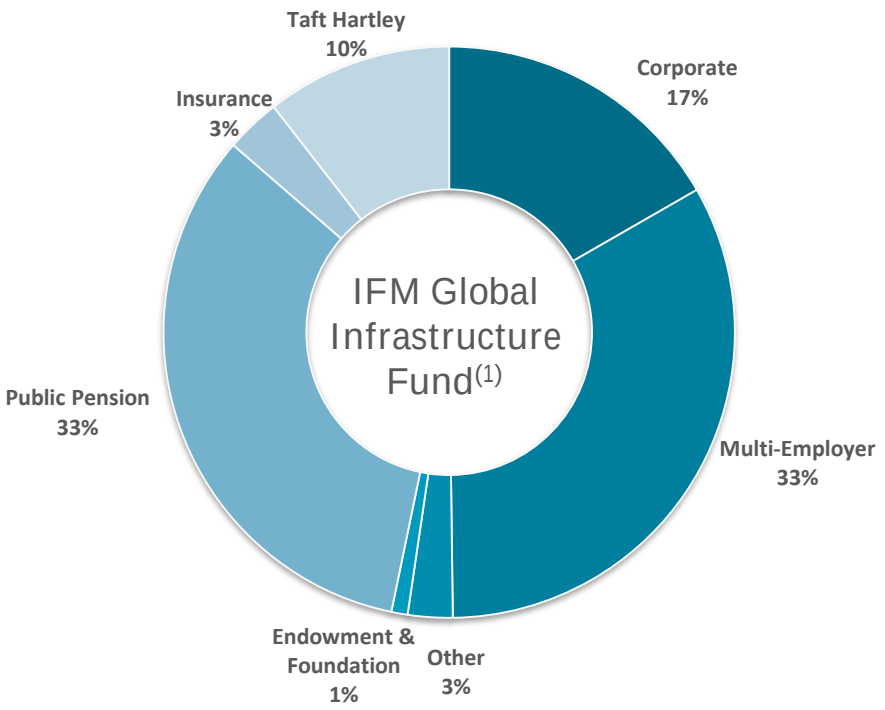
FUM figures as of June 30 2018
Differences due to rounding

Does not include satellite offices based around portfolio companies

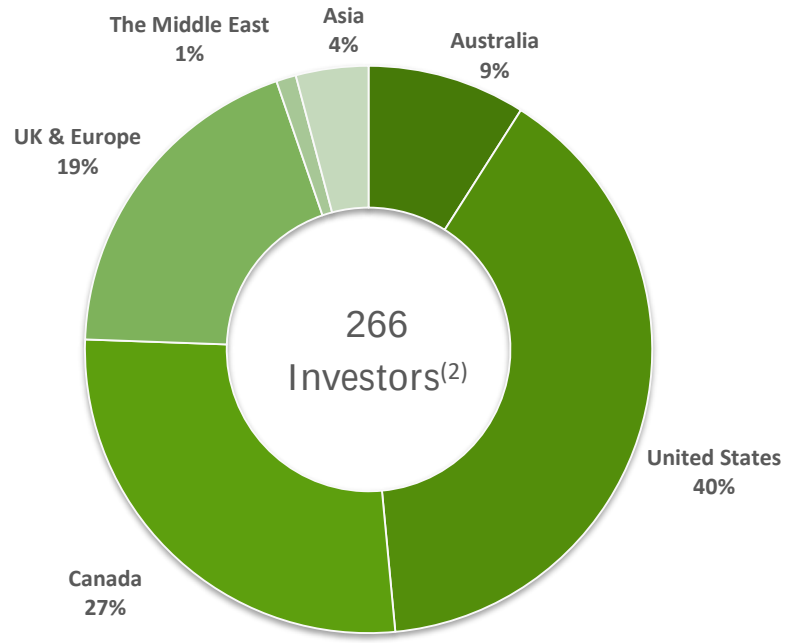
Whom do we serve?

IFM investors manages infrastructure investments for long term institutional investors globally.
We ultimately hold ourselves accountable to their *>15 million* members and retirees.

Committed Capital by FUM



Number of Investors by Region

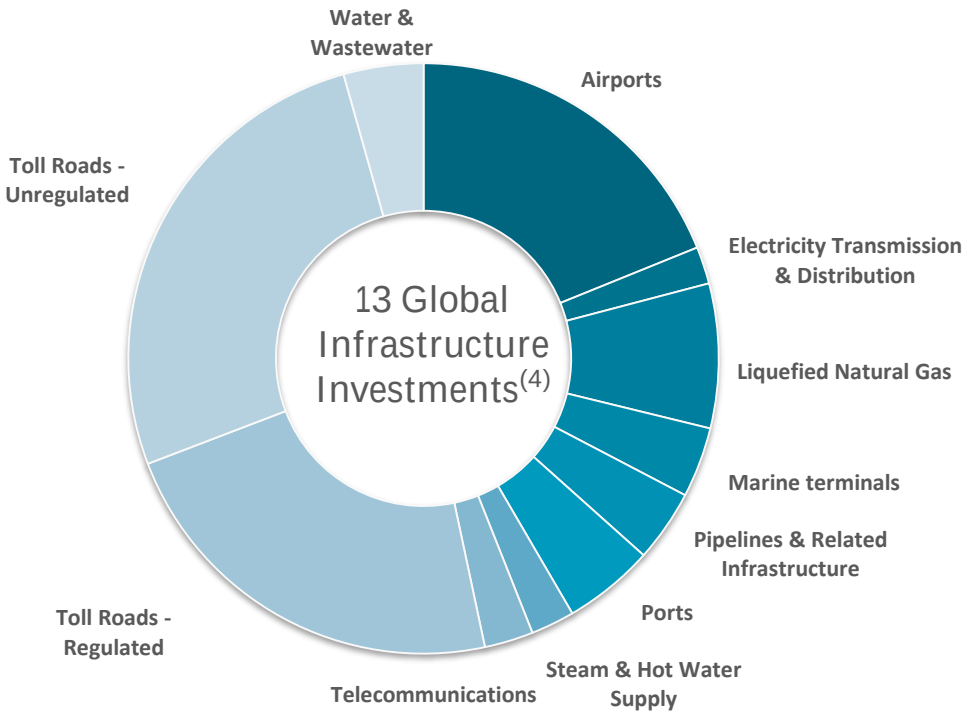


(1) This represents total NAV of the Global Infrastructure Master Fund plus all undrawn investor commitments and cash available for investment from Feeder Funds in USD as of June 30, 2018.
(2) Investor count as of June 30, 2018
Graphs are provided for illustrative purposes only and should not be relied on to form an investment decision.

31 investments across two mature open-ended funds

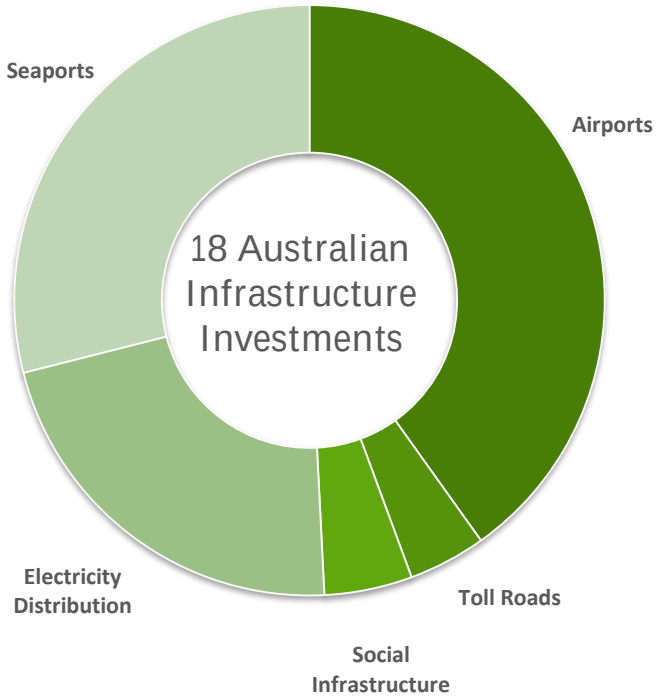
Inception: 2004

IFM Global Infrastructure Fund
US$18.3bn(1)



Inception: 1994

IFM Australian Infrastructure Fund(2)
AU$10.6bn(3)



(1) Asset portfolio in US$ for the Global Infrastructure Fund as of June 30 2018, excluding fund-level cash and undrawn investor commitments.
(2) The legal name of the fund is IFM Australian Infrastructure Wholesale Fund.
(3) Asset portfolio in AUD$ for the Australian Infrastructure Fund as of June 30 2018, excluding fund-level cash and undrawn investor commitments.
(4) The IFM Global Infrastructure Fund invests globally (ex-Australia)
All figures as of June 30, 2018


IFM Global
Infrastructure Fund

Our global infrastructure team

74 infrastructure specialists with extensive operational & financial expertise

North America – Team of 25


Julio Garcia
Head of Infrastructure – N. America


Tom Osborne
Executive Director


Michael Kulper
Executive Director


Adrian Croft
Executive Director


Sebastian Domenech
Director – Asset Mgmt


Brooks Kaufman
Investment Director


Jim Wierstra
Investment Director


Wei-Sun Teh
Investment Director


May Soh
Investment Director


Aaron McGovern
Investment Director


Kittredge Zuk
Vice President – Asset Mgmt


David Sparrow
Vice President


Amy Zhu
Senior Associate


William Docherty
Senior Associate


Julian Gray
Senior Associate


Nicole Zhang
Associate


David Seelbinder
Associate


Lee Wright
Associate


Stephanie Kwong
Associate


Brennan Hudson
Associate


Owen Scrivener
Associate


Sebastian Sotelo
Analyst


Derek Boyse
Analyst


Luis De Sergovia
Analyst


Sebastian Perez
Analyst


Kyle Mangini
Global Head of Infrastructure

Europe – Team of 19


Christian Seymour
Head of Infrastructure – Europe


Frederic Michel-Verdier
Executive Director


Manoj Mehta
Executive Director


Lars Bespolka
Executive Director


Werner Kerschl
Executive Director


Duncan Symonds
Director – Asset Mgmt


Deepu Chintamaneni
Investment Director


Guillaume Camus
Vice President


Jaime Siles
Vice President


Maximilian Fieguth
Vice President – Asset Mgmt


Giovanni Stroeckx
Senior Associate


Renato Pizzolla
Associate


Felix Schmidt
Associate


Jaime Salazar Rosado
Analyst


Annija Kruzite
Analyst


Drummond Clark
Analyst


William Phillips
Analyst – Asset Mgmt


Silje Grønning
Analyst – Asset Mgmt


Aniruddh Chandrashekar
Analyst

Asia – Team of 4


Jamie Cemm
Executive Director


Neil Doherty
Investment Director


Victor Ly
Associate


Wing Chung
Associate

Support

Commercial – Team of 50+
Finance & Operations – Team of 100+
Global Relationship Group – Team of 50+

Australia – Team of 25


Michael Hanna
Head of Infrastructure – Australia


Danny Elia
Executive Director, Global Asset Mgt


Michael Thompson
Executive Director


Quentin Law
Executive Director


Ashley Barker
Executive Director


Deepa Bharadwaj
Executive Director


Michael Landman
Executive Director, Portfolio Mgt


Marigold Look
Investment Director


Jill Rossouw
Investment Director


David Stegehuis
Investment Director


Mark Turner
Investment Director


Timothy May
Vice President


Josh Crane
Vice President


Peter Hannam
Vice President, Asset Mgt


Antony Tee
Senior Associate


Ashwin Mathur
Senior Associate, Portfolio


Joshua Norton
Senior Associate


Adrian Chua
Associate


Brian Chitty
Associate


Vivien Cheung
Associate


Matthew Wallis
Associate


Abbie Sui
Portfolio Associate


Calvin Ker
Analyst

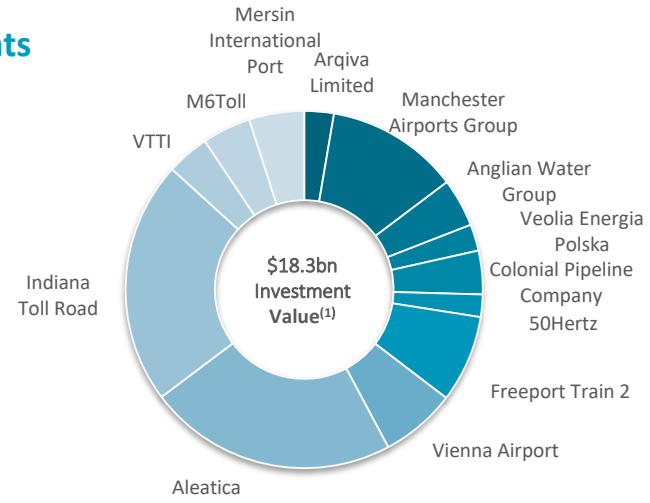

Emmanuel Heretakis
Portfolio Analyst,


Peter Papagiannopoulos
Analyst – Asset Mgt

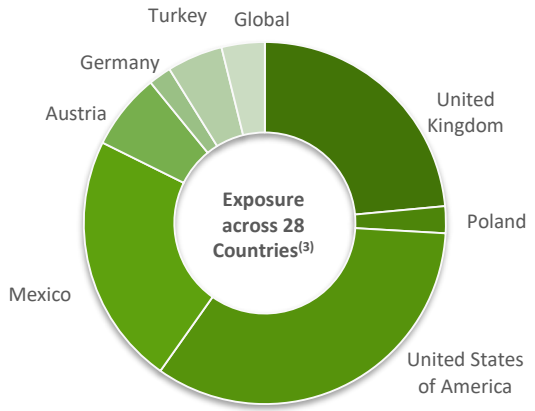
Diversified core infrastructure portfolio

The IFM Global Infrastructure Fund is diversified by sub-sector, revenue type, vintage year and geography.

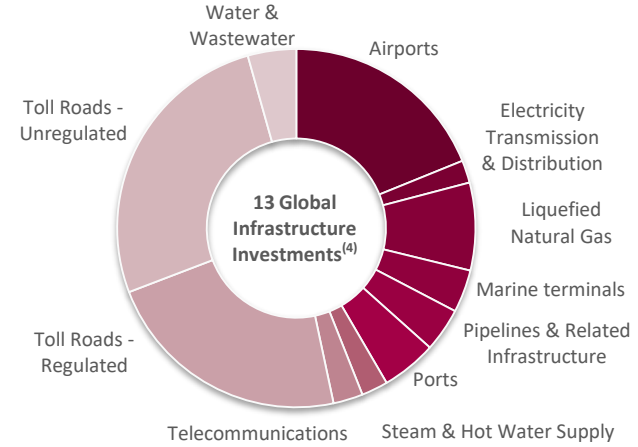
Investments



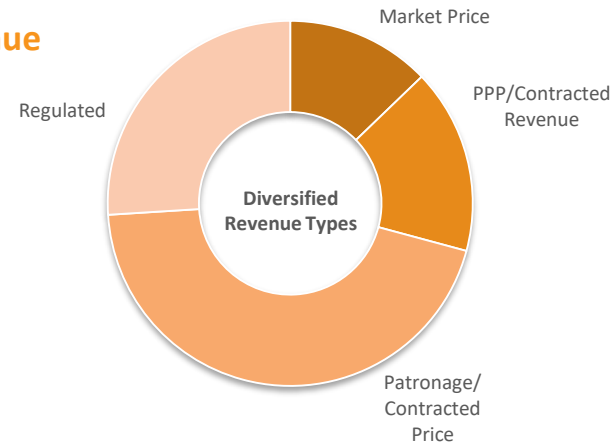
Geography (2)



Sectors



Revenue



All figures as of June 30, 2018.

(1) Asset portfolio in USD for the Global Infrastructure Fund (invests globally; ex-Australia), excluding fund-level cash and undrawn investor commitments.

(2) Geography represents portfolio companies' headquarter location. "Global" represents the VTTI asset footprint, which is inclusive of the US and 14 other countries.

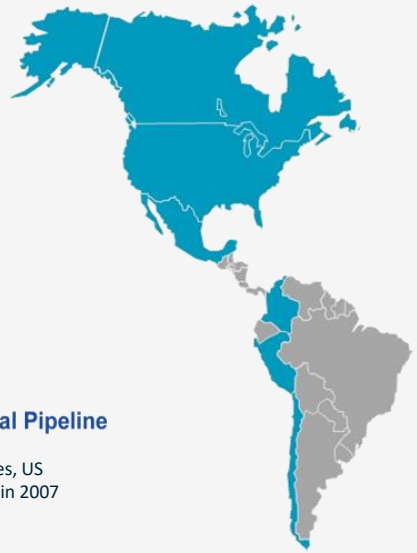
(3) Asset country count includes all the countries that IFM portfolio companies have operations in, not limited to headquarter locations.

IFM Global Infrastructure Fund

Diversified global portfolio of 13 investments

13 portfolio companies consisting of 52 individual assets diversified across 28 countries(1)

The Americas



Colonial Pipeline
Pipelines, US
Acquired in 2007

Global Container Terminals
Ports, US & Canada
Announced in 2018 (2)

FREEPORT LNG
Natural gas liquefaction, US
Acquired in 2014

indiana TOLL ROAD
Toll Road, US
Acquired in 2015

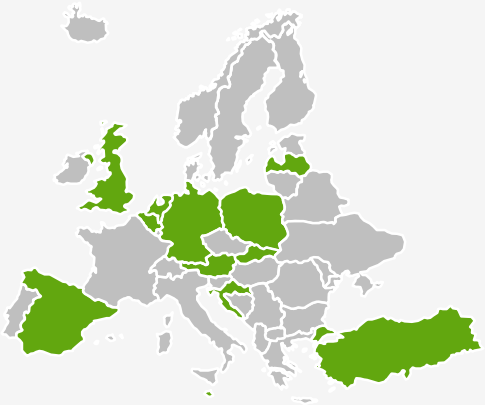
Global

aqualia
Water, Spain, Czech Republic & Global
Announced in 2018 (2)

vtti
Marine Terminals, Global
Acquired in 2017 (3)

OHL Concesiones
Mostly Toll Roads, Americas & Spain
Acquired in 2015-2018

Europe



arqiva
Telecom, UK
Acquired in 2004

VEOLIA Energia Polska
District Heating, Poland
Acquired in 2006/2010/2011

Anglian Water Group
Water & Sewerage, UK
Acquired in 2006

MIP
Port, Turkey
Acquired in 2017

50hertz
Electricity Transmission, Germany
Acquired in 2010

MAG
Airports, UK
Acquired in 2013

VIE Vienna International Airport
Airports, Vienna & Malta & Slovakia
Acquired in 2014/2016

M6toll
Toll Road, UK
Acquired in 2017

(1) Inclusive of OHL Concesiones which reached financial close on April 12, 2018. Exclusive of FCC Aqualia, GCT Global Container Terminals, which are announced transactions that have not reached financial close. There is no guarantee that the transactions will be completed.

(2) FCC Aqualia and GCT Global Container are announced transactions and have not reached financial close. There is no guarantee that the transactions will be completed.

(3) VTTI's marine terminals are distributed globally. Acquisition and asset management led by North American Investment Team. Maps do not show the VTTI terminals located outside of North America and Europe.

Recent track record of investment

Since 2013, we have executed 12 new and 3 follow-on investments, deploying >US$18bn. (1)

2013



Manchester Airports Group (UK)



NSW Ports (Australia)

2014

Freeport LNG (US)



Vienna Airport (Austria)

2015



Indiana Toll Road (US)



Conmex (Mexico)

2016



Vienna Airport (Austria) Follow-on



Ausgrid (Australia)

2017



Conmex (Mexico) Follow-on



VTTI & Follow-on (Global)



M6toll (UK)



OHL Mexico (Mexico)



Mersin Port (Turkey)



Freeport Notes 2 (US)

2018



OHL Concesiones (Mexico/Spain/ Latin America)



FCC Aqualia(2) (Global)



GCT Global Container Terminals (2) (US & Canada)

All investments made since 2013 have been included. This is not a representation of all investments completed since the inception of the Global Infrastructure Fund and Australian Infrastructure Fund

(1) Exclusive of FCC Aqualia and GCT Global Container Terminals.

(2) FCC Aqualia and GCT Global Container Terminals are announced transactions and have not reached financial close. There is no guarantee that the transactions will be completed.


Performance

Alaska Retirement Management Board

US LP Class B Account Activity	Date	Amount (USD)
Initial Commitment	January 2, 2014	$200,000,000
Drawdown	May 13, 2015	$200,000,000
Additional Commitment	September 30, 2015	$50,000,000
Total Distributions (Since Class B Inception)	May 31, 2016	$3,089,338
Ending Capital Balance	May 31, 2016	$219,559,388
Net TWR Since Inception (%p.a.)	**May 31, 2016**	**9.28%**

US LP Class A Account Activity	Date	Amount (USD)
Initial Commitment – switch to hedged feeder	June 1, 2016	$219,559,388
Additional Commitment	September 30, 2016	$50,000,000
Drawdown	February 15, 2017	$25,000,000
Drawdown	April 19, 2017	$25,000,000
Drawdown	November 1, 2017	$50,000,000
Total Distributions	July 31, 2018	$90,565,806
Ending Capital Balance	July 31, 2018	$417,992,004
Net TWR Since Inception (%p.a.)	**July 31, 2018**	**14.87%**

Notes:

1. Investor has chosen to have distributions re-invested into the Partnership and are reflected on the Capital Account Statements as additional contributions

Past performance is no guarantee of future results. Returns are shown net of all fees and all costs incurred by the investment programs, but before withholding taxes and other costs that are incumbent on clients. Nothing contained herein should be deemed to be a prediction or projection of future performance of any investment.

One purpose. Shared prosperity.

CONTACTS:

Jojo Granoff
Executive Director, Global Relationship Group
IFM Investors (US), LLC
Phone: + 1 212 784 2275
Email: jojo.granoff@ifminvestors.com

Paul Burraston
Director, Global Relationship Group
Registered Representative
Phone: +1 415 729 9315
Email: paul.burraston@ifminvestors.com

Chelsey Kaplan
Relationship Manager, Global Relationship Group
Registered Representative
Phone: +1 212 784 2260
Email: chelsey.kaplan@ifminvestors.com

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J.P. Morgan Asset Management Global Real Assets

Mandate: **JPMorgan Infrastructure Investment Fund** **Hired: 2014**

Firm Information	Investment Approach	Total ARMB Mandate
J.P. Morgan Investment Management Inc. (JPMIM) is the primary U.S. investment advisory branch of J.P. Morgan Asset Management (JPMAM), which is the marketing name for the asset management businesses of JPMorgan Chase & Co. (JPMC), a publicly traded company, and its affiliates worldwide. JPMIM is wholly-owned by JPMorgan Asset Management Holdings Inc. which is a subsidiary of JPMC. JPMIM was incorporated in Delaware on February 7, 1984. J.P. Morgan Global Real Assets employs 404 professionals, serves over 1,000 institutional clients, and is headquartered in New York, New York. As of 6/30/2018, J.P. Morgan Global Real Assets total assets under management were $74.3 billion. **Key Executives:** ***Paul Ryan***, CEO and Portfolio Manager ***Matthew LeBlanc***, CIO	JPMorgan's Infrastructure Investments Fund ("IIF") is an open-ended strategy that invests in unlisted infrastructure equity. IIF seeks to provide diversification from other asset classes, attractive risk-adjusted returns, downside protection, inflation sensitivity, and yield. Consistent with these objectives, the IIF invests in a range of unlisted, lower-risk "core" and "core-plus" assets with a focus on long-term (10+ years) contracted and regulated cash flows. These cash flows underpin the benefits of the asset class and drive a majority of investor returns in the form of cash yield, and also help to mitigate commodity/GDP and other risks. In further alignment with lower risk objectives, the Fund primarily invests in North America, Western Europe, Australia, and secondarily in other OECD countries. **Target Return:** 8-12% per annum	Assets Under Management: 6/30/2018: $113,632,566

Concerns: None

6/30/2018 Performance

	Last Quarter	1-Year	3-Years Annualized
Manager Net	-1.5%	9.6%	5.7%
S&P Global Infra Benchmark	2.60%	1.82%	5.98%

Infrastructure Investments Fund

Alaska Retirement Management Board



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Infrastructure Investments Fund ("IIF") — Open Ended Core / Core+ Infrastructure Portfolio

Seeks to deliver stable cash yield, diversification, attractive risk-adjusted returns and inflation protection through market cycles

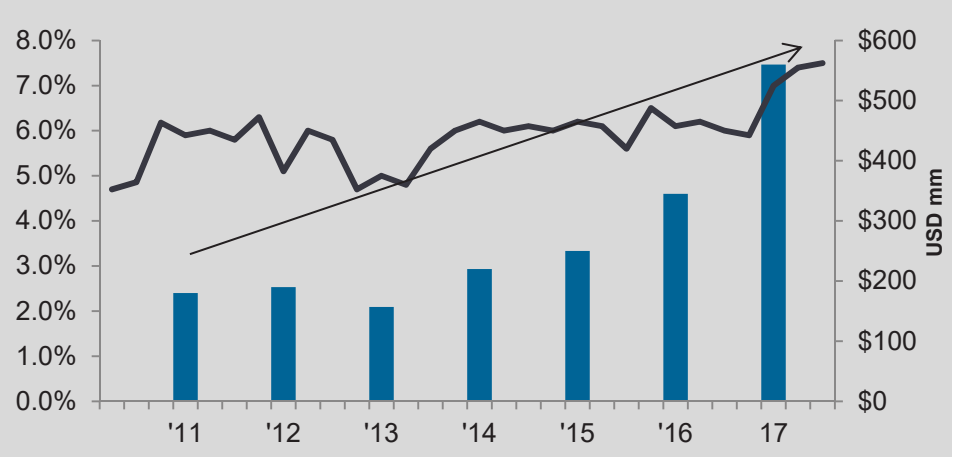
Strategy Overview

- Founded in 2006
- Open-ended perpetual structure
- Core/core+ infrastructure
- Focus on Diversification, Inflation Protection & Yield ("D.I.Y.")
- 16 portfolio companies (310 assets) in 25 countries & 11 subsectors
- **Short queue currently expected to be 3 months or less from next quarter end close**

Summary of Key Strategy Elements

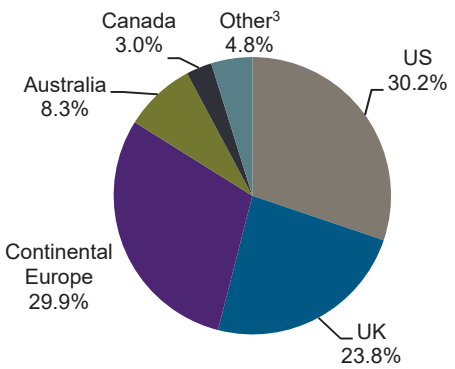
Net Asset Value	■ USD 9.7 billion
Gross Asset Value	■ USD 20.8 billion (54% loan-to-value)
Target Return	■ 8-12% net[1]
Target Cash Yield	■ 5-7% on NAV[1] (cash distributions)
Sector Focus	■ Distribution/Regulated, GDP-Sensitive & Contracted/Power
Geographic Focus	■ U.S., Canada, Western Europe, and other OECD

Cash Yield and Distributions as Foundation of Total Return[2]

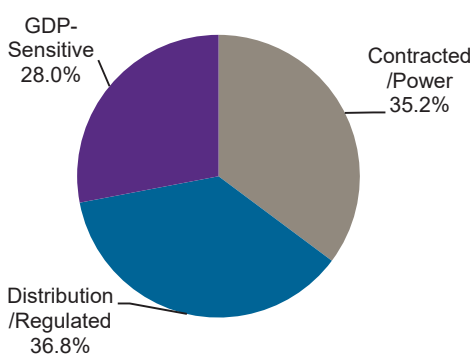


Existing Portfolio

Geographic Breakdown:



Sector Breakdown:

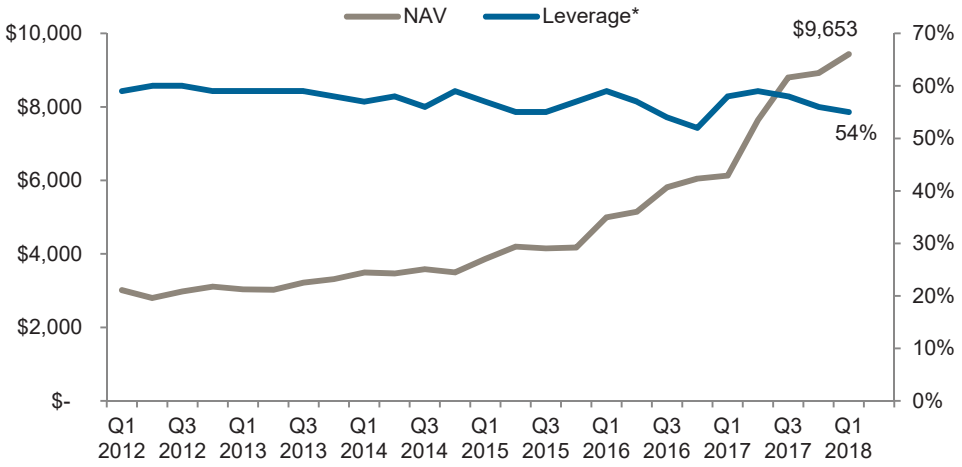


All data as of June 30, 2018. The advisor seeks to achieve the stated objectives. There can be no guarantee the objectives will be met. [1] The target returns and cash yield are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns or yield similar to the targets shown above. Please see the complete Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation of target returns.
[2] Yield on NAV, the trailing one-year cash yields were calculated using individual quarterly cash yields. [3] Other includes Japan, Chile and South Africa.

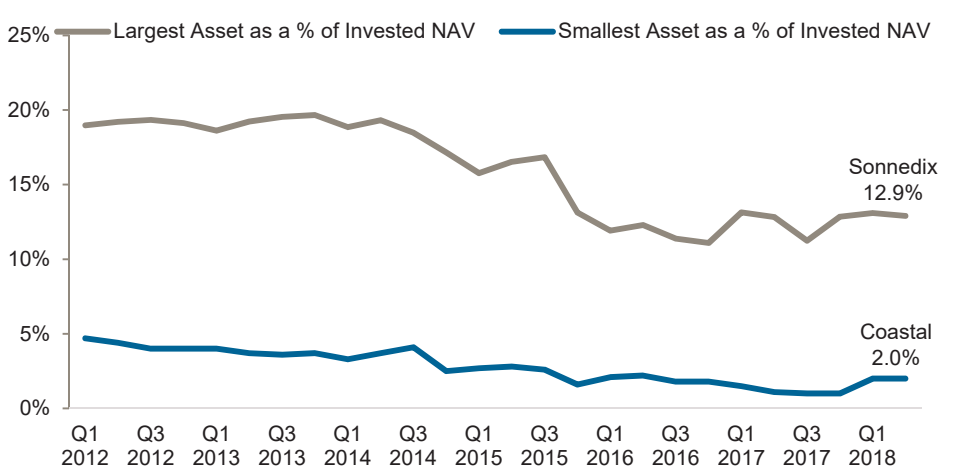
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Portfolio Snapshot

NAV and Leverage

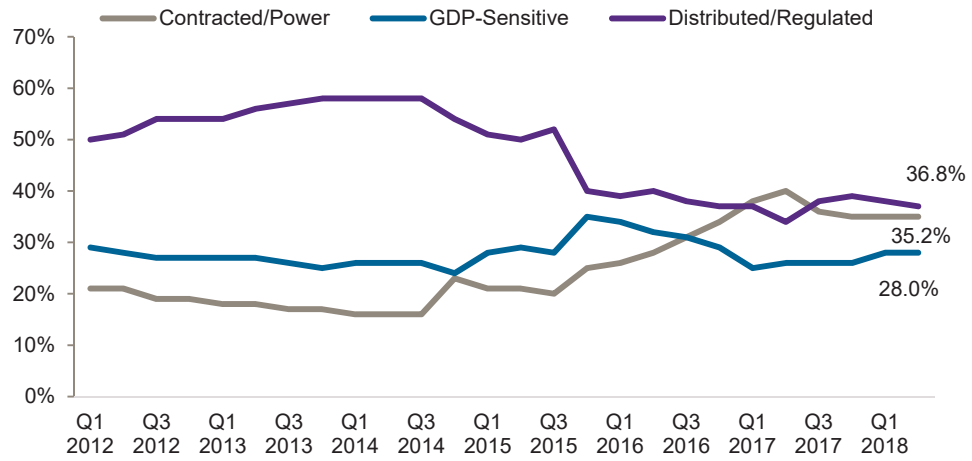


Asset Concentration as a % of Total Portfolio

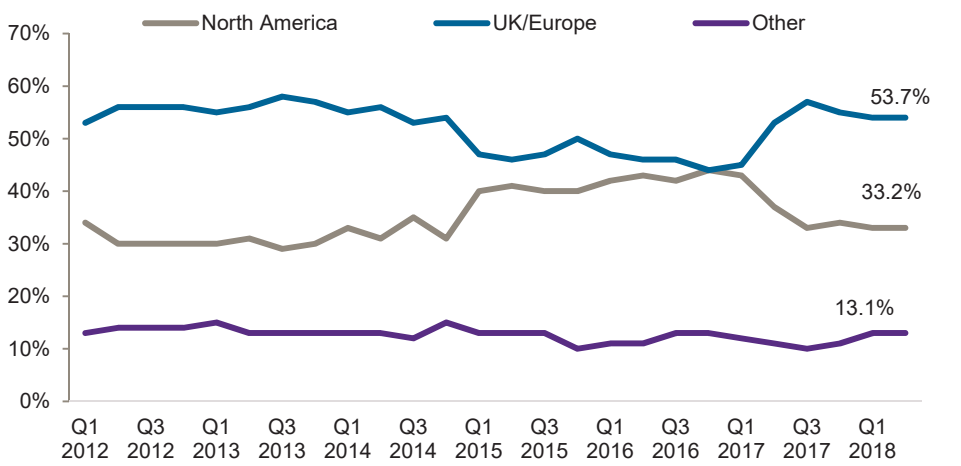


16 Portfolio Companies	310 Assets	11 Subsectors	$9.7 billion NAV	25 Countries

Sector Breakdown



Geographic Breakdown



As of June 30, 2018.
*Represents aggregate leverage
May not sum to 100 due to rounding. Past performance and yield is not indicative of future results.

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IIF Strategy – Aligned to Investor Outcomes Since 2006

Governance

- Control positions in middle market platforms and companies
- Independent boards of directors aligned to investor outcomes and local communities
- Consistent risk management frameworks across sectors and geographies

Alignment

- Diversified, risk-adjusted returns aid in protecting against rising rates and inflation
- 7.5% last 12 months cash yield; 6.2% p.a. for last 5 years
- 86% regulated or contracted[1]; 1.5% p.a. local currency total return volatility over 5 years

Transparency

- Consistent and detailed fund and asset level reporting
- Access to investment professionals and dedicated research team
- ESG leadership: annual reporting; UNPRI "A" rated; GRESB 5th rank of peer group[2]

All data as of June 30, 2018 unless otherwise specified.
The manager seeks to achieve the stated objectives. There can be no guarantee the objectives will be met

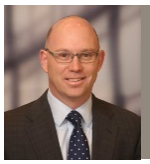
[1] 2017 estimated portfolio company revenues as of August 2017

[2] JPMAM is the signatory to The United Nations-supported Principles for Responsible Investment (UNPRI). PRI Ratings: 0% = E, 0-25% = D, 25-50%= C, 50-75 = B, 75-95% = A, 95% and above= A+. JPMAM Direct Infrastructure rating as of July 2018. For more on UNPRI's annual assessment, please see additional information at the conclusion of the presentation. JPMAM is a member of The Global Real Estate Sustainability Benchmark (GRESB) for Infrastructure. The Infrastructure Assessment assesses ESG performance at the asset and fund level for infrastructure fund managers, operators and assets, and investors that invest directly in infrastructure. 16 peers.

Dedicated IIG Team Supported by 69 Independent Directors Across the Portfolio[1]



Paul Ryan, MD
Portfolio Manager
New York



Matthew LeBlanc, MD
Chief Investment Officer
New York



Brian Goodwin, MD
Head of Portfolio Asset Management
New York

Investment & Asset Management Team — *New York*



Landy Gilbert
Managing Director
Power, Utilities & Energy



Andrew Kapp
Managing Director
Power, Utilities & Energy



Hai-Gi Li
Managing Director
Transportation/ Utilities



Ed Wu
Executive Director
Portfolio Asset Mgmt



Kathleen Lawler
Vice President
Power, Utilities & Energy



Dan Mitaro
Vice President
Power, Utilities & Energy



Robin Lutz
Vice President
Transportation/ Power



Marko Josipovic
Vice President
Transportation, Power & Utilities



Georgina Yea
Associate



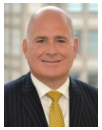
Clara Lequin
Associate



Preston Scherer
Associate

Michael Karp
Associate

Investment & Asset Management Team — *London*



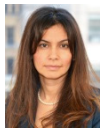
John Lynch
Managing Director
Power, Utilities & Energy



Rob Hardy
Managing Director
Transportation



Mark Walters
Managing Director
Power, Utilities and Energy



Sara Sulaiman
Executive Director
Power, Utilities & Energy



Mark Scarsella
Vice President
Transportation/ Utilities



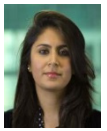
Ben Francis
Vice President
Transportation/ Utilities



Farah Meroue
Vice President
Transportation



Patricia Llopis
Associate



Sneha Sinha
Associate

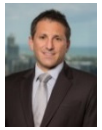


Gary Blackburn
Associate

Client Strategy



Nick Moller
Executive Director
New York



Gilly Zimmer
Executive Director
New York



Dan Galinko
Vice President
New York



Cassie Winn
Vice President
New York



Chris Simard
Associate
New York

Fund Execution and Research



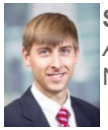
Amanda Wallace
Managing Director
New York



Hannah Logan
Executive Director
London



Ebru Sert
Executive Director
New York



Stephen Leh
Associate
New York

Finance/Tax

Stephen Liu, ED
Manura Miriyagalla, ED
Esther Cho, VP
Joe Kim, VP
Simon Choi, Associate

Client Service

Jonathan Schwartz, VP
Melissa Grant, Associate
Frances Huang, Associate
Penn Sednaoui, Analyst

All listed individuals are employees of JPMAM. There can be no assurance that the professionals currently employed by JPMAM will continue to be employed by JPMAM or that the past performance or success of any such professional serves as an indicator of such professional's future performance or success.

[1] As of June 30, 2018.

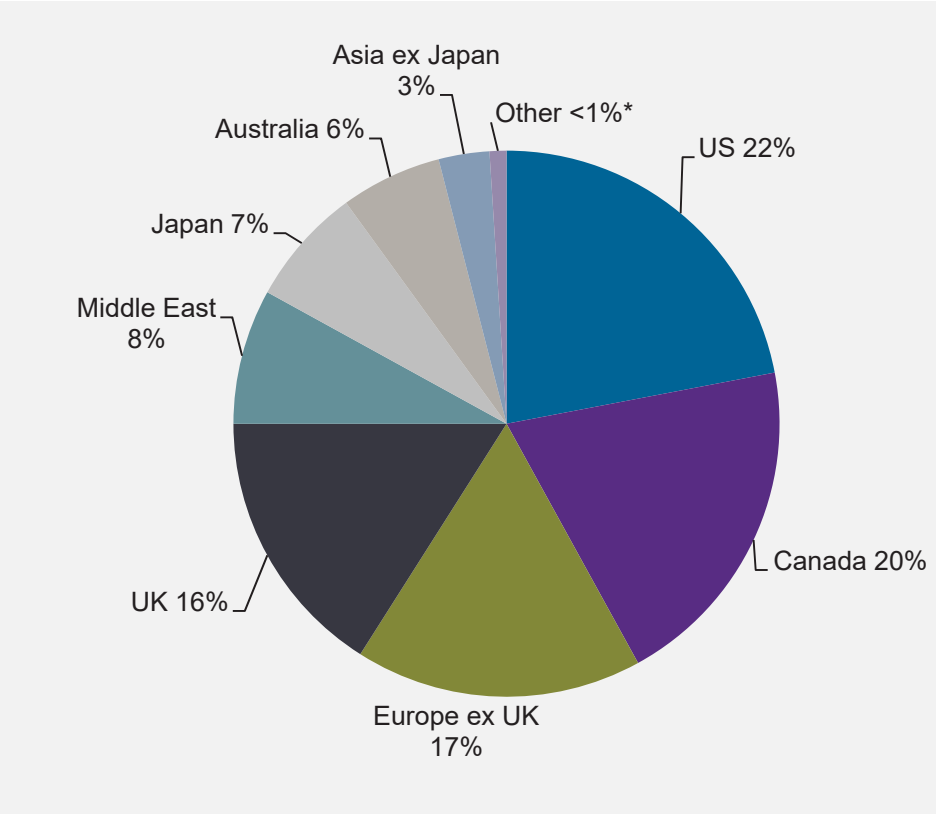
Source: JPMAM, as of July 2018.

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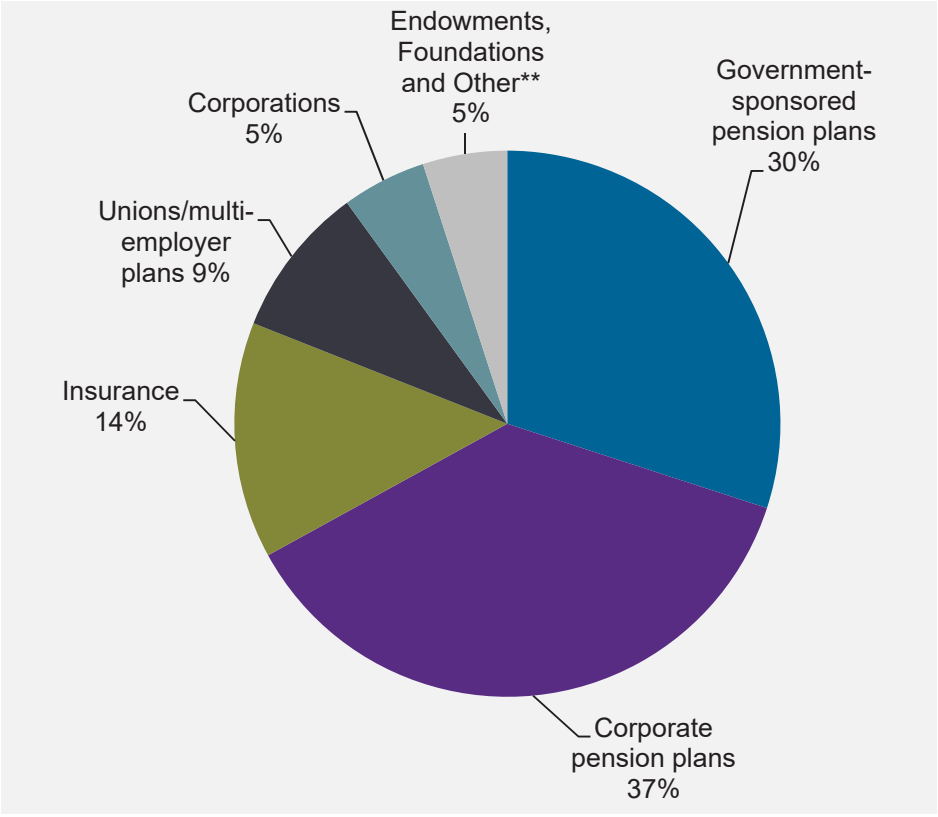
A Diversified Long Term Investor Base Built Over a Decade

IIF has commitments from 259 institutional investors across 24 countries

Commitments By Geography



Commitments by Investor Type



Based on committed client accounts as of June 30, 2018. *Other includes Cayman Islands and Thailand. ** Other includes fund of funds, international organizations and High Net Worth Investors.

ALTs by J.P.Morgan Asset Management

Current Portfolio – 16 Companies with 310 Underlying Assets[1]

Distribution/Regulated (37%)



Electricity North West
Regulated electric distribution network providing power to 6mm people in northwest England

Nortegas
Gas distribution system in Northern Spain

Southern Water Services
Regulated water and wastewater network in southeast England serving over 7mm customers

SouthWest Water Company
Regulated water and wastewater utilities serving over 350,000 people in Alabama, California, Oregon and South Carolina

Summit Utilities
Regulated natural gas distribution utilities with operations in Arkansas, Colorado, Maine, Missouri and Oklahoma

Värmevärden
Swedish District Heating company

Contracted/Power (35%)



Coastal Winds
North American wind portfolio in Texas, Oregon and New York totalling 354 MW's

Ventient Energy
Diversified portfolio of 37 contracted wind farms totaling 800 MW of capacity throughout the UK

Novatus Energy
More than 1200 MW of wind and solar projects in the U.S.

Sonnedix Power Holdings
Interest in global solar developer, owner and operator

Southwest Generation
IPP owning 1,191 MW of gas fired generation facilities in California, Colorado, and New Mexico

GDP-Sensitive (28%)



Beacon Rail
Leading European passenger and freight rail leasing platform

Koole Terminals
European liquid bulk storage company with c.2m cubic meter capacity focused on the Amsterdam-Rotterdam-Antwerp region

Nieuport Aviation
Located in Toronto, Canada's fastest growing airport, serving 2.7mm passengers in 2016

Noatum Ports
Leading operator in the Iberian Peninsula comprised of 18 terminals in Spain, along with Marmedsa, the largest Iberian port services group

North Queensland Airports
Cairns and Mckay Airports, serving the Great Barrier Reef and Bowen Basin, one of the largest coal deposits in the world.

Denotes Platform Investments
Assets identified for future potential equity capital deployment. The companies above are shown for illustrative purposes only. Their inclusion should not be interpreted as a recommendation to buy or sell.

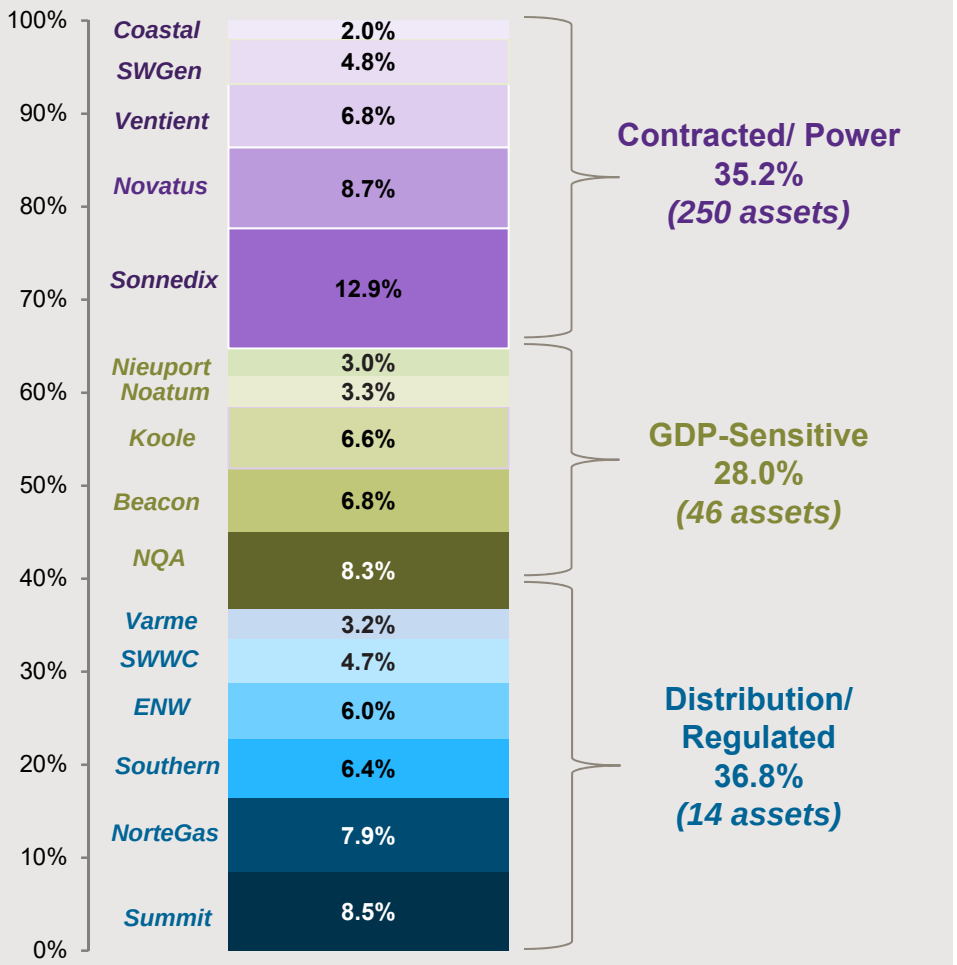
[1] Data as of June 30, 2018. Diversification does not guarantee investment returns and does not eliminate the risk of loss.

ALTs by J.P.Morgan Asset Management

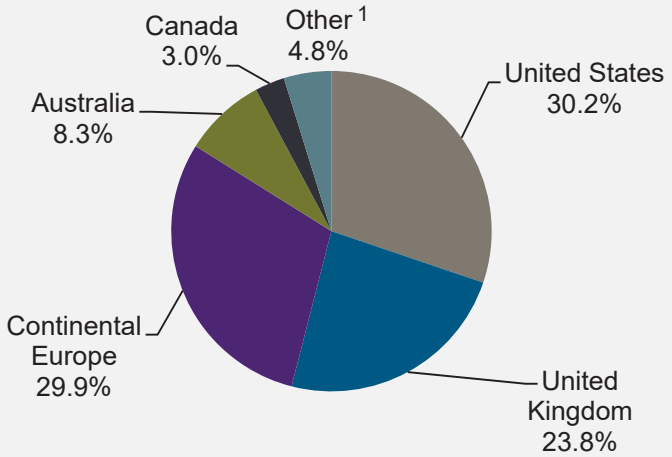
A Diversified Portfolio: $9.7 Billion; 16 Portfolio Companies, 310 Underlying Assets

No single asset comprises more than 7.9% of the portfolio

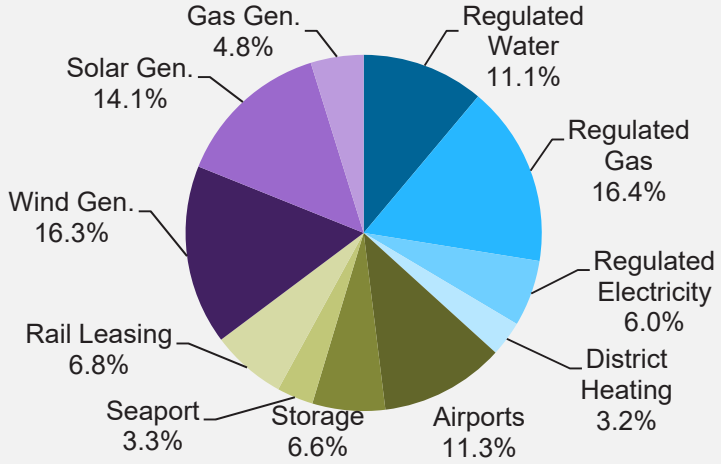
Portfolio Companies by % NAV – Q2 2018



Diversity By Country (NAV%) – Q2 2018



Diversity By Subsector (NAV%) – Q2 2018



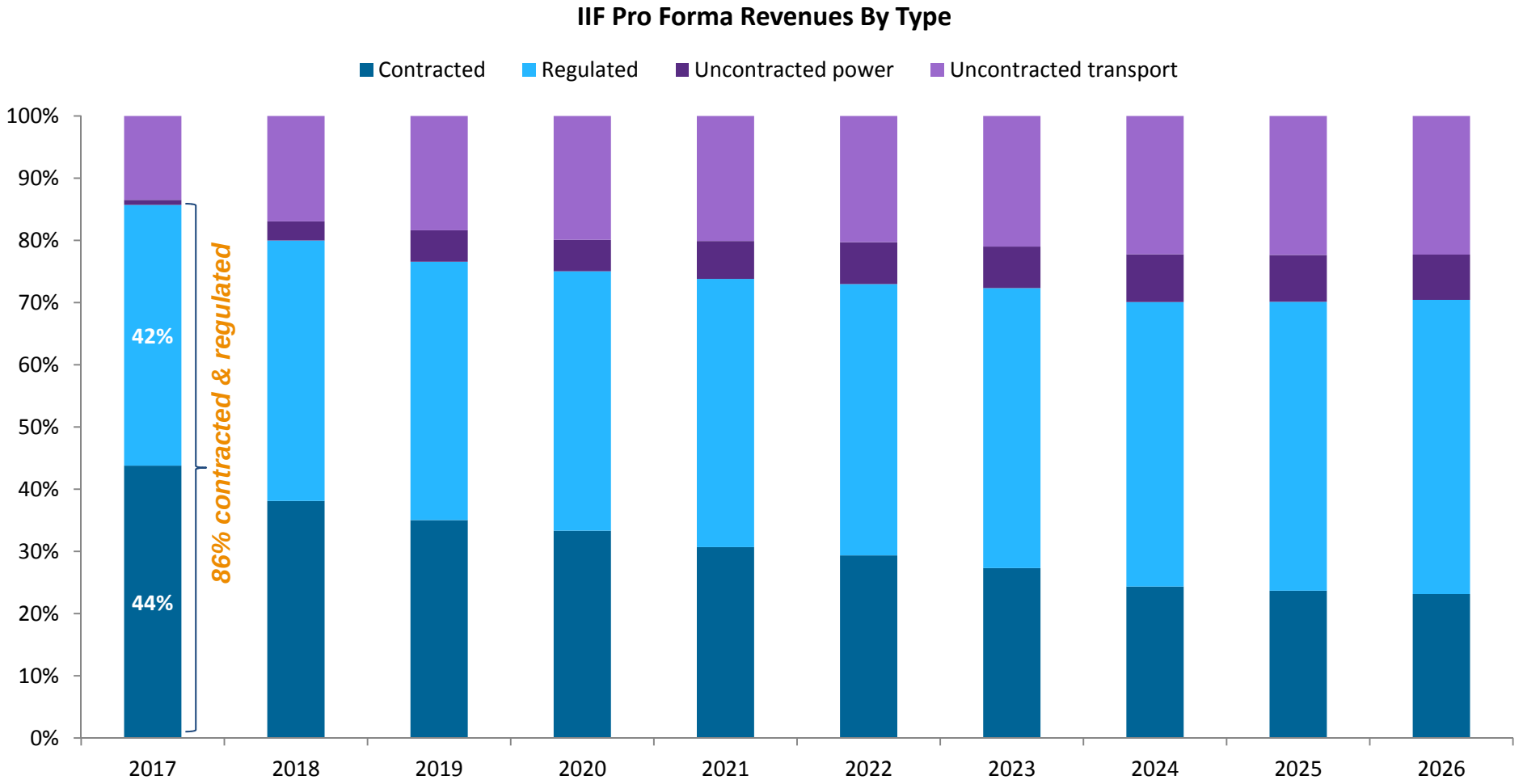
Data as of June 30, 2018.

[1] Other includes Chile, Japan, and South Africa. Diversification does not guarantee investment returns and does not eliminate the risk of loss.

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Deliberate Portfolio Construction Targets Stability and Lower Risk

- **Expected revenues above 70% regulated/contracted for the next 10 years**
- **Bottom-up data from 310 portfolio assets and assuming no changes to the portfolio**
- **Weighted average contract life of 14.1 years across IIF's power generation investments[1]**



Source: JPMAM. Contracted/regulated data as of August 2017.
[1] As of December 31, 2017

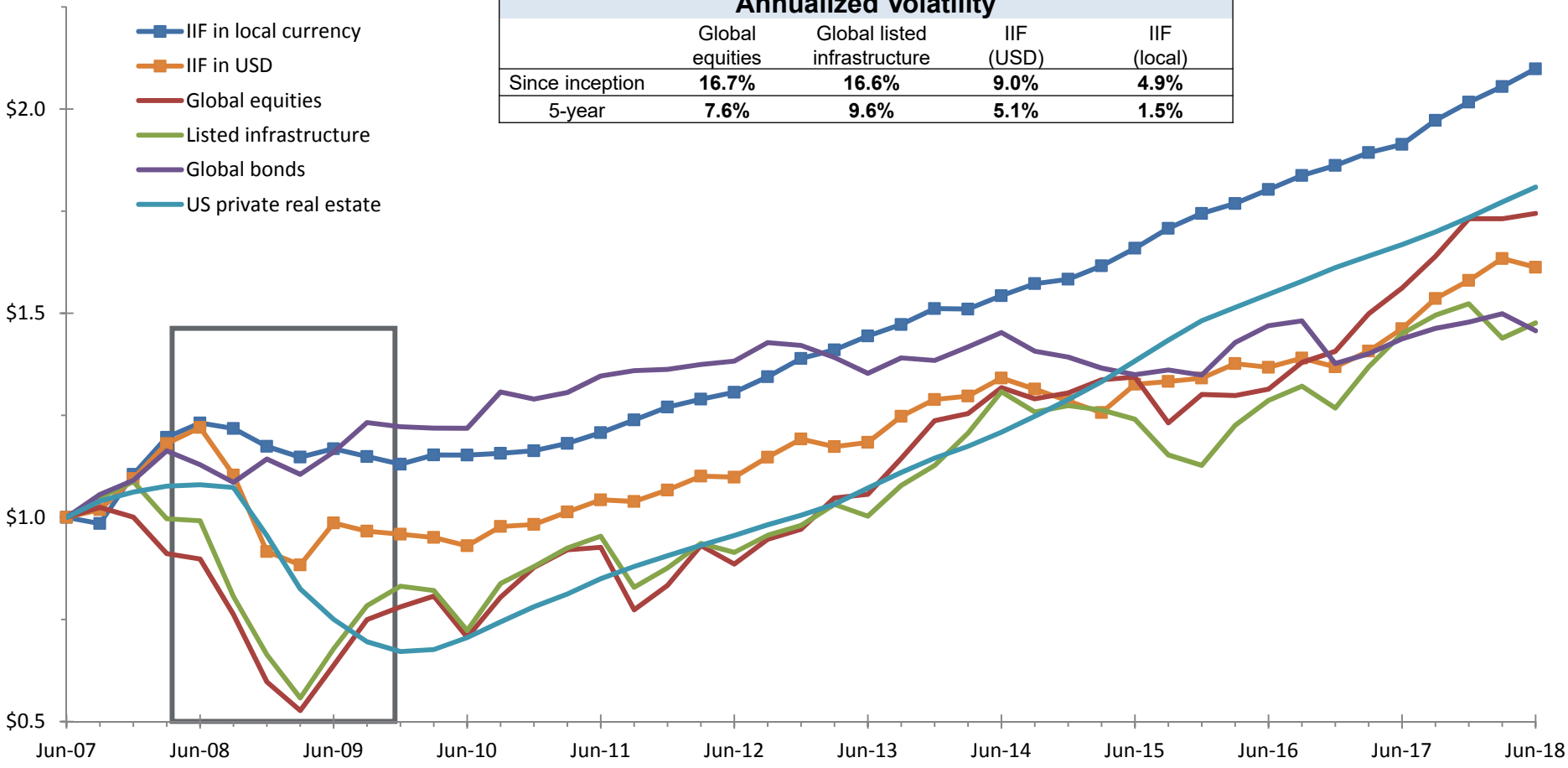
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IIF Has Demonstrated Strong Risk-Adjusted Returns

IIF has demonstrated robust returns with less volatility than other asset classes since inception

Evolution of USD 1 Invested in Q2 2007 to Q2 2018

Annualized Volatility				
	Global equities	Global listed infrastructure	IIF (USD)	IIF (local)
Since inception	**16.7%**	**16.6%**	**9.0%**	**4.9%**
5-year	**7.6%**	**9.6%**	**5.1%**	**1.5%**



Source: Bloomberg, NCREIF, J.P.Morgan Asset Management. Global equities, global listed infrastructure, global bonds, and US real estate are measured by MSCI World, S&P Global Infrastructure Index, Barclays Global Agg, and NFI-ODCE, respectively. All series are based on gross of fees total return indices, and denominated in USD; please refer to slide 11 for returns for IIF net of fees. Data as of Q2-2018.
Past performance is not indicative of future results. Indices do not include fees or operating expenses and are not available for actual investment.

ALTs by J.P.Morgan Asset Management

IIF Historical Return & Yield Summary

Returns for Periods Ended June 30, 2018

	One Year[1]	Three Year[1]	Five Year[1]	Ten Year[1]
Net Total Return Local Currency	8.7%	7.1%	6.7%	4.1%
Net Total USD Return	9.3%	5.7%	5.3%	1.5%
Cash (Distributions / NAV Cash Yield)	7.5%	6.4%	6.2%	5.4%

Past performance is no guarantee of future results. Returns include the re-investment of income. Unless otherwise noted, all performance numbers have been calculated in US dollar terms.

[1] Performance numbers represent a composite return of the combined fund investor vehicles (FIVs) in existence as of June 30, 2018. Specific FIV and investor returns are shown on the quarterly investor statements.

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Select Acquisitions – 2017 to 2018 YTD

From 2017 to 2018 YTD, IIF deployed over $4.2 bn of capital through 32 transactions of which 27 were platform investments

Pio Pico Energy Center



- 323 MW simple cycle gas fired peaking facility located near San Diego, California
- Acquisition: February 2017

Värmevärden



- Leading private company operating District Heating infrastructure in Sweden
- Acquisition: March 2017

Beacon Rail Leasing



- Rolling stock rail leasing company which provides passenger and freight leasing services in the UK and Europe
- Acquisition: April 2017

NorteGas Energía Distribución



- Second largest gas distribution network in Spain
- Acquisition: July 2017

Mesquite Power



- 625 MW natural gas combined cycle power plant located near Phoenix, Arizona
- Acquisition: July 2018

Blackwater Midstream



- Liquid bulk storage business with over 2.4 million barrels of capacity in Louisiana and Georgia
- Acquisition: July 2018

Includes closed transactions as of July 2018.

These examples are included solely to illustrate the investment process and strategies which have been utilized by the manager. It should not be assumed that investments within the portfolio have or will perform in a similar manner to the investment above. Please note that this investment is not necessarily representative of future investments that the manager will make. There can be no guarantee of future success.

Infrastructure Outlook and IIF Key Takeaways

All Weather Investment

- Challenging yield environment and increased volatility in other asset classes
- Rising rates and inflation are both expected to be positive for IIF
- Core infrastructure's "D.I.Y." benefits as powerful as ever

Long-Term Foundational Allocation

- ~$9.7bn portfolio with 16 portfolio companies and 310 assets
- Attractive risk adjusted returns versus other major assets classes
- Immediate access to target 5-7% cash[1] yield after capital call; no J-curve

Established Strategic Investor

- Better value in the middle market, avoiding high priced trophy auctions
- ~$7.3bn raised and deployed in the last 5 years
- Short estimated new investment queue of 3 months or less from next quarter end close

The target returns and yield are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns or yield similar to the targets shown above. Please see the complete Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation of target returns.
Data as of June 30, 2018.

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Risk and Disclosures

Supplementary Information

The Target Return and Target Cash Yield have been established by J.P. Morgan Investment Management Inc. ("J.P. Morgan") based on its assumptions and calculations using data available to it and in light of current market conditions and available investment opportunities and is subject to the risks set forth herein and as set forth more fully in the current Private Placement Memorandum of the Infrastructure Investments Fund ("The Memorandum"). The Target Returns and Target Cash Yield are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the Target Returns and Target Cash Yield shown above. Because of the inherent limitations of the Target Returns or Target Cash Yield, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. The Target Returns and Target Cash Yield cannot account for the impact that economic, market, and other factors may have on the implementation of an actual investment program. Unlike actual performance, the Target Returns and Target Cash Yield do not reflect actual trading, liquidity constraints, fees, expenses, and other factors that could impact the future returns of the strategy. The manager's ability to achieve the target returns is subject to risk factors over which the Investment Advisor may have no or limited control. There can be no assurance that the Fund will achieve its investment objective, the Target Return, the Target Cash Yield or any other objectives. The return achieved may be more or less than the Target Return and/or Target Cash Yield. The data supporting the Target Returns and Target Cash Yield is on file with J.P. Morgan and is available for inspection upon request.

Infrastructure investments are subject to significant risks. While J.P. Morgan believes that infrastructure investments have compelling risk and return characteristics, past performance is no guarantee of future results, and any risk or return analyses should not be relied upon. Risk/return continuums and other relative comparisons are based on J.P. Morgan's analysis of information available to it on project developments in the referenced asset classes, and such information may not be accurate or complete. Specific investments shown are for illustrative purposes only, and you should not assume that similar investments will be available to or, if available, will be selected for investment by the Fund.

Information contained in this Booklet, except where otherwise indicated, solely represents J.P. Morgan's views based on available information and current market conditions. The views expressed herein may change at any time based on new information, changing conditions or revised analyses.

The deduction of an advisory fee reduces an investor's return. Actual account performance will vary on individual portfolio security selection and the applicable fee schedule. Fees are available upon request.

The UNPRI assessment methodology (10 assessed modules) and assessment report together aim to achieve three objectives set by the PRI Advisory Council (Facilitate learning and development; Identify areas for further improvement; and Facilitate dialogue between asset owners and investment managers) on responsible investment activities and capabilities. JPMAM Direct Infrastructure asset class was ranked with a number of firms in the United Nations Principal for Responsible Investment, which JPM is a signature. The 2017 JPMAM assessment Report is available upon request.

Risks Associated with Investing in the Strategy:

Please consult the Memorandum for other key risk factors associated with investments in the Fund.

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Brookfield Investment Management

Mandate: **Brookfield Global Infrastructure Strategy** **Hired: 2014**

Firm Information	Investment Approach	Total ARMB Mandate
Brookfield Investment Management Inc., the entity under which the Brookfield Public Securities Group operates, is a registered investment advisor with the SEC. As of 6/30/2018, Brookfield Investment Management's Public Securities Group had total assets under management of $19.6 billion. As of 6/30/2018, the AUM for the Global Infrastructure Strategy was $4.2 billion. **Key Executives:** ***Craig Noble, CFA,*** Portfolio Manager ***Leonardo Anguiano,*** Portfolio Manager ***Thomas Miller, CFA,*** Portfolio Manager	Brookfield's Global Infrastructure Strategy offers a diversified portfolio of infrastructure securities based upon Brookfield's best investment ideas globally. Brookfield adopts a value-based stock selection methodology. They conduct a rigorous, bottom-up fundamental analysis focusing on free cash flow generation with an emphasis on primary research including asset inspections, site visits, management meetings, financial modeling, and sensitivity analysis. Investment decisions are made based on total return expectations. **Benchmark:** Dow Jones Brookfield Global Infrastructure Total Return Index (USD)	Assets Under Management: 6/30/2018: $106,053,648

Concerns: None

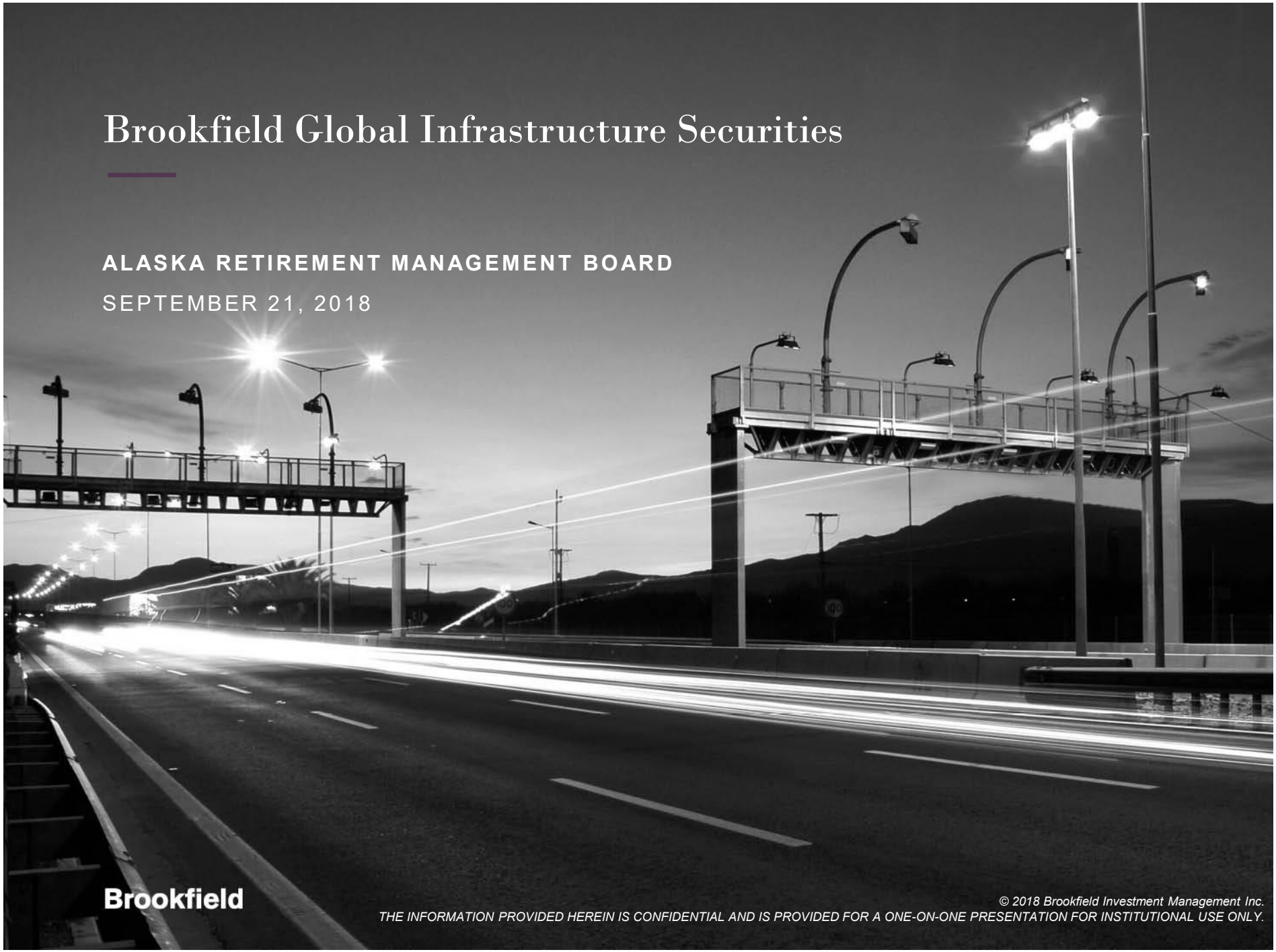
6/30/2018 Performance

	Last Quarter	1-Year	3-Years Annualized
Manager Net	3.90%	1.34%	3.04%
Benchmark	4.22%	2.52%	4.55%
S&P Global Infra Benchmark	2.60%	1.82%	5.98%

Brookfield Global Infrastructure Securities

ALASKA RETIREMENT MANAGEMENT BOARD

SEPTEMBER 21, 2018



Brookfield

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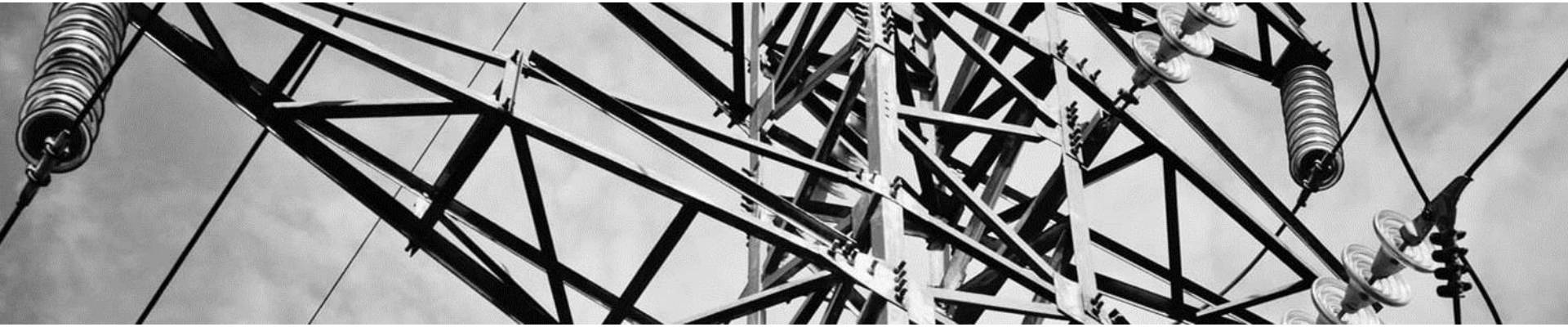
Executive Summary

Brookfield

An actively managed global portfolio of infrastructure securities diversified across geographies and sectors designed to deliver compelling risk-adjusted returns and attractive, resilient current income

Key Differentiators	• Bottom-up, cash-flow driven approach and operator mentality focuses investments on best ideas globally • Emphasize "pure play" owner operators with high barriers to entry, limited or no competition and stable cash flows • Active, relative value strategy allows managers to rotate into areas with optimal balance of upside potential and downside protection
Brookfield Advantage	• Deep sector knowledge drawn from 100 year history of owning and operating economic backbone assets • Seasoned team with the experience to exploit inefficiencies and capitalize upon temporary market dislocations • Nine-year track record of global infrastructure securities outperformance relative to benchmarks and peers[1]
Benefits	• Opportunity to capture attractive relative returns and capital appreciation stemming from predictable growth • Potential for meaningful current income supported by stable stream of cash flows • Exposure to hard asset investing with daily liquidity and pricing

1) Performance measured from January 1, 2009 to December 31, 2017. Past performance is not indicative of future results. See Appendix for additional disclosures.



The Brookfield Advantage

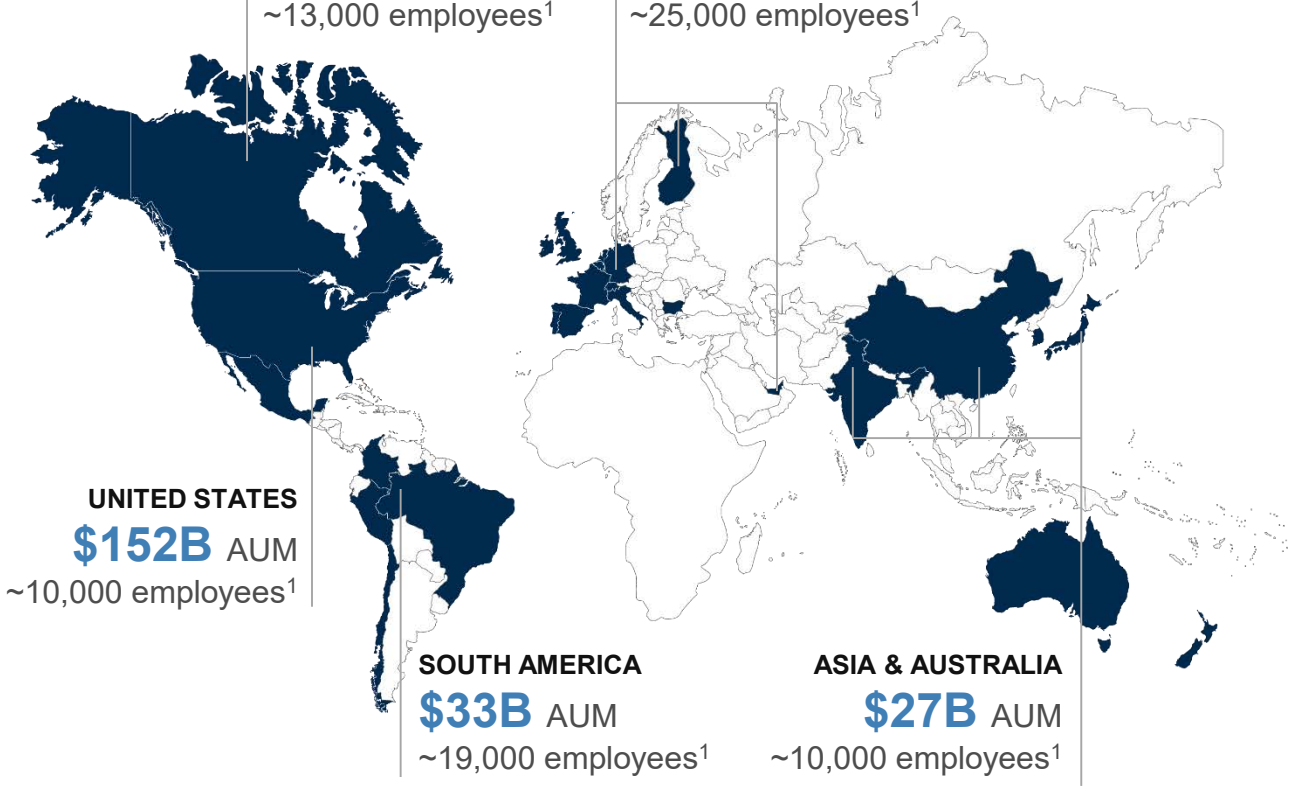
Brookfield's Global Scale

Brookfield

We benefit from our global scale, operating expertise and our broad-based network with local presence on five continents

CANADA
$29B AUM
~13,000 employees[1]

EUROPE & MIDDLE EAST
$46B AUM
~25,000 employees[1]



UNITED STATES
$152B AUM
~10,000 employees[1]

SOUTH AMERICA
$33B AUM
~19,000 employees[1]

ASIA & AUSTRALIA
$27B AUM
~10,000 employees[1]

115
YEARS INVESTING IN REAL ASSETS

~$285B
UNDER MANAGEMENT GLOBALLY

750+
INVESTMENT PROFESSIONALS[1]

80,000+
OPERATING EMPLOYEES[1]

30+
COUNTRIES

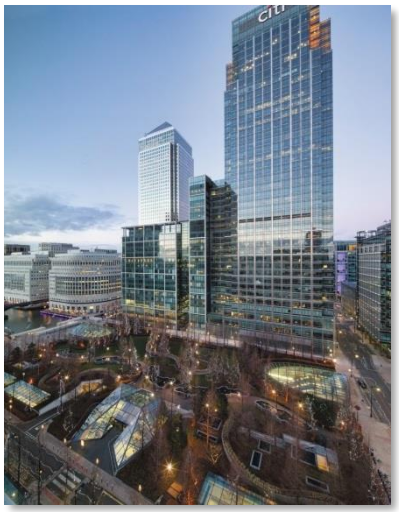
As of June 30, 2018; 1) Employee data as of December 31, 2017 and includes investment and operating professionals across all of Brookfield's platforms (i.e. private funds and listed entities) and investment sectors (e.g. real estate, infrastructure and private equity). Investment and operating professionals include all personnel involved in the investment and related processes, including research, investment analysis, risk analysis, performance measurement analysis and other personnel.

Brookfield's Focus

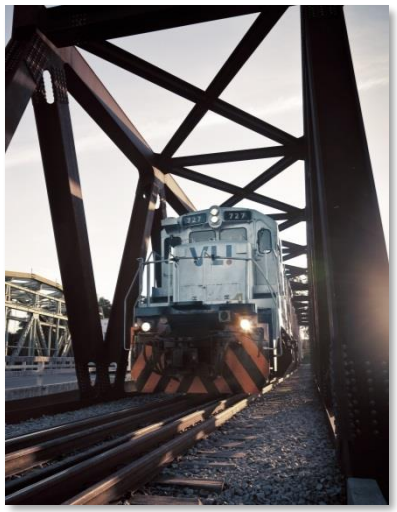
Brookfield

We invest in sectors where we believe we possess a competitive advantage

Real Estate
$160 billion
AUM



Infrastructure
$35 billion
AUM



Renewable Power
$43 billion
AUM



Private Equity
$30 billion
AUM



We have a deep history of investing **across real asset sectors**, the liquidity spectrum, and the capital structures

As of June 30, 2018; Assets under management for Brookfield Asset Management Inc. includes its affiliates.

Brookfield's Distinctive Investment Principles

We apply consistent, value-driven analysis to actively manage our real asset investments, targeting superior risk-adjusted returns over the long term

1
FOCUS ON VALUE OVER A LONG TIME HORIZON

- **Patience** can be a competitive advantage when investing on a value basis
- **Value investing** is attractive, in our view, over a long time horizon

2
ACTIVELY MANAGE REAL ASSET INVESTMENTS

- We believe that real assets emphasizing **cash flow generation and tangible value** can lead to superior outcomes
- **Sector experts** can be better equipped to identify mispriced investments than market generalists
- Finding the best opportunities requires **flexibility and a global perspective**

3
EMBRACE CONTRARIAN THINKING

- Attractive opportunities are frequently found in **out-of-favor market segments**
- **A consistent approach** emphasizing valuation often leads to contrarian views

Investment Flexibility

Brookfield

Our clients have unparalleled flexibility to partner with us while benefiting from our experience in owning and operating real assets[1]

Public Securities

- Real Estate Equities
- Infrastructure Equities
- Energy Infrastructure / MLPs
- Real Asset Debt
- Real Asset Solutions
- Hedge Funds

Private Funds

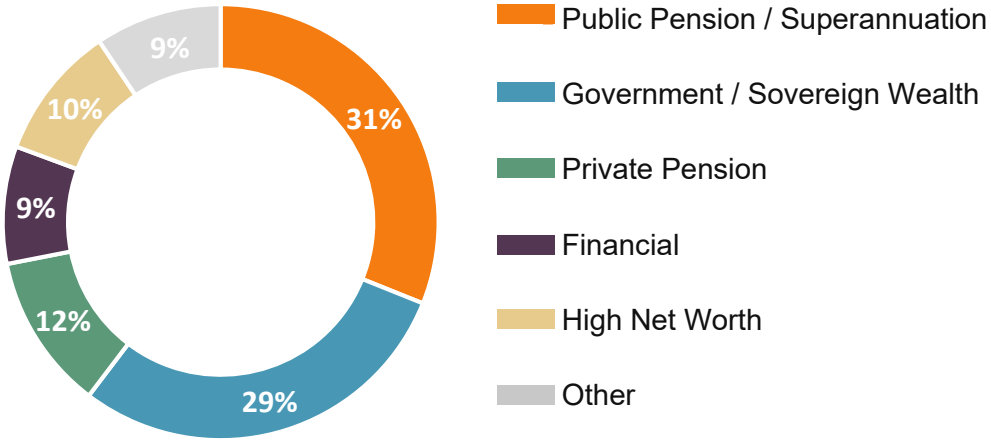
- Real Estate
- Infrastructure
- Private Equity

Listed Partnerships

- Brookfield Property Partners (BPY)
- Brookfield Infrastructure Partners (BIP)
- Brookfield Renewable Partners (BEP)
- Brookfield Business Partners (BBU)

Our Clients:

AUM Breakdown by Client Type



As of December 31, 2017; Assets under management for Brookfield Asset Management Inc. includes its affiliates. Refers to our main investing vehicles across our real estate, infrastructure and private equity platforms.

1) Subject to the Firm's informational barrier protocols.

Specialist Manager with a Deep and Experienced Team

Brookfield

Craig Noble, CFA
Chief Executive Officer and Chief Investment Officer

REAL ESTATE EQUITIES	INFRASTRUCTURE EQUITIES	ENERGY INFRASTRUCTURE EQUITIES	REAL ASSET DEBT	REAL ASSET SOLUTIONS
Jason Baine **Bernhard Krieg, CFA** **+9 Analysts**	**Leonardo Anguiano** **Tom Miller, CFA**[1] **Craig Noble, CFA** **+9 Analysts**[2]	**Rob Chisholm** **Jeff Jorgensen** **Dan Tutcher** **+3 Analysts**	**Dana Erikson, CFA** **Mark Shipley, CFA** **+5 Analysts**[2]	**Larry Antonatos** **+2 Analysts**
• 14 years of average experience • $7.3B assets managed by team • Assets managed since 2001	• 11 years of average experience • $4.2B assets managed by team • Assets managed since 2008	• 14 years of average experience • $3.6B assets managed by team • Assets managed since 2007	• 16 years of average experience • $0.8B assets managed by team • Assets managed since 2006	• 14 years of average experience • $1.8B assets managed by team[3] • Assets managed since 2014

David Levi, CFA
President

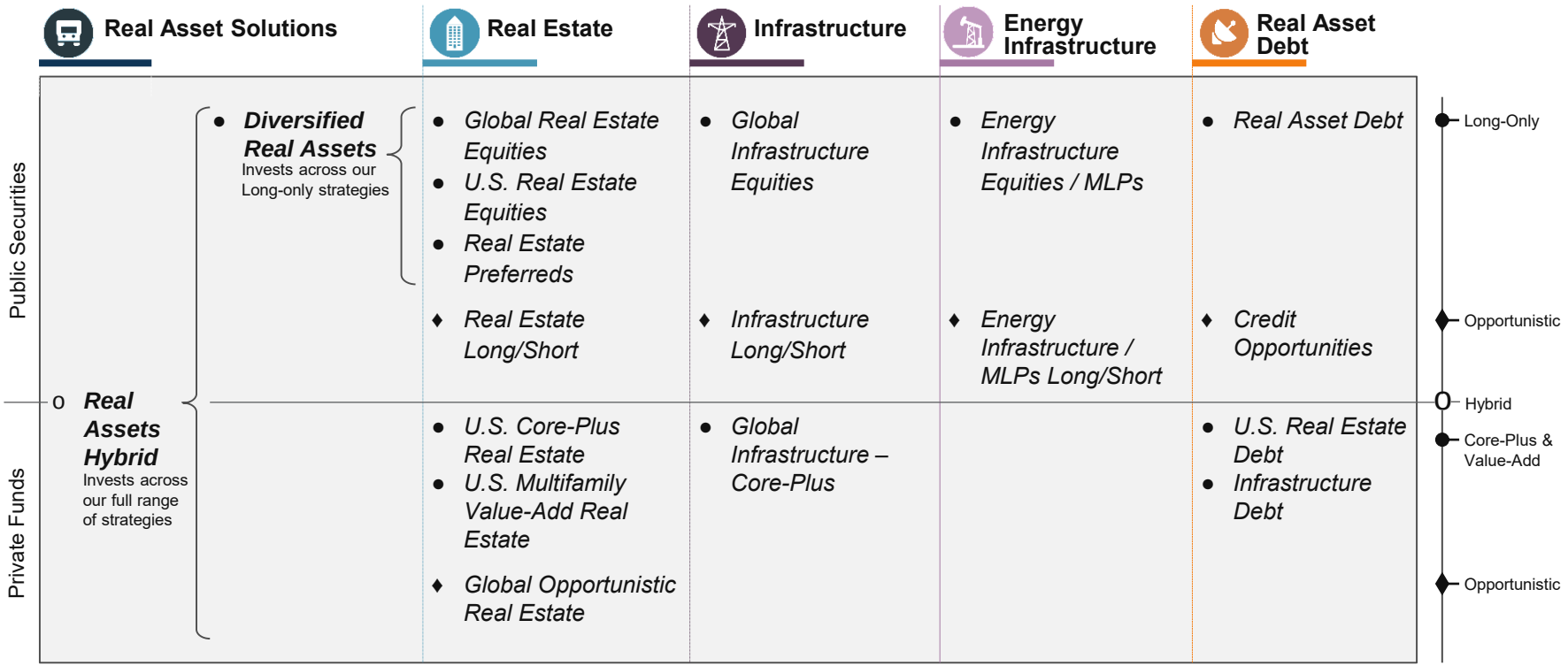
Kevin English	Brian Hurley	Mary Fifield	Regional Client Relationship Management
Chief Operating Officer	*General Counsel*	*Client Service & Communications*	

As of June 30, 2018 and includes Brookfield Investment Management Inc.'s subsidiaries and affiliates. For a complete list of strategies, please contact Marketing and Client Service at +1 312-377-8300.
1) Tom Miller has both portfolio management and analyst responsibilities.
2) Daniel Parker is leveraged between the Real Asset Debt and Infrastructure teams.
3) Assets managed by the Real Asset Solutions team are also managed by other teams in overlay asset allocation strategies, resulting in double-counting of assets.
See Appendix for additional disclosures.

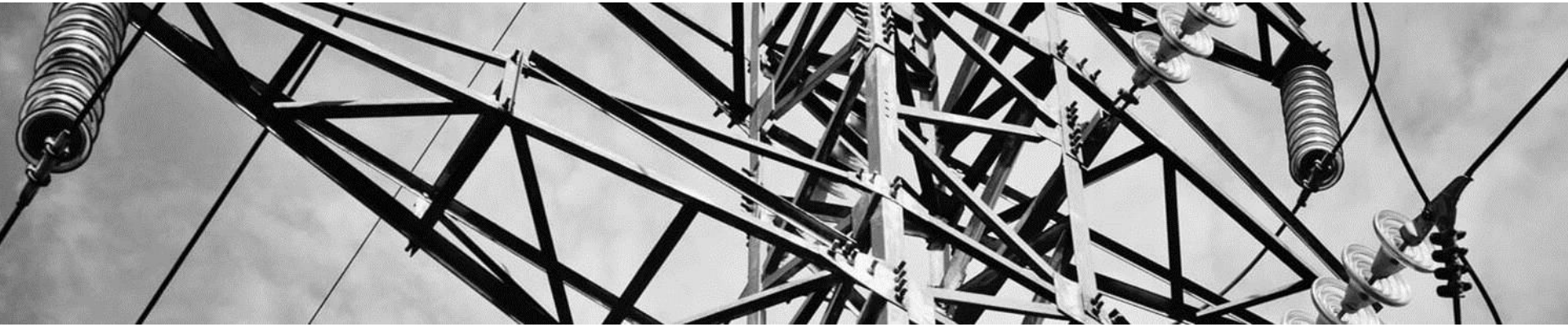
Range of Investment Strategies

Brookfield

Our clients partner with us through a range of real asset strategies built on a 30-year history of focused investing



Information is for illustrative purposes only and is subject to change without notice. Brookfield Investment Management is not responsible for updating the information presented herein.



Investing in Infrastructure

Infrastructure Universe

Brookfield

Infrastructure is the critical backbone of a modern economy

- Natural monopolies with significant barriers to entry
- Long lived assets
- Royalty stream on economic growth/inflation
- Highly cash generative with stable and predictable cash flows
- Growth driven by new infrastructure in emerging markets, privatizations, and expansion & upgrading in developed markets

$69 trillion

INVESTMENT REQUIRED IN GLOBAL INFRASTRUCTURE (2017-2035)[1]

Global Infrastructure Securities Universe



Utilities
(~230 companies)
- Gas
- Water
- Renewables/Electric Generation
- Electricity Transmission & Distribution



Energy Infrastructure
(~120 companies)
- Natural Gas Pipelines
- Petrol Pipelines
- Storage
- Midstream Services

Less GDP Sensitive — More GDP Sensitive



Communications
(~20 companies)
- Wireless Towers
- Broadcast Towers
- Satellites
- Fiber/Wireline Networks



Transports
(~90 companies)
- Airports
- Toll Roads
- Ports
- Railroads

1) Source: McKinsey Global Institute; *Bridging the Global Infrastructure Gap* as of October 2017.

Stable and Resilient Asset Class

Brookfield

Infrastructure has exhibited stable and growing cash flows, with EBITDA growth translating into historical dividend growth of 5.6% per year over the past 10 years

Annual EBITDA Growth

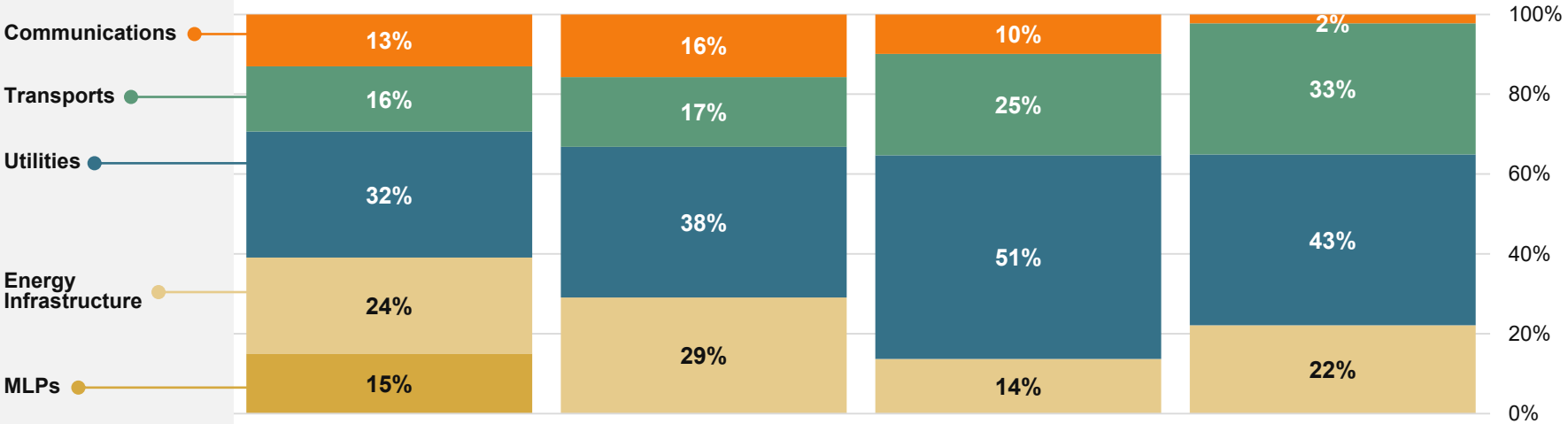


As of December 31, 2017. Performance does not constitute the Brookfield Infrastructure Composite performance. Brookfield does not have direct responsibility in managing the Dow Jones Index. Global Infrastructure and Global Equities represent the Dow Jones Brookfield Global Infrastructure Composite Index and MSCI AC World Index, respectively. Global Infrastructure EBITDA growth is derived using the constituents of the Dow Jones Brookfield Global Infrastructure Composite Index. Brookfield Investment Management cannot warrant that cash flow levels will meet historical percentages shown above. Any comparisons, assertions and conclusions regarding the performance of the Dow Jones Brookfield Global Infrastructure Composite Index during the time period prior to its initial calculation on July 14, 2008 is based on back-testing (i.e., calculations of how the index might have performed during that time period if the index had existed). Back-tested performance information is hypothetical and based on index methodology applied and calculated by S&P Dow Jones Indices and is provided solely for information purposes. See Appendix for additional disclosures. Note: Median EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization). Source: Brookfield Investment Management research and estimates; FactSet; S&P Dow Jones Indices; Merrill Lynch Global Quantitative Strategy; MSCI; IBES; Worldscope.

Infrastructure Indexes

Brookfield

Four widely followed indexes have significantly different definitions of the universe



	Dow Jones Brookfield Global Infrastructure Composite	Dow Jones Brookfield Global Infrastructure	FTSE Global Core Infrastructure 50/50	S&P Global Infrastructure
Top 10 Concentration	37.5%	43.5%	28.0%	37.4%
Number of Securities	142	103	228	74
Dividend Yield	4.2%	3.6%	3.6%	4.0%
Weighted Avg. Market Cap	$26.8B	$27.5B	$29.2B	$29.0B
Market Cap of Smallest Constituent	$0.6B	$0.8B	$0.2B	$1.3B
U.S. / International Exposure	51% / 49%	46% / 54%	53% / 47%	39% / 61%
Emerging Markets Exposure	3.4%	3.7%	11.3%	8.0%

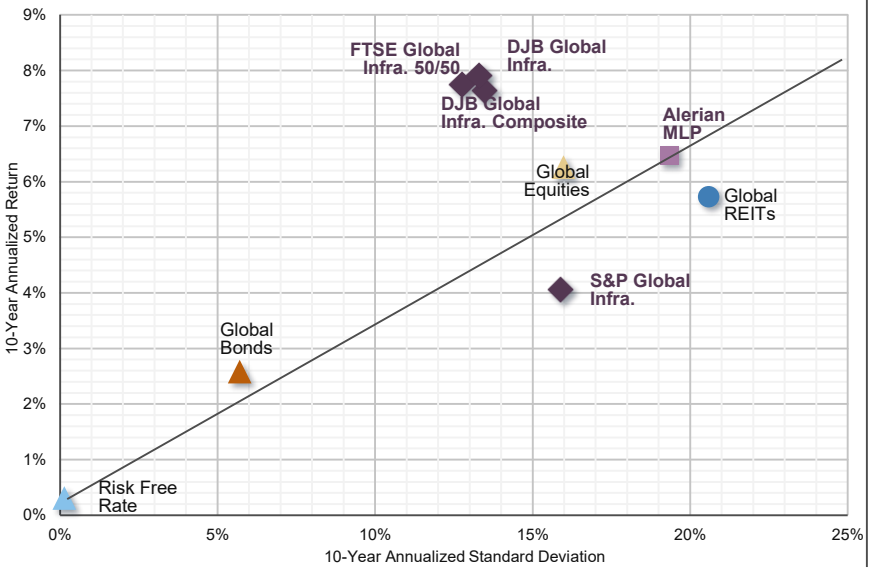
Source: FactSet. As of June 30, 2018.

Attractive Risk/Return Characteristics

Brookfield

Infrastructure represents a compelling investment from a risk/return perspective

10-Year Risk/Reward



Good Protection During Volatility *VIX spikes >15 points*	Global Infrastructure[1]	Global Equities
August 2015 *(8/17/2015-8/25/2015)*	-8.3%	-9.4%
Greek Debt Crisis *(4/23/2010-7/2/2010)*	-8.0%	-14.8%
Debt Ceiling / Euro Crisis *(7/22/2011-10/3/2011)*	-8.8%	-19.8%
Global Financial Crisis *(10/11/2007-3/6/2009)*	-46.8%	-56.7%

68% average downside capture during these periods

As of June 30, 2018.

Risk Free Rate defined as the Citigroup 3-Month Treasury Bill. Global Bonds defined as the Bloomberg Barclays Global Aggregate Bond Index. Global Equities defined as the MSCI World Total Return Index. Global REITs defined as the FTSE EPRA/NAREIT Developed Index. MLPs reflects the Alerian MLP Index. Global Infrastructure reflects the Dow Jones Brookfield Global Infrastructure Composite Index, the Dow Jones Brookfield Global Infrastructure Index, the FTSE Global Core Infrastructure 50/50 Index, and the S&P Global Infrastructure Index.

1) Global Infrastructure in the Periods of Market Volatility reflects the Dow Jones Brookfield Global Infrastructure Composite Index.

Source: Bloomberg and eVestment. Shown in USD. Brookfield Investment Management cannot warrant that returns or risk levels will meet historical percentages shown above. Any comparisons, assertions and conclusions regarding the performance of the Dow Jones Brookfield Global Infrastructure Composite Index during the time period prior to its initial calculation on July 14, 2008 is based on back-testing. Back-tested performance information is hypothetical and based on index methodology applied and calculated by S&P Dow Jones Indices and is provided solely for information purposes. Performance does not constitute the Brookfield Infrastructure Composite performance. Brookfield does not have direct responsibility in managing the Dow Jones Index. Past performance is not indicative of future results. See Appendix for additional disclosures.

Sector Dispersion

Brookfield

An actively managed, concentrated portfolio can provide additional investment benefits in infrastructure

Illustrative line follows Airports over time, which had a 10.2% annualized total return over the period (annualized 1/1/03-6/30/18), but had a significant dispersion of performance from year to year

Annual Returns by Sector (Local Currency)

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018 YTD
Gap between top & bottom performer[1]	**190%**	**52%**	**44%**	**53%**	**19%**	**48%**	**81%**	**40%**	**47%**	**32%**	**35%**	**30%**	**46%**	**39%**	**48%**	**30%**
Communications	192%	65%	50%	66%	20%	-17%	76%	37%	24%	33%	39%	30%	14%	32%	35%	6%
MLPs	45%	36%	31%	52%	19%	-18%	59%	36%	20%	30%	28%	29%	1%	22%	25%	2%
Diversified	31%	31%	20%	30%	19%	-21%	36%	27%	19%	14%	26%	23%	9%	18%	17%	1%
Utilities	26%	31%	19%	26%	19%	-22%	32%	23%	14%	13%	23%	21%	-4%	16%	12%	1%
Ports	21%	26%	19%	23%	18%	-29%	30%	17%	11%	11%	19%	19%	-4%	8%	12%	-3%
Toll Roads	21%	24%	17%	22%	13%	-37%	30%	11%	10%	9%	15%	17%	-5%	6%	8%	-3%
Rail	20%	23%	13%	21%	10%	-39%	23%	10%	10%	8%	13%	16%	-6%	5%	2%	-3%
Oil & Gas Storage & Transportation	15%	20%	8%	18%	4%	-42%	22%	5%	9%	5%	11%	14%	-23%	3%	-2%	-4%
Water	7%	17%	7%	16%	4%	-47%	12%	1%	-4%	5%	8%	10%	-30%	-1%	-6%	-5%
Airports	3%	16%	6%	13%	3%	-63%	7%	1%	-9%	4%	5%	5%	-31%	-7%	-7%	-10%
Electricity Transmission & Distribution	1%	14%	6%	13%	1%	-65%	-4%	-3%	-24%	1%	4%	0%	-33%	-8%	-13%	-24%

Top Performers

Bottom Performers

As of June 30, 2018.

1) Gap between the highest and lowest performance does not necessarily indicate positive performance during the time period.

Performance as measured by the indices including: Ports, Airports, Water, Electricity Transmission & Distribution, Communications, Diversified, Toll Roads, and Oil & Gas Storage & Transportation reflect the sector indices of the Dow Jones Brookfield Global Infrastructure Index. MLPs reflect the Dow Jones Brookfield Infrastructure MLP Index. Rail reflects the S&P 500 Rail Index. Utilities reflects the S&P 500 Utilities Index. Dow Jones Brookfield Global Infrastructure Index performance during the time period prior to its initial calculation on July 14, 2008 is based on back-testing (i.e., calculations of how the index might have performed during that time period if the index had existed). Back-tested performance information is hypothetical and based on index methodology applied and calculated by S&P Dow Jones Indices and is provided solely for information purposes. Performance does not constitute the Brookfield Infrastructure Composite performance. Brookfield does not have direct responsibility in managing the Dow Jones Brookfield Global Infrastructure Index. See Appendix for additional disclosures. Source: Bloomberg.

Brookfield Infrastructure Platform

Brookfield

Brookfield offers diversified exposure to long-lived assets providing economically essential services

Competitive Edge:

- Leading operating platforms with scale on five continents
- Dedicated real asset manager with proprietary analytical framework
- Distinctive “pure-play” focus with relatively lower risk profile

$82 billion

of Public & Private Infrastructure Assets Under Management



Infrastructure Securities[1] $4.2 billion

Infrastructure securities strategies offered by Brookfield Public Securities Group

- $4.2 billion in long-only Global Infrastructure Securities



Wind Energy Transmission Texas

Utilities & Communications $16 billion

Portfolio of utility assets in North and South America with 12,000 km of transmission lines[2]



Transportation Logistics, Brazil

Transportation $11 billion

Transportation, storage and handling services for bulk commodities and passengers across 37 ports, 4,000 km of toll roads and 10,300 km of rail operations in Europe, North & South America and Australia[2]



Devil Creek Gas Plant, Australia

Energy Infrastructure $4 billion

Portfolio of natural gas pipelines and gas storage systems with 15,000 km of transmission pipelines as well as oil & gas producing assets in the U.S. and Canada[2]

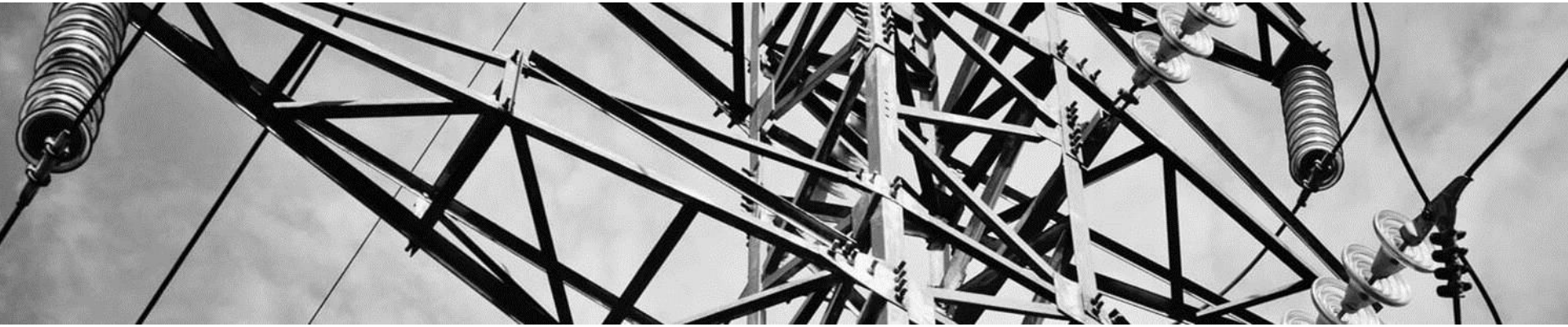


High Falls Hydro Facility, Canada

Power & Sustainable Resources $46 billion

A leading producer of renewable power with 217 hydro power plants on 81 river systems in North America, Brazil, and Colombia[2]

As of June 30, 2018. Assets under management for Brookfield Asset Management Inc. includes its affiliates. Brookfield Investment Management, Inc. has approximately $20 billion in total assets under management as of June 30, 2018. 1. As of March 31, 2018. 2. As of December 31, 2017.



Brookfield Global Infrastructure Securities

Alaska Retirement Management Board

Brookfield

Account AUM
$108 million

Inception
Mar-14

Strategy AUM
$4.3 billion[1]

Inception
Apr-08

High Conviction Portfolio

- Top 10 holdings represent approximately 35% to 60% of total portfolio
- Limited underweight positions
- Benchmarked to the Dow Jones Brookfield Global Infrastructure Index

Deliberate Exposures

- Active exposures relative to the Benchmark typically concentrated in stock-specific risk

Portfolio Characteristics

	Portfolio	Benchmark
Weighted Average Dividend Yield	4.2%	4.2%
Weighted Average Market Cap	$31.6B	$28.7B
Number of Holdings	48	102
Top 10 Concentration	51.2%	43.6%
Non-Benchmark Exposure	15.9%	--

As of July 31, 2018. Targets are subject to change without notice. The manager makes no warranty that the targets will be achieved. Assets are preliminary and subject to change.

1) Includes approximately $2.4 billion in the Brookfield Global Infrastructure Securities Strategy and MLPs. Strategy AUM Assets in Strategy reflect the Global Infrastructure Securities Strategy; all other information shown is derived from a representative account deemed to appropriately represent the management styles herein. Portfolio characteristics and performance information constitute supplemental information for purposes of GIPS. See Appendix for additional disclosures.

Investment Philosophy

- Employ true **active management**
  - Focus on excess returns
  - Exploit market inefficiencies and temporary dislocations
  - Best ideas globally
- Utilize **fundamental, bottom-up** approach
- Invest where we possess **competitive advantages**
- Recognize that superior returns often require **contrarian thinking**
- Expect to meaningfully outperform the global infrastructure securities market over a cycle







Our Investment Professionals

Brookfield

An uncommon depth of understanding of infrastructure assets

Differentiated Insights, Deeper Conversations

Investment Leadership	**Leonardo Anguiano** *Varied infrastructure experience including direct investing, sell-side research, capital raising and IPO processes, and equities*	**Tom Miller, CFA** *Varied infrastructure experience including energy infrastructure and MLPs*	**Craig Noble, CFA** *Invested in direct infrastructure with Brookfield's private platform; founder of listed infrastructure platform*
Analyst Team	Diverse areas of expertise draws from different backgrounds including, engineering, legal, regulatory, private equity, fixed income, and equities		
Broader Brookfield Platform	Reinforces owner/operator mentality and leads to deeper discussions with companies		

>800 Meetings per year

~300 Proprietary company models

12 years of average infrastructure experience

Meetings and proprietary models are as of December 31, 2017 and subject to change without notice.

Seasoned Team Supported by a Deep Roster of Analysts

Brookfield

Investment Team

Investment Leadership	**Leonardo Anguiano** Portfolio Manager *20 years of Experience*	**Thomas Miller, CFA** Portfolio Manager[1] *8 years of Experience*	**Craig Noble, CFA** Portfolio Manager *20 years of Experience*
Research Analysts	**Andrew Alexander** *Water; Transportation; Energy Infrastructure* Europe; Australia/N.Z. *14 years of Experience*	**Rob Bellinski, CFA** *Energy Infrastructure; MLPs* North America *11 years of Experience*	**Troy Green** *Utilities* North America *13 years of Experience*
	Joseph Idaszak *Renewables; Rail; Social Infrastructure* North America *6 years of Experience*	**Iñigo Mijangos**[2] *Renewables; European Utilities* Europe; North America *16 years of Experience*	**Daniel Parker, CFA**[3] *Utilities* North America *21 years of Experience*
	Fábio Schöntag[3] *Transportation; Energy Infrastructure; Utilities* Latin America, Europe *12 years of Experience*	**Tyler Strong, CFA** *Energy Infrastructure; Communications* North America *6 years of Experience*	**Perfeeno Wang** *Water; Transportation; Energy Infrastructure* Asia *5 years of Experience*
Trader	**Joshua Wright** *12 years of Experience*		

1) Thomas Miller, CFA has both portfolio management and analyst responsibilities
2) Iñigo Mijangos is employed by Brookfield Investment Management (UK) Limited but provides investment advice via Brookfield Investment Management Inc.
3) Daniel Parker and Fabio Schontag also contribute efforts to the Real Asset Debt Team

Our Process

Brookfield

Our process relies on research-intensive, bottom-up fundamental analysis to find the best ideas

Investment Universe ~400

1 Skyway Analysis

- Proprietary Analytical Framework ("Skyway")
- Key Screening Factors
  - Asset level analysis
  - Company level analysis
  - Valuation analysis

2 Due Diligence

- Desktop Analysis
  - Cash flow projections
  - Balance sheet assessment
  - Valuation
- Onsite Due Diligence
  - Asset visits
  - Management meetings
  - Regulatory due diligence
- Broader Brookfield Platform
  - Leverage investment team expertise

3 Investment Themes

- Economic outlook
- Industry fundamentals
- Geographic fundamentals
- Thematic views
- Investment themes and outlook integrated into bottom-up fundamental analysis

4 Portfolio Construction

- Ensure investment themes and relative valuation opportunities appropriately expressed in portfolio
  - Economic exposures
  - Industry exposures
  - Geographic exposures
  - Currency exposures
  - Diversification effects

Portfolio ~40-70

Focused Analysis & Due Diligence

- Leverage expertise of Brookfield Public Securities Group investment teams
- Assess factor risk for model portfolio and adjust weightings to desired risk tolerance

Skyway Analysis

Brookfield

Our Skyway Analysis is dynamic, evolving to reflect changing market conditions

Asset Level

- Market Position / Business Model (20-30%)
- Regulatory Framework / Contracts (20-35%)
- Growth Prospects (10-40%)
- Country Political / Sovereign Risk (10-25%)

Company Level

- Management Operational Quality (10-30%)
- Management Strategic Quality (20-50%)
- Corporate Governance (20-35%)
- Capital Structure (10-35%)

Security Valuation

Absolute (33%) | Relative (33%) | Sector (33%)

Valuation Score

EV/EBITDA
- Airports
- Ports
- Toll Roads
- Energy Infrastructure
- Diversified
- Communications

P/E
- Gas Utilities
- Water Utilities
- Electricity Transmission/ Distribution
- Rail

Yield
- MLPs

Skyway Outputs

Top / Bottom Securities | **Skyway Valuation & Quality Plotting** | **Material Scoring & Valuation Changes**

Source: Brookfield Investment Management. The universe and sector classifications are defined by Brookfield Investment Management. Information shown for illustrative purposes and is subject to change. Not intended to provide current market analysis. See Appendix for additional disclosures.

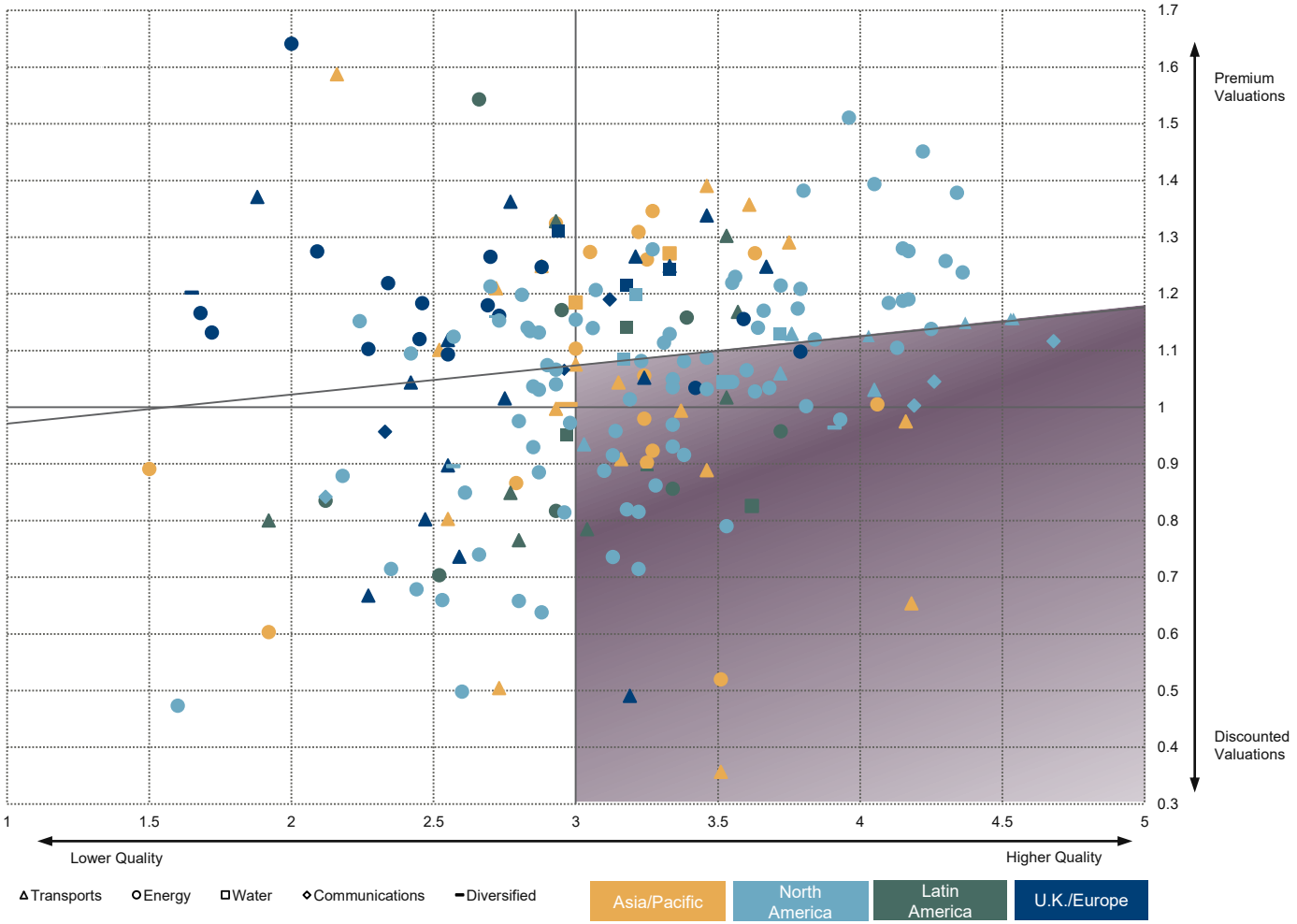
Skyway Outputs

Brookfield

Our proprietary model combines these quantitative and qualitative inputs with regression analysis to identify quality names with attractive valuation

Skyway Outputs

- Top 50 Securities
- Bottom 50 Securities
- Regression Variance Analysis
- Custom Sector Valuation
- Quality-Adjusted Valuation

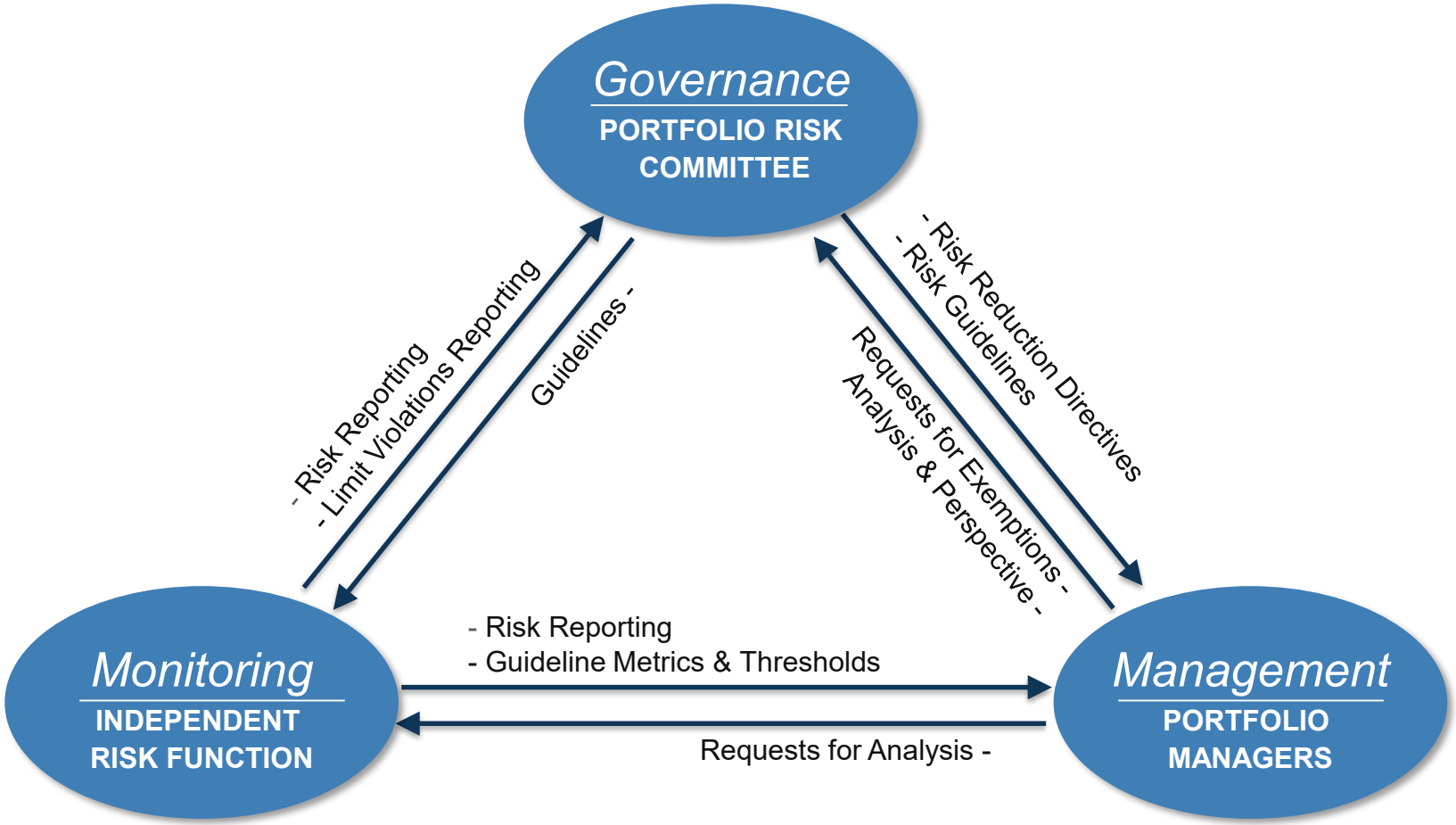


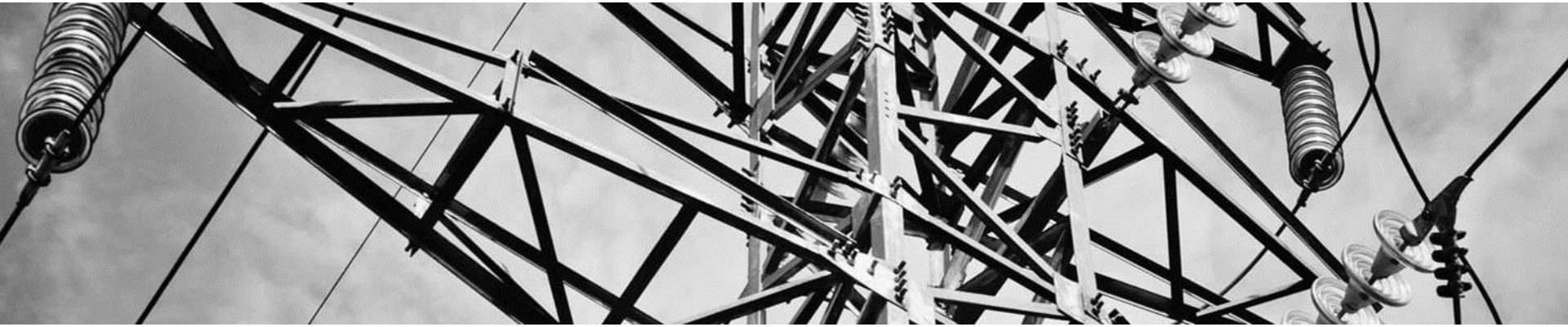
Source: Brookfield Investment Management. The universe and sector classifications are defined by Brookfield Investment Management. Information shown for illustrative purposes and is subject to change. Not intended to provide current market analysis. See Appendix for additional disclosures.

Risk Management Overview

Brookfield

Our portfolio risk management framework includes risk guidelines for each strategy, independent risk monitoring, and a formal governance process managed by the Portfolio Risk Committee





Performance & Characteristics

Infrastructure and the Macro Environment

Brookfield

Developments Impacting the Infrastructure Sector

Geopolitical Uncertainty

- Volatility around communication of U.S. policies
- Political uncertainty in Europe returns: Italian referendum, Spanish elections, Germany's coalition government, Brexit
- Increasing unease around global trade: U.S. and China and U.S. and EU trade disputes; NAFTA negotiations

Simplification Trends

- Corporate governance structures in MLPs are improving amid simplification transactions
- Our conversations with management teams reinforce the notion that the shift toward models that are less reliant on equity markets to fund growth is taking place

Regulatory Impacts

- Chinese government intervention, which is always unpredictable in nature
- The regulatory environment in Brazil is also uncertain, particularly with regard to the oversight of utilities



As of June 30, 2018. Source: Brookfield Investment Management. See Appendix for additional disclosures.

Index Performance Summary

Brookfield

Infrastructure Securities Indexes	MTD	QTD	YTD	1 Year	3 Year[1]	5 Year[1]	10 Year[1]
FTSE Global Core Infrastructure 50/50 Index	1.7	3.0	-1.6	3.6	8.0	8.5	7.8
S&P Global Infrastructure Index	2.0	2.6	-3.4	1.8	6.0	8.0	4.1
Dow Jones Brookfield Global Infrastructure Index	2.7	4.2	-1.4	2.5	4.6	7.2	7.6
Dow Jones Brookfield Global Infrastructure Composite Index	1.9	5.2	-1.8	1.2	3.5	6.1	7.9
In Local Currency[2]							
Dow Jones Brookfield Global Infrastructure Composite Index[2]	1.9	5.8	-1.9	1.7	-0.1	2.6	5.2
Regional Indexes[2]							
Asia Pacific	-1.2	5.8	4.2	9.8	4.1	4.9	6.2
Europe	0.7	3.5	-2.7	11.2	1.1	4.4	3.5
Americas	4.4	5.5	-1.9	0.0	2.1	4.1	6.5
Sector Indexes[2]							
Airports	-0.4	1.1	-3.1	3.6	11.3	14.4	10.5
Toll Roads	-0.6	1.0	-3.0	17.6	4.6	9.1	4.3
Ports	-7.2	-3.4	-23.9	-21.4	-20.0	-9.9	-8.0
Communications	4.1	0.6	1.4	9.1	7.9	9.5	10.5
Diversified	-0.2	2.9	-3.7	16.3	7.1	5.5	3.2
Electricity Transmission & Distribution	1.2	0.2	-4.6	-9.7	0.6	1.7	3.6
Water	-0.1	2.6	-9.8	-0.9	2.5	3.8	4.9
Oil & Gas Storage & Transportation	4.8	11.1	1.7	6.0	-2.3	1.3	4.9
MLPs	-1.7	12.1	-2.3	-5.0	-6.9	-2.4	7.1
Alerian MLP Index	-1.5	11.8	-2.6	-4.6	-5.9	-4.1	6.5
S&P 500 Utilities Index	2.8	3.7	1.2	3.4	11.7	10.6	6.6

Geopolitical Uncertainty

Regulatory Impacts

Simplification Trends

Additional Indexes							
S&P 500	0.6	3.4	1.8	14.4	11.9	13.4	10.2
MSCI World	0.0	1.9	0.2	11.7	9.1	10.6	6.9
MSCI Pacific	-2.2	-1.3	-2.3	10.2	6.7	7.2	4.2
MSCI Europe	-0.6	-0.9	-2.8	5.9	4.9	6.8	3.0
MSCI North America	0.7	3.6	1.7	14.3	11.4	12.9	9.5
MSCI Emerging Markets Index	-4.2	-8.0	-8.2	8.2	5.6	5.0	2.3
S&P Oil & Gas Exploration & Production Select Industry	2.1	22.4	13.2	36.4	-1.5	-4.8	-3.7

Interest Rates	6/30/2018	3/31/2018	12/31/2017	3/31/2017	6/30/2015	6/30/2013	6/30/2008
10-Year Treasury	2.86	2.74	2.41	2.39	2.35	2.49	3.97

1. Annualized.
2. Local currency indexes returns measured from January 2, 2018 to June 30, 2018 due to irregularities caused by periodic currency adjustments in the price data.

As of June 30, 2018. Source: Bloomberg. Returns in USD except where noted. Benchmark performance is shown for illustrative purposes only and does not predict or depict the performance of any investment. There may be material factors relevant to any such comparison such as differences in the volatility, and regulatory and legal restrictions between the indices shown and the strategy. See Appendix for additional disclosures.

Alaska Retirement Management Board Performance Summary

Brookfield

Supplemental Performance Summary as of July 31, 2018

(Gross and Net of Fees)

	QTD	YTD	One Year	Three Years[1]	Since Inception[1] (Mar-2014)
Alaska Retirement Management Board Performance (Gross of Fees)	**1.49%**	**0.20%**	**0.63%**	**4.45%**	**3.63%**
Alaska Retirement Management Board Performance (Net of Fees)	1.49%	-0.14%	-0.05%	3.74%	2.95%
Dow Jones Brookfield Global Infrastructure Total Return Index	1.81%	0.52%	1.09%	5.25%	5.41%

1) Annualized.

As of July 31, 2018. Performance information shown constitutes supplemental information for purposes of the Global Investment Performance Standards (GIPS®) and is supplemental to the GIPS®-compliant presentation included in the Appendix and may only be used in conjunction with the included GIPS®-compliant presentation. Gross performance results do not reflect the deduction of advisory fees, brokerage or other commissions and other expenses a client would have paid and returns will be reduced accordingly. The net of fees returns reflect the deduction of actual fees as determined by the fee schedule for the individual strategy. Actual fees will vary depending on, among other things, the applicable fee schedule and account size. Past performance does not guarantee future results. Brookfield does not have direct responsibility in managing the Dow Jones Brookfield Global listed Infrastructure Total Return Index.

See appendix for additional disclosures.

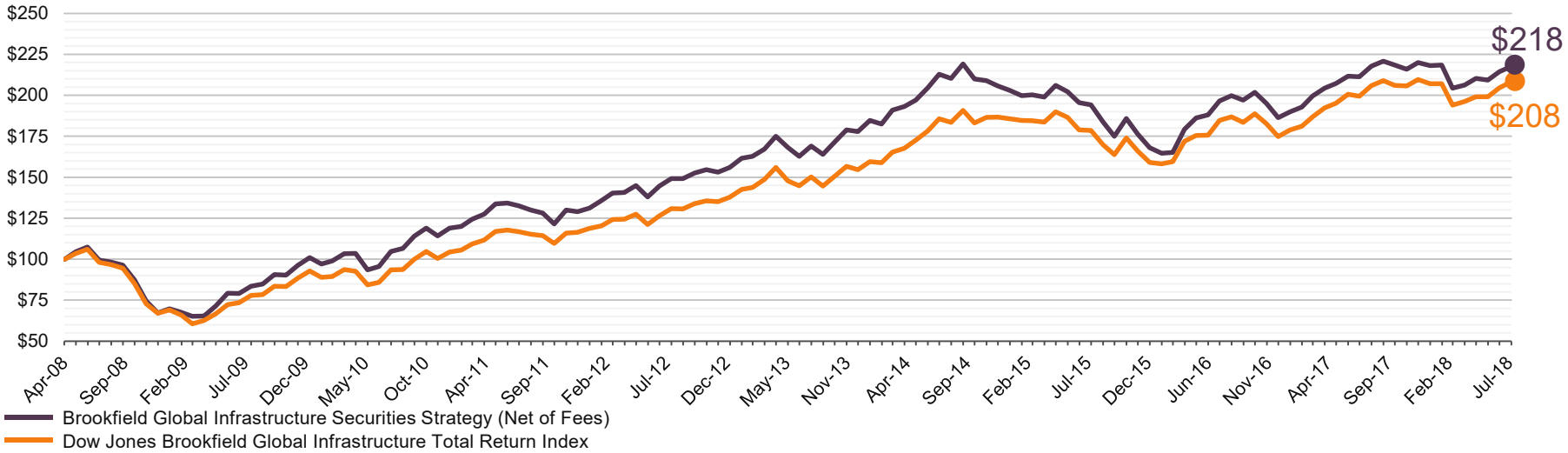
Global Infrastructure Securities Performance Summary

Brookfield

Supplemental Performance Summary
(Gross and Net of Fees)

	YTD 2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008[1]	Since Inception[2] (Apr-2008)
Brookfield Global Infrastructure Securities Strategy (Gross)	**0.05%**	**15.45%**	**13.30%**	**-16.62%**	**10.48%**	**18.95%**	**19.50%**	**10.68%**	**17.90%**	**45.29%**	**-29.94%**	**8.30%**
Brookfield Global Infrastructure Securities Strategy (Net)	**-0.25%**	**14.86%**	**12.72%**	**-17.02%**	**9.95%**	**18.34%**	**18.89%**	**10.29%**	**17.90%**	**44.64%**	**-30.23%**	**7.83%**
DJ Brookfield Global Infrastructure Total Return Index	0.52%	15.79%	12.52%	-14.40%	16.34%	15.89%	16.01%	13.75%	12.46%	34.24%	-30.86%	7.37%
FTSE Global Core Infrastructure 50/50 Total Return Index	0.75%	19.32%	11.76%	-8.05%	16.18%	14.28%	13.99%	7.09%	13.16%	30.22%	14.92%	7.79%
S&P Global Infrastructure Total Return Index	-1.31%	20.13%	12.43%	-11.46%	12.98%	14.99%	11.89%	-0.39%	5.77%	25.28%	16.34%	4.06%
MSCI World Total Return Index	3.93%	23.07%	8.15%	-0.32%	5.50%	27.37%	16.54%	-5.02%	12.34%	30.79%	13.76%	6.81%
CPI + 4%	3.65%	6.41%	5.77%	4.52%	5.35%	5.35%	5.88%	7.58%	5.14%	5.98%	3.67%	5.65%

Supplemental Performance
Growth of $100



1) Since April 30, 2008.
2) Annualized.

As of July 31, 2018. Refers to the Global Infrastructure Securities Composite. Performance information shown constitutes supplemental information for purposes of the Global Investment Performance Standards (GIPS®) and is supplemental to the GIPS®-compliant presentation included in the Appendix and may only be used in conjunction with the included GIPS®-compliant presentation. Gross performance results do not reflect the deduction of advisory fees, brokerage or other commissions and other expenses a client would have paid and returns will be reduced accordingly. The net of fees returns reflect the deduction of actual fees as determined by the fee schedule for the individual strategy. Actual fees will vary depending on, among other things, the applicable fee schedule and account size. Performance is shown for illustrative purposes only and does not predict or depict the performance of any investment. There may be material factors relevant to any such comparison such as differences in the volatility, and regulatory and legal restrictions between the indices shown and the strategy. Performance shown does not depict the performance of any account, fund or composite managed by Brookfield. Brookfield does not have direct responsibility in managing the Dow Jones Brookfield Global listed Infrastructure Total Return Index.
See Appendix for additional disclosures.

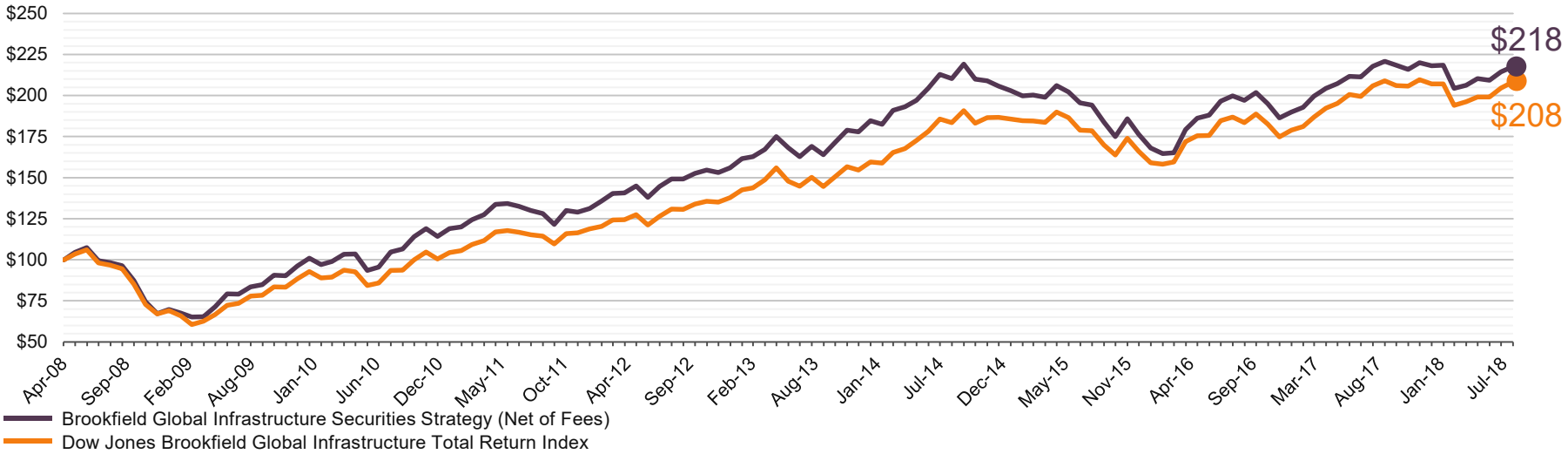
Global Infrastructure Securities Performance Summary

Brookfield

Supplemental Performance Summary
(Gross and Net of Fees)

	QTD	YTD	One Year	Three Years[1]	Five Years[1]	Ten Years[1]	Since Inception[1] (Apr-2008)	Since Inception Relative[1] (Gross)
Brookfield Global Infrastructure Securities Strategy (Gross of Fees)	**1.46%**	**0.05%**	**0.40%**	**4.38%**	**5.69%**	**8.73%**	**8.30%**	N/A
Brookfield Global Infrastructure Securities Strategy (Net of Fees)	**1.45%**	**-0.25%**	**-0.14%**	**3.85%**	**5.16%**	**8.26%**	**7.83%**	N/A
Dow Jones Brookfield Global Infrastructure Total Return Index	1.81%	0.52%	1.09%	5.25%	6.75%	7.96%	7.37%	**0.93%**
FTSE Global Core Infrastructure 50/50 Total Return Index	2.28%	0.75%	3.01%	8.02%	8.44%	8.13%	7.79%	**0.51%**
S&P Global Infrastructure Total Return Index	1.80%	-1.31%	0.31%	6.22%	7.54%	4.67%	4.06%	**4.24%**
MSCI World Total Return Index	3.15%	3.93%	12.49%	9.57%	10.10%	7.46%	6.81%	**1.49%**
CPI + 4%	0.43%	3.65%	6.83%	5.84%	5.58%	5.48%	5.65%	**2.65%**

Supplemental Performance
Growth of $100



1) Annualized.
As of July 31, 2018. Refers to the Global Infrastructure Securities Composite. Performance information shown constitutes supplemental information for purposes of the Global Investment Performance Standards (GIPS®) and is supplemental to the GIPS®-compliant presentation included in the Appendix and may only be used in conjunction with the included GIPS®-compliant presentation. Gross performance results do not reflect the deduction of advisory fees, brokerage or other commissions and other expenses a client would have paid and returns will be reduced accordingly. The net of fees returns reflect the deduction of actual fees as determined by the fee schedule for the individual strategy. Actual fees will vary depending on, among other things, the applicable fee schedule and account size. Performance is shown for illustrative purposes only and does not predict or depict the performance of any investment. There may be material factors relevant to any such comparison such as differences in the volatility, and regulatory and legal restrictions between the indices shown and the strategy. Performance shown does not depict the performance of any account, fund or composite managed by Brookfield. Brookfield does not have direct responsibility in managing the Dow Jones Brookfield Global listed Infrastructure Total Return Index.
See Appendix for additional disclosures.

Global Infrastructure Securities Strategy
YTD Performance Attribution

Brookfield

Top/Bottom Relative Contributors
By Region

Region	Relative Attribution Local Currency	Stock Selection + Interaction Effect	Allocation Effect	Currency Effect	Average Active Weight[1]
Canada	19 bps	14 bps	4 bps	1 bps	-1.4%
U.S.	6 bps	6 bps	0 bps	2 bps	0.7%
U.K.	-12 bps	-9 bps	-4 bps	-6 bps	1.7%
Latin America	-20 bps	-22 bps	2 bps	14 bps	1.1%
Continental Europe	-33 bps	-29 bps	-4 bps	3 bps	0.5%
Asia Pacific	-47 bps	-25 bps	-21 bps	3 bps	-5.8%

Top/Bottom Relative Contributors
By Sector

Sector	Relative Attribution Local Currency	Stock Selection + Interaction Effect	Allocation Effect	Currency Effect	Average Active Weight[1]
Electricity T&D	47 bps	18 bps	29 bps	-8 bps	-8.6%
Water	42 bps	32 bps	10 bps	-6 bps	-1.4%
Renewables/Electric Generation	29 bps	0 bps	29 bps	10 bps	10.9%
Airports	-47 bps	-43 bps	-4 bps	4 bps	-1.4%
Midstream	-48 bps	-60 bps	13 bps	7 bps	1.2%
Gas Utilities	-80 bps	-30 bps	-50 bps	-9 bps	-4.1%

Top/Bottom Relative Contributors
By Company

Ticker	Company	Region	Sector	Relative Attribution Local Currency	Currency Effect	Average Active Weight[1]
ORSTED.DC	Orsted A/S	Continental Europe	Renewables/Electric Generation	29 bps	0 bps	1.9%
ED	Consolidated Edison Inc	U.S.	Electricity Transmission & Distribution	21 bps	-4 bps	-2.5%
ENB.CN	Enbridge Inc	Canada	Pipelines	20 bps	1 bps	-0.2%
FE	FirstEnergy Corp	U.S.	Renewables/Electric Generation	17 bps	2 bps	1.0%
TRGP	Targa Resources Corp	U.S.	Midstream	17 bps	3 bps	2.0%
OHL.SM	Obrascon Huarte Lain SA	Continental Europe	Toll Roads	-18 bps	2 bps	0.3%
SESG.FP	SES SA	Continental Europe	Communications	-20 bps	0 bps	-0.7%
3.HK	Hong Kong & China Gas Co Ltd	Asia Pacific	Gas Utilities	-22 bps	-2 bps	-1.8%
384.HK	China Gas Holdings Limited	Asia Pacific	Gas Utilities	-28 bps	-1 bps	-0.9%
OKE	ONEOK Inc	U.S.	Midstream	-57 bps	-3 bps	-2.0%

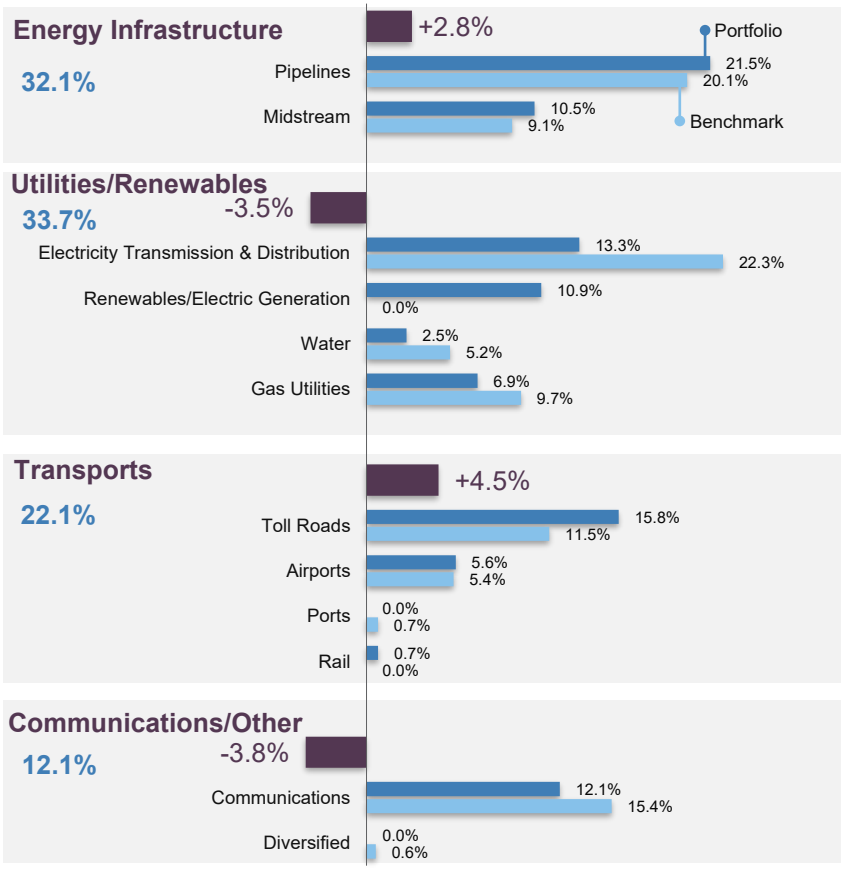
For the period from January 1, 2018 to July 31, 2018. 1) Relative to the Dow Jones Brookfield Global Infrastructure Index.
This performance attribution provides analysis of the effects of several portfolio management decisions, including sector, security level details, geography and currency level attribution. All attribution effects are computed using FactSet, linked through time, and do not reflect all fees, expenses or transaction costs. The total returns displayed for the strategy and benchmark do not capture all effects of daily cash flows and intra-day trading activity, and may be further impacted by pricing differentials, therefore they are subject to reasonable variance from the strategy and benchmark's actual return. The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Each investor's portfolio is individually managed and may vary from the information shown. Returns are shown in USD and gross of fees based on the manager's FactSet attribution analysis, which uses a holdings-based weighted average return methodology. Performance information shown constitutes supplemental information for purposes of the Global Investment Performance Standards (GIPS®) and is supplemental to the GIPS®-compliant presentation included in the Appendix and may only be used in conjunction with the included GIPS®-compliant presentation. Gross performance results do not reflect the deduction of advisory fees, brokerage or other commissions and other expenses a client would have paid and returns will be reduced accordingly. Past performance is not a reliable indicator or a guarantee of future results. A detailed description of the methodology used to calculate the performance attribution is available upon request. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. The securities identified and described do not represent all of the securities purchased, sold or recommended for client accounts. The reader should not assume that an investment in the securities identified was or will be profitable. Due to rounding, amounts presented herein may not add up precisely to the total.
See Appendix for additional disclosures.

Global Infrastructure Securities Strategy Portfolio Characteristics
July 2018

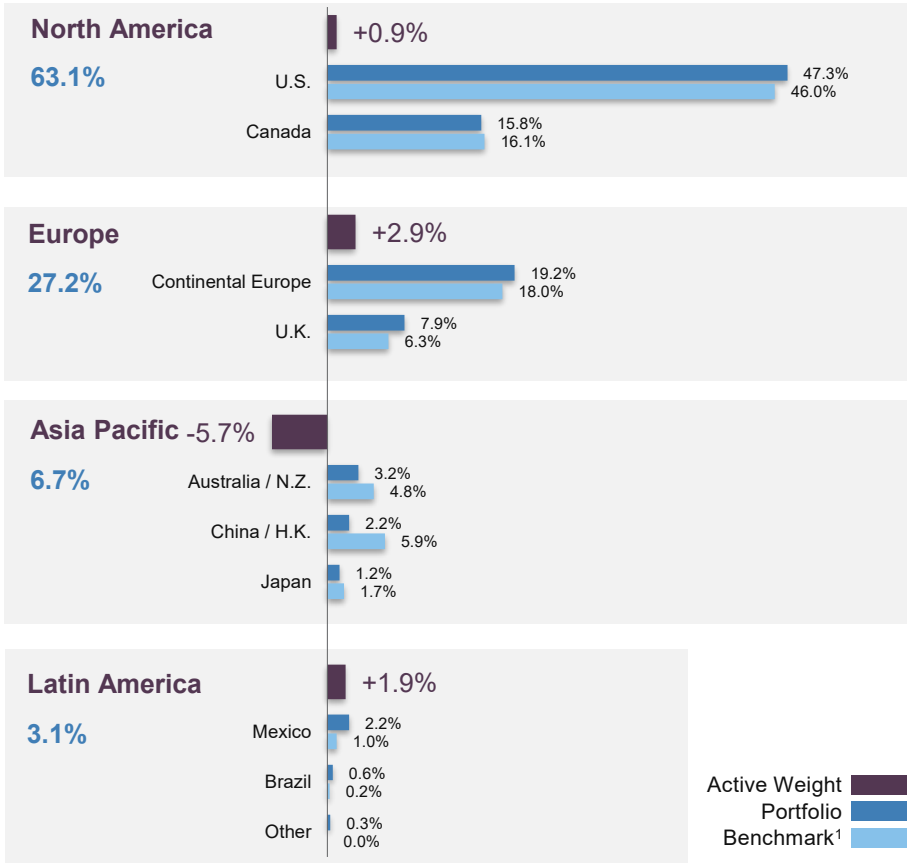
Brookfield

- The fundamental picture for the North American energy infrastructure sector continues to be strong
- Additionally, our conversations with management teams reinforce the shift in corporate governance structures toward models that are less reliant on equity markets to fund growth
- We shifted to underweight exposure to U.S. communications towers due to a dampened growth outlook in the short-to-medium term, predominantly driven by carrier consolidation

Sector Allocation



Regional Allocation



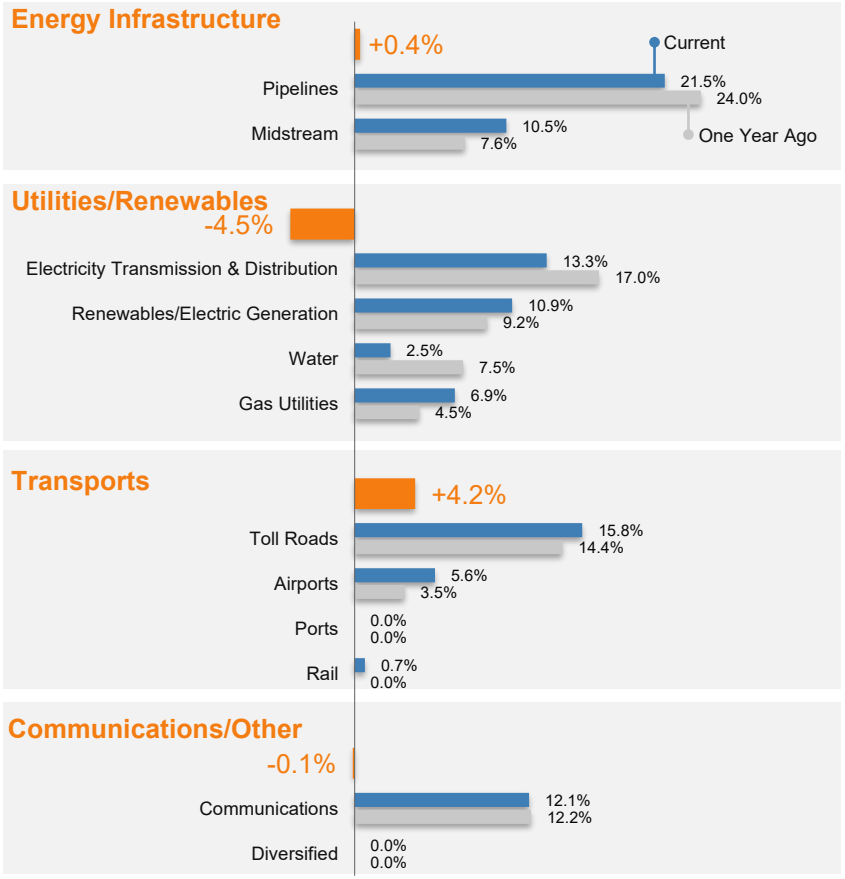
As of July 31, 2018. 1. Relative to the Dow Jones Brookfield Global Infrastructure Index. The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Sector weights constitute supplemental information for purposes of GIPS. Weights and portfolio holdings are subject to change. Due to rounding, amounts presented herein may not add up precisely to the total. See Appendix for additional disclosures.

Global Infrastructure Securities Strategy Allocation Changes July 2017 to July 2018

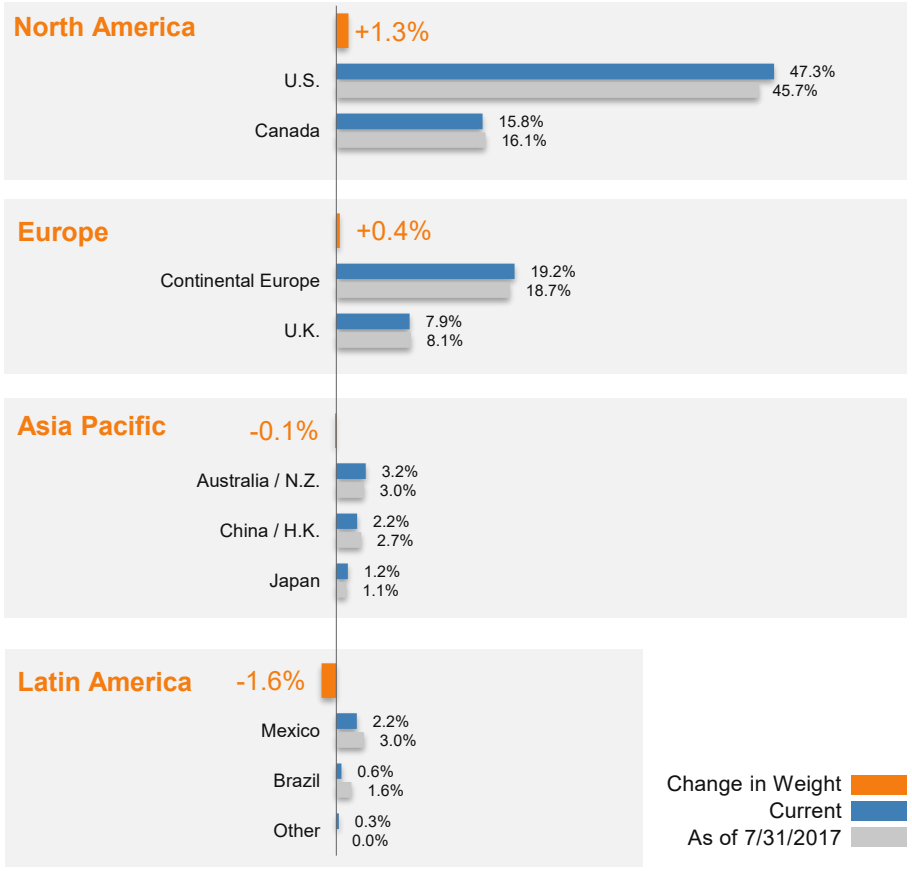
Brookfield

- Added exposure within the Renewables/Electric Generation sector
- Headwinds of higher interest rates (relative to recent history) continue to weigh on T&D utilities in the near term
- Decreased exposure to China/Hong Kong on concerns about the regulatory environment
- Decrease in Latin America was driven by geopolitical uncertainty

Sector Allocation



Regional Allocation



As of July 31, 2018. *As measured by the Oil & Gas Storage & Transportation sector of the Dow Jones Brookfield Global Infrastructure Index
The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Sector weights constitute supplemental information for purposes of GIPS. Weights and portfolio holdings are subject to change. Due to rounding, amounts presented herein may not add up precisely to the total. See Appendix for additional disclosures.

Global Infrastructure Securities Strategy
YTD Position Changes

Brookfield

Changes to Portfolio

Ticker	Company	Region	Sector	Change Made To Position	Change in Weight	Ending Weight
ENB.CN	Enbridge Inc	Canada	Pipelines	*Increase*	**2.7%**	8.1%
NI	Nisource Inc	U.S.	Gas Utilities	*Add*	**2.4%**	2.4%
DG.FP	Vinci SA	Continental Europe	Toll Roads	*Increase*	**1.6%**	6.1%
AENA.SM	Aena SA	Continental Europe	Airports	*Add*	**1.5%**	1.5%
NG/.LN	National Grid PLC	U.K.	Electricity Transmission & Distribution	*Increase*	**1.0%**	5.8%
SBAC	SBA Communications Corp	U.S.	Communications	*Decrease*	**-1.3%**	2.9%
APA.AU	APA Group	Asia Pacific	Pipelines	*Delete*	**-1.4%**	0.0%
IPL.CN	Inter Pipeline Ltd	Canada	Pipelines	*Delete*	**-1.5%**	0.0%
FGR.FP	Eiffage	Continental Europe	Toll Roads	*Delete*	**-1.6%**	0.0%
ABE.SM	Abertis Infraestructuras SA	Continental Europe	Toll Roads	*Delete*	**-1.7%**	0.0%

ENB.CN

Increased on fundamentals and valuation

- We increased our position in Enbridge Inc. to an overweight allocation on the announcement of the simplification of the Enbridge structure
- When included with previously announced asset sales, they show a strong execution in the company's strategy
- We also added exposure based on our belief that its line 3 pipeline replacement in Minnesota would be approved, which it was in June

ABE.SM

Deleted due to valuation

- Abertis was acquired by ACS (together with its subsidiary, Hochtief) and Atlantia SpA (ATL.IM, Toll Roads, Continental Europe)

As of July 31, 2018. Weights and portfolio holdings are subject to change. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. The securities identified and described do not represent all of the securities purchased, sold or recommended for client accounts. The reader should not assume that an investment in the securities identified was or will be profitable. The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Each investor's portfolio is individually managed and may vary from the information shown. See Appendix for additional disclosures.

Global Infrastructure Securities Strategy Key Holdings

Brookfield

Top Ten

Ticker	Company	Region	Sector	Market Cap (billions)	Weight	Active Weight[1]
AMT	American Tower Corp	U.S.	Communications	$65.3	**8.2%**	1.4%
ENB.CN	Enbridge Inc	Canada	Pipelines	$60.9	**8.1%**	1.8%
DG.FP	Vinci SA	Continental Europe	Toll Roads	$60.1	**6.1%**	0.7%
NG/.LN	National Grid PLC	U.K.	Electricity Transmission & Distribution	$36.3	**5.8%**	1.8%
KMI	Kinder Morgan Inc	U.S.	Pipelines	$39.2	**5.1%**	1.6%
WMB	Williams Cos Inc	U.S.	Midstream	$36.0	**4.5%**	2.0%
TRP.CN	TransCanada Corp	Canada	Pipelines	$40.1	**4.0%**	-0.1%
PPL.CN	Pembina Pipeline Corp	Canada	Pipelines	$18.1	**3.3%**	1.4%
TRGP	Targa Resources Corp	U.S.	Midstream	$11.5	**3.2%**	2.0%
SBAC	SBA Communications Corp	U.S.	Communications	$18.2	**2.9%**	1.0%
Total					**51.2%**	

Top Overweight Positions

Ticker	Company	Region	Sector	Market Cap (billions)	Weight	Active Weight[1]
TRGP	Targa Resources Corp	U.S.	Midstream	$11.5	3.2%	**2.0%**
CMS	CMS Energy Corp	U.S.	Renewables/Electric Generation	$13.7	2.0%	**2.0%**
ORSTED.DC	Orsted A/S	Continental Europe	Renewables/Electric Generation	$26.0	2.0%	**2.0%**
WMB	Williams Cos Inc	U.S.	Midstream	$36.0	4.5%	**2.0%**
ENB.CN	Enbridge Inc	Canada	Pipelines	$60.9	8.1%	**1.8%**

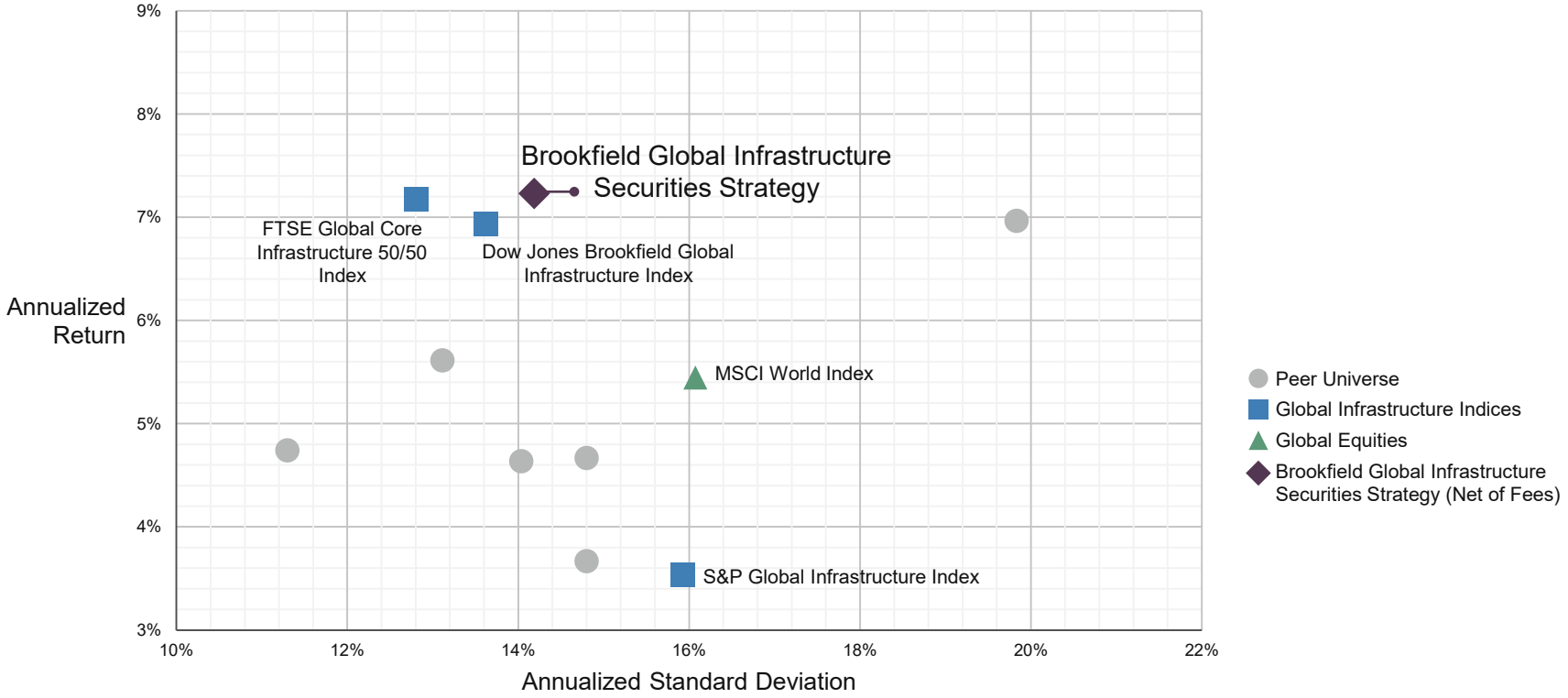
As of July 31, 2018.
1) Relative to the Dow Jones Brookfield Global Infrastructure Index. 10 largest holdings and 5 largest overweight positions constitute supplemental information for purposes of GIPS. Weights and portfolio holdings are subject to change. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. The securities identified and described do not represent all of the securities purchased, sold or recommended for client accounts. The reader should not assume that an investment in the securities identified was or will be profitable. The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Each investor's portfolio is individually managed and may vary from the information shown.
See Appendix for additional disclosures.

Global Infrastructure Securities Peer Analysis

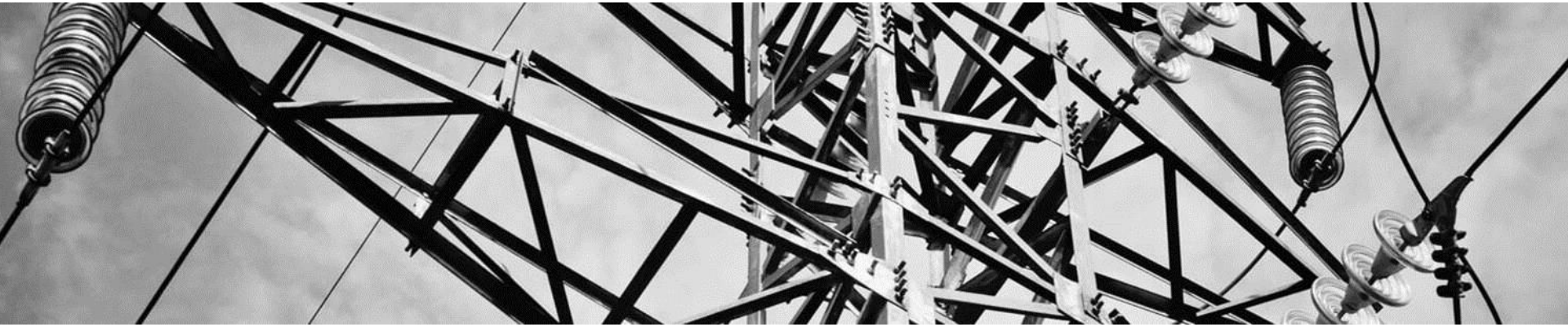
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Supplemental Performance: Return and Standard Deviation Comparison

(5/31/2008 to 6/30/2018)



Source: eVestment Alliance as of June 30, 2018 in USD. Long-Only Global Infrastructure Securities Universe consists of 6 Long-Only Infrastructure Securities products that the firm believes to be non-currency hedged, reporting net returns in the following vehicles: Separate Account Composite, Representative Accounts, Institutional Mutual Funds and Retail Mutual Funds. The universe may contain firms or strategies that could be managed differently than the Brookfield strategies noted herein. Performance returns constitute supplemental information for purposes of GIPS for informational purposes only. Please refer to the GIPS compliant disclosures for the Global Infrastructure Securities Composite in the Appendix. Brookfield pays a fee to eVestment for a subscription that allows access to its data. See Appendix for additional disclosures.



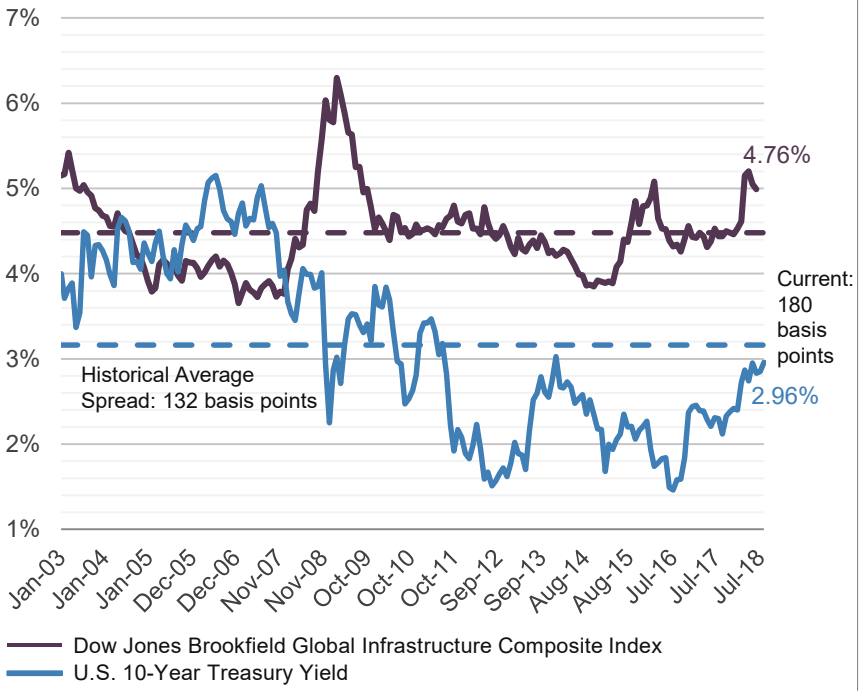
Current Outlook

Global Infrastructure – Current Valuations

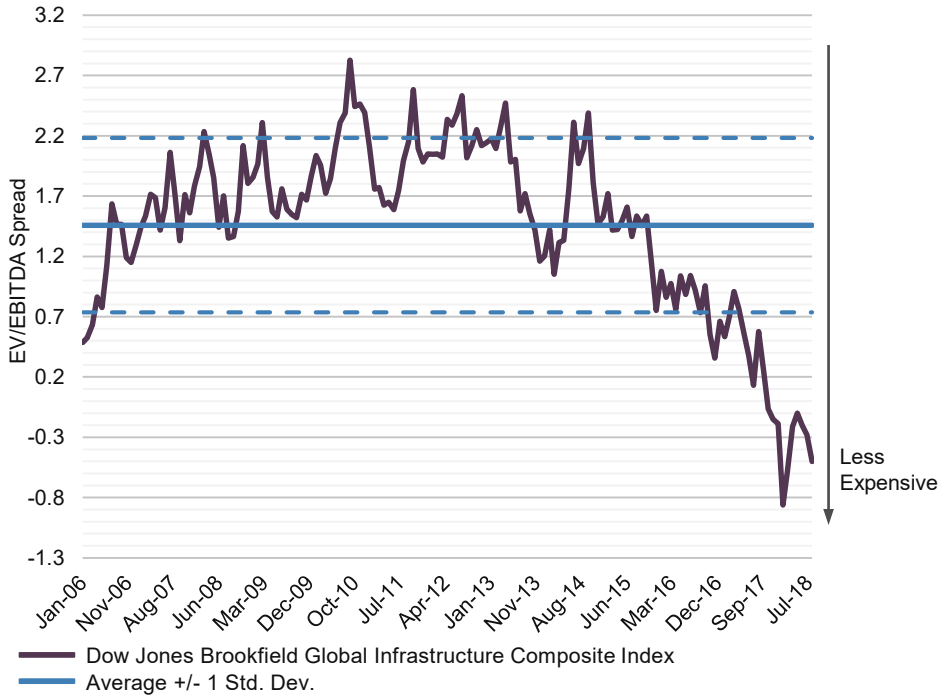
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Relative infrastructure valuations appear attractive based on wider-than-average yield spreads vs. the U.S. 10-Year Treasury and smaller-than-average multiple spreads vs. the S&P 500 at the end of July 2018

Yields versus U.S. Treasury Notes



EV/EBITDA: Infrastructure less S&P 500



As of July 31, 2018. Represents median EV/EBITDA based on forward 12 months analysis derived using the constituents of Brookfield Investment Management's Global Infrastructure Securities Universe. Source: Brookfield Investment Management research and estimates; FactSet, S&P Dow Jones Indices, BofA Merrill Lynch Global Indices and MSCI Indices. Note: EV/EBITDA (Enterprise Value/Earnings Before Interest, Taxes, Depreciation and Amortization). Brookfield Investment Management cannot warrant that EV/EBITDA or Yield levels will meet historical percentages shown above. Any comparisons, assertions and conclusions regarding the performance of the Dow Jones Brookfield Global Infrastructure Composite Index during the time period prior to its initial calculation on July 14, 2008 is based on back-testing (i.e., calculations of how the index might have performed during that time period if the index had existed). Back-tested performance information is hypothetical and based on index methodology applied and calculated by S&P Dow Jones Indices and is provided solely for information purposes. See Appendix for additional disclosures.

Opportunities Ahead for Infrastructure

Brookfield

We believe that Toll Roads and Global Renewables may provide attractive long-term potential; also finding select opportunities in Latin America

1

Toll Roads

- Traffic growth in continental Europe and Latin America are both strong as consumer confidence increases
- Real interest rates remain low across the Eurozone while consumer confidence is rising
- Private transactions have provided new valuation markers in excess of current listed valuations

2

Global Renewables

- Global renewable power buildout is progressing at an impressive pace as improvements have led to cost competitiveness / grid parity
- Broader sector has de-coupled from previous correlations (e.g. MLPs/Oil) with better understanding of underlying asset characteristics

3

Latin America

- Latin American infrastructure appears considerably undervalued as political risks weigh on share prices
- Foreign investment still faces considerable risk from swings in currency prices

For illustrative purposes only. The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Sector weights constitute supplemental information for purposes of GIPS. Weights and portfolio holdings are subject to change. See Appendix for additional disclosures.

Toll Roads

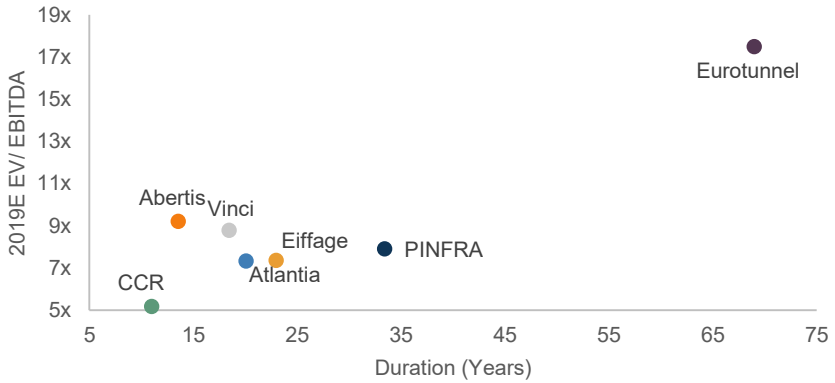
Brookfield

1

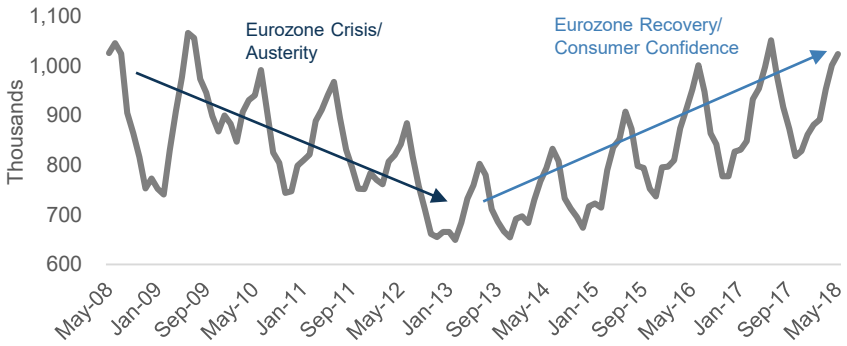
Concession length differences between operators and strong organic growth make Toll Roads an exemplary sector for stock picking

- Concession lengths for various global toll roads range from under 10 years to more than 70 years, making simple valuation measures an ineffective tool versus detailed cash flow analysis
- Eurozone new car registrations, backed by receding austerity and increasing consumer confidence have bolstered traffic growth on the continent
- Latin American toll roads continue to appear historically undervalued, and have no fundamental exposure to NAFTA

Concession Duration vs. Valuation Multiple



Eurozone New Car Registrations (4 mth m.a.)



Source: Bloomberg, Brookfield Investment Management research and estimates. Data as of June 30, 2018. See Appendix for additional disclosures.

Global Renewables

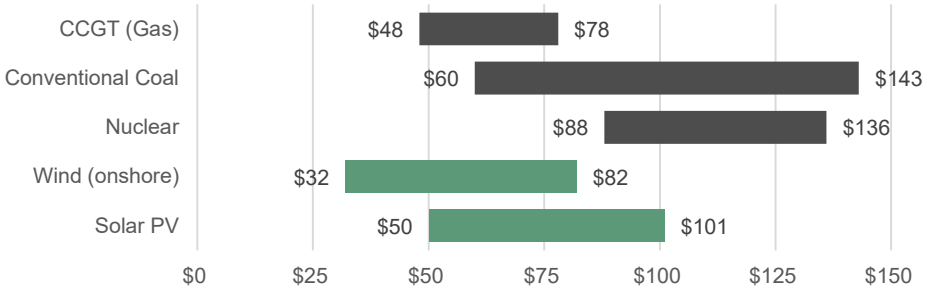
Brookfield

2

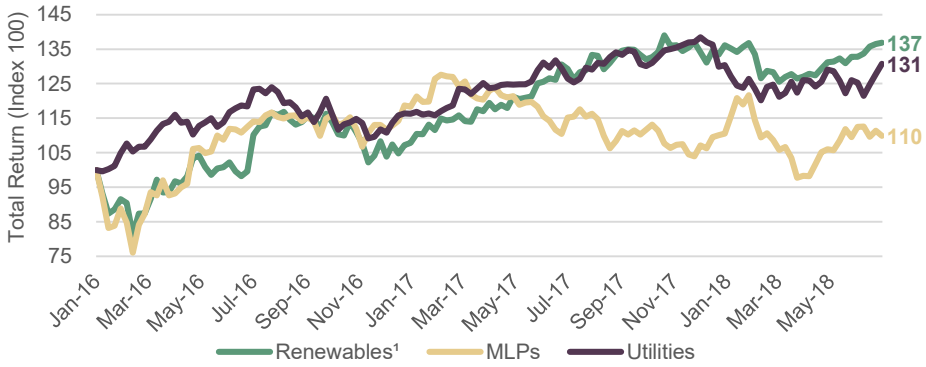
Global Renewables presents an attractive investment opportunity as power generation undergoes widespread change to promote a cleaner global footprint

- Global investment in renewable electric generation capacity has been double that of fossil fuels, over the past 5 years
- Renewable power is now reaching cost competitive levels with conventional generation due largely to continued technology improvements
- Renewable power companies have begun to de-couple from correlations with energy (e.g. MLPs)

Levelized Cost of Energy Comparison ($ / MWh)



Total Return Comparison



1) Renewables comprises an equal weighting of AY, CAFD, NEP, NYLD, PEGI, RNW CN, SAY SM, and TERP.
Source: Bloomberg New Energy Finance, EIA, GTM / SEIA, Broker research, Brookfield Investment Management research and estimates. Levelized cost of electricity (LCOE) is defined as the net present value of the unit-cost of electricity over the lifetime of a generating asset (often taken as a proxy for the average price that the generating asset must receive in a market to break even over its lifetime). See Appendix for additional disclosure.

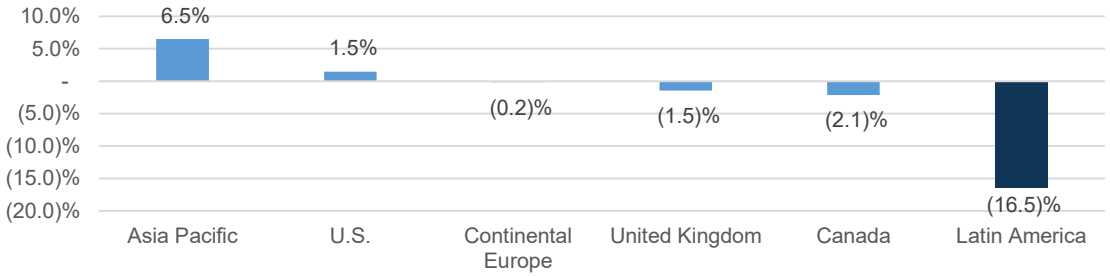
Latin America

Brookfield

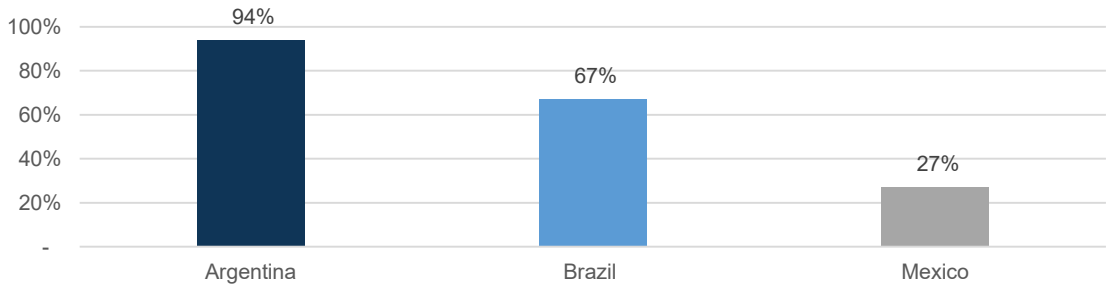
3

Latin American infrastructure has traded lower amid considerable near-term political uncertainty, presenting opportunity for long-term focused investors

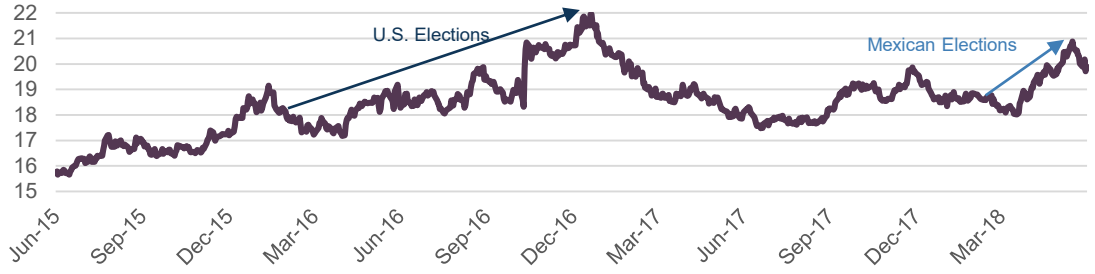
Infrastructure Total Return by Sector – 2018 YTD



Latin American 5Y CDS – 2018 YTD



Peso / Dollar FX – June 2015 to Present

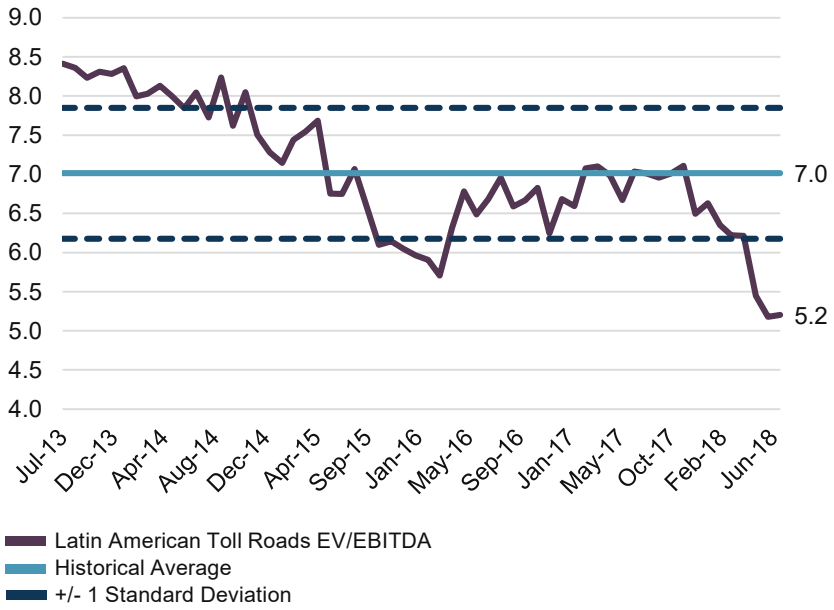


As of June 30, 2018.
Source: FactSet; Bloomberg; Brookfield Investment Management Research. See Appendix for additional disclosures.

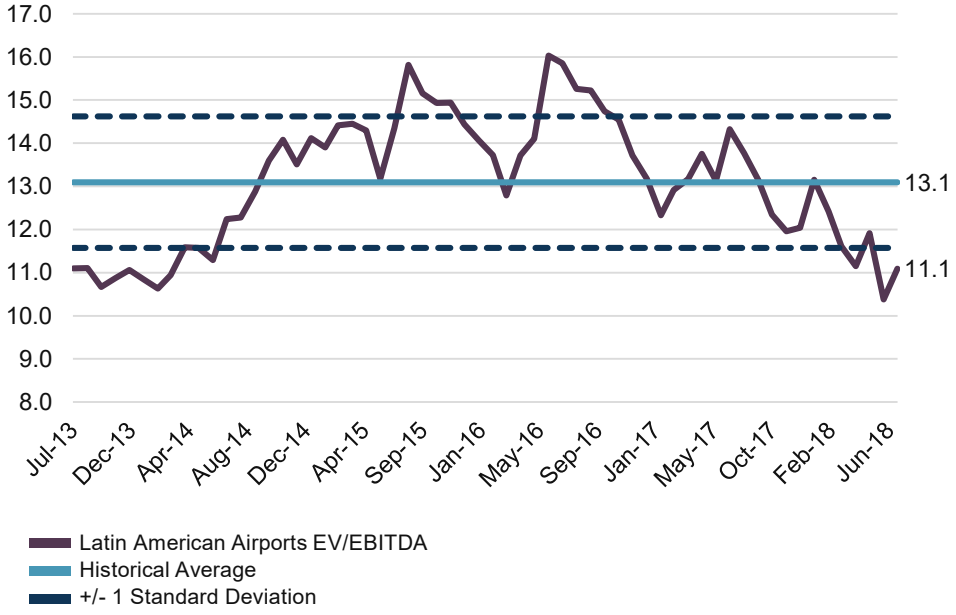
3

Latin American infrastructure has traded lower amid considerable near-term political uncertainty, presenting opportunity for long-term focused investors

Latin American Toll Roads EV/EBITDA



Latin American Airports EV/EBITDA



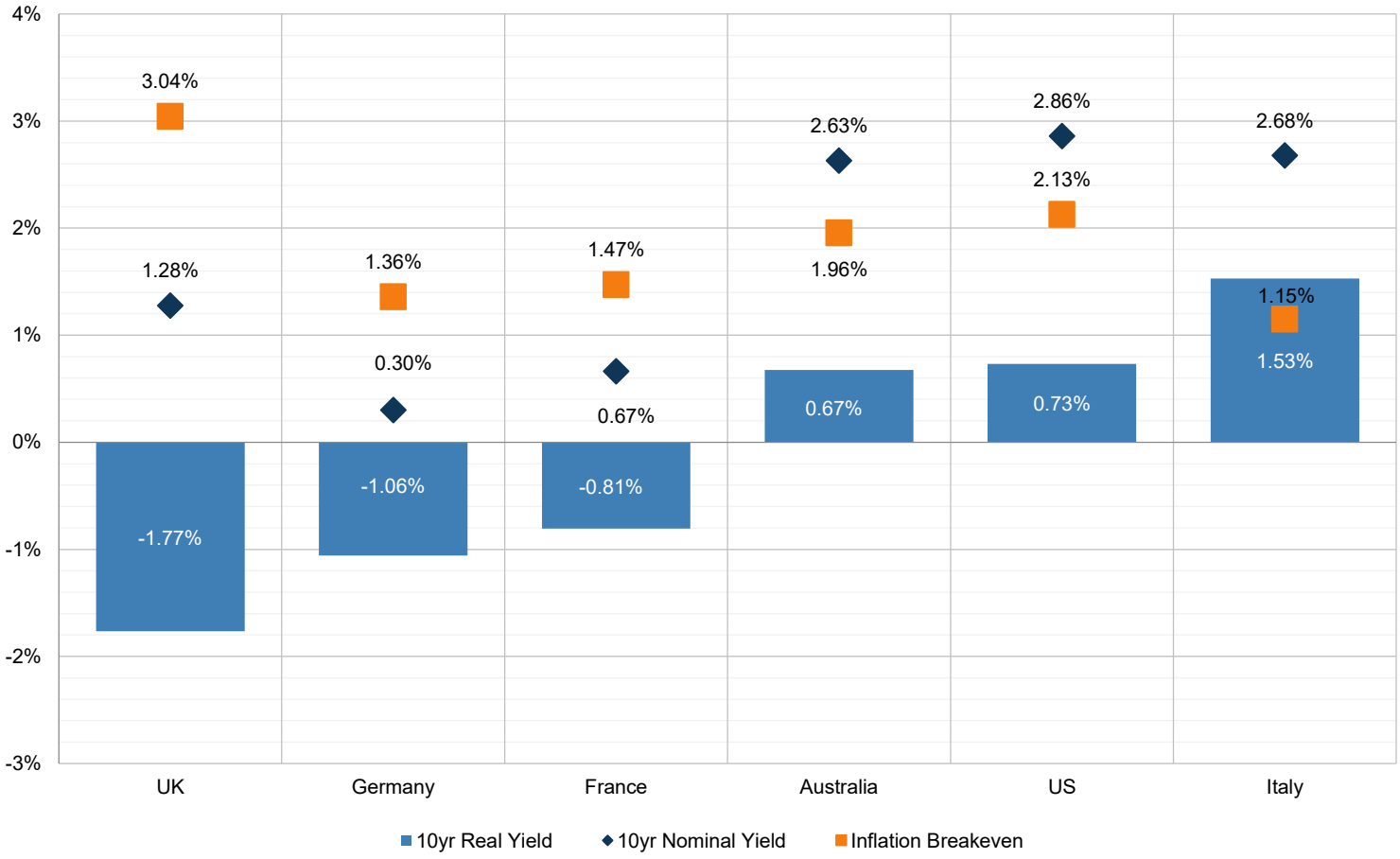
As of June 30, 2018. Represents median EV/EBITDA based on forward 12 months analysis derived using the constituents of Brookfield Investment Management's Global Infrastructure Securities Universe. Source: Brookfield Investment Management research and estimates; FactSet, S&P Dow Jones Indices, BofA Merrill Lynch Global Indices and MSCI Indices. Note: EV/EBITDA (Enterprise Value/Earnings Before Interest, Taxes, Depreciation and Amortization). Brookfield Investment Management cannot warrant that EV/EBITDA will meet historical percentages shown above. See Appendix for additional disclosures.

Real Yields Remain Low (or Negative) Around the World

Brookfield

Rising inflation (and inflation expectations) will likely be supportive to infrastructure cash flows

- Infrastructure assets generally have inflation indexation, therefore, cash profits and asset values tend to benefit from higher inflation. Real bond yields (not nominal) are therefore important.



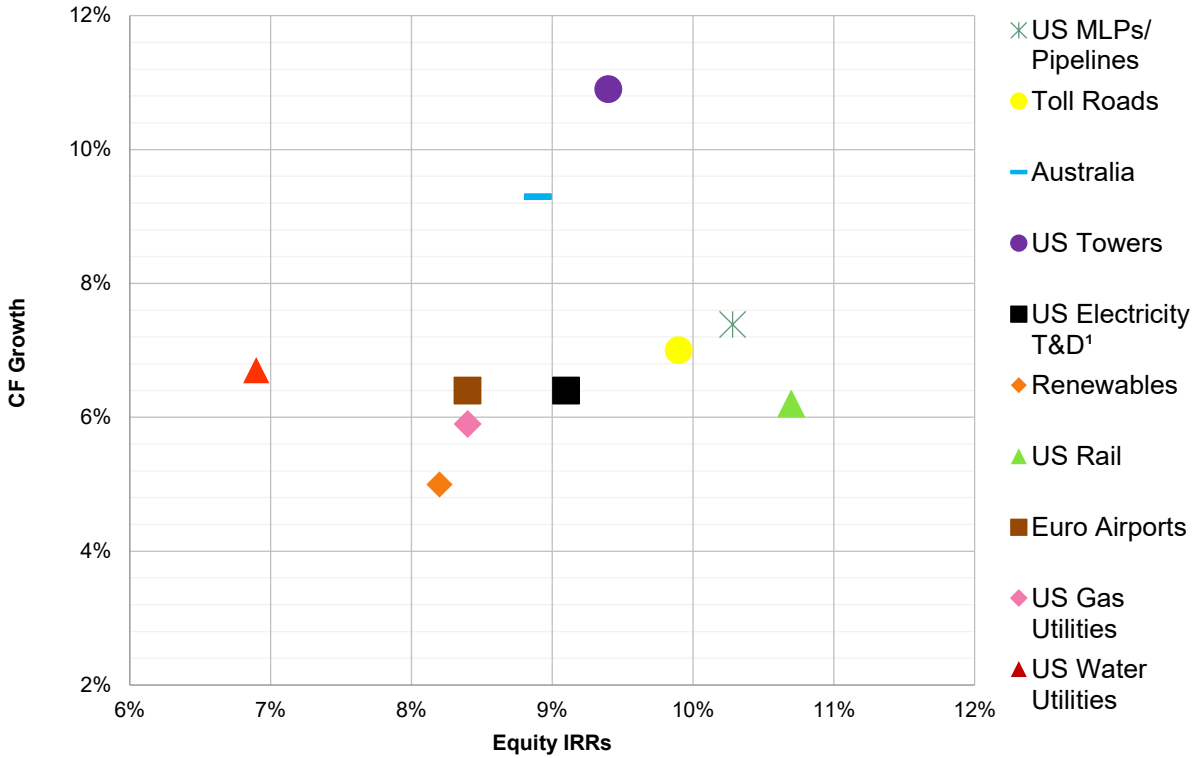
As of June 30, 2018. Source: Brookfield Investment Management research, Bloomberg. See Appendix for additional disclosures.

Equity Returns of 8% to 10% Projected for the Asset Class…

Brookfield

…and we believe there are significant opportunities to outperform the asset class

- Wide valuation bifurcation means many sectors are screening as very cheap, while some pockets appear overvalued
- Cash flow growth across listed infrastructure sectors remains healthy and balance sheets are generally sound



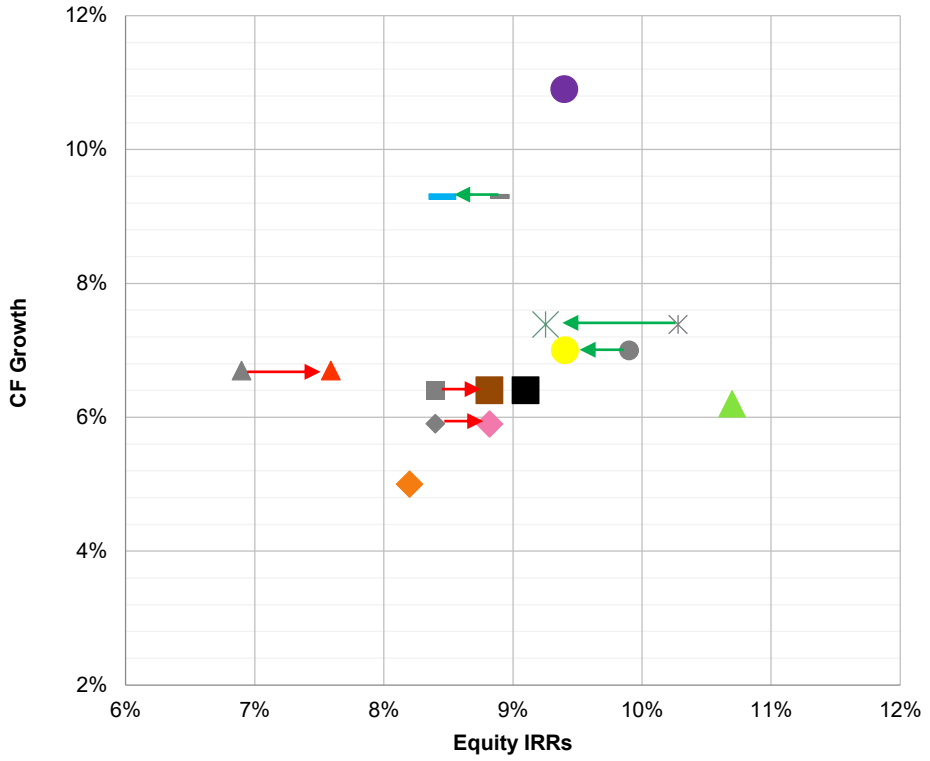
1. T&D = Transmission & Distribution.

As of June 30, 2018. Source: Brookfield Investment Management research; Bloomberg. Brookfield makes no assurances that the return targets will be achieved. See Appendix for additional disclosures.

Significant Re-Rating in the Medium-Term Possible

Brookfield

- If stocks trade in-line with our estimation of risk-adjusted cost of capital for each sector, further upside of 5% to 10% is possible
- We estimate modest downside risk among the sectors most exposed to interest rate movements



Projected Capital Movement

US MLPs/ Pipelines	10%	Sectors of focus and overweight positions.
Toll Roads	5%	
Australia	5%	
US Towers	0%	Neutral sector view, stock selection is key.
US Electricity T&D[1]	0%	
Renewables	0%	
US Rail	0%	
Euro Airports	(5)%	Generally negative sector view due to valuation. We find only select individual stocks.
US Gas Utilities	(5)%	
US Water Utilities	(10)%	

Grey figures reflect values shown on the previous slide

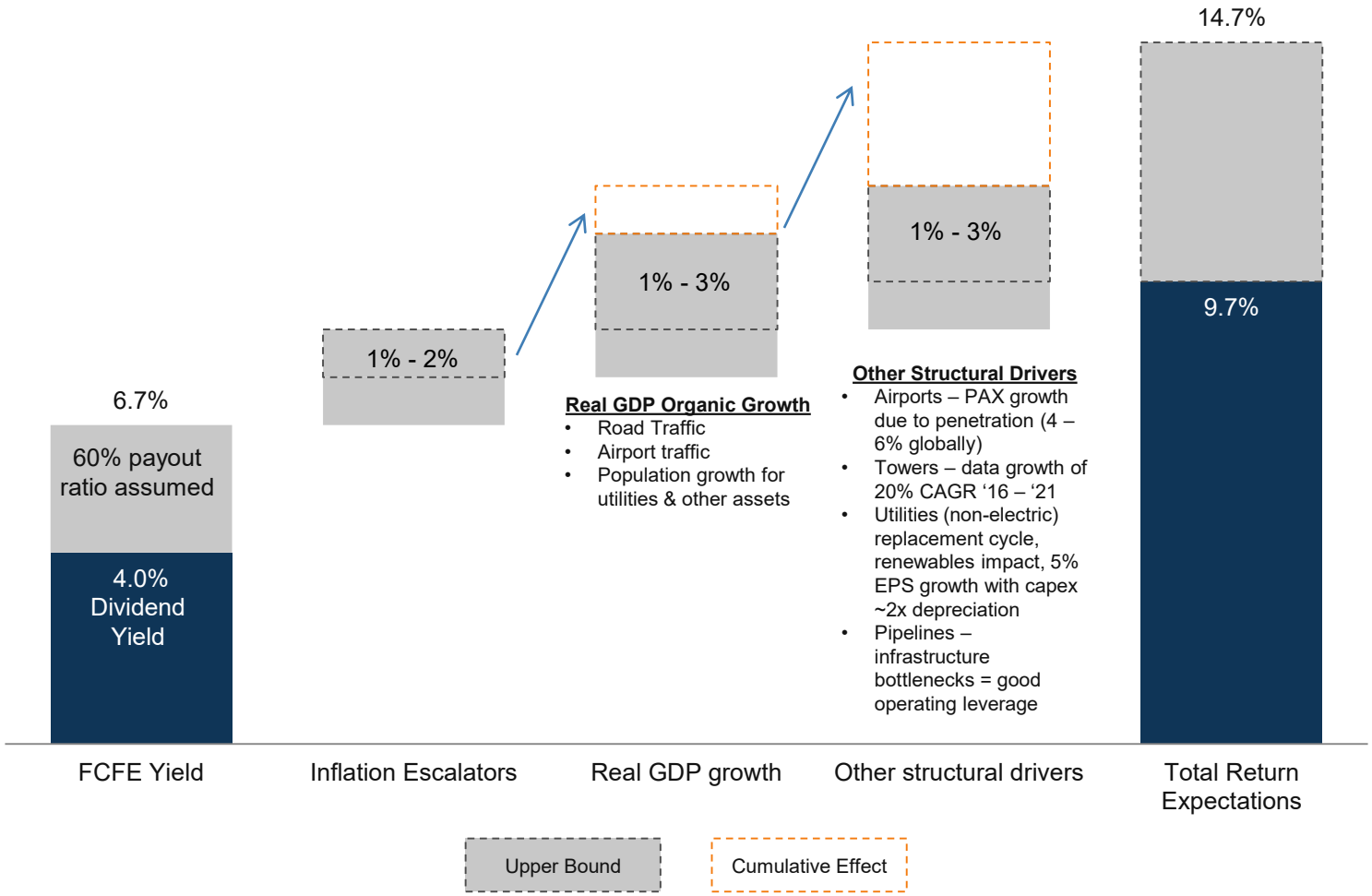
1. T&D = Transmission & Distribution.

As of June 30, 2018. Source: Brookfield Investment Management research; Bloomberg. See Appendix for additional disclosures.

Illustrative Total Return Expectations

Brookfield

Typical infrastructure company with a good balance sheet / coverage ratio:



For illustrative purposes only. Not intended to provide current market analysis. Source: Brookfield Investment Management, Inc. See Appendix for additional disclosures.

Case Study: European Renewables

Brookfield

Skyway Analysis | Due Diligence | Investment Themes | Portfolio Construction

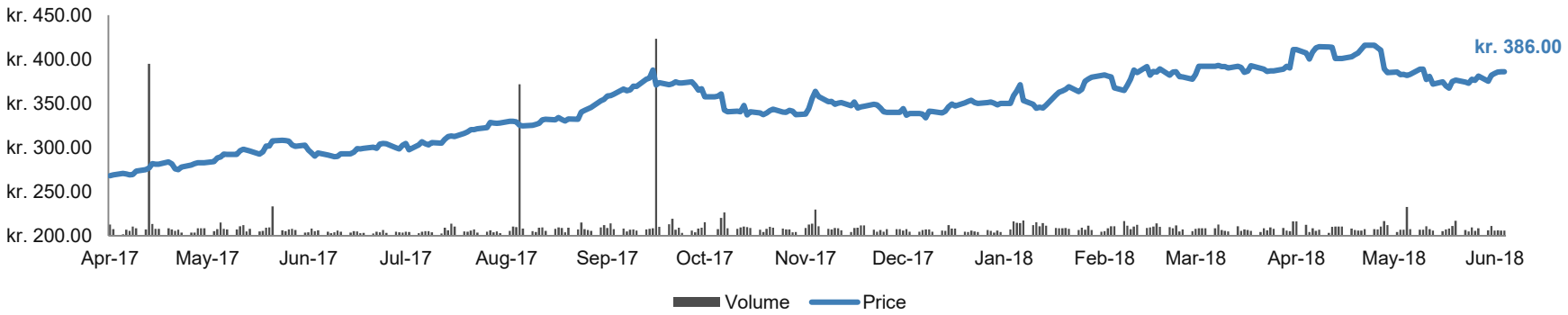
Company Overview

- The portfolio of operations is divided into four businesses: Wind Power, Bioenergy & Thermal Power, Distribution & Customer Solutions, and Oil & Gas (recently sold)
- Global leader in offshore wind development by installed capacity

Fundamental Considerations

- Long-term power supply agreements in favorable subsidy regimes
- Development pipeline through 2020 is all under construction and currently on-time / on-budget
- Estimated whole company Return on Capital Employed >10% through 2023
- Several recent and upcoming auction processes to win more projects through 2025
- Sale of the Oil & Gas division in 2017 paves the way for a pure-play clean energy utility, expanding the potential investor base

Market Cap: 162bn DKK



Source: Brookfield Investment Management, Inc., Company materials, Bloomberg. For illustrative purposes only. Information is as of June 30, 2018 and subject to change without notice. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. Each fund, account and investment vehicle in this strategy is managed individually. No assurance that any specific fund, separate account or other investment vehicle managed by Brookfield Investment Management Inc. has previously or currently holds the names referenced herein. There is no guarantee that the specific securities referenced were profitable or will be profitable. Past performance is not indicative of future results. See Appendix for additional disclosures.

Skyway Summary & Analysis Helps Determine Research Priorities

Brookfield

Skyway Analysis | Due Diligence | Investment Themes | Portfolio Construction

Company Overview

Region / Industry: Renewables
NTM EV/EVITDA: 8.9x
NTM P/E: 14.8x
NTM Dividend Yield: 1.6%

Skyway Scores Summary

1 Asset Level

Category	Weight	Score
Business Model and Market Position	30%	4.00
Regulatory Framework / Contracts	30%	4.00
Growth Prospects	25%	4.00
Country Political / Sovereign Risk	15%	3.00
Asset Level	**50%**	**3.92**

2 Company Level

Category	Weight	Score
Management Operational Quality	20%	4.00
Management Strategic Quality	35%	5.00
Corporate Governance	20%	3.00
Capital Structure	25%	3.00
Company Level	**50%**	**3.90**

Quality Score (Max of 5): 3.91
Quality Rank (out of ~400): 8

Valuation Scores Summary & Quality-Adjusted Rank

3 Skyway Valuation

Metric: EV/EBITDA	Weight	Score
Absolute (vs. 5-yr avg. for company)	33%	1.30
Relative (vs. Industry peers)	33%	1.00
Sector (vs. 5-yr avg. for sector)	33%	1.12
Valuation Score	**100%**	**1.14**

Valuation Rank (out of ~400): 223

1 + 2 + 3

Quality-Adjusted Valuation Rank (out of ~400): 209

With a top-tier management team that has a clear pipeline of asset development for growth, the company is headed in the right strategic direction. Given that it is a technology leader and first mover in its industry, it merits additional analysis to determine fair value potential.

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Investment Due Diligence Processes is a Key Differentiator

Brookfield

Skyway Analysis | **Due Diligence** | Investment Themes | Portfolio Construction

1 Desktop Analysis

- Long-term asset-by-asset wind power model given the stability & length of contracts and remuneration scheme detail
- Due to lumpiness of timing on certain EBITDA contributions from farm-downs, 20 – 40 year asset models are better for determining the NPV value over the life of the asset
- Sum-of-the-Parts valuation given the various business segments and valuation strategies associated with each (e.g., DCF / NPV for wind power vs. premium to RAB regulated utilities business vs. EBITDA multiple for power & heat generation business)

2 On-site Due Diligence

- Participation in the IPO process enabled intimate knowledge of the assets and key senior management
- Meetings with key senior management members have included in-person office visits, conference calls, and video conferences
- Recent detailed due diligence session in Gentofte, Denmark with management and saw power facility outside Copenhagen; helped increase conviction on operational & strategic direction and underlying valuation on existing assets and near-term pipeline

3 Broader Brookfield Platform

- Brookfield's private platform is an owner of several renewable assets, but in this case they are tangible in nature as offshore wind is primarily a European asset whereas Brookfield's platform mainly consists of global hydro
- Brookfield's acquisition of the TerraForm platform is of particular note as the asset base is primarily wind and solar, which could potentially lead to an exchange of ideas with regards to technology preference in different markets

Our detailed SOTP analysis suggested **deep discount to intrinsic value** with transition to clean utility

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Investment Thesis & Positioning Developed from Research Process

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Skyway Analysis | Due Diligence | Investment Themes | Portfolio Construction

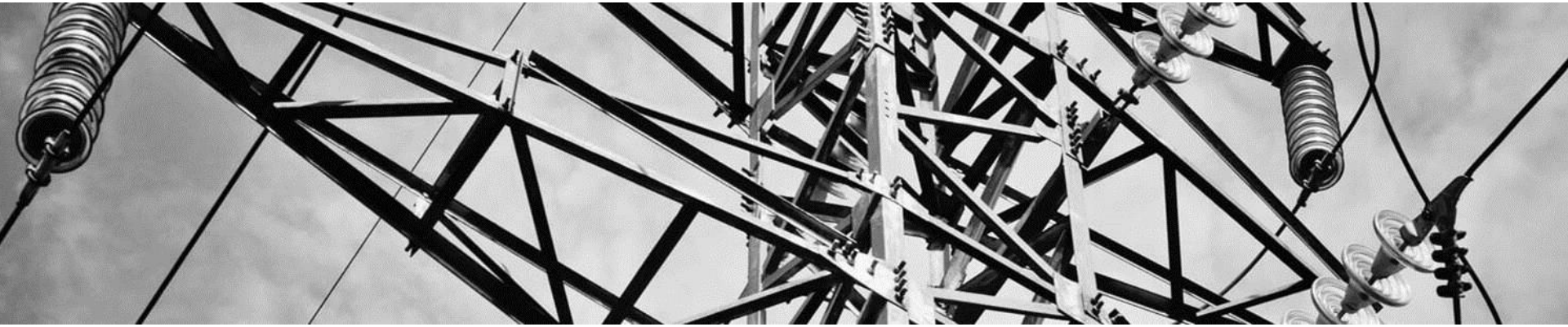
Investment Themes

- Best-in-class developer / operator in a high barriers to entry industry in an immature market
  - Development expertise is crucial in achieving project IRRs well in excess of cost of capital
  - Opportunity to be a first mover in additional markets post-2020
- Stable cash flow profile with clearly identified near-term growth from projects already under construction with high quality tariffs
  - Several projects under construction between now and 2021 across U.K., Germany, and Netherlands
  - Can build out 1 GW per annum from current cash flow
- Opportunity for additional pipeline additions through upcoming auction processes
  - Won 590 MW German Auction, of which 480 MW can be deployed with the next generation turbine technology (13 – 15 MW) at €0 CfD
  - Won 1,386 MW U.K. auction at attractive implied IRRs
  - Won 1,820 MW in Taiwan auctions

Portfolio Construction

- Portfolio positioning
  - 2% portfolio weight in GLI, the largest position in renewable energy as well as one of the largest overweight positions in general for the portfolio
  - Relative to the key infrastructure indexes, renewables are non-benchmark
- Represents a high quality global renewable opportunity for the portfolio with long-term contracted value
  - Valuation remains attractive for fundamental value of current and under construction assets
  - More longer-term value can be ascribed based on probability outcomes of auctions at a returns higher than cost of capital
- Risk management
  - Contracted cash flow profile serves as an offset to “riskier” development activity
  - As non-benchmark, it requires a higher level of conviction to be added to the portfolio

Information is as of June 30, 2018 and subject to change without notice. Source: Brookfield Investment Management, Inc. For illustrative purposes only. The mention of specific securities is not a recommendation or solicitation for any person to buy, sell or hold any particular security. Each fund, account and investment vehicle in this strategy is managed individually. No assurance that any specific fund, separate account or other investment vehicle managed by Brookfield Investment Management Inc. has previously or currently holds the names referenced herein. There is no guarantee that the specific securities referenced were profitable or will be profitable. Past performance is not indicative of future results. See Appendix for additional disclosures.



Appendix

Biographies

Leonardo Anguiano

Managing Director,
Portfolio Manager

Leonardo Anguiano has 20 years of industry experience and is a Managing Director on the Public Securities Group's Infrastructure Equities team. In addition to his portfolio manager duties, he is also responsible for covering European securities focusing on the water, transportation and energy infrastructure sectors. His past experience includes both direct and listed infrastructure investing and he has spent the majority of his career in London. Prior to joining the firm in 2015, Leonardo worked for Santander in Madrid where he was in specialty sales covering infrastructure and utilities. Prior to Santander, Leonardo worked at Arcus Infrastructure Partners and Babcock & Brown focusing on direct infrastructure investing. Leonardo started his career at JP Morgan Cazenove on the sell side. He earned a Master of Philosophy degree from Cambridge University and a Bachelor of Science degree from the London School of Economics.

Tom Miller, CFA

Director,
Portfolio Manager

Tom Miller has 8 years of industry experience and is a Director on the Public Securities Group's Infrastructure Equities team. In addition to his portfolio manager duties, he is also responsible for covering North American infrastructure securities focusing on MLPs and the Energy Infrastructure sector. Prior to joining the firm in 2013, he worked at FactSet. Tom holds the Chartered Financial Analyst designation and earned a Bachelor of Science degree from Indiana University.

Craig Noble, CFA

CEO, Chief Investment Officer,
Portfolio Manager

Craig Noble has 20 years of industry experience and is Chief Executive Officer and Chief Investment Officer for the Public Securities Group as well as Portfolio Manager on the global infrastructure team and a Senior Managing Partner of Brookfield Asset Management. Over the last 13 years, he has held multiple positions within Brookfield, including significant roles within capital markets and direct infrastructure investment. He transitioned to the Public Securities Group in 2008 to help launch the firm's listed infrastructure business and became the CEO in 2013. Prior to Brookfield, he spent five years with the Bank of Montreal, focused on credit analysis, corporate lending and corporate finance. Craig holds the Chartered Financial Analyst designation. He earned a Master of Business Administration degree from York University and a Bachelor of Commerce degree from Mount Allison University.

Biographies

Andrew Alexander
Director

Andrew Alexander has 14 years of industry experience and is a Director on the Public Securities Group's Infrastructure Equities team. He is responsible for covering Energy Infrastructure as well as infrastructure securities focusing on the Water and Transportation sectors in Europe and Australia/New Zealand. Prior to joining the firm in 2008, Andrew was with SNL Financial where he specialized in the Energy sector, which encompassed power, natural gas and coal, and he launched a full analysis of Master Limited Partnerships. Andrew earned a Masters in Corporate Finance degree from the SDA Bocconi School of Management in Milan, Italy and a Bachelor of Arts degree from the University of Virginia.

Rob Bellinski, CFA
Vice President

Robert Bellinski has 11 years of industry experience and is a Vice President on the Public Securities Group's Infrastructure Equities team. He is responsible for covering North American infrastructure securities focusing on MLPs and the Energy Infrastructure sector. Robert is also the Investment Specialist for the firm's infrastructure investment strategies. Working in partnership with the infrastructure portfolio management team, he is involved in the marketing and positioning of the firm's infrastructure products to the global investment community. Prior to joining the firm in 2014, Robert worked for Morningstar where he was a sell-side equity analyst for four years. Prior to Morningstar, he worked in management consulting on corporate transaction and complex security valuations for a variety of industries. Rob holds the Chartered Financial Analyst designation and earned a Master of Business Administration degree from DePaul University and a Bachelor of Business Administration degree from the University of North Texas.

Troy Green
Associate

Troy Green has 13 years of industry experience and is an Associate on the Public Securities Group's Infrastructure Equities team. He is responsible for covering North American infrastructure securities focusing on the Utilities sector. Prior to joining the firm in 2015, Troy was a Founder/Portfolio Manager at Green Oak Investment Partners L.P. He began his career in 2005 as an electrical engineer at Marathon Petroleum and then Bechtel Corporation. He later worked for Turner Construction Company on projects such as the JetBlue terminal at JFK airport, New York Yankee Stadium, and the new World Trade Center. Troy earned a Master of Business Administration degree from New York University and a Bachelor of Science degree in Electrical Engineering from Virginia Tech.

Biographies

Joseph Idaszak
Assistant Vice President

Joseph Idaszak has 6 years of industry experience and is an Assistant Vice President on the Public Securities Group's Infrastructure Equities team. He is responsible for covering North American infrastructure securities focusing on the Renewables, North American Rail and Social Infrastructure sectors. Prior to joining the firm in 2016, Joseph was an Investment Associate at Silverpath Capital Management where he focused on Renewables and MLPs. Prior to that, he was an Investment Banking Analyst at Goldman, Sachs & Co. where he also focused on Renewables and MLPs. Joseph earned a Bachelor of Business Administration degree from the University of Notre Dame.

Inigo Mijangos
Director

Iñigo Mijangos has 16 years of industry experience and is a Senior Analyst for the Public Securities Group's Infrastructure Equities team. He is focused on Regulated Utilities and Renewables, across Europe, Latin America and North America. Prior to joining the firm in 2018, Iñigo worked at Santander UK as a Portfolio Manager and Research Analyst, where he co-managed a European equity absolute return long/short strategy. Prior to Santander, he worked as a Research Analyst for T. Rowe Price and Kepler Cheuvreux. He started his career as a Senior Financial Auditor at Arthur Andersen. Iñigo earned a PhD in Banking and Stock Markets at Universidad Autonoma de Madrid and a Degree in Economics from Universidad San Pablo CEU.

Dan Parker, CFA
Director

Dan Parker has 21 years of industry experience and is a Director on the Public Securities Group's Infrastructure Equities team. He is responsible for covering North American infrastructure securities focusing on the Utilities sector. Previously, Dan was as a global sector research analyst for our Real Asset Debt business. Prior to joining the firm in 2006, Dan spent four years at Standard & Poor's where he covered the utilities and natural resource sectors. He started his career in international trade finance as a credit analyst at Canada's Export Credit Agency, EDC. Dan holds the Chartered Financial Analyst designation and is a member of the CFA Society Chicago, Inc. He earned an Honours Bachelor of Commerce degree from Lakehead University.

Biographies

Fábio Schöntag
Assistant Vice President

Fábio Schöntag has 12 years of industry experience and is an Assistant Vice President on the Public Securities Group's Infrastructure Equities team. He is responsible for covering Latin American and European infrastructure securities focusing on the Transportation, Energy Infrastructure and Utilities sectors. Prior to joining the firm in 2014, he was a financial analyst at Brookfield Gestao De Ativos, Brascan Bank and ANBIMA. Fábio earned a Master of Business Administration degree from Pontifical Catholic University of Rio de Janeiro and a Bachelor of Science degree from Unesa University.

Tyler Strong, CFA
Vice President

Tyler Strong has 6 years of industry experience and is a Vice President on the Public Securities Group's Infrastructure Equities team. He is responsible for covering the North American Energy Infrastructure and Global Communications sectors as well as North American infrastructure securities. Tyler holds the Chartered Financial Analyst designation and earned a Bachelor of Business Administration degree from the University of Wisconsin-Madison.

Perfeeno Wang
Associate

Perfeeno Wang has 5 years of industry experience and is an Associate on the Public Securities Group's Infrastructure Equities team. She is responsible for covering Asian infrastructure securities focusing on the Water, Transportation and Energy Infrastructure sectors. Prior to joining the firm in 2015, Perfeeno was an Assistant Research Analyst for Shanghai Leasing Services and Exchange where she focused on healthcare leasing, automobile leasing and asset-backed securities, and led research on the synergy between solar power and the leasing industry. Perfeeno earned a Master of Finance degree from Tulane University and a Bachelor of Arts degree from Zhejiang University.

Biographies

Joshua Wright

Vice President

Joshua Wright has 12 years of industry experience and is a global equity trader for the Public Securities Group's Infrastructure Equities team. He is responsible for trading infrastructure securities across the firm's infrastructure platform. Prior to joining the firm in 2015, he worked for Magnetar Capital as the head trader for the energy and syndicate portfolios. Joshua began his career at British Petroleum in the Trader Development program that included rotations across different trading sectors. Joshua earned a Bachelor of Science degree in Finance from Indiana University.

Global Infrastructure Securities Composite Disclosures

Brookfield

Year	Composite Gross	Composite Net	3-Yr Composite Standard Deviation	Dow Jones Brookfield Global Infrastructure Index	3-Yr Benchmark Standard Deviation	Number of Accounts	Composite Dispersion	Composite AUM ($ millions)	Total Firm AUM ($ millions)
2016	13.30%	12.72%	12.04%	12.52%	11.31%	14	0.4%	1,221	13,229
2015	-16.62%	-17.02%	11.86%	-14.40%	11.50%	14	1.0%	1,737	16,795
2014	10.48%	9.95%	10.00%	16.34%	9.66%	14	4.8%	1,976	17,989
2013	18.95%	18.35%	10.48%	15.89%	9.86%	11	0.1%	1,390	20,412
2012	19.50%	18.88%	13.14%	16.01%	12.20%	8	0.1%	877	16,623
2011	10.68%	10.06%	15.64%	13.75%	15.09%	6	0.2%	307	20,980
2010	17.90%	17.22%	N/A	12.46%	N/A	< 5	N/A	26	22,112
2009	45.29%	44.43%	N/A	34.24%	N/A	< 5	N/A	22	24,054

Compliance Statement
Brookfield Investment Management Inc. claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Brookfield Investment Management Inc. has been independently verified for the periods July 1, 2000 through December 31, 2016. The verification report is available upon request. Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation.

Definition of the Firm
The GIPS firm is defined as Brookfield Investment Management Inc., which is also known as the "Brookfield Public Securities Group" (the "Firm"), an SEC registered investment adviser. The Firm is a wholly owned subsidiary of Brookfield Asset Management Inc. ("Brookfield"). The Firm was formed on October 1, 2009 by integrating Brookfield Redding LLC into Hyperion Brookfield Asset Management, Inc. On June 1, 2011, AMP Capital Brookfield Pty limited and Brookfield Investment Management (UK) Limited were included within the GIPS firm definition. Effective March 31, 2012, as a result of an internal reorganization, Brookfield Investment Management Inc., redefined the firm by removing AMP Capital Brookfield Pty Limited from its definition and including Brookfield Investment Management (Canada) Inc.

On February 2, 2018, Center Coast Capital Advisors, LP was acquired by a wholly owned subsidiary of Brookfield and was included within the Firm's GIPS firm definition.

Policies
Policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request.

Global Infrastructure Securities Composite Disclosures (Cont.)

Brookfield

Composite Description

The Global Infrastructure Securities Composite contains fully discretionary accounts with holdings in publicly traded infrastructure companies globally, excluding Master Limited Partnerships. Holdings consist primarily of equity securities. This composite was created on April 11, 2008.

Prior to October 1, 2009, the portfolio managers were affiliated with Brookfield Redding LLC, which was integrated into Hyperion Brookfield Asset Management, Inc. to form a unified investment management platform known as Brookfield Investment Management Inc. While these assets and individuals were part of the integration, the performance of Brookfield Redding LLC should not be interpreted as the actual historical performance of Brookfield Investment Management Inc. A complete list of composite descriptions is available upon request.

Prior to December 31, 2017 the Global Infrastructure Securities Composite was called the Global Infrastructure Securities (Ex-MLPs) Composite and prior to December 31, 2011 was called the Global Infrastructure Composite.

Benchmark

The Dow Jones Brookfield Global Infrastructure Index is calculated and maintained by Dow Jones Indexes and comprises infrastructure companies with at least 70% of its annual cash flows derived from owning and operating infrastructure assets.

Composite Dispersion

Composite dispersion is calculated using the asset-weighted standard deviation of annual gross-of-fees returns for the accounts in the composite the entire year. Composite dispersion is not presented when there are five or fewer accounts in the composite as of December 31.

Reporting Currency

Valuations are computed and performance is reported in U.S. dollars.

Fees

The composite gross-of fees returns include the reinvestment of income and the impact of transaction costs, but do not include the deduction of investment advisory fees or any other account expenses, such as custodial fees. The composite performance is presented gross of foreign withholding taxes. Net returns are net of transaction expenses, actual management fees, and actual performance based fees. The standard fee schedule for the Global Infrastructure Securities Composite is 75 basis points on the first $25 million, 70 basis points on the next $25 million, 65 basis points on the next $50 million and 60 basis points thereafter.

Derivatives

Leverage, derivatives and short positions are not used in the Global Infrastructure Securities Composite.

Past performance is not indicative of future results.

Disclosures

The GIPS firm is defined as Brookfield Investment Management Inc., which is also known as the "Brookfield Public Securities Group" (the "Firm"), an SEC registered investment adviser. The Firm is a wholly owned subsidiary of Brookfield Asset Management Inc. ("Brookfield"). The Firm was formed on October 1, 2009 by integrating Brookfield Redding LLC into Hyperion Brookfield Asset Management, Inc. On June 1, 2011, AMP Capital Brookfield Pty limited and Brookfield Investment Management (UK) Limited were included within the GIPS firm definition. Effective March 31, 2012, as a result of an internal reorganization, Brookfield Investment Management Inc., redefined the firm by removing AMP Capital Brookfield Pty Limited from its definition and including Brookfield Investment Management (Canada) Inc. On February 2, 2018, Center Coast Capital Advisors, LP was acquired by a wholly owned subsidiary of Brookfield and was included within the Firm's GIPS firm definition. Brookfield Investment Management Inc. is headquartered in New York and has investment teams in Boston, Chicago, and Toronto. The firm provides clients investment management across corporate credit, real estate equities and infrastructure equities. BIM claims compliance with the Global Investment Performance Standards (GIPS®).

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Past performance is not indicative of future performance and the value of investments and the income derived from those investments can fluctuate. Future returns are not guaranteed and a loss of principal may occur.

All rates of return are annualized unless marked otherwise. Performance shown are net of fees unless otherwise stated. Index returns do not reflect any management fees, transaction costs or expenses. Investment results shown reflect realized and unrealized gains and losses and income. Returns are time-weighted on a daily basis using the Modified Dietz formula in order to minimize the impact of any intra-period cash flows, and are calculated and compounded monthly. Please refer to Part 2 of Brookfield Investment Management Inc.'s Form ADV for additional information on advisory fees.

While Brookfield Investment Management Inc. seeks to design a portfolio that will reflect appropriate risk and return features such as sector weights, credit quality and duration, the Client understands that such characteristics of its portfolio, as well as its volatility, may deviate to varying degrees from those of the benchmark.

The information shown is derived from a representative account deemed to appropriately represent the management styles herein. Each investor's portfolio is individually managed and may vary from the information shown. The specific securities identified are not representative of all of the securities purchased, sold or recommended for advisory clients. It should not be assumed that an investment in the securities identified will be profitable. Actual holdings will vary for each client and there is no guarantee that a particular client's account will hold any or all of the securities listed. The quoted benchmarks within this presentation do not reflect deductions for fees, expenses or taxes. These benchmarks are unmanaged and cannot be purchased directly by investors. Benchmark performance is shown for illustrative purposes only and does not predict or depict the performance of any investment. There may be material factors relevant to any such comparison such as differences in the volatility, and regulatory and legal restrictions between the indices shown and the strategy.

Brookfield Investment Management Inc. may have potential conflicts in connection with the allocation of investments or transaction decisions for client accounts. Brookfield Investment Management Inc., its affiliates or personnel of affiliates may have interests in the investment(s) being allocated and situations in which an account of an affiliate ("Affiliate Account") may have interests in the investment(s) being allocated and situations in which an Affiliate Account may receive a certain percentage of the investments being allocated. Brookfield Investment Management Inc. seeks to manage client accounts and Affiliate Accounts according to each account's investment objectives and applicable guidelines and applicable legal and regulatory requirements.

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Information herein contains, includes or is based upon forward-looking statements within the meaning of the federal securities laws, specifically Section 21E of the Securities Exchange Act of 1934, as amended. Forward-looking statements include all statements, other than statements of historical fact, that address future activities, events, or developments, including without limitation, business or investment strategy or measures to implement strategy, competitive strengths, goals, expansion and growth of our business, plans, prospects and references to future our success. You can identify these statements by the fact that they do not relate strictly to historical or current facts. Words such as "anticipate," "estimate," "expect," "project," "intend," "plan," "believe," and other similar words are intended to identify these forward-looking statements. Forward-looking statements can be affected by inaccurate assumptions or by known or unknown risks and uncertainties. Many such factors will be important in determining our actual future results or outcomes. Consequently, no forward-looking statement can be guaranteed. Our actual results or outcomes may vary materially. Given these uncertainties, you should not place undue reliance on these forward-looking statements.

Disclosures

Brookfield

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The Dow Jones Brookfield Global Infrastructure Index is calculated and maintained by S&P Dow Jones Index's and comprises infrastructure companies with at least 70% of their annual cash flows derived from owning and operating infrastructure. The Firm has no role in managing the Index. Data presented in this report reflect performance and characteristics of the index and not those of a Brookfield composite. There is no affiliation between Dow Jones and Brookfield. Index performance shown does not represent Brookfield composite performance.

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Disclosures

Investing in MLPs involves additional risks as compared to the risks of investing in common stock, including risks related to cash flow, dilution and voting rights. The strategy's investments are concentrated in the energy infrastructure industry with an emphasis on securities issued by MLPs, which may increase volatility. Energy infrastructure companies are subject to risks specific to the industry such as fluctuations in commodity prices, reduced volumes of natural gas or other energy commodities, environmental hazards, changes in the macroeconomic or the regulatory environment or extreme weather. MLPs may trade less frequently than larger companies due to their smaller capitalizations which may result in erratic price movement or difficulty in buying or selling. Additional management fees and other expenses are associated with investing in MLPs. Additionally, investing in MLPs involves material income tax risks and certain other risks. Actual results, performance or events may be affected by, without limitation, (1) general economic conditions, (2) performance of financial markets, (3) interest rate levels, (4) changes in laws and regulations and (5) changes in the policies of governments and/or regulatory authorities. Investing in MLPs may generate unrelated business taxable income (UBTI) for tax-exempt investors both during the holding period and at time of sale. This material is provided for general and educational purposes only, and is not intended to provide legal, tax or investment advice or to avoid legal penalties that may be imposed under U.S. federal tax laws. Investors should contact their own legal or tax advisors to learn more about the rules that may affect individual situations.

Index Definitions

The Alerian MLP Index is a composite of the 50 most prominent energy master limited partnerships ("MLPs") calculated by Standard & Poor's using a float-adjusted market capitalization methodology.

The Dow Jones Brookfield Global Infrastructure Composite Index is calculated and maintained by S&P Dow Jones Indices and comprises infrastructure companies with at least 70% of its annual cash flows derived from owning and operating infrastructure assets, including Master Limited Partnerships ("MLPs").

The Dow Jones Brookfield Global Infrastructure Index is calculated and maintained by S&P Dow Jones Indices and comprises infrastructure companies with at least 70% of its annual cash flows derived from owning and operating infrastructure assets.

The FTSE Global Core Infrastructure 50/50 Index gives participants an industry-defined interpretation of infrastructure and adjusts the exposure to certain infrastructure sub-sectors. The constituent weights are adjusted as part of the semi-annual review according to three broad industry sectors - 50% Utilities, 30% Transportation including capping of 7.5% for railroads/railways and a 20% mix of other sectors including pipelines, satellites and telecommunication towers. Company weights within each group are adjusted in proportion to their investable market capitalization.

The MSCI ACWI (All Country World Index) is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.

The MSCI World Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets.

The S&P Global Infrastructure Index provides liquid and tradable exposure to 75 companies from around the world that represent the listed infrastructure universe with weights across three infrastructure clusters: Utilities, Transportation, and Energy.

The S&P 500 Index is an equity index including 500 widely held U.S. companies.

The S&P 500 Utilities Index comprises companies included in the S&P 500 Index that are classified as member of the utilities sector as per the Global Industry Classification Standard (GICP®).

The above-mentioned indices do not reflect deductions for fees, expenses or taxes. The indexes are unmanaged and cannot be purchased directly by investors. Index performance is shown for illustrative purposes only and does not predict or depict the performance of any investment.

Definitions of Terms

Annualized Return is periodic returns rescaled to a period of one year.

Sharpe Ratio is a measure of the excess return (or risk premium) per unit of risk (measured by standard deviation) in an investment asset or a trading strategy.

Standard Deviation measures the degree to which an investment's return varies from its mean return.

Correlation measures the extent of linear association of one fund or index to another

Lazard Asset Management

Mandate: **Lazard Global Listed Infrastructure Strategy** **Hired: 2014**

Firm Information

Lazard Asset Management is a subsidiary of Lazard Freres & Co., a limited liability company.

As of 6/30/2018, the firm's total assets under management were approximately $214 billion.

As of 6/30/2018, the AUM for the Global Listed Infrastructure Strategy was $12.5 billion.

Key Executives:
Matthew Landy, Portfolio Manager
Tony Dote, Managing Director

Investment Approach

The Lazard Global Listed Infrastructure strategy seeks long-term, defensive, low-volatility returns that exceed inflation by investing in a range of companies around the world that are considered to be "Preferred Infrastructure" (monopoly-like, explicit/implicit inflation pass-through, quality regulatory/political environment).

Lazard seeks to build a portfolio of 25 – 50 equity securities that aims to provide their investors with returns of inflation +5% per annum over rolling five-year periods.

Benchmark: FTSE Developed Core Infrastructure 50/50 Index

Total ARMB Mandate

Assets Under Management:
6/30/2018: $150,629,438

Concerns: None

6/30/2018 Performance

	Last Quarter	1-Year	3-Years Annualized
Manager Net	2.05%	5.91%	13.65%
Benchmark	3.86%	3.38%	7.96%
S&P Global Infra Benchmark	2.60%	1.82%	5.98%

LAZARD

ASSET MANAGEMENT

Alaska Retirement Management Board

Lazard Global Listed Infrastructure (Unhedged)

September 21, 2018

Ed Keating
Client Portfolio Manager

Tony Dote
Managing Director

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Information and opinions presented have been obtained or derived from sources believed by Lazard to be reliable. Lazard makes no representation as to their accuracy or completeness. All opinions expressed herein are as of the date of this presentation and are subject to change.

Please refer to the Important Information section for additional information about risks.

TAB

Lazard Asset Management



NORTH AMERICA
Boston
Montreal
New York
San Francisco
Toronto

EUROPE
Brussels
Dublin
Frankfurt
Geneva
Hamburg
London
Madrid
Milan
Zurich

Hong Kong
Seoul
Singapore
Sydney
Tokyo
ASIA PACIFIC

Dubai
MIDDLE EAST

1848	800+	340+	15	$214.0
Lazard Founded	Employees[1]	Investment Personnel	Countries	Billion AUM[1]

1 As of 30 June 2018. Includes those of Lazard Asset Management LLC (New York) and its affiliates, but do not include those of Lazard Frères Gestion (Paris) or other asset management businesses of Lazard Ltd.

Lazard Global Listed Infrastructure

Strategy Objective	Seek long-term, defensive, low-volatility returns that exceed inflation by investing in a range of global companies that are considered to be "preferred infrastructure".
Performance Objective	▪ Inflation +5% p.a. over rolling 5-year periods *(Long-term risk/reward profile between equities and fixed income)* ▪ Shorter term performance reference: FTSE Developed Core Infrastructure 50/50 Index[2]
Investment Universe	"Preferred Infrastructure"
Investment Style	Value, benchmark unaware
Investment Basis	Long-only
Number of Stocks	25-50
Currency Management	Unhedged
Inception	August 2007
AUM[1]	USD$12.3 billion

Lazard was one of the first managers to launch a diversified global listed infrastructure strategy

1 As of 31 March 2018.

2 *FTSE Developed Core Infrastructure 50/50 Index Disclaimer - refer to the last page of this presentation*

Global Listed Infrastructure Resources

Global Listed Infrastructure Team



John Mulquiney
PM/Analyst
Sydney
18 stocks
Joined 2005



Warryn Robertson
PM/Analyst
Sydney
13 stocks
Joined 2001



Bertrand Cliquet
PM/Analyst
London
19 stocks
Joined 2004



Matthew Landy
PM/Analyst
New York
22 stocks
Joined 2005



Anthony Rohrlach
Analyst
Sydney
23 stocks
Joined 2007



Edward Keating
Client Portfolio Manager
New York
Joined 2001

Currency Hedging

Team based In New York:
- Yvette Klevan
  PM/Analyst, Fixed Income
- Jared Daniels
  PM/Analyst/Trader, Fixed Income

Global Research Resources

- New York
- Frankfurt
- London
- Seoul
- Dubai
- Tokyo
- Sydney

Marketing & Client Service

Professionals based in:
London, New York, Chicago, San Francisco, Singapore, Sydney, Toronto, Montreal, Tokyo, Hong Kong and Frankfurt

Melanie McQuire
Product Manager, Sydney

Global Trading

Sydney
New York
London
Seoul

Legal/Compliance

- Pre-trade compliance
- International compliance skills
- Established compliance program

Requirements - Global portfolio management skills; Global Equity management skills; Infrastructure stock analysis skills; Disciplined investment process

Investment Team Experience – Over 80 combined years of investment experience; Over 60 years of infrastructure-specific analysis and investing

Stocks covered as of 31 March 2018.
Team membership is current as of the date of this document.

Lazard Equity Investment Resources
Regional Expertise

Multi-regional (Global / EAFE)

Caroline Abramo[1]	Yury Dubrovsky[1]	Jai Jacob[1]	Mark Little	Mark Panter[1]	Stephen Scott
Eduardo Abreu	Giles Edwards	Robin Jones	Ruihan Liu	Hubert Parzecki[1]	Victoire Spahn
David Alcaly	Robert Failla	Matthew Kalish	Craig Lottner	Michael Per[1]	Ronald Temple[2]
Lee Ann Alexandrakis	Sara Fischer	Philip Karageorgevitch	Edward Lund	Jose Perez Sanchez[1]	Kim Tilley[1]
Nigel Barrett	Martin Flood[2]	Thomas Kasa	Ciprian Marin	Christopher Pope	Christopher Torino
Michael Bennett	Louis Florentin-Lee	Peter Kashanek	Stephen Marra[1]	Michael Powers	Erik Van Der Sande
Michael Bernadiner[1]	Steven Fockens	Edward Keating	Kevin Matthews	John Reinsberg	Yann Vasseur
Frank Bianco[1]	Michael Fry	Tjeert Keijzer[1]	Thomas McManus[1]	Sean Reynolds[1]	Kyle Waldhauer
David Bliss	Gautam Garg	Erianna Khusainova[1]	Juan Mier[1]	Giuseppe Ricotta[1]	Jason Williams
Nicholas Bratt	Sarah George[1]	John King	Neil Millar	Warryn Robertson	Susanne Willumsen
Terence Brennan[1]	David Gibson	Jessica Kittay	Paul Moghtader	Anthony Rohrlach	Barnaby Wilson
Adrian Cheung	Eduardo Gonzalez[1]	Patrick Korn	Jonathan Morris	Mark Rooney	Douglas Workman[1]
William Cheung[1]	Jenny Hardy	Werner Kraemer[1]	John Mulquiney	Edward Rosenfeld	Steve Wreford
Bertrand Cliquet	Christopher Hartung	Andrew Lacey[2]	Sritharan Nadesan[1]	Adam Rubinstein	Juncheng Zhang[1]
Michael Cook	Rupert Hope[1]	Alex Lai	Dennis Neveling	Patrick Ryan	Ming Zhong
Kun Deng	Peter Hunsberger	Matthew Landy	Andrew Norris	Anureet Saxena	
Claire Donohue	Taras Ivanenko	Jay Leupp	Rakshit Pandey	Craig Scholl	

US

Dmitri Batsev	Jerry Liu
Christopher Blake	Bret Miller
Daniel Breslin	Keith Mori
Rhett Brown	Prateek Pant[1]
Zoe Chen[1]	David Pizzimenti
Michael DeBernardis	Kevin Pleines
Martin Flood[2]	Henry (Ross) Seiden
Eugene Krishnan	Nicholas Sordoni
Jason Huang	Ronald Temple[2]
Andrew Lacey[2]	Richard Tutino
Jay Levy	Christopher Whitney

Europe

Léopold Arminjon	Alan Custis
Nitin Arora	Marina Erskine-Leacock
Aaron Barnfather	Beatrix Ewert
Patricia Biggers	Alistair Godrich
Jimmie Bork	William Parry
Jelena Boskovic	Daniel Rozier
Aron Ceccarelli	Guillaume Samama
Antoine Champenier	Ulrich Schweiger
Elias Chrysostomou	Paul Selvey-Clinton
Alan Clifford	Laura Somers-Edgar
Nathan Cockrell	Lloyd Whitworth

Asia-Pacific

Thurl Abrahams	Jake (Jaeyub) Myung
Scott Anderson	Takayuki Natsume
Matthew Bills	Yeaseul (Jacqueline) Oh
Aaron Binsted	Rob Osborn
Neal Doying	Warryn Robertson
Timothy Griffen	Jason Tin
Philipp Hofflin	Philippe Tison
Takako Hoshino	Shuichi Yoshimura
Ario Kishida	Tim Zhao

Emerging Markets

Mohamed Abdel-Hadi	Thomas Boyle	Donald Floyd	Rugsit Kanan	Walid Mourad	Ashish Shrivastava
Sleiman (Sam) Aboul Hosn	Rohit Chopra	Christian Frei	Linda Liang	Talal Noueihed	Warren Stein
Fadi Al Said	Elizabeth Chung	Peter Gillespie	Mark Lien	Kevin O'Hare	Kevin Tsao
David "Briggs" Barton	Mitchell Clayton	Mostafa Hassan	Michelle "Xiaomeng" Liu	Paul Rogers	HongKun (May) Wang
Jagdish Bathija	Myla Cruz	Dylan Heck	John Mariano	Stephen Russell	Sookyum (Celine) Woo
Christian Bautista	Max Dimitrijevic	Robert Horton III	Erik McKee	Timur Salikhov	Ben Wulfsohn
Georg Benes	James Donald	Alex Ingham	Jacob (Ryan) Mims	Rahwa Senay	
Christopher Boyatt	Lada Emelianova	David Jauregui	Andrei Morosanu	Monika Shrestha	

As of 30 June 2018.

1 Due to the nature of their activities, these individuals appear among both equity and fixed income resources.

2 Due to the nature of their responsibilities, these individuals have been assigned more than one primary regional focus.

Preferred Infrastructure

"Preferred Infrastructure" is a subset of the infrastructure market that we believe has higher revenue certainty, profitability and lower volatility.

Not all infrastructure assets will deliver these investment characteristics. To identify the ones which we call "Preferred Infrastructure" we focus on the following factors:

Infrastructure assets ***can*** have attractive investment characteristics, including:	
Long-life assets Inflation-linked returns	Lower risk of capital loss Low correlations (portfolio diversifier)

What parameters to focus on…	
a) Revenue Certainty	▪ Stable demand ▪ Monopoly-like characteristics ▪ Price regulated and inflation-linked ▪ Long term
b) Profitability	▪ High operating margins ▪ Sustainable leverage ▪ Appropriate cost structure
c) Longevity	▪ Developed economy and legal system

Not All Infrastructure is Created Equal…

We believe a strict adherence to our Preferred Infrastructure investment philosophy is critical to delivering on the attractive characteristics of infrastructure.

Preferred	Non-Preferred
Regulated Utility (e.g., Southern Company)	**Merchant Electricity Generator (e.g., E.On; Exelon)**
✓ Monopoly-like assets	✗ Competitive markets
✓ Regulated return	✗ Commodity price volatility
✓ Explicit/implicit inflation pass through	✗ High fixed cost structure
= Stable, consistent pattern of return	= Volatile, uncertain pattern of return

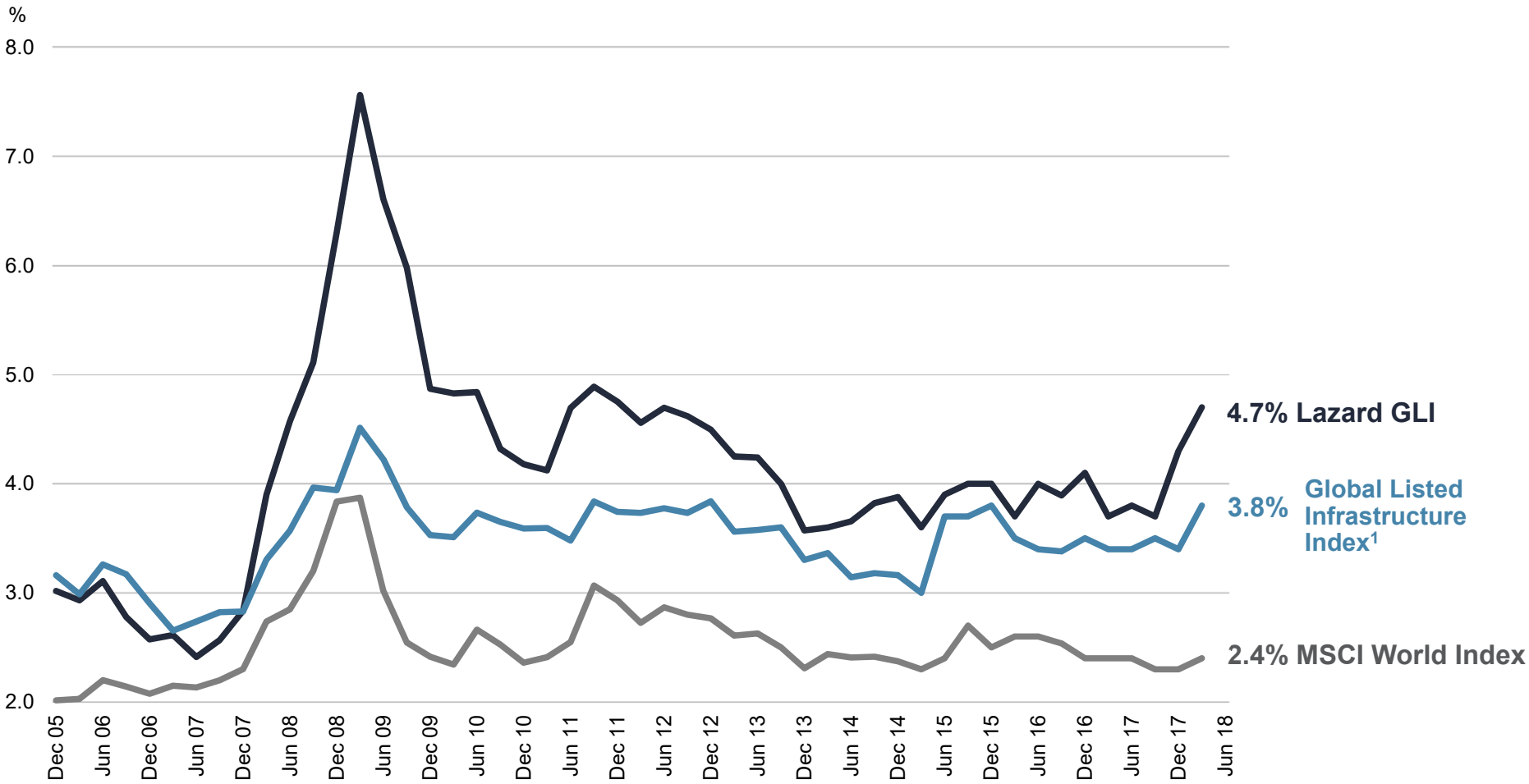
Other examples…

✓ Toll roads	✗ Construction companies, road services
✓ Airports	✗ Airlines, baggage handling
✓ Broadcast towers	✗ Telecommunication service companies
✓ OECD countries	✗ Emerging/Developing countries

The securities identified are not necessarily held by Lazard and should not be considered a recommendation or solicitation to purchase or sell these securities.

Sustainable Yield Premium: Lazard GLI

Stable Earnings Can Lead to Consistent Yield Premium



As of 31 March 2018

Estimates based on historical financial accounts of companies held in the Lazard Global Listed Infrastructure strategy. Statistics are calculated using an index style construction methodology.

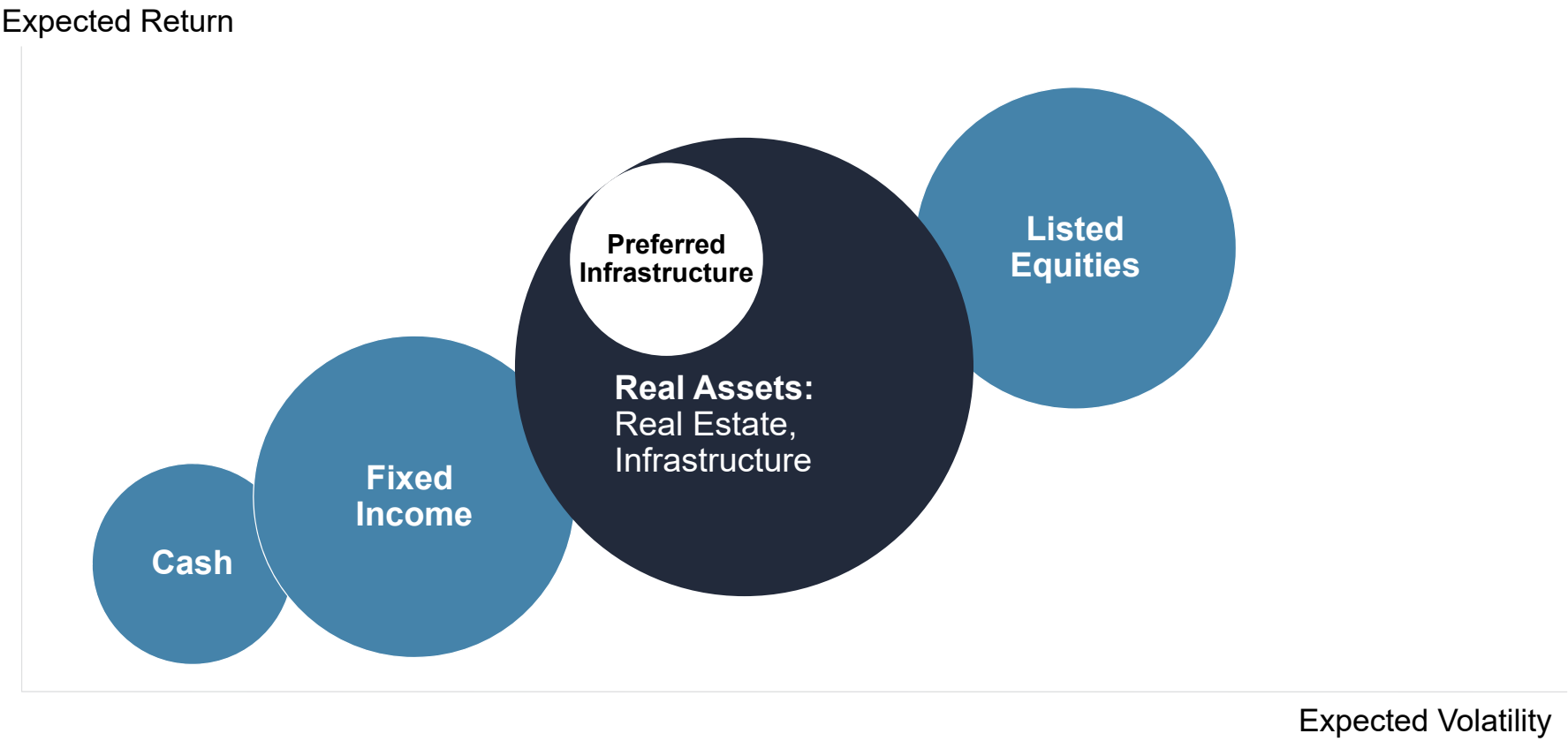
Investment characteristics are based upon a portfolio that represents the proposed investment for a fully discretionary account.

All estimates are based on current information and are subject to change. Past performance is not a reliable indicator of future results.

1 Global Listed Infrastructure Index (AUD Hedge) from inception to March 31, 2015 is the UBS Global 50/50 Infrastructure and Utilities Net Index (AUD Hedged) and the FTSE Developed Core Infrastructure 50/50 100% Hedged to AUD Net Tax Index afterwards.

Source: Lazard, UBS, FTSE, MSCI

Expected Risk and Return

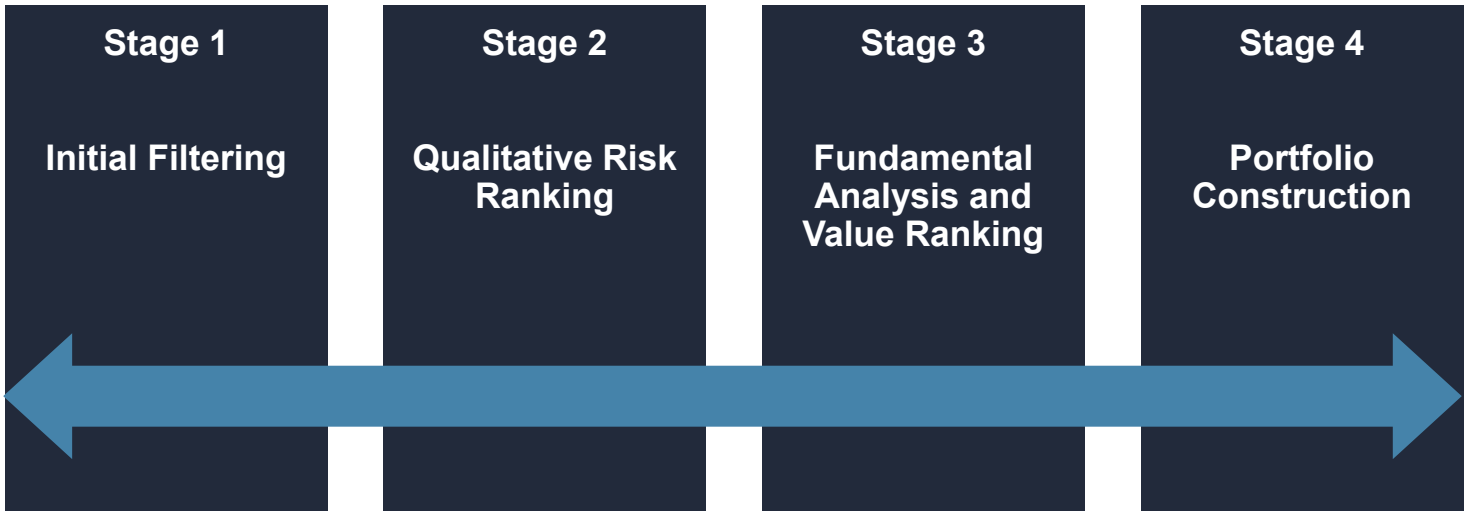


Invest in assets which feature:

- **Long duration**
- **Inflation-linking**
- **Lower risk of capital loss**

For illustrative purposes only.
Expected returns do not represent a promise or guarantee of future results and are subject to change.

Investment Process Overview
Lazard Global Listed Infrastructure

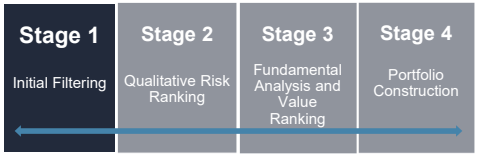


	Stage 1	Stage 2	Stage 3	Stage 4
	▪ Stock identification ▪ Primary filtering	▪ Qualitative risk review	▪ Stock appraisal ▪ Currency impact	▪ Portfolio rules ▪ Trading skills
Number of stocks	~400	150	95	25 - 50

Lazard's investment process is neither sequential nor static, but ongoing.

Note: The number of stocks in each stage may vary with time and the evolution of the infrastructure sector and the investment process.
Lazard's investment process is presented here in sequential steps for illustrative purposes only. In practice, the process is not sequential and will, as needed, weigh certain criteria over others.

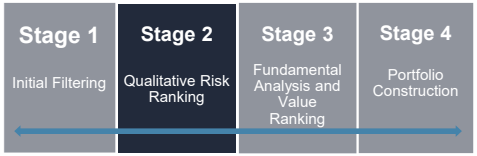
Investment Process Overview
Initial Filtering



- The team begins the formation of its investable universe with approximately 400 stocks which could be broadly classified as infrastructure. These are then screened to eliminate companies that do not meet the following primary requirements:
  - Majority of assets in OECD countries
  - Ownership of infrastructure assets (not just a service provider)
  - Minimum market capitalization of US$250M
- These filters reduce the list to approximately 230 stocks.
- A further filter which requires monopolistic characteristics / pricing power is then applied, resulting in approximately 150 stocks for further consideration.

Lazard's investment process is neither sequential nor static, but ongoing.

Investment Process Overview
Qualitative Risk Ranking

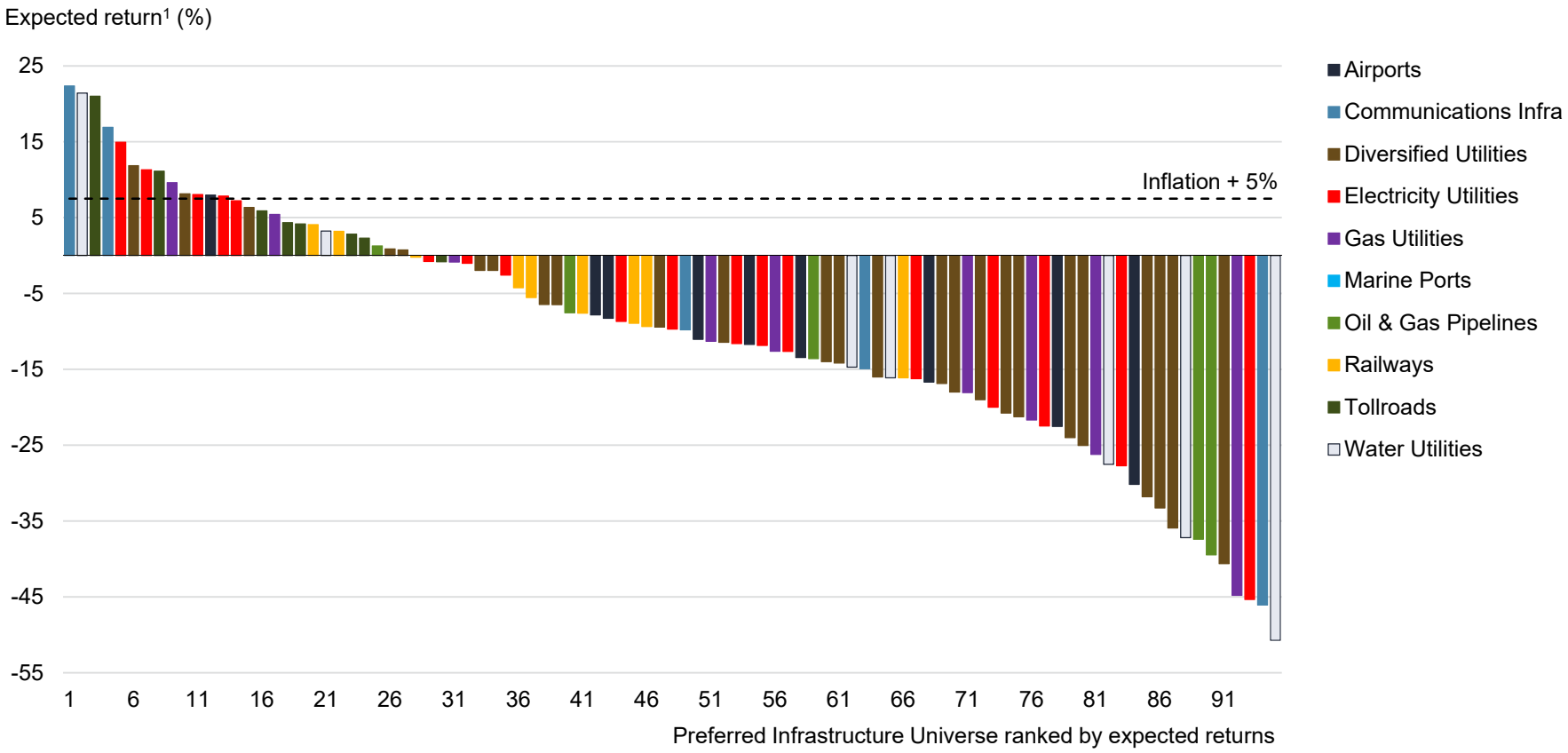


	Parameter	A	B	C
Revenue Certainty	Demand volatility	Stable or modest growth	Stagnant Growth	Volatile or declining
	Competition	Monopoly position with high barriers	Substitution possible or strong concession	Direct competition, weak concession
	Rate volatility	Inelastic demand and no regulation	Regulated or long-term contract	Elastic demand
	Term	Indefinite	30 years +	< 30 years
Profitability	Operating margin	60% +	20% - 60%	<20%
	Cost volatility	Highly predictable	Good costs confidence	Volatile
	Gearing	<25%	25%-65%	65% +
Longevity	Other risks	Minimal	Limited risks with major exposures insured or hedged	Some concerns

In this phase, each stock is ranked, using the factors identified above, according to how "preferred" it is.

Lazard Preferred Infrastructure Universe
Value Rank by Sector

Stage 1	Stage 2	Stage 3	Stage 4
Initial Filtering	Qualitative Risk Ranking	Fundamental Analysis and Value Ranking	Portfolio Construction



The "Value Rank" illustrates the expected returns of each stock within the Preferred Infrastructure universe.

As of 31 March 2018.

1 Over 3 years, assuming all the stocks trade at our valuation in 3 years time.

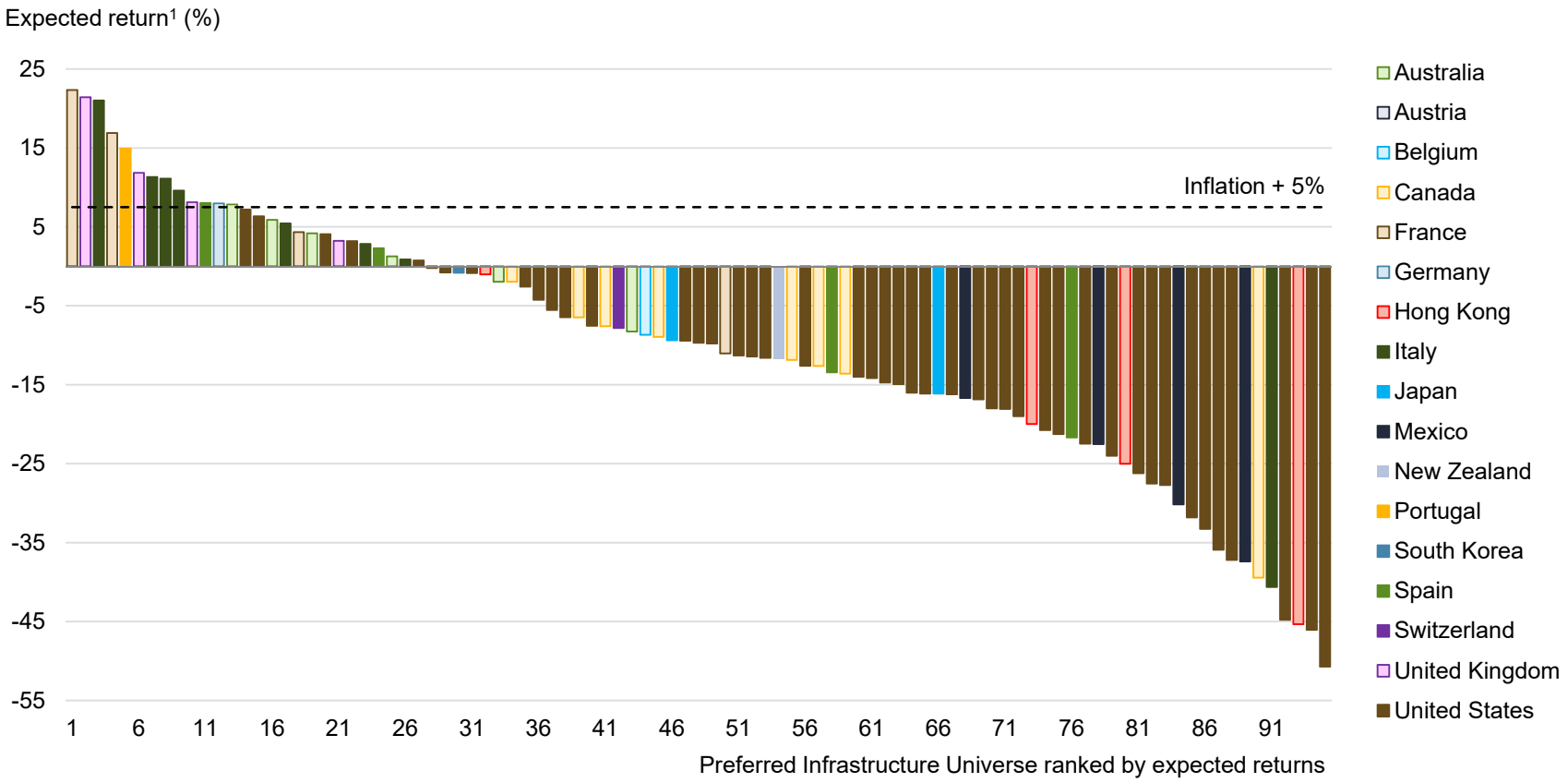
The opinions and estimates contained in this graph are based on current information and are subject to change. It should not be assumed that any investment was, or will be profitable. Expected returns do not represent a promise or guarantee of future results and are subject to change.

Shown for illustrative purposes only.

Each bar represents an individual stock's expected return per annum for the next three years. This is based on a comparison of Lazard's Global Listed Infrastructure team's intrinsic valuation of the stock three years out, the market price of the stock today and the interim forecast dividends.

Lazard Preferred Infrastructure Universe
Value Rank by Country

Stage 1	Stage 2	Stage 3	Stage 4
Initial Filtering	Qualitative Risk Ranking	Fundamental Analysis and Value Ranking	Portfolio Construction



The "Value Rank" illustrates the expected returns of each stock within the Preferred Infrastructure universe.

As of 31 March 2018.

1 Over 3 years, assuming all the stocks trade at our valuation in 3 years time.

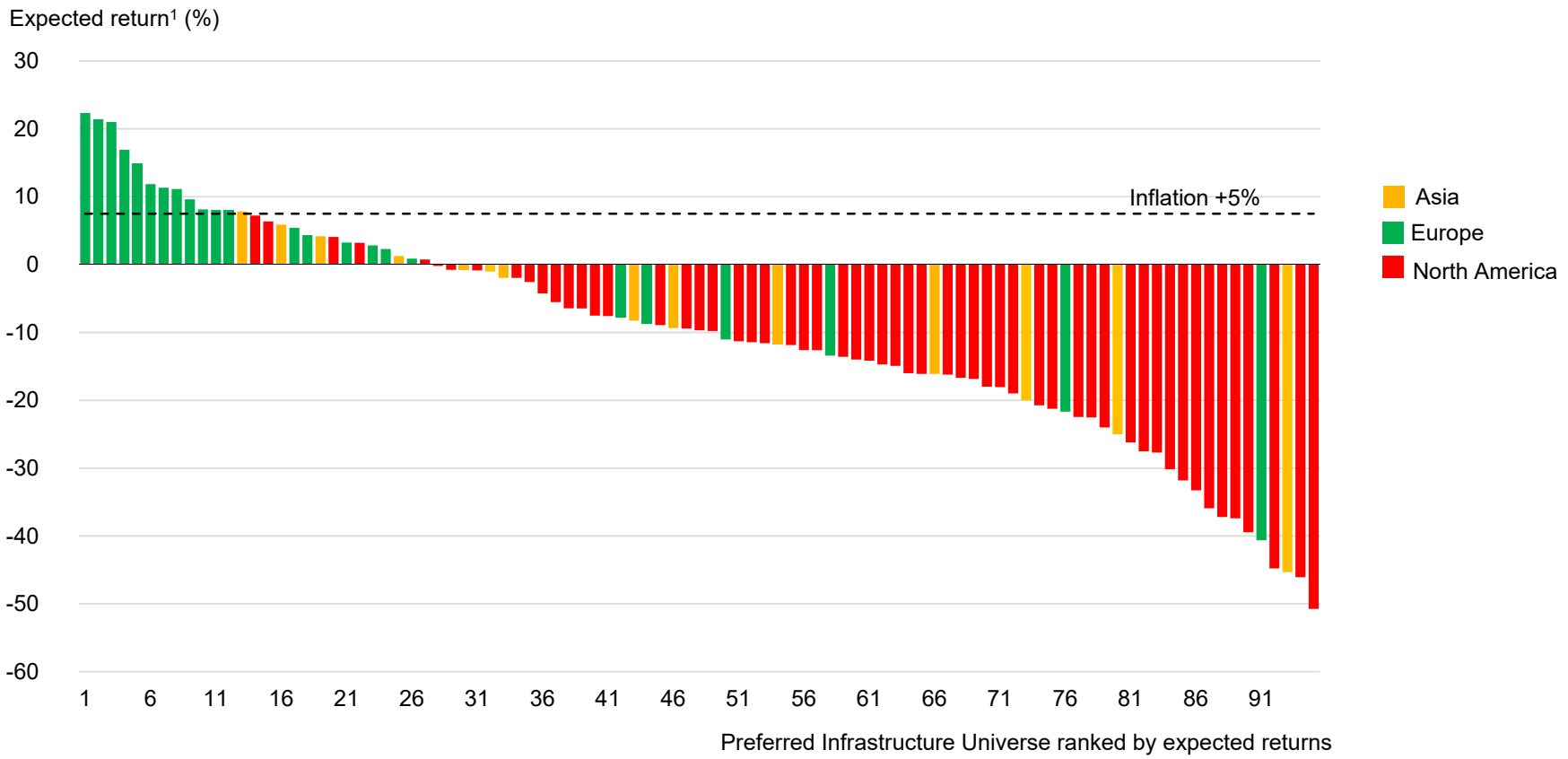
The opinions and estimates contained in this graph are based on current information and are subject to change. It should not be assumed that any investment was, or will be profitable. Expected returns do not represent a promise or guarantee of future results and are subject to change.

Shown for illustrative purposes only.

Each bar represents an individual stock's expected return per annum for the next three years. This is based on a comparison of Lazard's Global Listed Infrastructure team's intrinsic valuation of the stock three years out, the market price of the stock today and the interim forecast dividends.

Lazard Preferred Infrastructure Universe
Value Rank by Region

Stage 1	Stage 2	Stage 3	Stage 4
Initial Filtering	Qualitative Risk Ranking	Fundamental Analysis and Value Ranking	Portfolio Construction



The "Value Rank" illustrates the expected returns of each stock within the Preferred Infrastructure universe.

As of 31 March 2018.

1 Over 3 years, assuming all the stocks trade at our valuation in 3 years' time.

The opinions and estimates contained in this graph are based on current information and are subject to change. It should not be assumed that any investment was, or will be profitable. Expected returns do not represent a promise or guarantee of future results and are subject to change.

Shown for illustrative purposes only.

Each bar represents an individual stock's expected return per annum for the next three years. This is based on a comparison of Lazard's Global Listed Infrastructure team's intrinsic valuation of the stock three years out, the market price of the stock today and the interim forecast dividends.

Risk Management
Explicit and Implicit

In addition to independent risk oversight, there are 3 core components to what we do in practice:

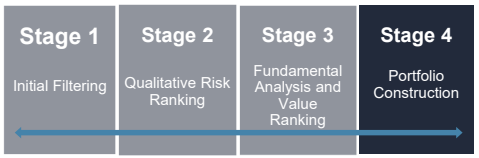
1. **Universe Selection** – assets with higher revenue certainty, profitability and lower volatility

2. **Valuation Process** – "margin of safety"

3. **Common Sense Diversification** – stock, sector and country

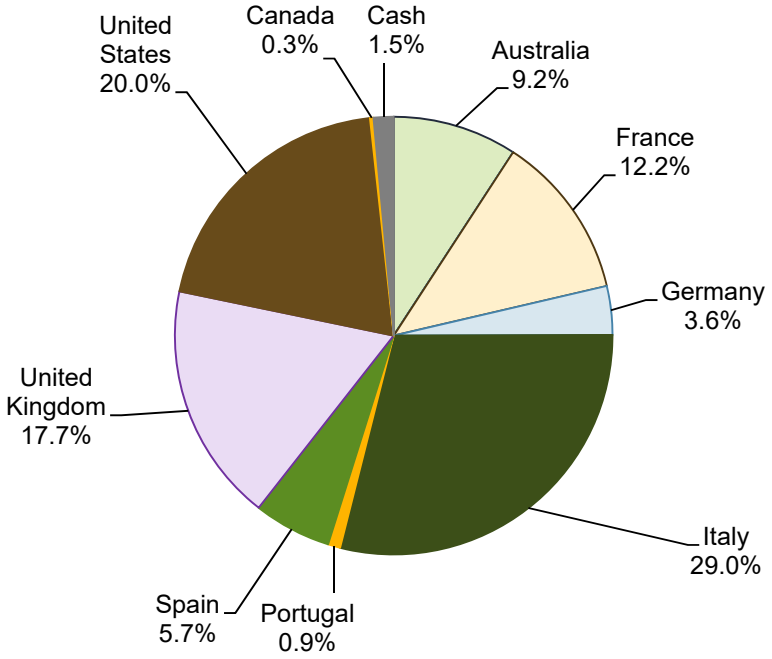
Stock specific risk is managed implicitly through our investment process

Portfolio by Country and Sector
Lazard Global Listed Infrastructure

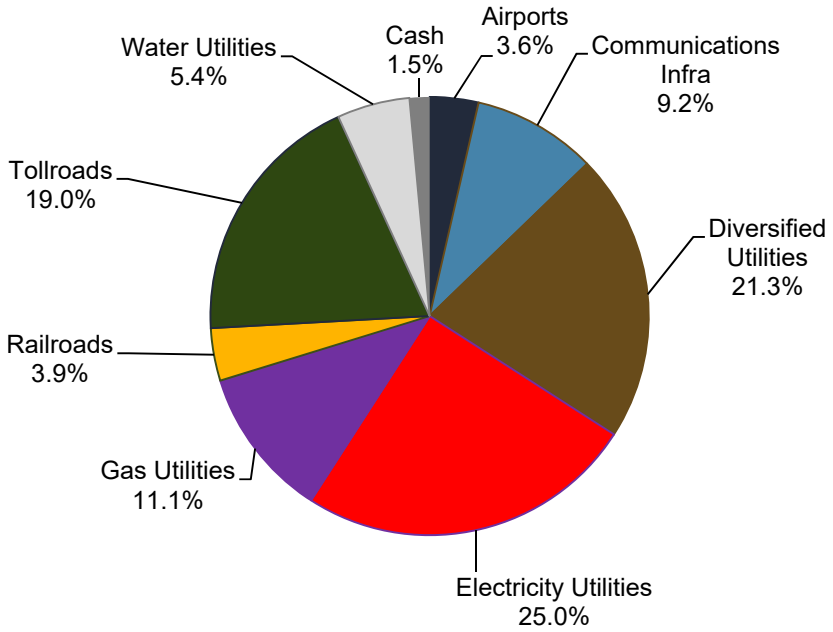


Broken Down by Company Domicile

Portfolio by Country

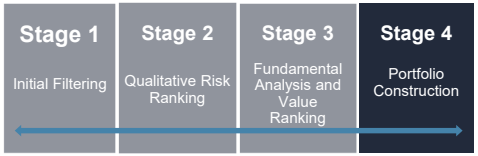


Portfolio by Sector



As of 30 June 2018.
The allocations mentioned are based upon a portfolio that represents the proposed investment for a fully discretionary account. Allocations are subject to change.
This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Top 10 Holdings
Lazard Global Listed Infrastructure (Unhedged)



Company	Country	Sector	% Equity
Terna	Italy	Electricity Utilities	8.3
Snam	Italy	Gas Utilities	8.3
Edison International	United States	Electricity Utilities	8.3
Atlantia	Italy	Tollroads	8.2
PG & E	United States	Diversified Utilities	8.1
National Grid	United Kingdom	Diversified Utilities	7.1
Red Electrica Corporacion	Spain	Electricity Utilities	5.8
SES	France	Communications Infra	5.4
Transurban Group	Australia	Tollroads	5.4
United Utilities Group	United Kingdom	Diversified Utilities	5.4

As of 30 June 2018.
Allocations and securities mentioned are based upon a portfolio which represents the proposed investments for a fully discretionary account. Allocations and security selection are subject to change. The securities mentioned are not necessarily held by Lazard for all client portfolios, and their mention should not be considered a recommendation or solicitation to purchase or sell these securities. It should not be assumed that any investment in these securities was, or will prove to be, profitable, or that the investment decisions we make in the future will be profitable or equal to the investment performance of securities referenced herein. There is no assurance that any securities referenced herein are currently held in the portfolio or that securities sold have not been repurchased. The securities mentioned may not represent the entire portfolio.
This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Performance Summary
ARMB - Lazard Global Listed Infrastructure (Unhedged)

Performance as of 30 June 2018 (%)

					Annualized
	2018Q2	YTD	1 Year	3 Year	Since Inception 11 March 2014
Total Portfolio (Gross of Fees)	**2.22**	**-2.02**	**6.58**	**14.38**	**10.46**
*Global Listed Infrastructure Index	3.86	-0.96	3.38	7.95	6.62
Excess Returns (bps)	**-164**	**-106**	**+320**	**+643**	**+384**

Portfolio Composition as of 30 June 2018 ($)

	Market Value	% of Portfolio
Equity	$148,431,860	98.54%
Cash and Equivalents	$2,197,578	1.46%
Total Portfolio	**$150,629,438**	**100%**

Reporting Currency: US Dollar

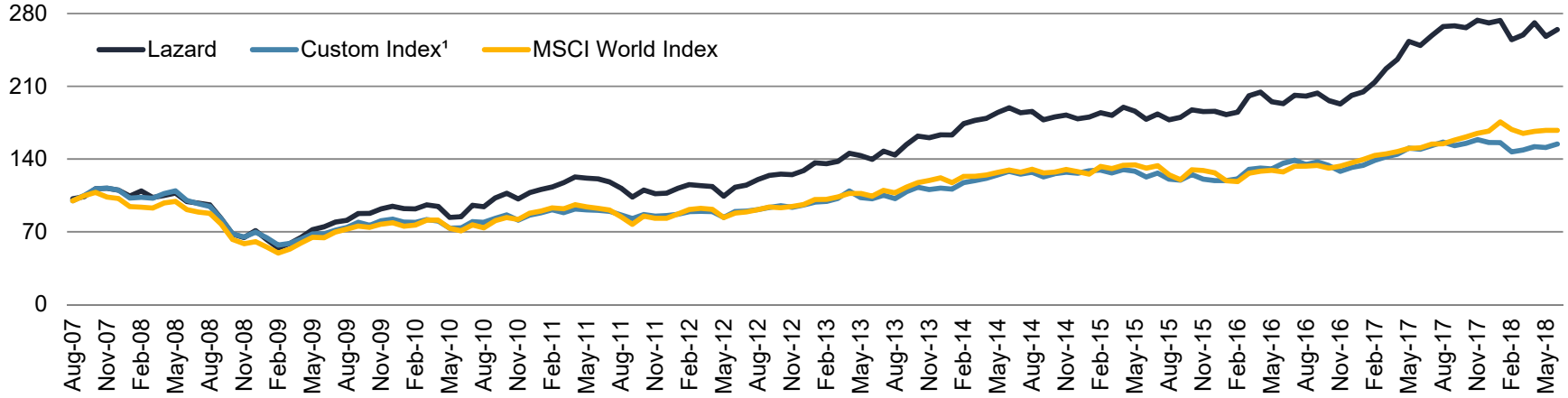
*The Global Listed Infrastructure Index consist of the UBS Global Infrastructure & Utilities 50-50 NR Index (USD) from inception to 3/31/15 and then becomes the FTSE Developed Core Infrastructure 50/50 NTR Custm (USD) from 4/1/2015 to present.

Performance Summary
Lazard Global Listed Infrastructure (Unhedged)

Returns for Periods Ending 30 June 2018 (%)

	Lazard Global Listed Infrastructure (Unhedged)	Global Listed Infrastructure Index[1]	MSCI World Index NDR	Citigroup World Government Bond Index All Maturities
QTD	**1.9**	3.9	1.7	-3.4
YTD	**-2.4**	-1.0	0.4	-0.9
1 Year	**6.1**	3.4	11.1	1.9
3 Years p.a.	**14.0**	8.0	8.5	2.8
5 Years p.a.	**13.6**	8.7	9.9	1.1
10 Years p.a.	**10.3**	4.4	6.3	2.1
Since Inception returns p.a. (USD)[2]	**9.3**	4.1	4.8	3.1

Growth of $100: Since Inception



1. The Global Listed Infrastructure Index from inception to March 31, 2015 is the UBS Global 50/50 Infrastructure and Utilities Index and the FTSE Developed Core Infrastructure 50/50 Net Tax Index afterwards.
2. Since inception is from 01 August 2007 and represents the Lazard Global Listed Infrastructure (Unhedge) Composite.

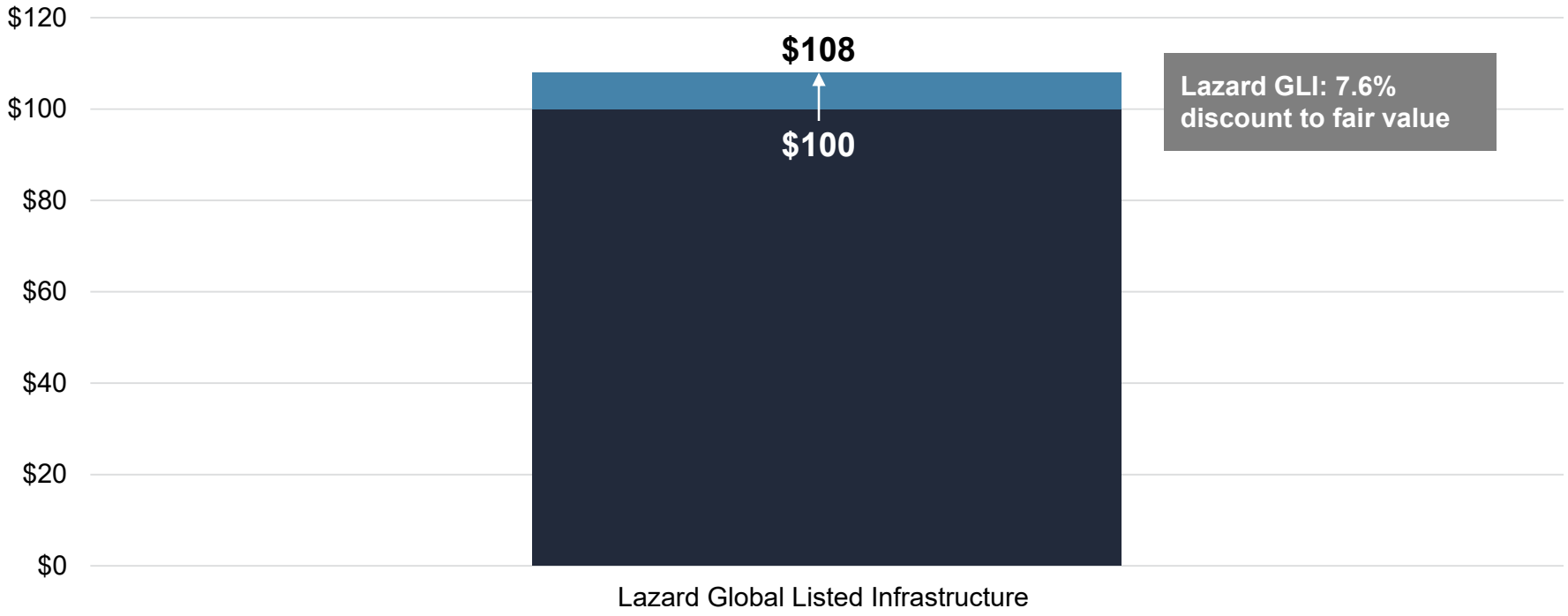
All data in USD

Performance is presented gross of fees. Please refer to "GIPS® Composite Information" for additional information, including net-of-fee results. The performance quoted represents past performance. Past performance is not a reliable indicator of future results.

Return data for MSCI World Index NDR and Citigroup World Government Bond Index All Maturities are shown in Local Currency

Source: Lazard, UBS, MSCI, Citigroup

Fair Value Assessment
Lazard Global Listed Infrastructure



The fair value of a $100 investment into Lazard Global Listed Infrastructure is worth approximately $108. Which means, on 31 March 2018, our strategy was trading at approximately 7.6% discount to fair value.

Fair value of stocks held as of 31 March 2018 in USD.
The information presented is theoretical and is shown for information purposes only. It is based on Lazard's assumptions underlying the calculation of fair value as of 31 March 2018 and is subject to change should our assumptions change. The information does not represent a promise or guarantee that the stocks will achieve fair value.
Source: Lazard Asset Management Pacific.
This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Regional Contribution
Lazard Global Listed Infrastructure (Unhedged)

2018 Q2

Contribution	Average Weight (%)	Total Performance (%)	Contribution (%)
United Kingdom	18.2	5.1	0.91
North America	18.1	3.1	0.55
Continental Europe	52.0	0.5	0.38
Asia ex-Japan	8.6	1.5	0.12

YTD

Contribution	Average Weight (%)	Total Performance (%)	Contribution (%)
North America	17.5	2.0	0.55
United Kingdom	16.4	-4.8	-0.36
Asia ex-Japan	7.8	-6.3	-0.43
Continental Europe	54.2	-3.7	-2.08

As of 30 June 2018.

Reporting Currency: USD

Contribution is based upon a representative portfolio. Contribution analysis is provided for illustrative purposes only, as values are calculated based on returns gross of fees. Performance would be lower if fees and expenses were included. Past performance is not a reliable indicator of future results.

The securities identified are not necessarily held by Lazard Asset Management and should not be considered a recommendation or solicitation to purchase or sell these securities. It should not be assumed that any of the referenced securities were or will prove to be profitable, or that the investment decisions we make in the future will be profitable or equal to the investment performance of securities referenced herein. There is no assurance that any securities referenced herein are currently held in the account's portfolio or that securities sold have not been repurchased. The securities discussed may not represent the account's entire portfolio.

This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Source: Lazard

Country Contribution
Lazard Global Listed Infrastructure (Unhedged)

2018 Q2

Contribution	Average Weight (%)	Total Performance (%)	Contribution (%)
France	12.0	16.4	1.83
United Kingdom	18.2	5.1	0.91
United States	18.1	3.1	0.54
Australia	8.6	1.5	0.12
Spain	6.6	1.1	0.03
Canada	0.0	2.8	0.01
Germany	3.5	-0.7	-0.03
Portugal	1.0	-5.1	-0.05
Italy	28.9	-5.3	-1.41

YTD

Contribution	Average Weight (%)	Total Performance (%)	Contribution (%)
United States	17.4	2.0	0.54
France	12.7	4.5	0.44
Canada	0.0	2.8	0.01
Portugal	1.0	-1.7	-0.02
Spain	7.9	-0.8	-0.13
Germany	3.6	-11.3	-0.35
United Kingdom	16.4	-4.8	-0.36
Australia	7.8	-6.3	-0.43
Italy	29.0	-7.2	-2.02

As of 30 June 2018.

Reporting Currency: USD

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This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Source: Lazard

Sector Contribution
Lazard Global Listed Infrastructure (Unhedged)

2018 Q2

Contribution	Average Weight (%)	Total Performance (%)	Contribution (%)
Communications Infra	8.4	24.3	1.84
Railroads	4.8	12.5	0.62
Water Utilities	4.9	11.7	0.54
Diversified Utilities	20.6	0.8	0.16
Pipelines	0.1	22.2	0.03
Airports	3.5	-0.7	-0.03
Tollroads	20.7	-0.9	-0.16
Electricity Utilities	22.9	-2.1	-0.43
Gas Utilities	11.0	-6.1	-0.63

YTD

Contribution	Average Weight (%)	Total Performance (%)	Contribution (%)
Communications Infra	8.4	6.8	0.60
Railroads	5.8	6.4	0.45
Pipelines	0.0	22.2	0.03
Water Utilities	4.4	-2.5	0.00
Airports	3.6	-11.3	-0.35
Electricity Utilities	20.7	-2.4	-0.39
Diversified Utilities	19.0	-4.5	-0.59
Tollroads	22.3	-4.1	-0.83
Gas Utilities	11.6	-10.3	-1.24

As of 30 June 2018.

Reporting Currency: USD

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This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Source: Lazard

Stock Contribution – Top Contributors and Detractors

Lazard Global Listed Infrastructure (Unhedged)

2018 Q2

Contributors	Average Weight (%)	Total Performance (%)	Contribution (%)
SES	4.7	43.5	1.64
Pennon Group	3.2	16.2	0.49
Norfolk Southern	2.7	11.2	0.33
CSX	2.1	14.8	0.29
Eutelsat Communications	3.8	4.8	0.20
Detractors	**Average Weight (%)**	**Total Performance (%)**	**Contribution (%)**
Snam.	8.0	-6.5	-0.50
Terna	8.0	-5.1	-0.40
Atlantia	7.9	-2.7	-0.19
Spark Infrastructure Group	2.1	-8.1	-0.18
PG&E	6.6	-3.1	-0.16

YTD

Contributors	Average Weight (%)	Total Performance (%)	Contribution (%)
SES	4.5	24.1	1.01
Edison International	5.4	2.0	0.32
CSX	1.7	10.9	0.28
Norfolk Southern	3.6	4.6	0.21
Abertis Infraestructuras	2.8	-1.2	0.11
Detractors	**Average Weight (%)**	**Total Performance (%)**	**Contribution (%)**
Snam	7.8	-11.0	-0.86
Eutelsat Communications	3.9	-10.5	-0.41
Terna	7.9	-4.8	-0.38
Fraport	3.6	-11.3	-0.35
United Utilities Group	5.2	-7.1	-0.35

As of 30 June 2018.

Reporting Currency: USD

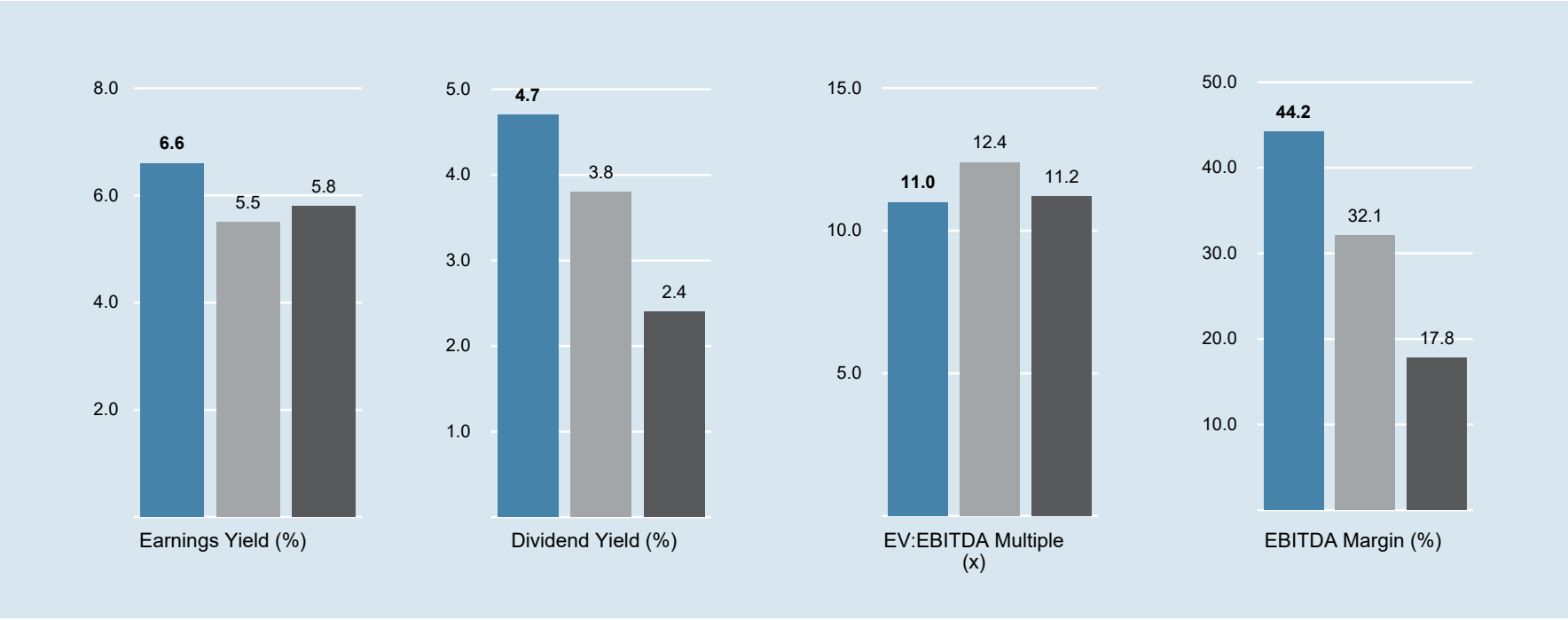
Contribution is based upon a representative portfolio. Contribution analysis is provided for illustrative purposes only, as values are calculated based on returns gross of fees. Performance would be lower if fees and expenses were included. Past performance is not a reliable indicator of future results.

The securities identified are not necessarily held by Lazard Asset Management and should not be considered a recommendation or solicitation to purchase or sell these securities. It should not be assumed that any of the referenced securities were or will prove to be profitable, or that the investment decisions we make in the future will be profitable or equal to the investment performance of securities referenced herein. There is no assurance that any securities referenced herein are currently held in the account's portfolio or that securities sold have not been repurchased. The securities discussed may not represent the account's entire portfolio.

This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Source: Lazard

Financial Statistics
Lazard Global Listed Infrastructure



As of 31 March 2018.
Lazard estimates based on historical financial accounts of companies held in the Lazard Global Listed Infrastructure strategy. All estimates are based on current information and are subject to change.
This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information."
Source: Lazard, Factset, FTSE, MSCI

Buy & Sell Transactions – 2018 Q2
Lazard Global Listed Infrastructure

Portfolio:

26 Stocks as at 30 June 2018 vs. 26 Stocks as at 31 March 2018

- Complete Buys
  - ATCO
  - APA Group
  - AusNet Services
- Complete Sells
  - Abertis Infraestructuras
  - APA Group
  - Enagas

As of 30 June 2018.
Securities mentioned are based upon a portfolio which represents the proposed investments for a fully discretionary account and are subject to change.
The securities identified are not necessarily held by Lazard Asset Management and should not be considered a recommendation or solicitation to purchase or sell these securities. It should not be assumed that any of the referenced securities were or will prove to be profitable, or that the investment decisions we make in the future will be profitable or equal to the investment performance of securities referenced herein. There is no assurance that any securities referenced herein are currently held in the account's portfolio or that securities sold have not been repurchased. The securities discussed may not represent the account's entire portfolio.
This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Outlook

We believe:

- We do not expect the strategy to deliver the same level of strong performance it has achieved in recent times (the strategy exceeded its annual investment return objective in eight out of the past nine years).

- The majority of global listed infrastructure stocks are US-listed utilities, which as a group we believe are both relatively and absolutely more expensive now than at any time in the past three decades - we remain significantly underweight to this sector relative to infrastructure indices and peers.

- The scarce valuation opportunities have lead to a concentrated portfolio where we believe the risk/return trade-off is favorable, but this brings a higher degree of stock-specific risk.

- We believe that the returns available from the strategy will meet our performance objective of CPI+5% over rolling 5-year periods, and look relatively attractive when compared to a passive investment in infrastructure indices, bonds, or in broader equity markets.

The opinions and estimates contained in this presentation are subject to change and should not be considered a recommendation or solicitation to purchase or sell particular securities.

TAB

Fundamental Analysis
Satellite Market Overview

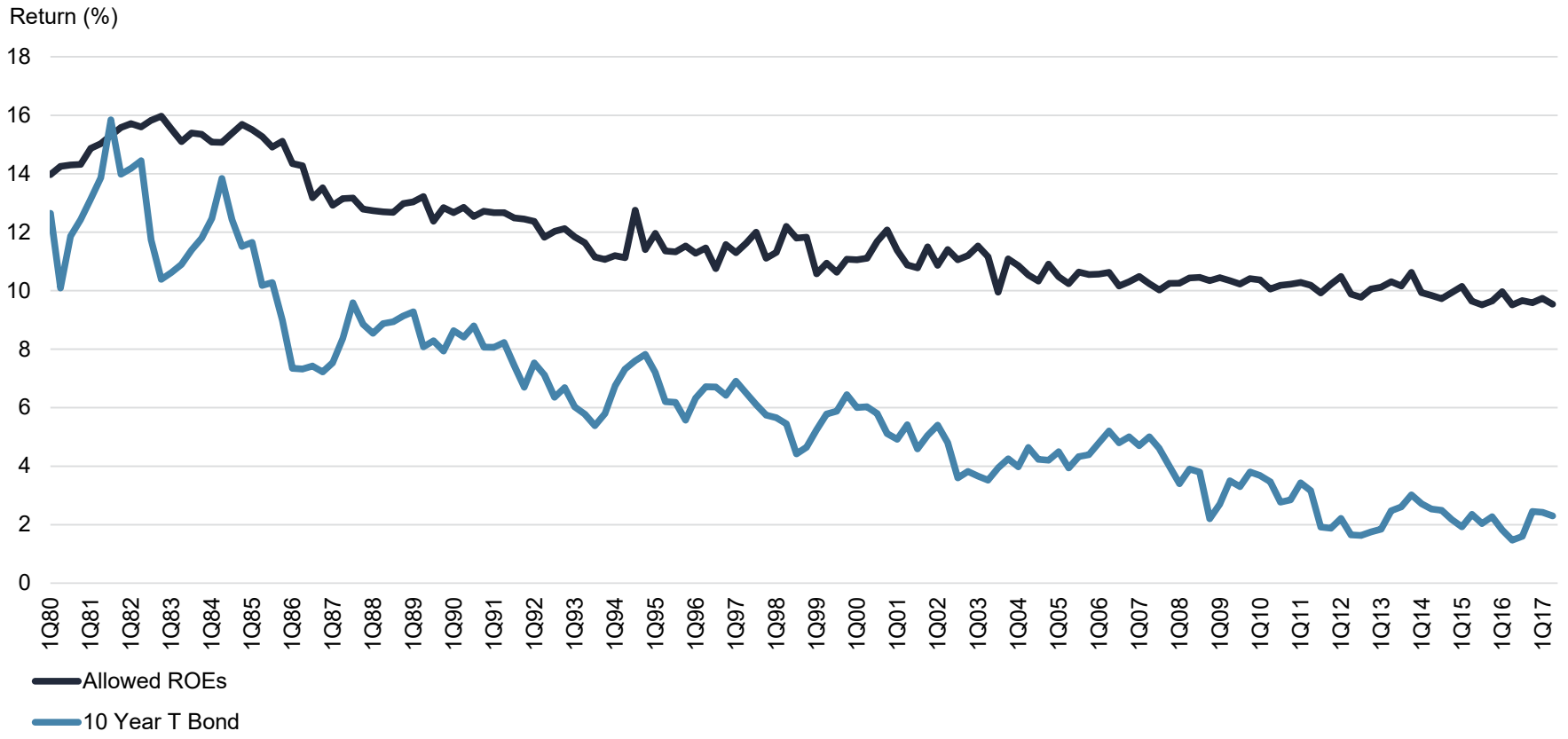


- Geostationary satellites (GEO) hold monopoly rights over orbital slots.
- Approximately 70% of satellite customer revenues come from Pay-TV.
- Satellites have 15-year life expectancy with economics underwritten by multi-year take-or-pay contracts delivering an average 14.5% post-tax asset IRR.
- We value GEO satellites using a 7.5% discount rate and a terminal value which assumes the returns earned fall to 7.5% (no premium to WACC). This equates to an assumed 30% decline in revenues and free cash flow.
- Satellite providers augment their Pay-TV contracted customers with shorter term contracts with telecommunications companies (data), Governments (surveillance) and corporates (remote communications). The development of High Throughput Satellite (HTS) capability is impacting these revenue streams, not Pay-TV.
- Risks to our valuations of satellite stocks SES and Eutelsat include that they launch satellites with contracted revenues which would generate a less than WACC return.
- Based on our valuations, SES and Eutelsat trade on some of the most attractive multiples in their listed histories.

Data as of 31 March 2018
The securities mentioned are not necessarily held by Lazard for all client portfolios, and their mention should not be considered a recommendation or solicitation to purchase or sell these securities. It should not be assumed that any investment in these securities was, or will prove to be, profitable. The securities mentioned may not represent the entire portfolio.
Source: Euroconsult; NSR; Inmarsat, Eutelsat, SES SA, Lazard estimates

US Regulated Utilities

US Utilities Allowed ROE vs. 10-year Treasury Yield

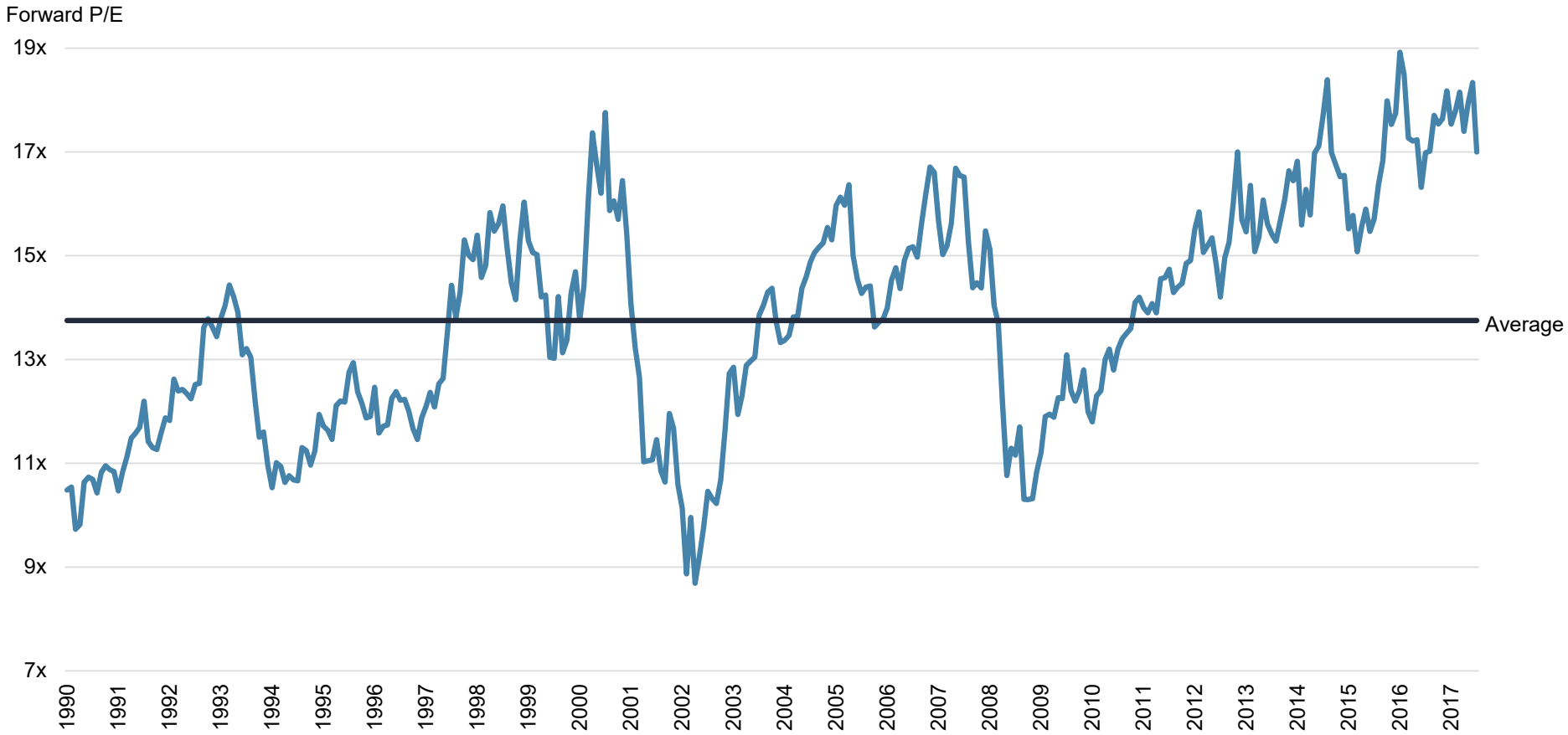


US utilities have enjoyed a widening spread over the cost of capital since the early 1980's, as allowed returns fell more slowly than bond yields.
Our projections assume a lower cost of capital spread, and hence lower valuations than recent history.

As of 31 December 2017
Past performance is not a reliable indicator of future results.
Source: RRA, Lazard

US Regulated Utilities

Forward Price to Earnings Ratio



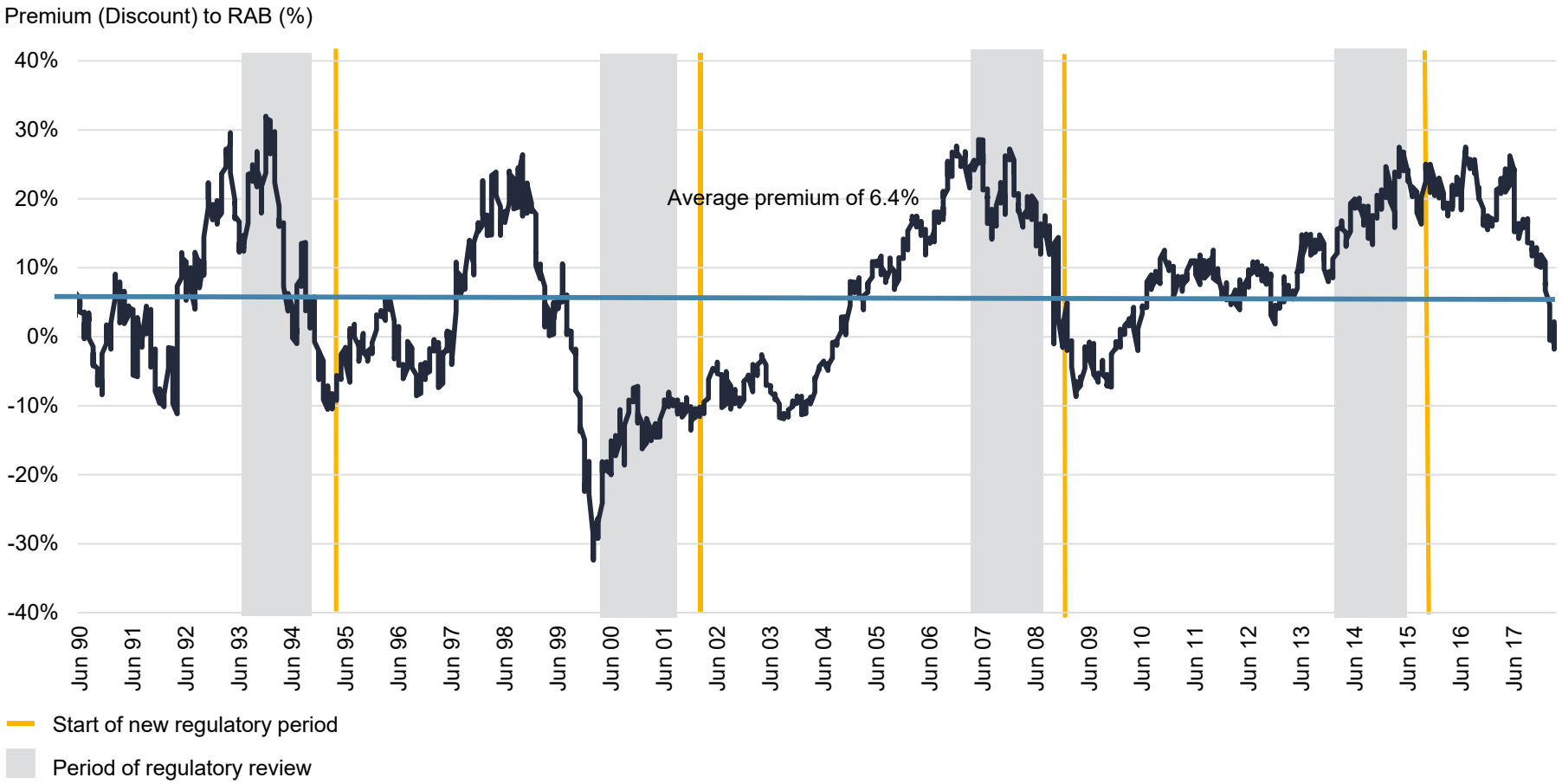
US regulated utilities are trading on an average P/E of 18x and 24% above the long run average

As of 31 December 2017

Forward P/E for a group of regulated utility stocks in the US. The securities mentioned are not necessarily held by Lazard for all client portfolios, and their mention should not be considered a recommendation or solicitation to purchase or sell these securities. It should not be assumed that any investment in these securities was, or will prove to be, profitable.

Source: Factset, Lazard

UK Water Companies



Historically, listed UK water companies have on average traded on a 6.4% premium to RAB (Regulated Asset Base). We have recently initiated small positions in the strategy at a modest premia to RAB.

As of 31 March 2018
Past performance is not a reliable indicator of future results.
Source: Bloomberg, Ofwat and Lazard.

TAB

Holdings by Infrastructure - Sector

Lazard Global Listed Infrastructure (Unhedged)

Holdings	% of Portfolio
Airports	**3.6**
Fraport	
Communications Infrastructure	**3.8**
Eutelsat Communications	
SES	
Diversified Utilities	**21.3**
ATCO	
Ausnet Services	
Hera	
National Grid	
PG & E	
United Utilities Group	
Electricity Utilities	**25.0**
Edison International	
Red Electrica	
Redes Energeticas Nacionais	
Spark Infrastructure	
Terna	
Gas Utilities	**11.1**
Italgas	
SNAM	

Holdings	% of Portfolio
Railroads	**3.9**
CSX	
Norfolk Southern	
Toll Roads	**19.0**
ASTM	
Atlantia	
Atlas Arteria	
Societa Iniziative Auto e Servizi	
Transurban Group	
Vinci	
Water Utilities	**5.4**
Pennon	
Severn Trent	
Cash & Equivalents	**1.5**

As of 30 June 2018.

Allocations and securities mentioned are based upon a portfolio which represents the proposed investments for a fully discretionary account. Allocations and security selection are subject to change.

The securities mentioned are not necessarily held by Lazard for all client portfolios, and their mention should not be considered a recommendation or solicitation to purchase or sell these securities. It should not be assumed that any investment in these securities was, or will prove to be, profitable, or that the investment decisions we make in the future will be profitable or equal to the investment performance of securities referenced herein. There is no assurance that any securities referenced herein are currently held in the portfolio or that securities sold have not been repurchased. The securities mentioned may not represent the entire portfolio.

This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Source: Lazard, MSCI

Holdings by Infrastructure - Region

Lazard Global Listed Infrastructure (Unhedged)

Holdings	% of Portfolio
Australia	**9.2**
Atlas Arteria	
Ausnet Services	
Spark Infrastructure Group	
Transurban Group	
Canada	**0.3**
ATCO	
France	**12.2**
Eutelsat Communications	
SES	
Vinci	
Germany	**3.6**
Fraport	
Italy	**29.0**
ASTM	
Atlantia	
Hera	
Italgas	
SNAM	
Societa Iniziative Auto e Servizi (SIAS)	
Terna	

Holdings	% of Portfolio
Portugal	**0.9**
Redes Energeticas Nacionais	
Spain	**5.7**
Red Electrica	
United Kingdom	**17.7**
National Grid	
Pennon	
Severn Trent	
United Utilities Group	
United States	**20.0**
CSX	
Edison International	
Norfolk Southern	
PG & E	
Cash & Equivalents	**1.5**

As of 30 June 2018.

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This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Source: Lazard, MSCI

Portfolio Construction: Diversification is Key

- A portfolio of 25–50 stocks is developed from the most attractive stocks on the value rank.
- Portfolio weightings to an individual stock: generally 1%–8%.
- Maximum company holding: 10% of the company's market capitalization.
- Full diversification is maintained across geographies and sectors.

Country Parameters (%)

United States	0 – 50	Japan	0 – 30	Mexico	0 – 15
Australia	0 – 30	Spain	0 – 30	New Zealand	0 – 15
Canada	0 – 30	United Kingdom	0 – 30	Portugal	0 – 15
France	0 – 30	Austria	0 – 15	South Korea	0 – 15
Germany	0 – 30	Belgium	0 – 15	Switzerland	0 – 15
Italy	0 – 30			All other OECD[1]	0 – 15

North America	0 – 80
Europe	0 – 80
Asia	0 – 30
Australasia	0 – 30

Sector Parameters (%)

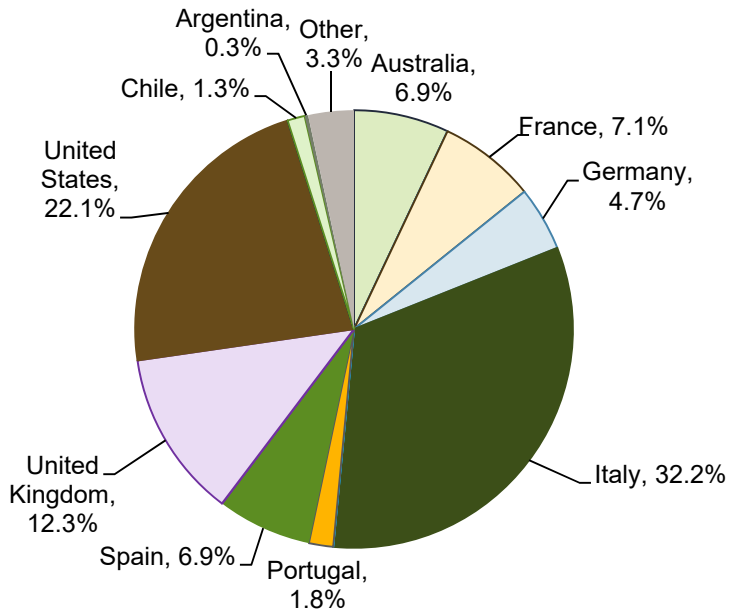
Diversified Utilities	0 – 50	Water Utilities	0 – 40	Communications Infrastructure	0 – 30
Marine Ports	0 – 40	Gas Utilities	0 – 40	Railways	0 – 30
Airports	0 – 40	Electricity Utilities	0 – 40	Oil & Gas Pipelines	0 – 30
Toll roads	0 – 40				

1 The limit to "All other OECD countries" is not an aggregate
Note: These weightings apply upon acquisition of investments – price movements may result in these limits being exceeded.
Lazard's investment process is neither sequential nor static, but ongoing.
Allocations and security selection are subject to change.

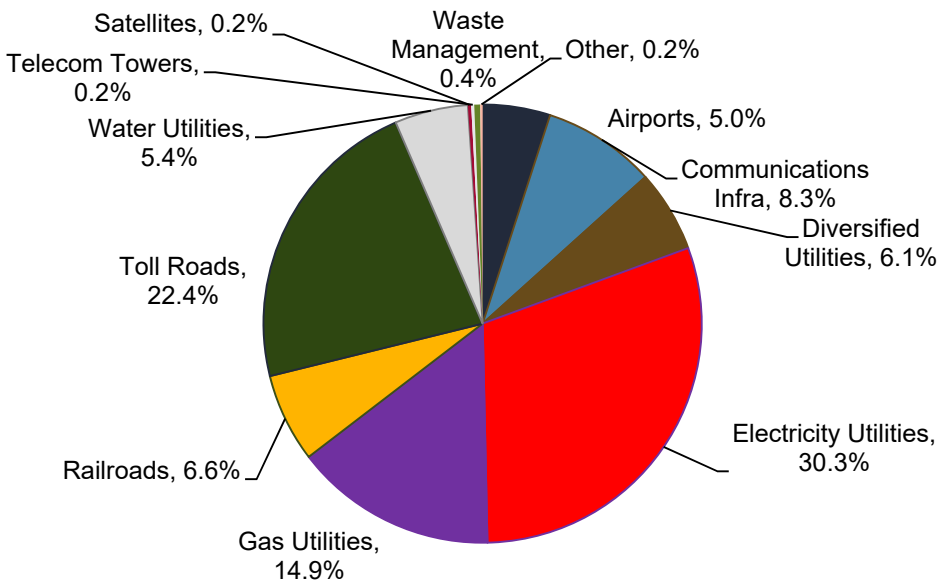
Portfolio by Country and Sector
Lazard Global Listed Infrastructure

Broken Down by Net Present Value of Underlying Company Assets

Portfolio by Country



Portfolio by Sector



Portfolio Summary:

- 26 Companies
- 17 Countries
- 8 Infrastructure Sectors
- 275+ Assets

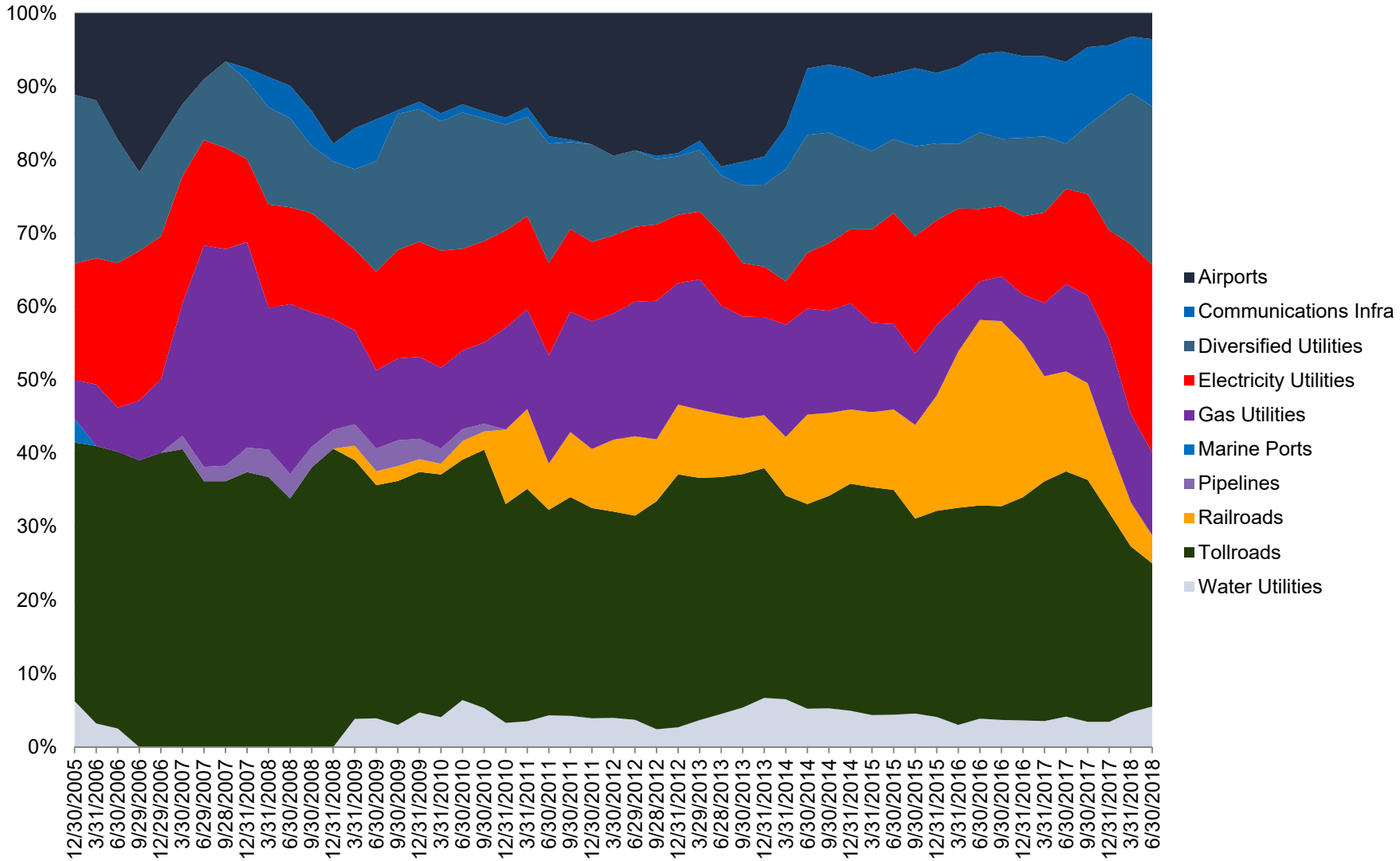
Global Asset Diversification (Toll Roads)

- 150 toll road concessions
- 23,000+ kms of toll roads
- 12 countries

As of 31 March 2018.
Weights are calculated ex-cash.
The allocations mentioned are based upon a portfolio that represents the proposed investment for a fully discretionary account. Allocations are subject to change.
This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information."

Sector Weights - Since Inception

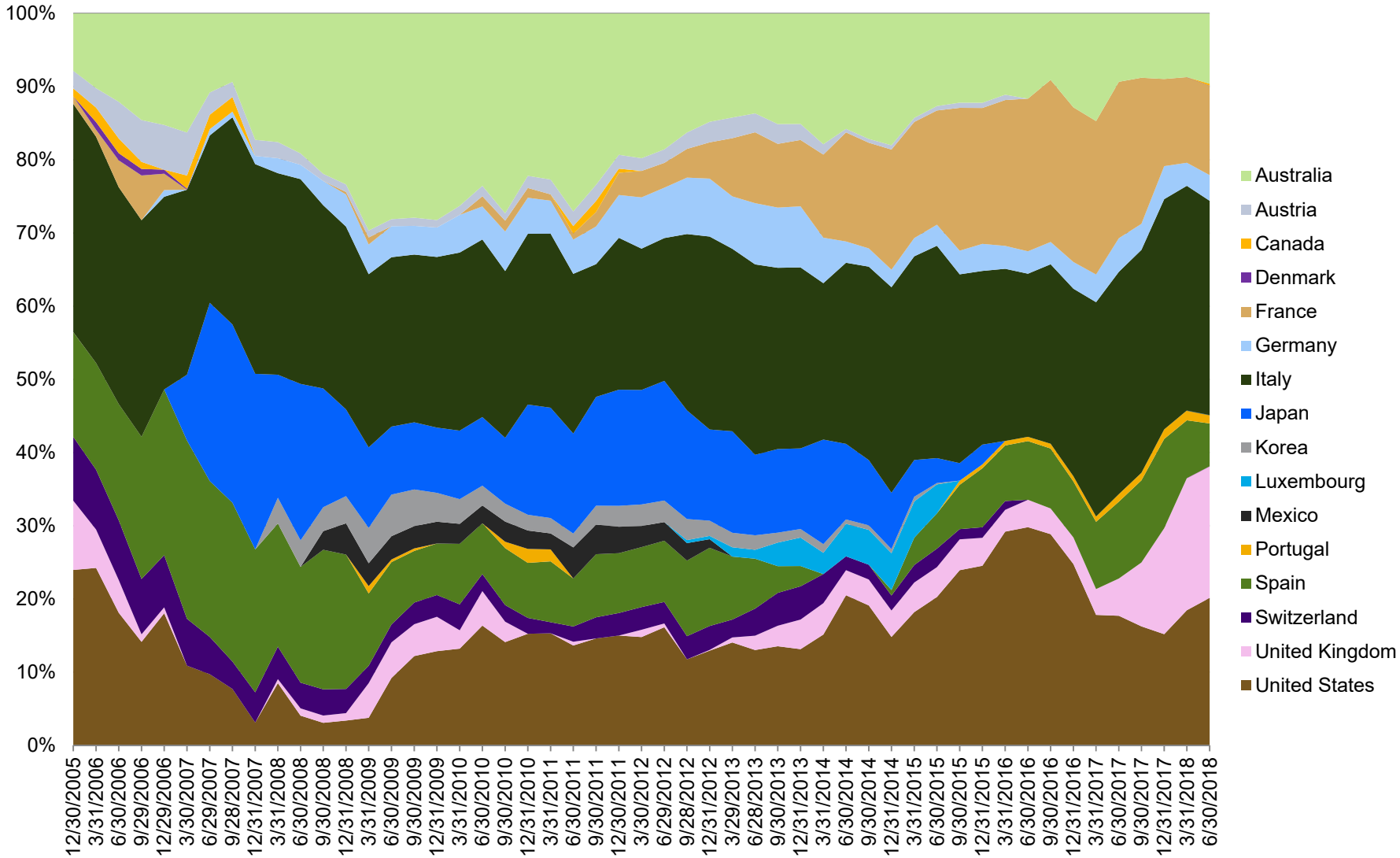
Lazard Global Listed Infrastructure



As of 30 June 2018.
Weights are calculated ex-cash.
The allocations mentioned are based upon a portfolio that represents the proposed investment for a fully discretionary account. Allocations are subject to change.
This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Country Weights - Since Inception

Lazard Global Listed Infrastructure



As of 30 June 2018.
Weights are calculated ex-cash.
The allocations mentioned are based upon a portfolio that represents the proposed investment for a fully discretionary account. Allocations are subject to change.
This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information.

Financial Statistics
Lazard Global Listed Infrastructure

Ratios	Lazard Global Listed Infrastructure	FTSE Developed Core Infrastructure 50/50 Index	MSCI World Index
Earnings Yield (%)	6.6	5.5	5.8
Dividend Yield (%)	4.7	3.8	2.4
EV:EBITDA Multiple (x)	11.0	12.4	11.2
EBITDA Margin (%)	44.2	32.1	17.8
EBITDA Interest Cover (x)	5.7	5.4	10.1
Price/Book (x)	2.0	2.0	2.3
FCF Yield (%)	3.9	1.9	4.0
Debt to EV (%)	41.0	39.4	18.0
Turnover[1] (%)	52.6	N/A	N/A

As of 31 March 2018

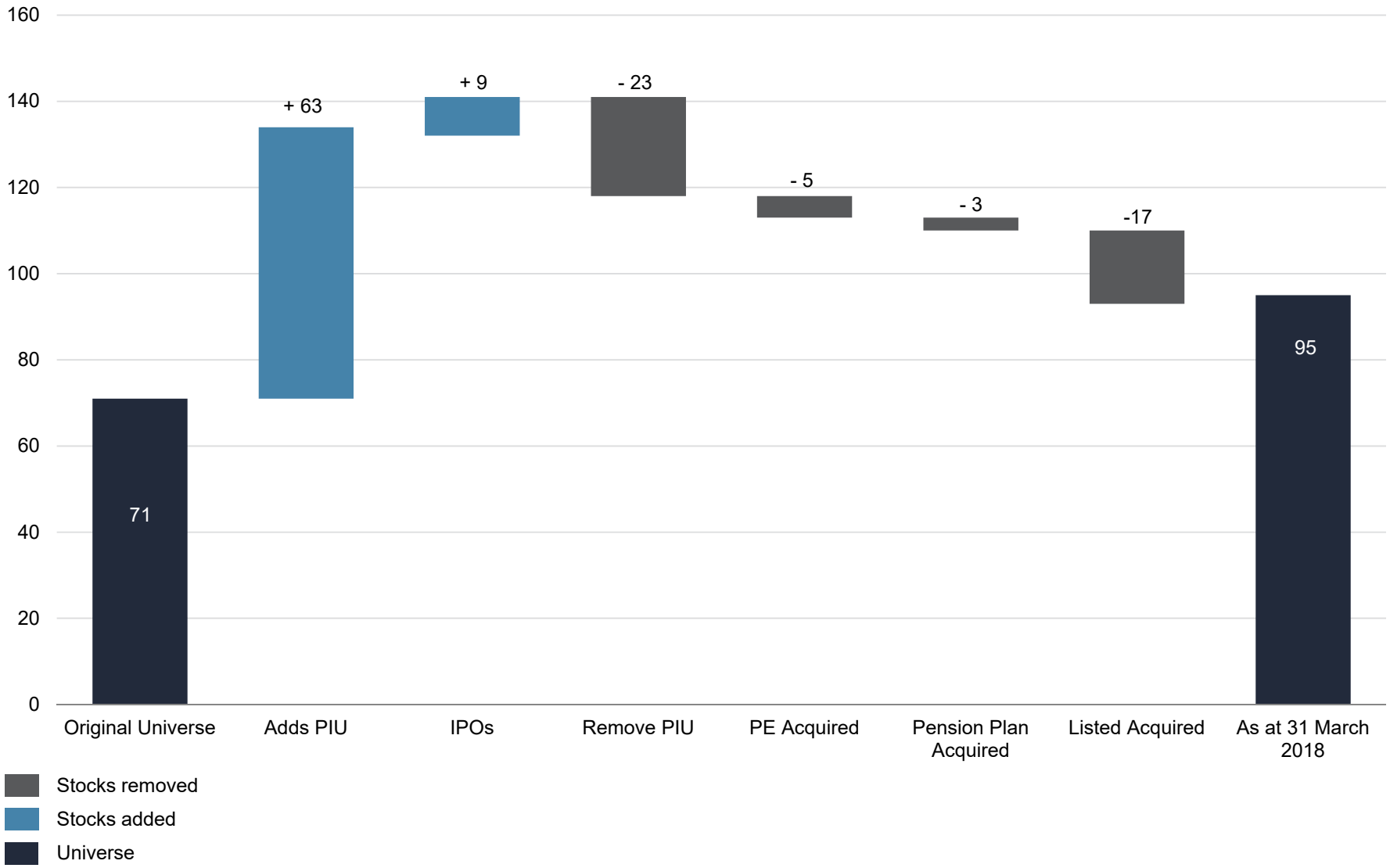
1 Lesser of purchase or sales; annual turnover for the 12 months to 31 March 2018

Source: Lazard estimates based on historical financial accounts of companies held in the Lazard Global Listed Infrastructure strategy. All estimates are based on current information and are subject to change.

This information is for illustrative purposes only and is supplemental to the "GIPS® Composite Information."

Evolution of the Preferred Infrastructure Universe

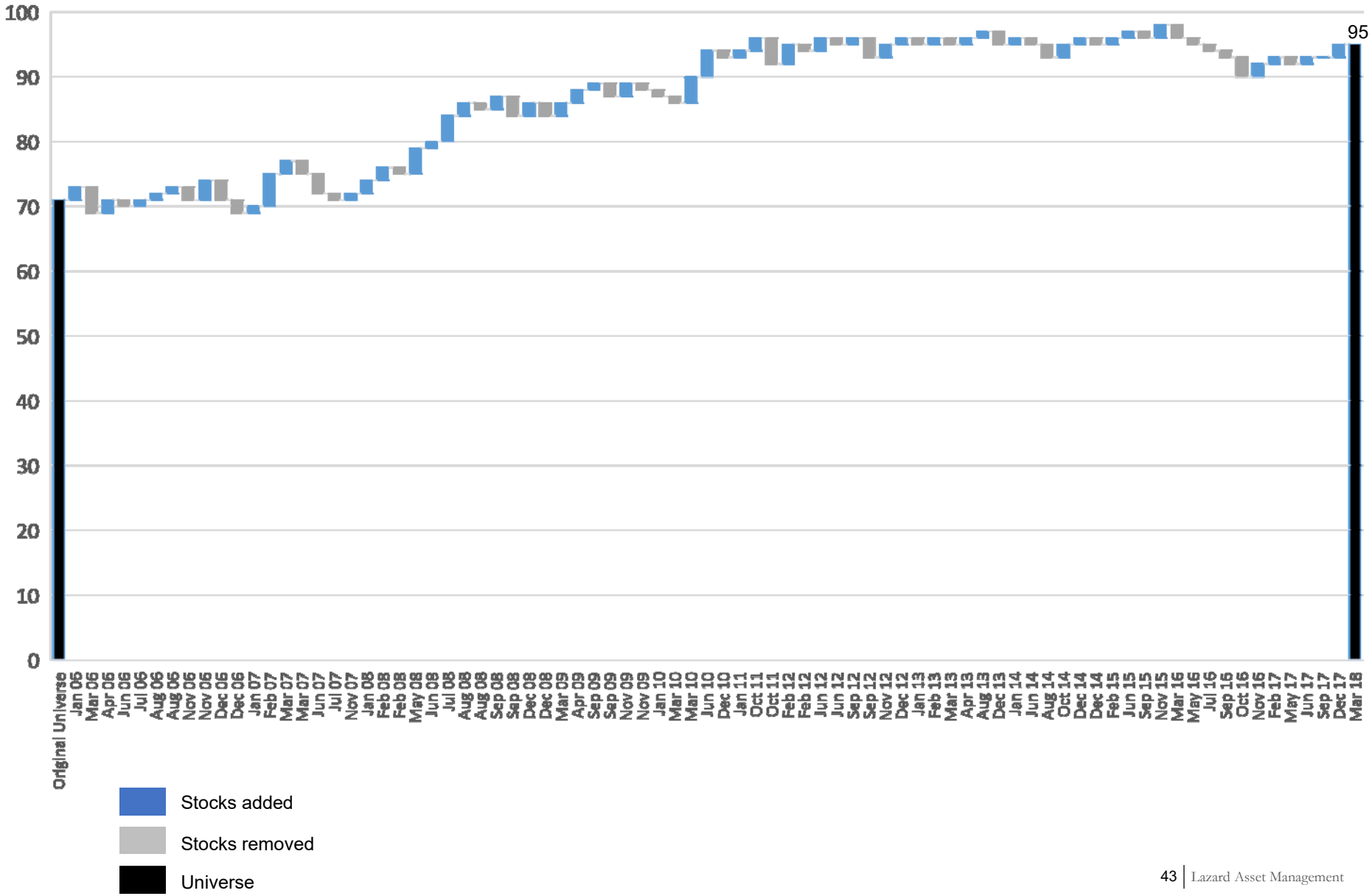
Lazard Global Listed Infrastructure



As at 31 March 2018
Universe start date October, 2005

Evolution of the Preferred Infrastructure Universe

Lazard Global Listed Infrastructure



As at 31 March 2018
Universe start date October, 2005

Lazard Global Listed Infrastructure
ESG Considerations

PRI

Lazard is a signatory to the United Nations-supported PRI. The PRI Initiative is an international network of investors working together to put the six principles for responsible investment (the "Principles") into practice:

1. We will incorporate ESG issues into investment analysis and decision-making processes.
2. We will be active owners and incorporate ESG issues into our ownership policies and practices.
3. We will seek appropriate disclosure on ESG issues by the entities in which we invest.
4. We will promote acceptance and implementation of the Principles within the investment industry.
5. We will work together to enhance our effectiveness in implementing the Principles.
6. We will each report on our activities and progress towards implementing the Principles.

GLIF ESG Activities

Environment	Social	Governance
US Utilities (carbon etc.) ▪ Southern Co., AEP ▪ Wisconsin ▪ PG&E, Edison International UK Water utilities: *"Achievement of sustainable development"*	Regulatory considerations: ▪ *E.G. affordability vs. financeability*	▪ TOMI/SIAS ▪ MCG bid ▪ SYD (formally MAp) ▪ Ausnet Services ▪ Xcel Energy ▪ Spark Infrastructure

Lazard Global Listed Infrastructure (Unhedged)
Composite Performance Summary

				Annualized			
	QTD	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception 01 Aug 2007
Lazard Global Listed Infrastructure (Unhedged)	**1.9**	**-2.4**	**6.1**	**14.0**	**13.6**	**10.3**	**9.3**

Broad Market Reference Indices

				Annualized			
	QTD	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception 01 Aug 2007
Global Listed Infrastructure Index[1]	3.9	-1.0	3.4	8.0	8.7	4.4	4.1
MSCI World Index	1.7	0.4	11.1	8.5	9.9	6.3	4.8
Citigroup World Government Bond Index All Maturities (Unhedged)	-3.4	-0.9	1.9	2.8	1.1	2.1	3.1

As of 30 June 2018.
All data in USD
1. The Global Listed Infrastructure Index from inception to March 31, 2015 is the UBS Global 50/50 Infrastructure and Utilities Index and the FTSE Developed Core Infrastructure 50/50 Net Tax Index afterwards.
The investment objective is investor inflation (Consumer Price Index) plus 5%, over a 5-year period.
Performance is presented gross of fees. Please refer to "GIPS® Composite Information" for additional information, including net-of-fee results. The performance quoted represents past performance. Past performance is not a reliable indicator of future results.
Lazard Global Listed Infrastructure is not measured versus the performance of any benchmark.

Biographies
Global Listed Infrastructure Management Team



John Mulquiney, CFA
Portfolio Manager/Analyst
Lazard Asset Management Pacific Co. (Sydney)
John Mulquiney is a Portfolio Manager/Analyst on the Global Listed Infrastructure and Global Equity Franchise teams. He has been working in the investment field since 1997. Prior to joining Lazard in August 2005, John worked at Tyndall Australia where he covered stocks in various sectors including financials, consumer discretionary, health care and materials. John was also in the Asset and Infrastructure Group at Macquarie Bank, where he undertook transactions and developed valuation models for airports, electricity generators, rail projects and health infrastructure. Most recently, John spent four years at Nanyang Ventures, an early expansion venture capital fund. John holds a PhD from the Australian National University, and a BA (Hons) from Sydney University. He is a CFA® charter holder.



Warryn Robertson
Portfolio Manager/Analyst
Lazard Asset Management Pacific Co. (Sydney)
Warryn Robertson is a Portfolio Manager/Analyst on the Global Listed Infrastructure, Global Equity Franchise and Australian Equity teams. He has been working in the investment field since 1992. Prior to joining Lazard in April 2001, Warryn was an Associate Director at Capital Partners. Previously, Warryn worked at PriceWaterhouseCoopers Corporate Finance. Warryn holds an MBA from the Melbourne Business School (Melbourne University) and a BCom, University of Canberra.



Bertrand Cliquet, CFA
Portfolio Manager/Analyst
Lazard Asset Management Limited (London)
Bertrand Cliquet is a Portfolio Manager/Analyst on the Global Listed Infrastructure and Global Equity Franchise teams. Before joining Lazard in 2004, Bertrand worked for Goldman Sachs International as a Research Analyst. Earlier, he worked in the Mergers and Acquisitions group at Deutsche Bank, focusing on the utility and retail sectors. He also did an internship at Enskilda Securities in Paris, where he worked as an analyst covering the retail sector. Bertrand has been working in the investment field since 1999. He attained a business degree from HEC in Paris, with a major in Finance. Bertrand was awarded the Prize of the "Club Finance International", and the Prize of the HEC Foundation for his thesis on "The deregulation of the European electricity market and its consequences for electricity prices and the strategic positioning of energy companies". Bertrand is fluent in both French and German. He is a CFA® charter holder.

Biographies
Global Listed Infrastructure Management Team



Matthew Landy

Portfolio Manager/Analyst

Lazard Asset Management LLC (New York)

Matthew Landy is a Portfolio Manager/Analyst on the Global Listed Infrastructure and Global Equity Franchise teams. He began working in the investment field in 1995. Prior to joining Lazard in 2005, Matt worked in the private equity industry where he was involved in early stage venture capital in Europe and management buy-out investing in Australia. Previously he was an Equity Analyst with Tyndall Investment Management covering stocks in the consumer staples, consumer discretionary, financials and information technology sectors. Matt has a BCom and a BA from Monash University in Melbourne, Australia.



Anthony Rohrlach, CFA

Research Analyst

Lazard Asset Management Pacific Co. (Sydney)

Anthony Rohrlach is a Research Analyst on the Global Listed Infrastructure and Global Equity Franchise teams. He has been working in the investment field since 1999. Prior to joining Lazard in 2007, Anthony spent over eight years as a research analyst with UBS where he covered infrastructure, transportation and utilities companies. Anthony holds an Honours degree in Finance from the Australian National University. He is a CFA® charter holder.



Edward P. Keating

Client Portfolio Manager

Lazard Asset Management LLC (New York)

Edward Keating is a Client Portfolio Manager on the Discounted Assets, Global Listed Infrastructure and Global Equity Franchise teams. He began working in the investment field in 2001, upon joining Lazard. He has a BA from Iona College.

Lazard Global Listed Infrastructure (Unhedged)
Composite Disclosure Notes

Reporting Date: 31 March 2018
Composite Inception Date: 01 August 2007
Reporting Currency: U.S. Dollar

Composite Description
The composite returns represent the total returns of all fully discretionary portfolios with a Global Listed Infrastructure (Unhedged) investment mandate and a minimum of $5 million in assets under management. Lazard's Global Listed Infrastructure (Unhedged) composite reflects a long-only, valuation-driven investment approach that seeks long-term, defensive, low volatility returns by investing in a range of companies around the world that Lazard considers to be "Preferred Infrastructure." The Preferred Infrastructure approach focuses primarily on companies that own assets that meet certain preferred criteria, such as revenue certainty, profitability, and longevity. The strategy typically invests in 25-50 equity securities of companies that fall within the Preferred Infrastructure framework, and have a minimum market capitalization of $250 million at purchase.

Calculation of Performance Returns
Additional information regarding policies for valuing portfolios, calculating performance, and preparing compliant presentations are available upon request. Net returns for Lazard mutual funds included in this composite are net of all fees. The composite returns are reported net of foreign withholding taxes on dividends, interest and capital gains. The composite returns presented represent past performance and is not a reliable indicator of future results, which may vary.

Fee Schedule
Lazard's standard fee schedule for Global Listed Infrastructure (Unhedged) accounts is 0.90% of the first $10 million of assets, 0.75% on the next $25 million, 0.70% on the next $40 million, 0.65% on the next $75 million, 0.60% on the next $150 million and 0.55% on assets above $300 million. Actual account fees, inclusive of performance-based fees (if applicable) are used in the construction of composite net of fee performance unless otherwise noted. A complete list and description of all Lazard composites is available upon request.

Benchmark Information
The Lazard Global Listed Infrastructure (Unhedged) Composite has no benchmark, as an appropriate index does not exist.

GIPS Compliance and Verification Status
Lazard Asset Management claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. Lazard Asset Management has been independently verified for the period of January 1, 1993 through December 31, 2016. The verification reports are available upon request. Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation. Lazard Asset Management is the "Firm" to which the GIPS Standards apply (Frankfurt office included in Firm definition as of January 1, 2003). GIPS is a registered trademark of CFA Institute. CFA Institute has not been involved in the preparation or review of this presentation. The composite creation date is September 2011.

	Calendar													Annualized				
	QTD	YTD	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	Aug 07 - Dec 07	1 YR	3 YR	5 YR	10 YR	Since Inception
Lazard Rate of Return (%; Gross of Fees)	-4.24	-4.24	34.57	8.26	4.02	9.48	26.66	20.20	-0.40	13.80	32.93	-35.41	10.22	14.35	12.53	13.49	9.67	9.35
Lazard Rate of Return (%; Net of Fees)	-4.39	-4.39	33.86	7.64	3.54	9.06	26.03	19.48	-0.85	13.09	31.90	-36.02	10.07	13.69	11.91	12.93	9.03	8.72
Composite Standard Deviation (3-yr. Ann.)		11.67	10.87	10.41	10.61	11.94	13.45	16.80	21.27	26.02	N/A	N/A	N/A					
# of Portfolios		6	7	7	9	7	4	1	1	2	1	1	1					
Composite Dispersion (Asset Wtd. Std. Dev.)		0.10	0.54	0.27	0.58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
Composite Assets (USD Millions)		1679.1	1868.7	1489.8	1238.0	1236.6	793.0	331.3	309.6	163.1	7.3	8.2	16.1					
Total Firm Assets (USD Billions)		208.6	206.6	168.0	160.1	171.4	161.6	148.3	124.4	140.6	116.5	79.8	126.9					

Important Information

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State Street Global Advisors

Mandate: **MSCI ACWI ex-US IMI Fund** **Hired:** **2009**

Firm Information

State Street Global Advisors Trust Company is a wholly owned subsidiary of State Street Bank and Trust Company, which is in turn a wholly owned subsidiary of State Street Corporation. State Street Corporation is a publicly traded bank holding company whose shares are traded on the New York Stock Exchange under the symbol "STT."

As of June 30, 2018 State Street Global Advisors had $2,723.44 billion in AUM*

* AUM reflects approximately $32.9 billion (as of June 30, 2018), with respect to which State Street Global Advisors Funds Distributors, LLC (SSGA FD) serves as marketing agent; SSGA FD and State Street Global Advisors are affiliated.

Key Executives:
Cyrus Taraporevala, President & CEO
Rick Lacaille, Global CIO
Lynn Blake, CIO, Global Equity Beta Solutions
Sonya Park, Senior Relationship Manager

Investment Approach

As an index manger, SSGA strives to deliver performance that closely aligns with the performance of a strategy's respective index. SSGA generally fully replicates the index but when prudent will employ an optimization technique using historical data and correlations to create a portfolio that has the same risk and return characteristics of the respective index.

Benchmark: MSCI ACWI ex-US IMI

Total Mandate

Assets Under Management:
03/31/2018: $1,023,164,456

Concerns: None

03/31/2018 Performance

	Last Quarter	1-Year	3-Years Annualized	5-Years Annualized	6-Years Annualized
SSgA ACWI ex-US IMI Fund (Net)	-0.99%	17.35%	6.90%	6.49%	6.89%
MSCI ACWI ex-US IMI	-1.06%	17.10%	6.75%	6.24%	6.64%

State of Alaska

Kimberly Cook

Craig DeGiacomo

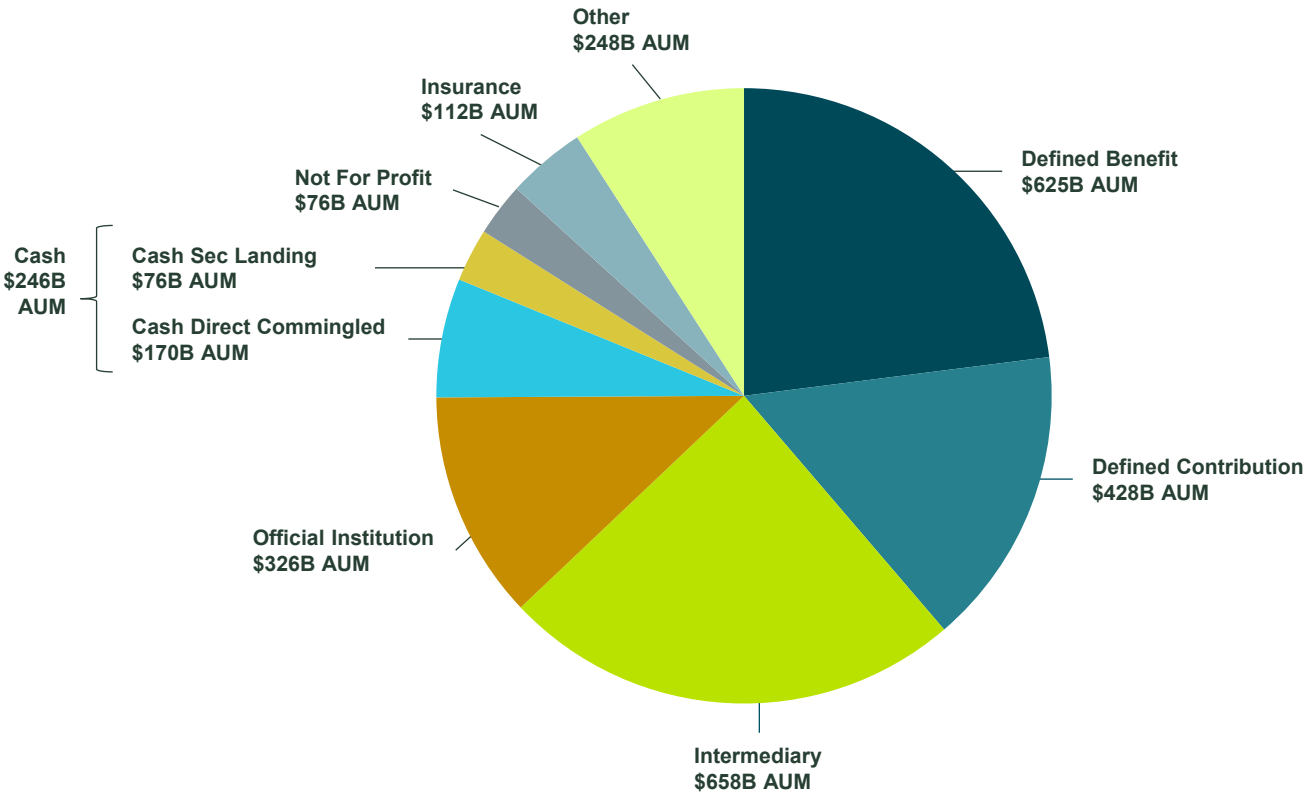
Karl A. Schneider, CAIA

September 21, 2018

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US$2.72 Trillion in Assets Under Management [1]

Clients by AUM



AUM reflects approximately $32.9 billion (as of June 30, 2018), with respect to which State Street Global Advisors Funds Distributors, LLC (SSGA FD) serves as marketing agent; SSGA FD and State Street Global Advisors are affiliated.

[1]Official Institutions is a client type that includes all plan type assets including DB and DC.

Why choose State Street Global Advisors?
Indexing Skillfully Delivered

- **Team —** Tenured and stable team with dedicated portfolio managers averaging 18 years experience
- **Performance —** Deliver performance by striking the appropriate balance between return,
  risk and costs (>98% of funds have consistently tracked within expectations)*
- **Client centric focus —** Listen, understand and adapt to client needs and challenges
- **Research —** Embedded research team delivering innovative solutions beyond traditional
  beta – i.e., factors, ESG and thoughtful implementation strategies
- **Asset Stewardship —** Effective steward of client assets with a coordinated firm wide
  proxy voting platform

Source: SSGA
* Based on cumulative quarterly gross-of-fees returns for 1,326 GEBS managed pooled, and separate account portfolios from January 1, 2018 to March 31, 2018 . Tracking error based on the difference between portfolio and benchmark cumulative returns.

Our Portfolio Management Beliefs

*We aim to **deliver** to*
*each client the **returns** and **characteristics***
of their target index

- We believe that a **cost-efficient, broad market exposure** will help clients achieve their investment objectives
- To more efficiently manage portfolios, we use a **globally consistent investment management platform** and processes
- We believe in **teamwork** and we promote a culture of **sharing best practices**
- **Accountability** is important: Each fund has a lead Portfolio Manager who will be the primary decision-maker
- To deliver the best possible solutions for our clients, we **innovate** through **research**
- As **long-term stewards of your capital,** we **engage** with investee companies and **encourage responsible investing**

Source: SSGA

Global Equity Beta Solutions

65 Portfolio Managers = average 19 years experience

Lynn Blake, CFA®
Global CIO, Global Equity Beta Solutions

Theresa Holland*
Executive Assistant

Richard Hannam, ASIP
EMEA

Julian Harding, ASIP, Ch.FSCI, FCA
Core Research
Rohit Nagori*
Mitesh Tank, CFA, FRM

Natalie Waller
London
Christopher Flood, CFA, ASIP

Mark Davey, CFA
Nina Doneva
James Fielding
Gwennael Freydt, CFA
Richard Hamilton
Ross James, CFA
Dominic Klee
Matt McCarthy, CFA
Matt Moffat
Zehra Sayeed
Ozan Vechi

Susan Darroch
APAC ex-Japan Sydney
Andrew Howson
Alexander King, CFA
Lillian Poon, CFA

Mark Hui, CFA
Hong Kong
Michelle Ip
SaiSai Lin
Kwok-Shing Yip, CPA

Nobuya Endo, CFA
Japan
Shunsuke Ichinose, CMA
Masaki Ishikawa, CFA, CMA
Hitomi Miwa, CMA

Mike Feehily, CFA
Americas

Karl Schneider, CAIA
Deputy Head, Americas

David Arrighini, CFA
TEMC

Jennifer Bender, PhD*
Research
TJ Blackburn, PhD*
Todd Bridges, PhD*
Jashu Krishna*
Mohamed Rehan*
Xiaole Sun, CFA*
Taie Wang, CFA*

Shayne White*
Systems
Temitayo Akinsanya*
Dan Smith*

Rakhi Kumar*
ESG Investments and Asset Stewardship
Matthew DiGuiseppe*
Stefano Maffina*
Caitlin McSherry*
Paul Moore*
Michael Younis*
Philip Vernardis*
Robert Walker*

Christopher McKnett*
ESG Strategist
Andrew Collins*
Mahesh Jayakumar, CFA, FRM*

Boston

Alternative Asset Equities Amy Cheng	Emerging Markets Equities Tom Coleman, CFA	Developed Markets Equities Dwayne Hancock, CFA	Smart Beta/ESG Equities Emiliano Rabinovich, CFA
David Chin Ray Donofrio Mike Finocchi Payal Gupta Ted Janowsky, CFA	Melissa Kapitulik Mark Krivitsky Chuck LeVine Kate Morgan, CFA Kala O'Donnell	Keith Richardson Amy Scofield David Swallow, CFA Dan TenPas, CFA Teddy Wong	Juan Acevedo Lisa Hobart John Law, CFA Eric Viliott, CFA, CFP® Olga Winner, CFA

Portfolio Specialists
Scott Pittsley, CFA*
Nicholas Trager*
Bejay Ugale*
Xianhang Wu*

Portfolio Strategists
Heather Apperson*
Ana Harris, CFA*
Johnnie Yung*

Ted Janowsky, CFA
Company Stock Portfolio Management

Scott Roy	Jeannine Doyle	Anne Muir	Sabine Cappa
Maria Cummings Susann Curtis	Joseph Lima Margaret Miggins		Bernice Stacy Lee Williams Kathleen Yacano*

Global Trading — 31 Global Traders

Operations — 150+ Dedicated Professionals

Data Group — 13 Dedicated Professionals

Relationship with State Street Corporation

As of March 5, 2018
* Does not manage assets for the Global Equity Beta Solutions team. CFA® is a trademark owned by CFA Institute. Certified Financial Planner Board of Standards Inc. owns the certification marks CFP®, CERTIFIED FINANCIAL PLANNER™ and federally registered CFP (with flame design) in the US, which it awards to individuals who successfully complete CFP Board's initial and ongoing certification requirements.

STATE STREET GLOBAL ADVISORS

Our Trading Team

The global trading team at SSGA differentiates our firm from the competition

Nat Evarts
7 Equity, Futures and Currency traders*
US, Canada, Central and Latin America

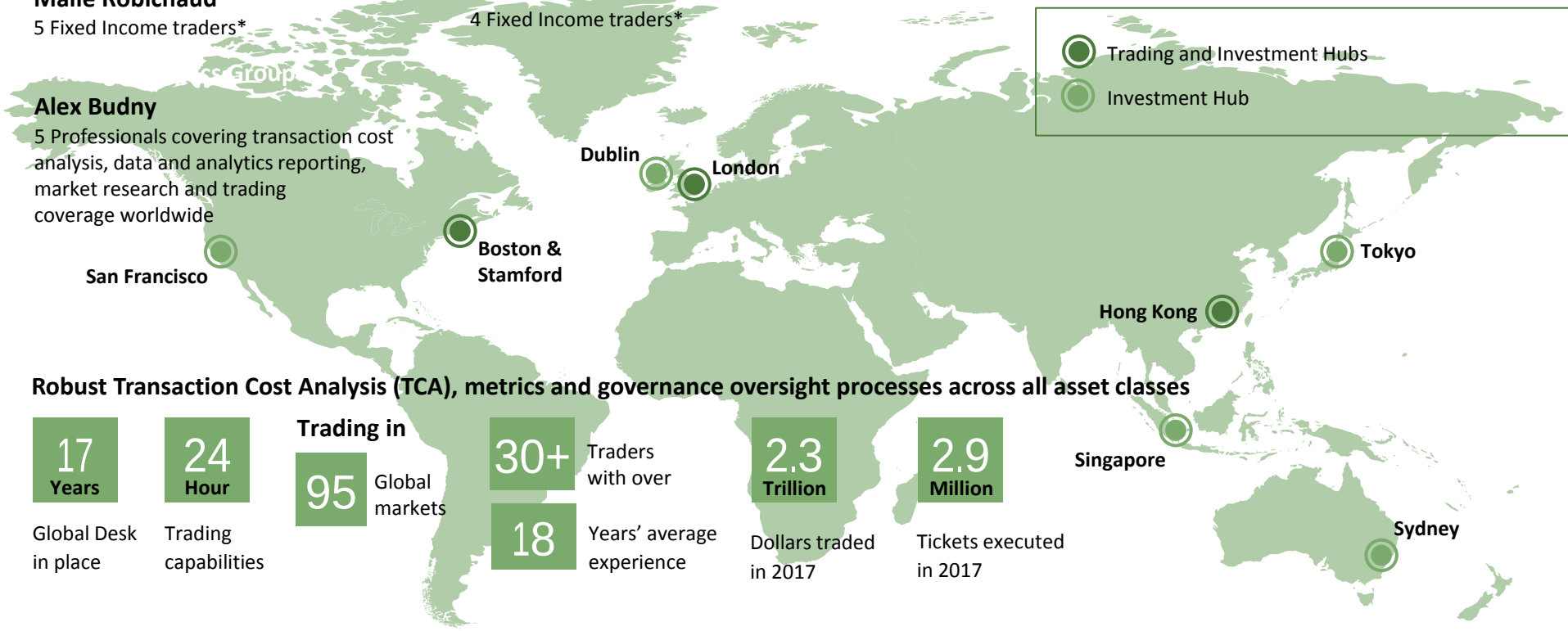
Maile Robichaud
5 Fixed Income traders*

Graham Sorrell
8 Equity, Futures, Currency and Fixed Income traders*
55 Markets throughout Europe, Africa, and the Middle East

Sharon Ruffles
4 Fixed Income traders*

David Rogers
4 Equities, Futures and Currency traders
Australia, Japan and 13 other markets throughout Asia

Alex Budny
5 Professionals covering transaction cost analysis, data and analytics reporting, market research and trading coverage worldwide



Robust Transaction Cost Analysis (TCA), metrics and governance oversight processes across all asset classes

17 Years Global Desk in place

24 Hour Trading capabilities

Trading in 95 Global markets

30+ Traders with over **18** Years' average experience

2.3 Trillion Dollars traded in 2017

2.9 Million Tickets executed in 2017

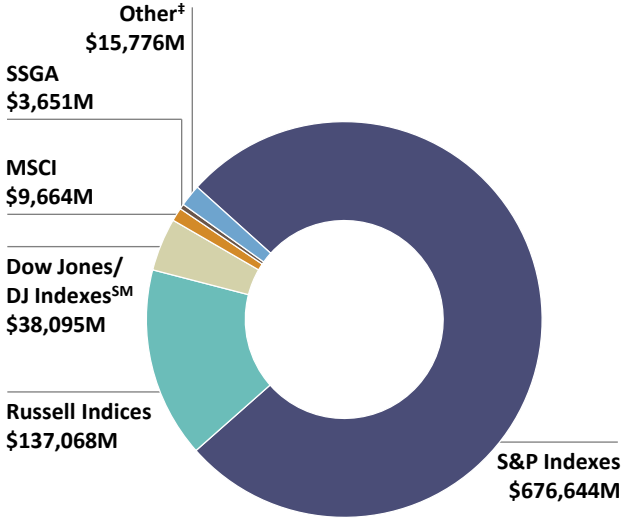
As of March 31, 2018
* Does not include the Heads of Regional Trading Desks.
Asset classes include equity, fixed income, futures and currency. Figures are in USD.

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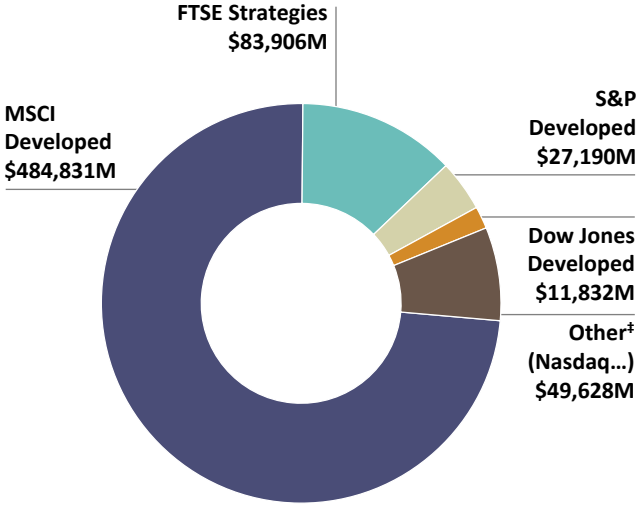
A Leading Manager of Global Indexed Assets

Total Global Equity Beta Solutions Assets Under Management: $1.61 Trillion (USD) as of March 31, 2018

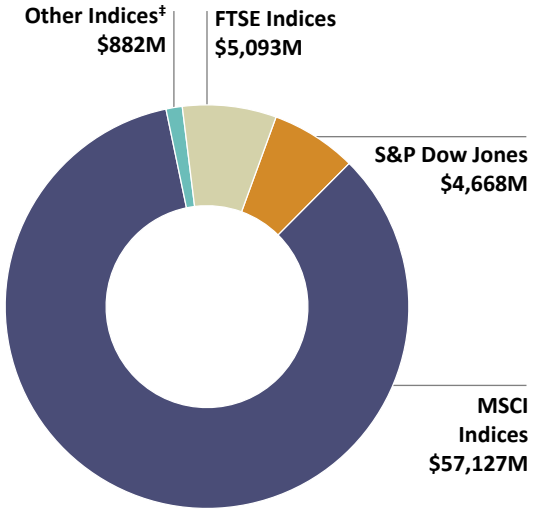
US Index Assets Under Management
$880,897 Million as of March 31, 2018



International and Global Equity AUM
$657,386 Million as of March 31, 2018



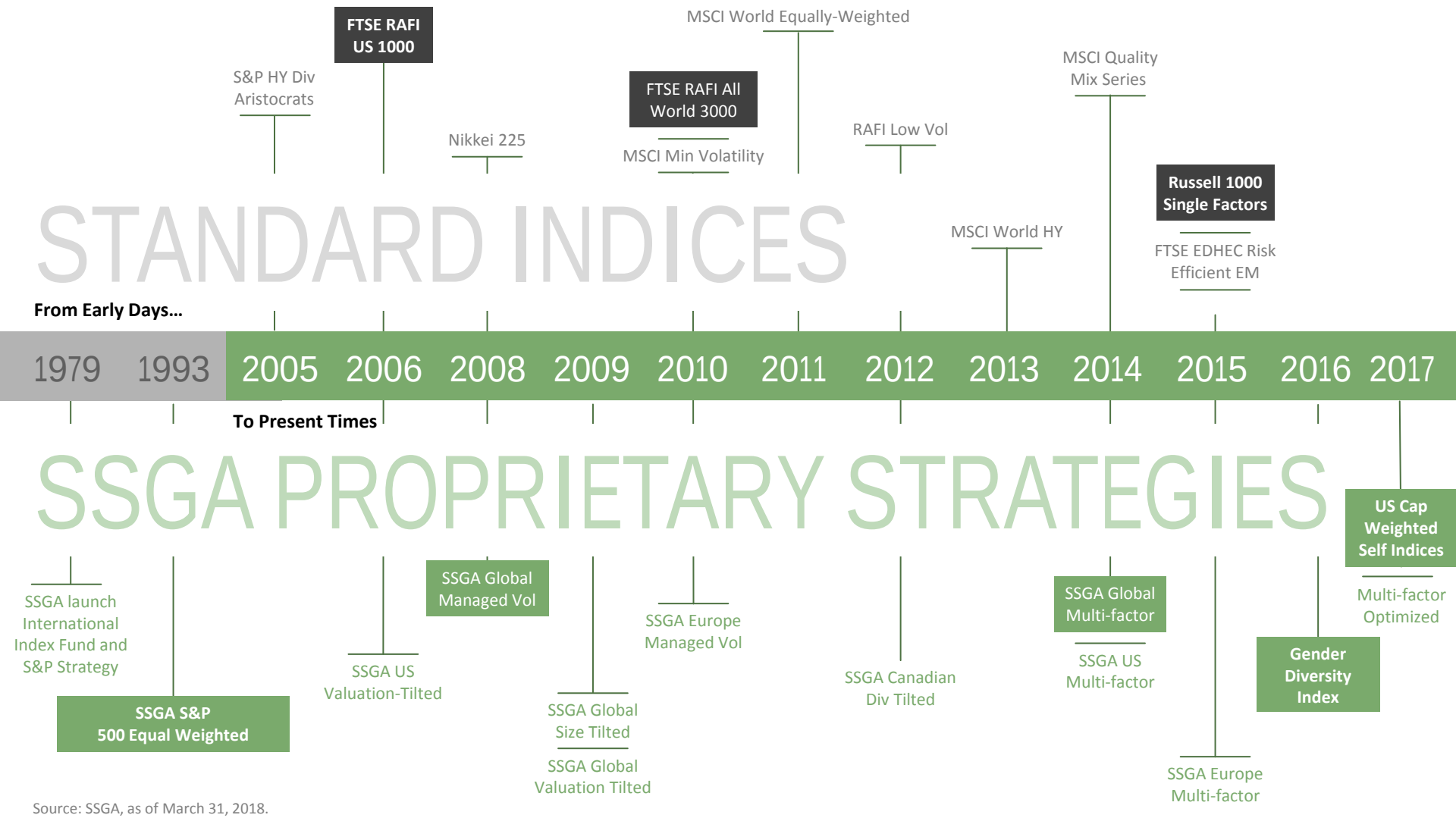
Emerging Markets Equity AUM
$67,769 Million as March 31, 2018*



Source: SSGA
As of March 31, 2018
* Exclusive of Emerging Markets Equities invested in other MSCI-benchmarked strategies such as MSCI ACWI and MSCI ACWI ex-US.
‡ Other includes Other indices, SSGA rules-based and factor-tilting strategies, low-volatility equity, commodities, REITs and additional alternative asset classes

STATE STREET GLOBAL ADVISORS.

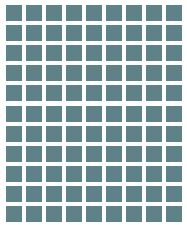
A Long History of Indexing Innovation



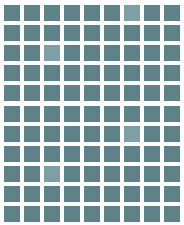
Source: SSGA, as of March 31, 2018.
Inception date of select portfolios.

STATE STREET GLOBAL ADVISORS

We Select the Most Appropriate Methodology



Index

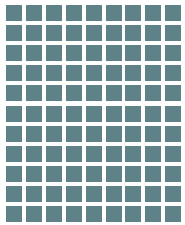


Portfolio

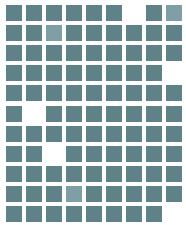
Perfect Replication

Buy **all the securities** in the underlying index **at exactly or very close to** their index weights.

Hard to achieve in practice due to frictional cash and transaction costs.



Index

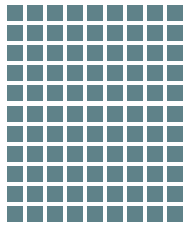


Portfolio

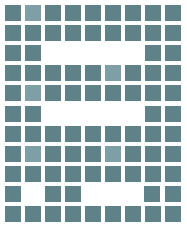
Full to Near-Full Replication

Buy **all or almost all of the securities at close** to index weights.

Applicable to narrowly defined indices and portfolios of reasonable size.



Index



Portfolio

Optimisation (Equities)

Buy a **subset of the securities**.

This approach uses an optimiser to create a portfolio that mimics the characteristics and returns of the underlying index.

Applicable to broader indices and smaller sized portfolios.

Applicable to broad portfolios with restrictions or exclusions.

Source: SSGA

Tried and Tested Process Designed to Ensure Quality Outcome



MONITOR

- Monitor portfolio against the benchmark index daily
- Identify potential index changes
- Identify flows



ANALYZE

- Assess portfolio deviations versus benchmark index
- Assess impact of potential changes in index and client flows in portfolio



IMPLEMENT

- Determine required changes to the portfolio
- Construct trade instructions and send request to trading team

Source: SSGA

Interconnected Functions Improve Control and Oversight



PROPRIETARY PM SYSTEM

Designed and built around our portfolio management process and workflow

Comprehensive view of portfolios

Full data integration with other SSGA applications

Dedicated software development resources

Continuous development and improvements

Source: SSGA

STATE STREET GLOBAL ADVISORS

Indexing Skilfully Delivered

INDEX RECONSTITUTION

Pursue the best outcome for the client

PORTFOLIO REBALANCING

Be pragmatic:

It doesn't always make sense to trade

INDEX EVENTS

Research corporate actions/events to assess impact fully and manage risk



TRADING

Determine the most cost-efficient approach

SCRIP DIVIDENDS

Look for the premium:

cash versus stock



DERIVATIVES

Used to overlay cash and synthesize full exposure to equity markets

STOCK LENDING

Can help offset costs and potentially add value

CORE BETA RESEARCH

Continuously look for opportunities to improve and evolve implementation

Source: SSGA

Portfolio Rebalancing: Be Pragmatic

Example: MSCI Quarterly Rebalance May 2018

- **MSCI World ex-US Index**
  Rebalance two-way index turnover = 2.40%
  Typical SSGA MSCI World ex-US portfolio traded approximately 1.36%, a **40% reduction in turnover**

- **MSCI Emerging Markets Index**
  Rebalance two-way index turnover = 7.48%
  Typical SSGA MSCI Emerging Markets portfolio traded approximately 4.75%, a **36% reduction in turnover**

- By monitoring ex-ante tracking closely, we can avoid trading some of the smaller names of a given index rebalance. This **reduces the overall turnover** of a portfolio and also **reduces the transaction costs** associated with it.

Internal Liquidity: A Powerful Cost Saving Resource

US Market Case Study[1] (2015–2017)

Total value*: $108.5 Billion

In-kind[3]/Internal Crossing/Unit Crossing: **90.1% of the Total**

Estimated Cost Savings[†]: **0.06% of the Total**

$64.4M Transaction Cost Savings[†]

Non-US Developed Case Study[2] (2015–2017)

Total value*: $30.9 Billion

In-kind[3]/Internal Crossing/Unit Crossing: **75.9% of the Total**

Estimated Cost Savings[†]: **0.23% of the Total**

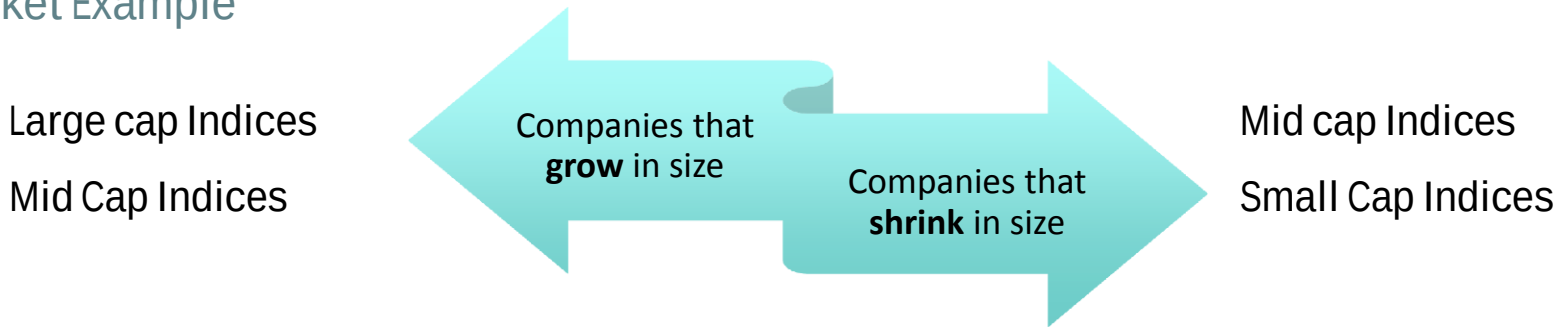
$71.1M Transaction[†] Cost Savings

Availability of internal crossing at SSGA may be affected by your asset class, vehicle type, jurisdiction, or other factors.
[1] Based on actual client order flow trading activity in the S&P 500® Defined Contribution Commingled Fund.
[2] Based on actual client order flow trading activity in the Bi-Monthly EAFE ERISA Commingled Funds.
[3] In-kind transfers are redemptions/contributions made via security transfers.
* For calendar years 2015–2017. It is not known whether similar results have been achieved after 2017.
[†] This represents estimated average savings across all aggregate trading over the period. These estimates are based on subjective judgments and assumptions and do not reflect the effect of unforeseen economic and market factors on decision making. There is no guarantee that a particular client transaction will experience the same level of savings. In fact, savings could differ substantially. Any savings is contingent upon other activity taking place on a given transaction day. Had other funds been selected, different results of transaction cost savings may have been achieved. All figures are in USD.

Index Migration: Index Changes create Crossing Opportunities

- Companies regularly **move between indices**
- If the **book of business is diverse**, there are **opportunities to reduce transaction costs** around index change events

US Market Example



Migration Trades

- **$38.0 billion** between 2014–2017
- **79%** crossed internally
- Estimated Cost Savings: **$40 million**[1]

Availability of internal crossing at SSGA may be affected by your asset class, vehicle type, jurisdiction, or other factors.
[1] Impact and spread cost estimates are based on calculations provided by vendor tools that specialize in these estimations but are proprietary to the vendor. Commissions, taxes, and other explicit cost estimates are based on standard schedules published within SSGA but may vary from the results experienced in actual trading. Savings are calculated by multiplying the estimated market trading costs (ranging from 10 to 20 basis points–depending on liquidity type and region) by the relevant trade volume amount. US large cap stocks account for about 64% of the noted savings.
As of December 2017 updated annually. Source: SSGA. All figures are in USD.



Index Reconstitution Research

- **Robust quantitative analysis**
- **Ever-evolving opportunity sets**
- **Additional input into trading strategies**
- **Covering major index families, global and regional**
- **Disaggregate index changes by type for further insight**

Initial Findings — MSCI reviews

- Investors seeking a **global equity exposure** would benefit from **lower turnover** by investing in **MSCI World** compared to investing regional MSCI indices
- Overall, the **value add in between announcement and index rebalance date** is consistently **trending lower**
- There is a **significant rise in the traded volume** of relevant securities well **ahead of the announcement date**, which could explain the consistent lowering trend of value add
- In **2016**, the impact **on value add was dominated** by the more significant changes in the **November** and **May** semi-annual rebalances
- Looking only at **additions in 2016**, **these have not on average contributed positive value-add** traded between announcement date and index rebalance date

Source: SSGA
As of 31 December 2017

STATE STREET GLOBAL ADVISORS

Index Events: Thorough Research of Corporate Actions

BAT (July/2017)

- BAT acquires the remaining share of Reynolds American that it did not already own (57.8%)
- According to the terms of the acquisition, Reynolds shareholders would receive $29.44 in cash and 0.5260 of a new BAT share which would be represented by new BAT ADSs listed on the New York Stock Exchange
- BAT and Reynolds were both constituents of developed market indices, plus country specific indices (UK: BAT; US; Reynolds)
- BAT saw its weight increased in all developed market indices while Reynolds was deleted

Index Weights* (30 June 2017)

- BAT: 4.5% in FTSE All Share
- Reynolds: 0.26% in S&P 500
- BAT: 0.35% in MSCI World
- Reynolds 0.15% in MSCI World

SSGA's Implementation

- Continuously monitoring of market conditions and demand helped us shape a more dynamic trading strategy to the benefit of our clients

Source: SSGA. For illustrative purposes only. This information should not be considered a recommendation to invest in a particular sector or to buy or sell any security shown.
* Approximate weights, not to be relied upon thereafter. Figures in USD.

Appendix A: Important Disclosures

Important Risk Disclosure

FOR INSTITUTIONAL USE ONLY, Not for Use with the Public.

Past performance is not an indicator of future results. Diversification does not ensure a profit or guarantee against loss.

Equity securities are volatile and can decline significantly in response to broad market and economic conditions.

Indexing strategies are managed with a passive investment strategy, attempting to track the performance of an unmanaged index of securities. As a result, indexing strategies may hold constituent securities of the Index regardless of the current or projected performance of a specific security, which could cause their return to be lower than if they employed an active strategy. While the strategy seeks to track the performance of the Index as closely as possible, its return may not match or achieve a high degree of correlation with the return of the Index due to operating expenses, transaction costs, cash flows and operational inefficiencies.

Foreign investments involve greater risks than US investments, including political and economic risks and the risk of currency fluctuations all of which may be magnified in emerging markets. Investing in foreign domiciled securities may involve risk of capital loss from unfavourable fluctuation in currency values, withholding taxes, from differences in generally accepted accounting principles or from economic or political instability in other nations. Investments in emerging or developing markets may be more volatile and less liquid than investing in developed markets and may involve exposure to economic structures that are generally less diverse and mature and to political systems which have less stability than those of more developed countries.

Currency Risk is a form of risk that arises from the change in price of one currency against another. Whenever investors or companies have assets or business operations across national borders, they face currency risk if their positions are not hedged.

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Investing in futures is highly risky. Futures positions are considered highly leveraged because the initial margins are significantly smaller than the cash value of the contracts. There are a number of risks associated with futures investing including but not limited to counterparty credit risk, basis risk, currency risk, derivatives risk, foreign issuer exposure risk, sector concentration risk, leveraging and liquidity risks.

Derivative investments may involve risks such as potential illiquidity of the markets and additional risk of loss of principal.

Important Risk Disclosure

Investing involves risk including the risk of loss of principal.

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Appendix B: Biographies

Biographies



Kim is an Assistant Vice President of State Street Global Advisors and a Senior Client Service Manager in the Institutional Client Group. She is responsible for managing client relationships with a focus on institutional clients located in the Western region of the United States, based in the San Francisco office.

Previously at SSGA, Kim managed institutional client relationships in the Mid-Atlantic region based in the Boston office. Prior to joining the Institutional Client Group, Kim worked in the firms Portfolio Administration Group responsible for the operations of funds managed by both the Global Beta Equity Solutions and Tax Efficient Market Capture Portfolio Management teams. Prior to joining SSGA, Kim worked in client service at Acadian Asset Management following her role at State Street Bank and Trust as a Portfolio Accountant.

Kim received her Bachelors of Science in Business Administration with a concentration in Finance and minor in Economics from the University of New Hampshire. Kim holds the FINRA 7 and 63 registrations.

Craig is a Managing Director and the Head of Public Funds & Taft-Hartley at SSGA within the Americas Institutional Client Group. Craig has returned to State Street where he first began his career, and spent 17 years, serving initially as a portfolio strategist for our active international equity strategies. From there Craig later became a senior relationship manager and then Head of New Business Development for Public Fund and Taft-Hartley clients until his departure in 2011.

In 2011, Craig joined Pioneer Investments where he initially was responsible for sales and consultant coverage across client segments. Subsequently he became Head of Relationship Management, leading a team responsible for all aspects of managing Pioneer's institutional client base.

Craig holds a MBA from Boston College and BA from Providence College.

Biographies

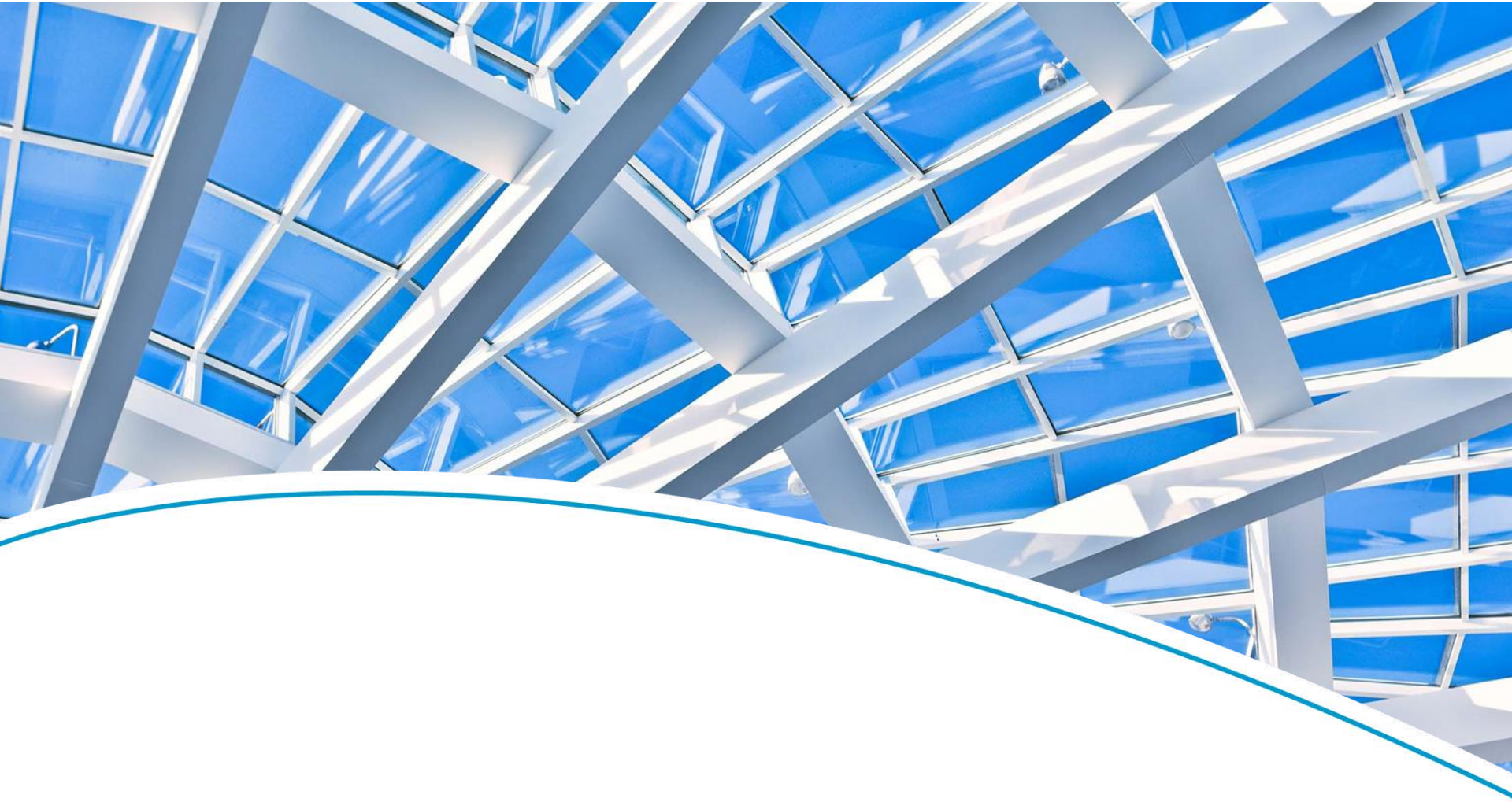


Karl Schneider, CAIA, is a Managing Director of SSGA and Deputy Head of Global Equity Beta Solutions (GEBS) in the Americas. He also serves as a senior portfolio manager for a number of the group's passive equity portfolios. Previously within GEBS, he served as a portfolio manager and product specialist for US equity strategies and synthetic beta strategies, including commodities, buy/write, and hedge fund replication. He is also a member of the S&P Dow Jones US Equities Index Advisory Panel.

Prior to joining the GEBS team, Mr. Schneider worked as a portfolio manager in SSGA's Currency Management Group, managing both active currency selection and traditional passive hedging overlay portfolios. He joined SSGA in 1997.

Mr. Schneider holds a BS in Finance and Investments from Babson College and also an MS in Finance from Boston College. He has earned the Chartered Alternative Investment Analyst designation and is a member of the CAIA Association.

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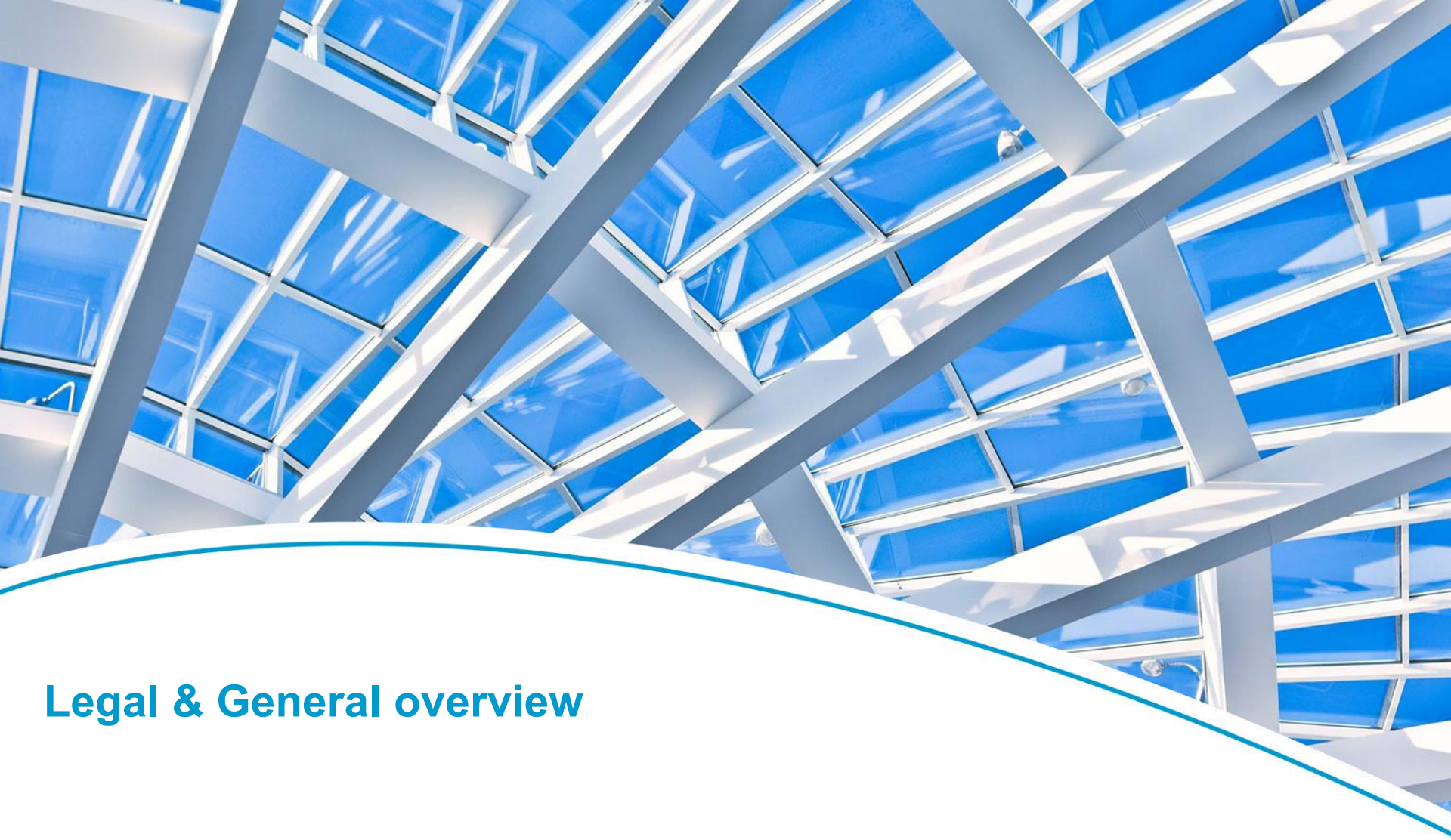
1 Legal & General overview

2 Global Index overview

3 Scientific Beta Index funds - Philosophy and process

4 Appendix

Legal & General
INVESTMENT MANAGEMENT
AMERICA



Legal & General overview

“Legal & General” also seen as “we” throughout this presentation relates to Legal & General Investment Management America (“LGIMA”), an SEC registered investment advisor, Legal & General Investment Management (“LGIM”), an FCA registered advisor, LGIM Asia an adviser registered with the Hong Kong Securities and Futures Commission and LGIM International (“LGIMI”), an FCA registered advisor and SEC registered investment advisor. The foregoing is for the services of only LGIMA.

For more additional information regarding LGIMA, please see the Disclosure Section at the end of this presentation.

Legal & General overview

Who we are

Global provider of investment management and retirement solutions. Groupwide managed assets of $1.3 trillion[1]

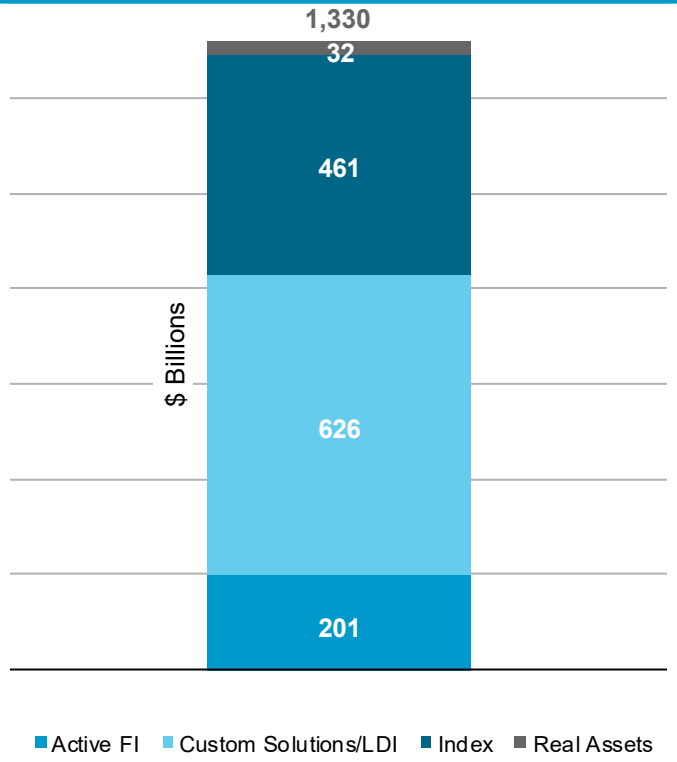
- Founded in 1836
- Fifth largest institutional asset manager in the world[2]
- Over 8,000 employees worldwide

What we do

Help our clients manage their outcomes by delivering custom solutions through our core strengths:

- Active fixed income
- Index strategies
- Liability Driven Investing (LDI)
- Derivative Overlays
- Pension risk transfer (through Legal & General Retirement)
- Real Assets

Breakdown of Assets[1]



[1]Assets include Legal & General Investment Management (LGIM), LGIM International (LGIMI), and Legal & General Investment Management America (LGIMA) AuM. Conversion rate: 1 GBP = 1.3528 USD, as of December 31, 2017. These assets include derivatives notional of $369 billion.
[2]P&I 2016 Survey as of December 31, 2017 (includes notional AuM).

LGIMA overview

Active Fixed Income	Customized Solutions	Buy and Maintain/PRT	Index
$48 billion	**$31 billion***	**$26 billion****	**$85 billion**
Experienced team of credit professionals with proven track record	Customized strategies across LDI, derivative overlays, multi-asset and risk premia*	Portfolios designed to meet end-game objectives	Customized index capabilities focused on governance and transparency

Founded in 2006, LGIMA is a US investment management firm that manages $175 billion* on behalf of institutional investors, focusing on delivering investment outcomes for clients.**

Data as of June 30, 2018.
*Please note of the $30 billion in custom solutions assets, $15 billion is derivative notional funds for the custom solution programs.
**Includes assets managed on behalf of affiliates.
***Does not include notional values.
Derivatives used for replication or hedging purposes

Legal & General
INVESTMENT MANAGEMENT AMERICA

Representative LGIMA client list

Corporate clients

- 3M Employee Retirement Income Plan Trust
- Ameren Master Retirement Trust
- American Air Liquide Holdings, Inc. Retirement Plan
- A.O. Smith Pension Trust
- Aon Pension Plan Trust
- BASF Corporation Pension Plan
- Bell Atlantic Master Trust - (Verizon)
- Bemis Retirement Plan
- Boehringer Ingelheim USA Corp Master Trust
- Boeing Pension Master Trust
- Caleres, Inc. Retirement Plan
- Cargill, Inc. and Associated Companies
- CBS Master Trust
- Celanese Americas Retirement Pension Plan
- CenterPoint Energy Retirement Plan and Trust
- CH2M Hill Defined Benefit Master Trust
- DTE Energy Corporate Services, LLC
- Duke Energy Corporation Master Retirement Trust
- Dynegy Inc. Master Retirement Trust
- Ericsson Inc. Retirement Plan
- Exelon Corporation Pension Master Trust
- FCA US LLC Master Retirement Trust
- First Horizon National Corporation Pension Plan
- FirstEnergy System Master Retirement Trust
- Ford Motor Company Defined Benefit Master Trust
- General Motors Employees Pension Trust
- GOCO Pension Plan
- Goodyear Tire & Rubber Company Common Trust
- Hormel Foods Defined Benefit Master Trust
- Integrys Energy Group Master Retirement Trust
- Kellogg Company Master Trust
- Law Companies Group, Inc. Pension Plan
- Legacy Pension Plan (Barrick)
- Mercer Group Trust
- Michelin North America, Inc. Master Retirement Trust
- Mondelez Global LLC Defined Benefit Trust
- Nestlé in the USA Pension Trust
- PG&E Retirement Master Trust
- Pinnacle West Capital Corporation Retirement Plan
- Pitney Bowes Pension Plan
- Reynolds American Master Trust
- Rio Tinto America Master Retirement Trust
- Rolls-Royce North American Pension Plan
- Roseburg Forest Products Co. and Carpenters Industrial Council Master Pension Trust
- SEI
- Sempra Energy Defined Benefit Master Trust
- SPX Corporation Master Pension Trust
- TECO Energy Group Retirement Plan
- The Milliken Pension Trust
- TRW Master Trust
- US Bank Pension Plan
- Vulcan Materials Company
- Woods Hole Oceanographic Institution Retirement Trust

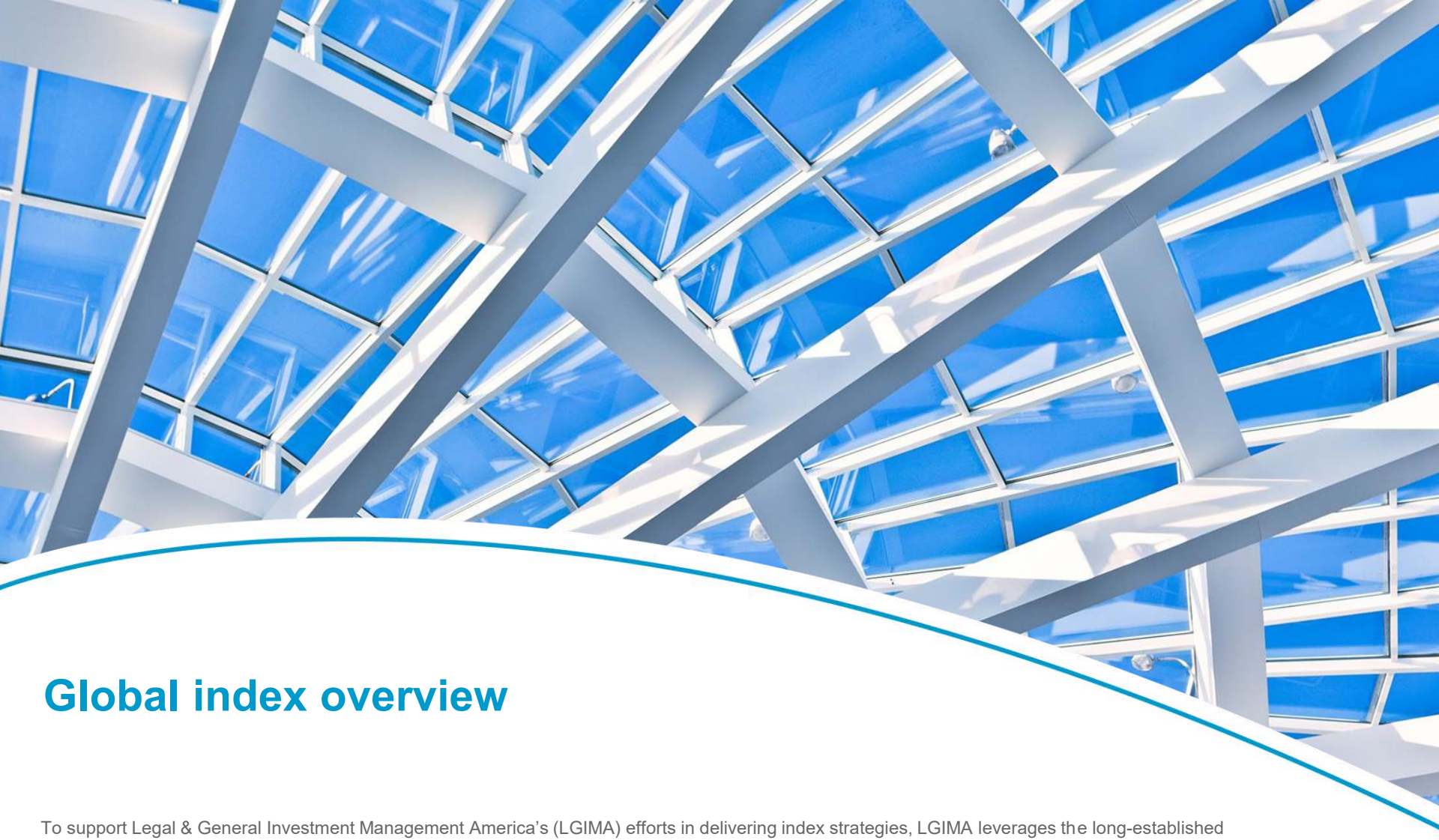
Non-corporate clients

- Arizona State Retirement System
- Beaumont Health; Southfield, MI.
- Blue Cross Blue Shield Association
- Care New England Pension Plan
- City of Austin Employees' Retirement System
- Employees' Retirement System of the State of Hawaii
- Horizon Healthcare Services, Inc
- John S. and James L. Knight Foundation
- Novant Health, Inc.
- Ohio Bureau of Workers' Compensation
- OhioHealth Cash Balance Retirement Plan Trust
- Piedmont Healthcare, Inc. Retirement Plan
- Premier Health Partners Employees Retirement Plan
- SantaFe Healthcare Inc. Pension Plan
- St. Clair Hospital Retirement Plan
- The American Jewish Joint Distribution Committee, Inc. Employees Retirement Plan
- The University of Arkansas Foundation, Inc.
- University Hospitals Health System Inc. Retirement Plan

As of June 20, 2018.

The clients listed above are believed to be generally representative of the types of clients serviced by LGIMA, but were selected in part on the basis of the name recognition of their organizations. Investment returns realized by these clients were not considered when selecting them. It is not known whether the listed clients approve or disapprove of LGIMA or the advisory services provided. Client names may be abbreviated for simplicity in presentation. This list also contains investors in our LGIMA Pooled Funds or Legal & General CIT.

Legal & General
INVESTMENT MANAGEMENT AMERICA



Global index overview

To support Legal & General Investment Management America's (LGIMA) efforts in delivering index strategies, LGIMA leverages the long-established business model and utilizes the resources of its affiliate, Legal & General Investment Management (LGIM), for advice and for back office and risk management functions, and LGIM International (LGIMI) for global trading services. The Legal & General groupwide Global Index Team is comprised of members of LGIM, LGIMA, LGIM Asia and LGIMI, working independently or collaboratively through service level agreements or sub-advisory agreements, and is described as "Legal & General" or as "we/our" throughout this section.

LGIMA advises the Legal & General Collective Investment Trust, which is offered pursuant to 3(c)(11) of the Investment Company Act and is solely distributed for investment by eligible trusts (collectively referred to as "Index Funds"). The Index Funds are bank maintained collective investment funds for which Reliance Trust Company is the trustee and investment manager. LGIMA manages private funds which are offered pursuant to 3(c)(7) of the Investment Company Act and is solely distributed for investment to qualified purchasers.

Indexing

Creating long term value for our clients

Global index provider

- **30-year track record** of managing index assets for clients[1]
- **Fifth largest** global indexer[2] with over **$461 billion in global assets[3] and $84 billion managed in the US**[1]
- **Global team** of **30 investment professionals** in Chicago, London and Hong Kong[4]
- **Low cost implementation** focused on minimizing transaction costs and risk while preserving wealth

Index engagement model

- **Focus on outcomes:** Analyze current portfolios relative to desired outcomes
- **Design matters:** In-depth insights on the construction and methodology of indices; it's an active decision
- **Factor based investing:** Expertise in defining, combining, and implementing factor based portfolios
- **Solutions:** Scalable as well as custom solutions using both physical as well as synthetic solution to shape outcomes

Commingled fund value proposition

- **Governance:** Fewer conflicts of interest with emphasis on governance due to unaffiliated trustee and custodian
- **Transparency:** One flat fee proposal, all fund expenses paid by LGIMA
- **Flexibility:** At cost movement into funds, T-1 International notification, at cost movement between lending and non-lending

Analyze portfolios relative to targeted outcomes → **Design matters when recommending target exposures** → **Transparent, low cost, flexible implementation** → **Strong governance and risk management**

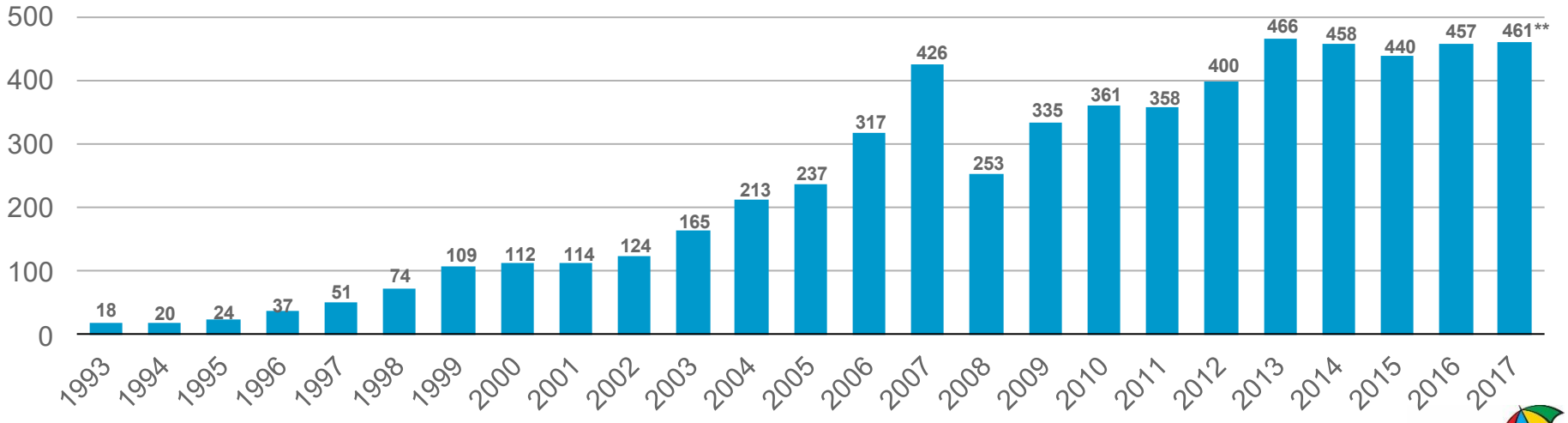
[1]As of March 31, 2018.
[2]Source: P&I – June 30, 2017.
[3]As of December 31, 2017.
[4]The Legal & General groupwide Global Index team is comprised of members of LGIM, LGIMA, LGIM Asia and LGIMI, working independently or collaboratively through service level agreements or sub-advisory agreements, and is described as "Legal & General" or as "we/our" throughout this presentation.

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Legal & General passive assets under management

Manager	Index AUM	Equity	Fixed Income
1 BlackRock Inc.	3,682,536	2,724,501	919,332
2 Vanguard Group Inc.	3,301,070	2,633,402	667,668
3 State Street Global Advisors	1,934,329	1,505,091	311,868
4 Northern Trust Asset Management	484,406	400,430	83,976
5 Legal & General*	444,846	311,581	119,579
6 BNY Mellon Investment Management	325,145	284,513	40,464

Source: P&I – June 30, 2017. Total may include assets not included in breakout categories.



Source: LGIM.
*LGIM internal AUM data as of June 30, 2017. May not total due to rounding.
**Assets include LGIM, LGIMI and LGIMA AUM.
Conversion rate: 1 GBP = 1.3528 USD, as of December 31, 2017.

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Legal & General factor-based strategy assets

Non-traditional indices (factor based, alternative exposures, ESG) - AUM $62 billion[1]

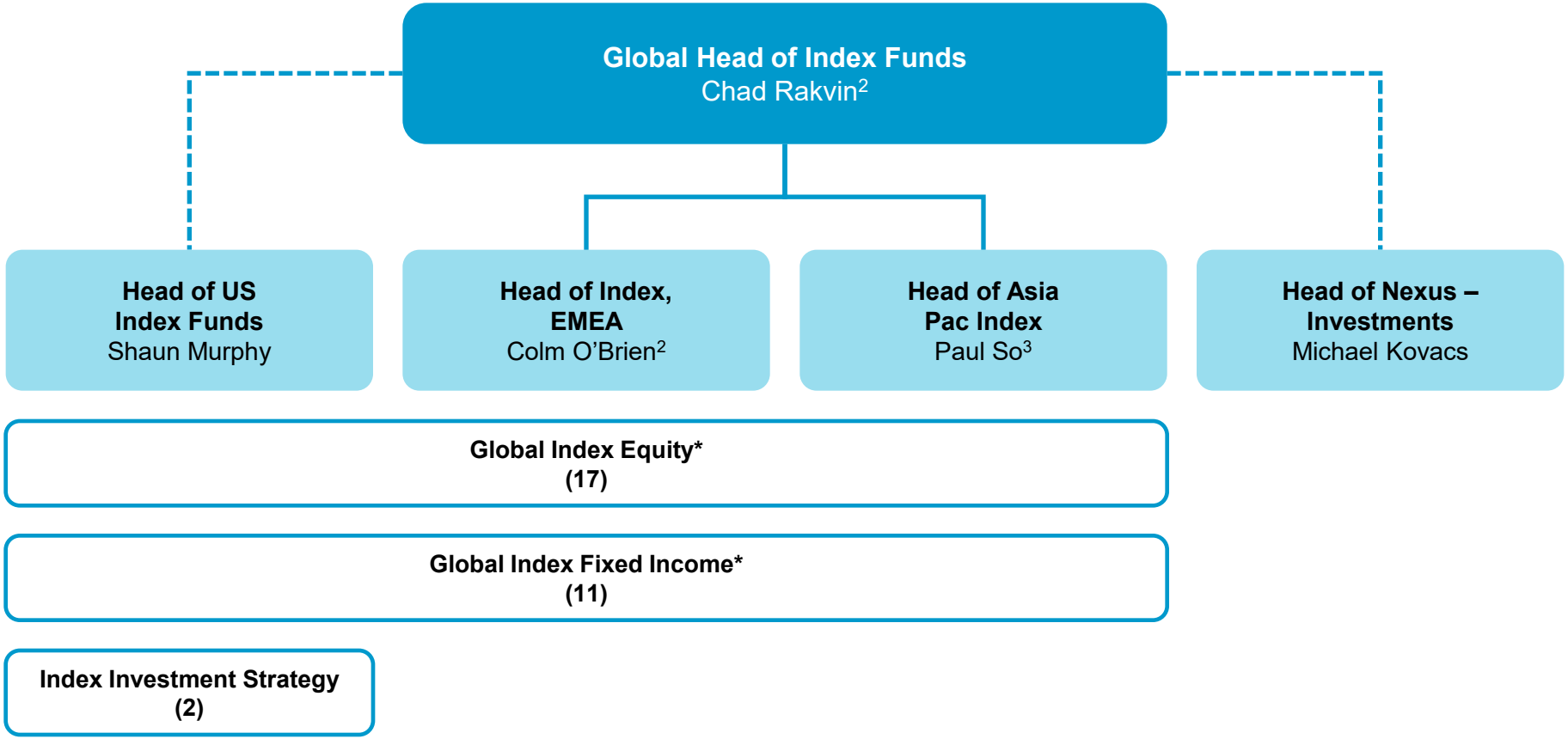
Scientific Beta AUM $4.3 billion[2]

Strategy	Total Strategy Assets ($mm)[3]
Scientific Beta Developed ex US Four-factor EW	**$1,582**
Scientific Beta Emerging Market Four-factor EW	**$826**

[1]Assets include Legal & General Investment Management (LGIM) and Legal & General Investment Management America (LGIMA). As of December 31, 2017.
[2]Assets include Legal & General Investment Management (LGIM) and Legal & General Investment Management America (LGIMA). As of June 30, 2018.
[3]AUM as of June 30, 2018.

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Global index team[1]



As of February 6, 2018

[1]The Legal & General groupwide Global Index team is comprised of members of LGIM, LGIMA, LGIM Asia and LGIMI, working independently or collaboratively through service level agreements or sub-advisory agreements.

[2]LGIM employee.

[3]LGIM Asia employee.

*Some team members are double counted because they have both equity and fixed income responsibilities.

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Legal & General CIT structure

Factor	Description	Benefit
Independent trustee	Trustee has no affiliation to Legal & General	Independent fund oversight to mitigate conflicts of interest
One flat fee proposal	All non client driven activity fees and expenses paid for by Legal & General	Fee transparency and lower cost offering
Flexible lending/ non-lending structure	Allows movement between lending and non-lending structure with no additional cost	Lower cost, more flexibility
Stock lending split	Conservative program administered by third party where **100%** of net revenue is provided to pooled clients*	Lower risk and improved fund performance
Fund restructuring service	At-cost movement in and out of fund structure	Potential for lower risk and cost
Cash flow notification	Notification until trade date for domestic exposure and trade date minus one for international exposure	Provides flexibility in line with plan sponsor's exposure and liquidity requirements
Mitigation of conflicts of interests	No passive commissions used for soft dollar activities Thoughtful selection of third party service providers to help minimize cost and risk that are passed through to the funds	Mitigates conflicts and lowers total expense ratio, which improves fund performance

*For this service the lending agent is paid 15% of the gross revenues of the lending program. The remaining 85% of income is paid directly to the participants.

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Scientific Beta index funds - Philosophy and process

Philosophy and process overview

Investment philosophy

- Two equally important objectives: close tracking and minimizing costs

Mitigating risk

- Understanding risk characteristics
- Detailed knowledge of index rules

Minimizing costs and maximizing value

- Reduce turnover
- Efficient trading strategies
- Implementation of index changes
- Corporate actions

Investment risk control

- ✓ Portfolio constraints
- ✓ Pre-trade risk controls
- ✓ Exception reporting
- ✓ Independent monitoring

Rigorous investment process

Portfolio Construction

- Full replication versus sampling
- Trade generation
- Disciplined management of cost and risk

Implementation

- Define, understand, and control transaction cost
- Disciplined management of cost and risk

Risk Management

- Multi-dimensional risk controls
- Investment risk/compliance oversight



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Rigorous investment process – Portfolio construction

Portfolio construction

- Full replication
- Trade generation – Event driven investing
  - Optimization versus stratified sampling
  - Define and incorporate transaction cost estimate
  - Risk model
  - Efficient use of derivatives

Typical portfolio characteristics			
	Sci Beta Emerging	Sci Beta United States	Sci Beta Developed Ex US
Expected tracking error (+/-)	0.03%	0.01%	0.02%
Stock misweights (+/-)	0.03%	0.01%	0.02%
Country misweights (+/-)	0.10%	N/A	0.05%
Industry misweights (+/-)	0.08%	0.02%	0.05%
Sector misweights (+/-)	0.08%	0.02%	0.05%

Result:

- A trade list that balances total transaction costs and active risk
- A portfolio that matches the risk and return characteristics of the benchmark

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SciBeta Emerging 4F EW CIT characteristics

Country	Fund	Index [1]	Misweight
Brazil	4.74%	4.74%	0.00%
Chile	1.91%	1.91%	0.00%
China	28.74%	28.74%	0.00%
Colombia	1.10%	1.11%	0.00%
Czech Republic	0.67%	0.66%	0.00%
Greece	1.06%	1.06%	0.00%
Hungary	0.61%	0.61%	0.00%
India	10.41%	10.41%	0.01%
Indonesia	1.92%	1.93%	-0.01%
Korea (the Republic of)	10.57%	10.56%	0.01%
Malaysia	5.08%	5.08%	0.00%
Mexico	2.27%	2.27%	0.01%
Peru	0.67%	0.66%	0.00%
Philippines	1.23%	1.24%	0.00%
Poland	1.95%	1.95%	0.00%
Qatar	0.87%	0.86%	0.00%
Russia	2.12%	2.12%	0.00%
South Africa	3.80%	3.80%	0.00%
Taiwan	12.79%	12.79%	0.00%
Thailand	4.89%	4.88%	0.00%
Turkey	1.17%	1.17%	0.00%
U.A.E. (United Arab Emirates)	1.45%	1.45%	0.00%

Sector	Fund	Index [1]	Misweight
Cyclical Consumers Goods and Services	9.53%	9.51%	0.02%
Basic Materials	9.39%	9.38%	0.01%
Energy	9.66%	9.65%	0.01%
Healthcare	3.89%	3.89%	0.00%
Technology	11.62%	11.62%	0.00%
Financials	25.41%	25.42%	0.00%
Utilities	8.53%	8.54%	-0.01%
Non-Cyclical Consumer Goods and Services	10.34%	10.35%	-0.01%
Industrials	6.10%	6.12%	-0.02%
Telecommunications Services	5.52%	5.52%	0.00%

Top 10 weighted index holdings	Country	Fund %	Index %[1]	Misweight
CHINA MOBILE LTD	China	1.13%	1.13%	0.00%
CNOOC LTD	China	1.06%	1.06%	0.00%
LENOVO GROUP LTD	China	0.81%	0.81%	0.00%
58.COM INC-ADR	China	0.67%	0.67%	0.00%
INFOSYS LTD	India	0.65%	0.65%	0.00%
CHINA RESOURCES BEER HOLDING	China	0.63%	0.63%	0.00%
CATHAY FINANCIAL HOLDING CO	Taiwan	0.60%	0.60%	0.00%
ANHUI CONCH CEMENT CO LTD-H	China	0.60%	0.60%	0.00%
PETROCHINA CO LTD-H	China	0.60%	0.60%	0.00%
CHINA UNICOM HONG KONG LTD	China	0.57%	0.57%	0.00%

Source: Scientific Beta, LGIMA and Indigo as of August 27, 2018.
[1]Benchmark: SciBeta Emerging MBMS 4F EW Net Return.
LGIMA advises a collective investment trust which are offered pursuant to 3(c)(11) of the Investment Company Act and is solely distributed for investment by eligible trusts. The Index Funds are bank maintained collective investment funds for which Reliance Trust Company of Georgia is the trustee and investment manager. This presentation should not be construed as solicitation for investment.

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SciBeta Developed Ex US 4F EW CIT characteristics

Country	Fund	Index [1]	Misweight
Australia	4.44%	4.44%	0.00%
Austria	0.91%	0.93%	-0.02%
Belgium	1.38%	1.39%	0.00%
Canada	9.48%	9.49%	-0.01%
Denmark	1.47%	1.47%	0.00%
Finland	2.37%	2.37%	0.00%
France	9.50%	9.48%	0.02%
Germany	6.29%	6.27%	0.02%
Hong Kong	3.21%	3.21%	0.00%
Ireland	0.99%	0.99%	0.00%
Israel	0.54%	0.54%	0.00%
Italy	3.27%	3.27%	0.01%
Japan	23.08%	23.11%	-0.03%
Netherlands	3.34%	3.33%	0.01%
New Zealand	0.59%	0.59%	0.00%
Norway	1.50%	1.50%	0.00%
Portugal	0.51%	0.51%	0.00%
Singapore	2.70%	2.70%	0.00%
Spain	1.56%	1.55%	0.01%
Sweden	2.58%	2.59%	-0.01%
Switzerland	5.39%	5.39%	0.00%
United Kingdom	14.90%	14.90%	0.00%

Sector	Fund	Index [1]	Misweight
Industrials	17.64%	17.65%	-0.01%
Basic Materials	10.82%	10.82%	0.00%
Cyclical Consumers Goods and Services	15.30%	15.34%	-0.04%
Financials	22.85%	22.80%	0.05%
Non-Cyclical Consumer Goods and Services	8.59%	8.58%	0.01%
Energy	6.07%	6.07%	0.01%
Utilities	6.08%	6.08%	0.01%
Healthcare	4.81%	4.83%	-0.02%
Technology	5.02%	5.02%	0.00%
Telecommuncations Services	2.82%	2.83%	0.00%

Top 10 weighted index holdings	Country	Fund	Index [1]	Misweight
ROYAL DUTCH SHELL PLC-A SHS	United Kingdom	0.51%	0.51%	0.00%
KONINKLIJKE AHOLD DELHAIZE	Netherlands	0.48%	0.48%	0.00%
NN GROUP NV	Netherlands	0.39%	0.38%	0.01%
AGEAS	Belgium	0.38%	0.38%	0.00%
PEARSON PLC	United Kingdom	0.37%	0.37%	0.00%
INFORMA PLC	United Kingdom	0.37%	0.37%	0.00%
DIRECT LINE INSURANCE GROUP	United Kingdom	0.36%	0.36%	0.00%
DEUTSCHE WOHNEN SE	Germany	0.37%	0.36%	0.01%
VONOVIA SE	Germany	0.36%	0.35%	0.01%
ROYAL MAIL PLC	United Kingdom	0.35%	0.35%	0.00%

Source: Scientific Beta, LGIMA and Indigo as of August 27, 2018.
[1]Benchmark: SciBeta Emerging MBMS 4F EW Net Return.
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Performance

SciBeta Emerging 4F EW and SciBeta Developed Ex US 4F EW

SciBeta Emerging 4F EW CIT	Gross of Fees	Net of Fees	Benchmark
Month-to-date	2.70	2.67	2.73
3 Month	-6.42	-6.5	-6.27
Year-to-date	-6.64	-6.83	-6.33
1-year	0.32	-0.03	0.58
Since Inception – January 5, 2017	11.71	11.34	12.06
SciBeta Developed Ex US 4F EW CIT	**Gross of Fees**	**Net of Fees**	**Benchmark**
Month-to-date	1.67	1.65	1.66
3 Month	-1.71	-1.76	-1.76
Year-to-date	-0.79	-0.91	-0.98
Since Inception – September 27, 2017	5.26	5.07	5.01

Source: LGIMA internal data and ERI Scientific Beta as of July 31, 2018.
Gross of fees performance returns are presented before management and custodial fees.

The investment management fee schedule for the SciBeta Emerging Multi-factor CIT is 0.35% on on assets $0- $100 million; 0.30% on assets $100 to $250 million; 0.25% on assets $250 million - $500 million; 0.20% on assets > $500 million . $20 million minimum account size. Net of fees performance, and other expenses, which are further described in the GIPS presentation, is calculated based on a flat 0.35% fee on all assets, although actual investment advisory fees incurred by clients may vary.

The investment management fee schedule for the SciBeta Dev ex USA Multi-factor CIT is 0.20% on on assets $0- $100 million; 0.18% on assets $100 to $250 million; 0.16% on assets $250 million - $500 million; 0.14% on assets > $500 million. Net of fees performance, and other expenses, which are further described in the GIPS presentation, is calculated based on a flat 0.20% fee on all assets, although actual investment advisory fees incurred by clients may vary.

Past performance is not indicative of future results. Investment advisory fees are described in Part 2A of Form ADV.

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Portfolio management – Emerging market equity overview

Operational and process risk
- Settlement issues
- Failed trades
- Buy-in process
- High overdraft rates

Regulatory and market risk
- Capital and foreign exchange controls
- Foreign ownership limits
- Local account set up

Execution risk
- Prevent information leakage
- Achieve best execution – Venues available

Cost risk
- Minimize total transaction costs while containing risks
- Use substitute securities, depository receipts, foreign lines, futures, ETFs



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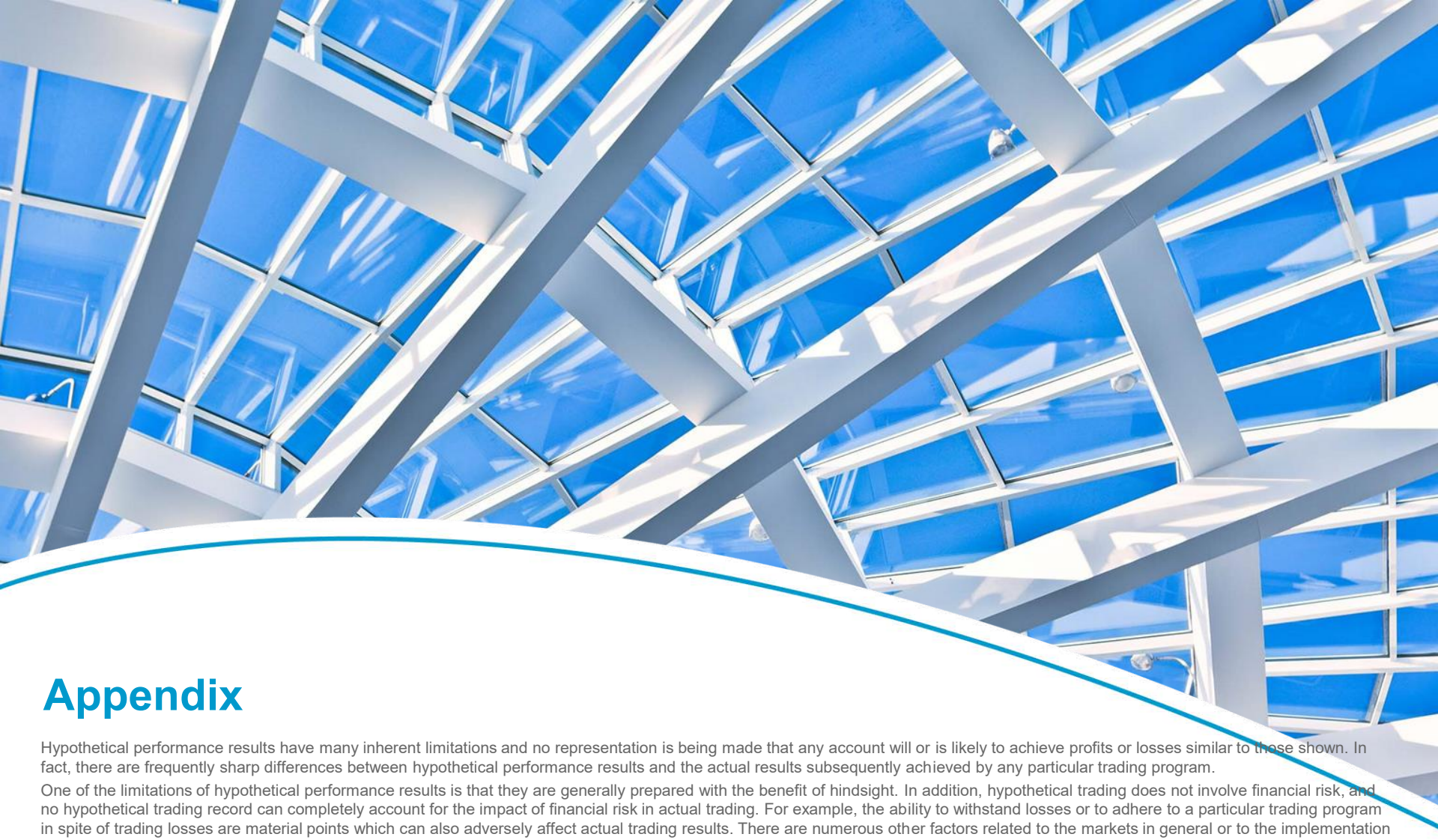
LGIMA index value add

- Risk adjusted performance can be enhanced through a careful trade implementation
- Need thorough understanding of the capital markets and index methodologies
- Value add categories



Source: LGIMA, S&P Dow Jones.

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Appendix

Hypothetical performance results have many inherent limitations and no representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program.

One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In addition, hypothetical trading does not involve financial risk, and no hypothetical trading record can completely account for the impact of financial risk in actual trading. For example, the ability to withstand losses or to adhere to a particular trading program in spite of trading losses are material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results and all of which can adversely affect actual trading results.

The use of hypothetical performance is subject to inherent limitations derived from the reliance on historical data and the benefit of hindsight. All trading strategies applied to the analysis were available throughout the performance period. However, the analysis includes certain assumptions where actual performance could be different from the hypothetical performance presented.

In order to match the index returns a fund would need to track the security weightings in a way that would exactly match the Index and that the economic and market conditions were sufficient to have allowed effective execution of replicate the risk and return characteristics of the index. There are a number of factors that could reduce our ability to track index positions perfectly, including small position sizes and/or available liquidity in some securities. We estimate the net effects of index- and trading-related factors on the passive components of the strategy would affect performance either favorably or unfavorably depending on the size of the portfolio.

A review of the ERI Scientific Beta index methodology has been conducted by: a) comparing in and out of sample performance of the hypothetical back-tested information provided by Scientific Beta; b) testing the returns against the intended factor biases; c) conducting a comparison of similar multi-factor indices to Scientific Beta's multi-factor index; and d) reviewing the reasonability of portfolio characteristics. The output of the indices appears reasonable given the methodology and targeted portfolio risk biases.

Implementation of Scientific Beta Emerging Market Index funds

Understanding inefficiencies in emerging markets

45%
Current restricted FX in SciBeta EM 4F EW

7%
Expected LGIMA restricted FX in SciBeta EM 4F EW

LGIMA provides solutions to mitigate restricted FX dislocation

- ✓ LGIMA's index funds use an unaffiliated custodial network
- ✓ Market research and knowledge allows us to work directly with sub-custodians to make sure we are receiving optimal rates for FX execution
- ✓ For segregated funds, LGIMA has partnered with a third party provider to manage the restricted FX implementation

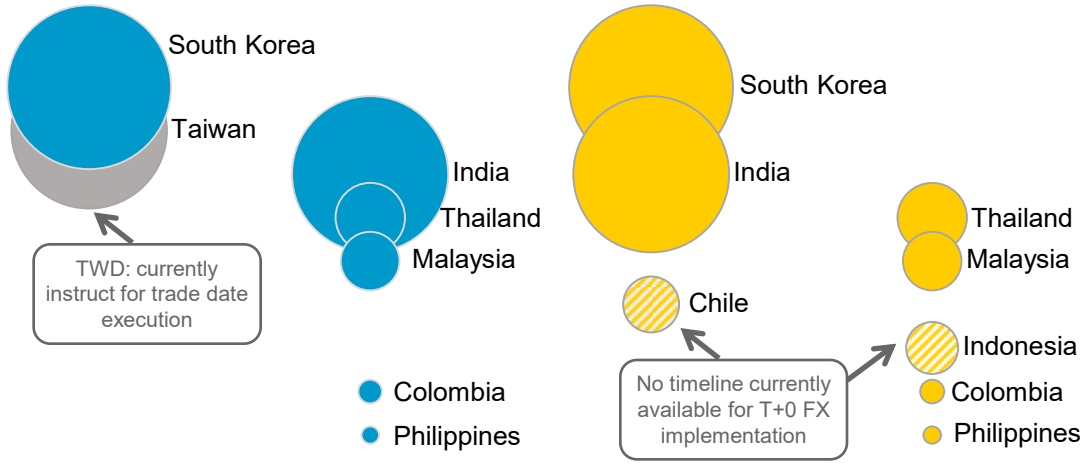
Standard custody FX timing

Expected FX slippage of 0 – 50bps from transactions executed through sub-custodian network

LGIMA custody FX timing

Reduce timing risk by executing on trade date; minimizes FX slippage from benchmark WM Reuters benchmark FX rate

Size of bubble = weight in SciBeta EM 4F EW



Trade cycle	T+0	T+1	T+2	T+3
% of index	0%	0%	34%	8%
% of index	17%	25%	2%	2%

Source: LGIMA, SciBeta November 30, 2017.

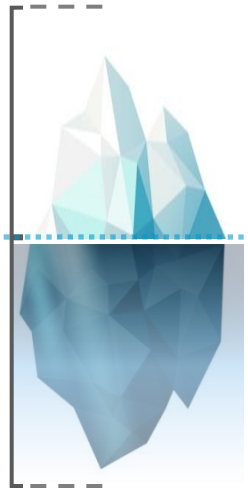
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Transaction costs - $100 million purchase emerging markets

Analyzing explicit and implicit costs of implementation

Estimated cost attribution for emerging markets

	Anticipated SciBeta 4F EW		Anticipated MSCI EM	
	"Worst Case"	"Best Case"	"Worst Case"	"Best Case"
	BPS		BPS	
Transaction costs Taxes, commissions, and exchange fees	-13	-12	-13	-12
Custody ticket charges	-2	-1	-2	-1
Subtotal Explicit costs	-15	-13	-15	-13
Restricted FX "Standard" settlement	-50	+50	-50	+50
Restricted FX LGIMA "risk mitigated" settlement	-10	+10	-10	+10
Total With "Standard" FX settlement	-65	+37	-65	+37
Total With LGIMA "risk mitigated FX settlement	-25	-3	-25	-3



Source: Based on current data identified by LGIMA as of October 13, 2017. Changes in a range of factors may impact anticipated results.

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Scientific Beta Indexes

Factor tilts plus diversification



[1]Amenc, N., F. Goltz, A. Lodh. 2012. Choose Your Betas: Benchmarking Alternative Equity Index Strategies. *Journal of Portfolio Management.*

[2]Amenc, N., F. Goltz. 2013. Smart Beta 2.0. *Journal of Index Investing*.

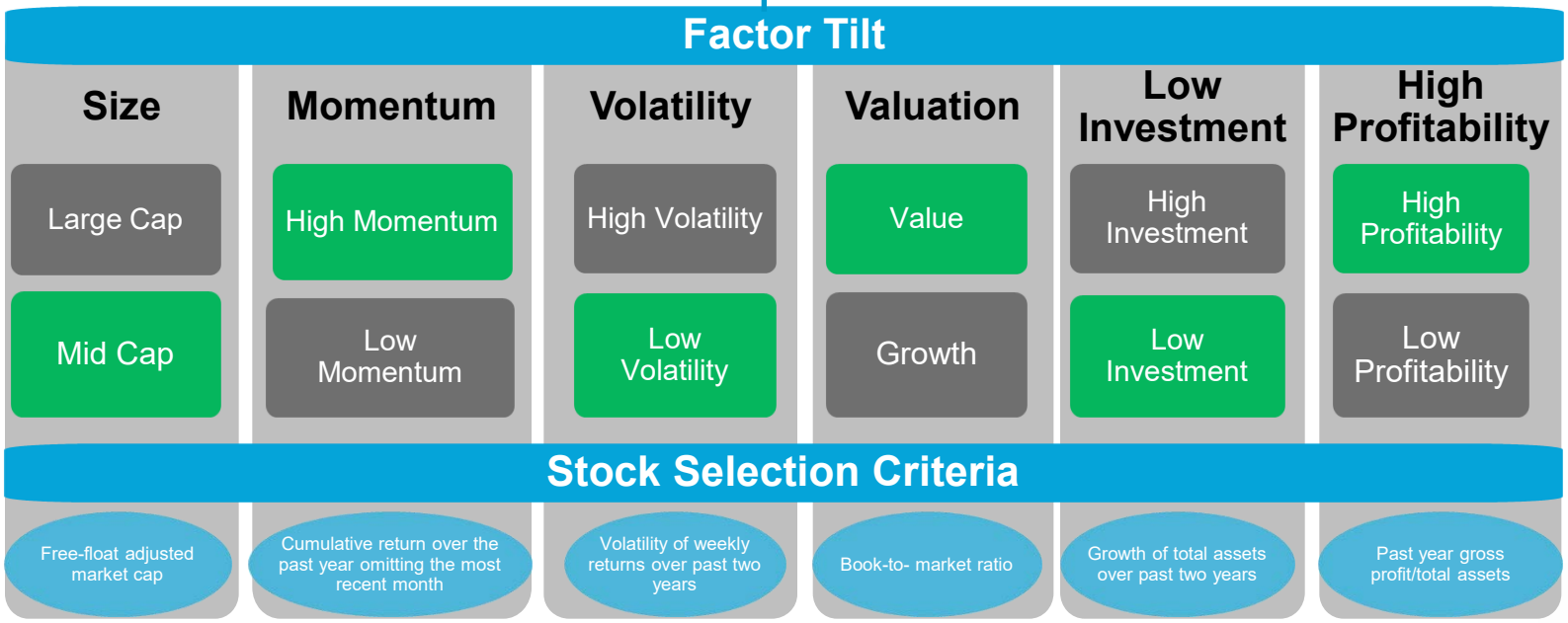
[3]Amenc, N. F. Goltz, A. Lodh, L. Martellini. 2012. Diversifying the Diversifiers and Tracking the Tracking Error: Outperforming Cap-Weighted Indices with Limited Risk of Underperformance. *Journal of Portfolio Management.*

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Factor selection and portfolio creation

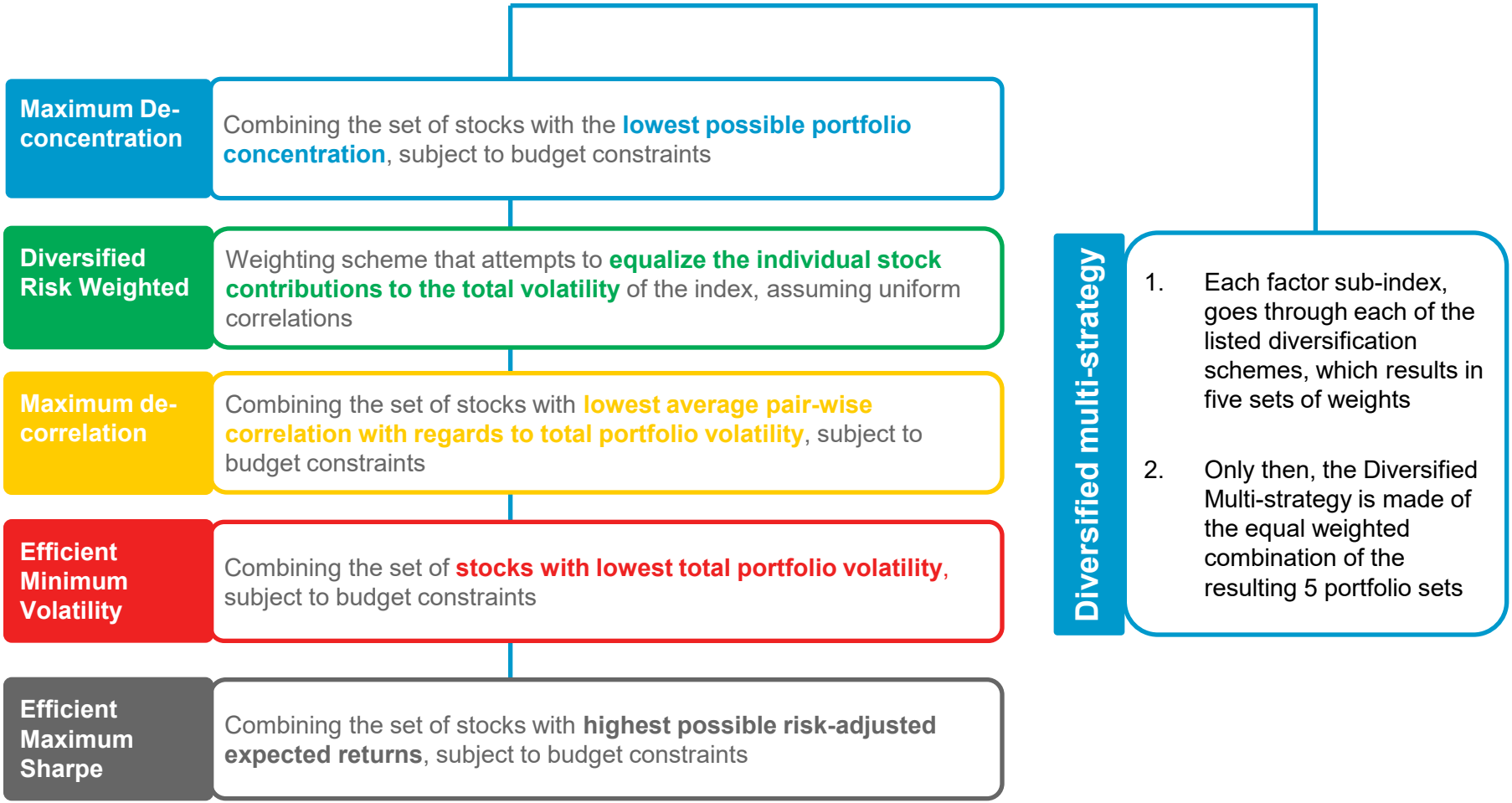
- Factor portfolios are the relevant 50% of the regional universe in the desired factor
- The factor portfolio can then be run through 1-5 diversification strategies (all 5 = diversified multi-strategy)
- The result is the final single factor portfolio
- Multi-factor portfolios can be combined via an equal weight (EW) or equal risk contribution (ERC)



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Smart beta 2.0 – Explaining Sci Beta's diversification 'voodoo'

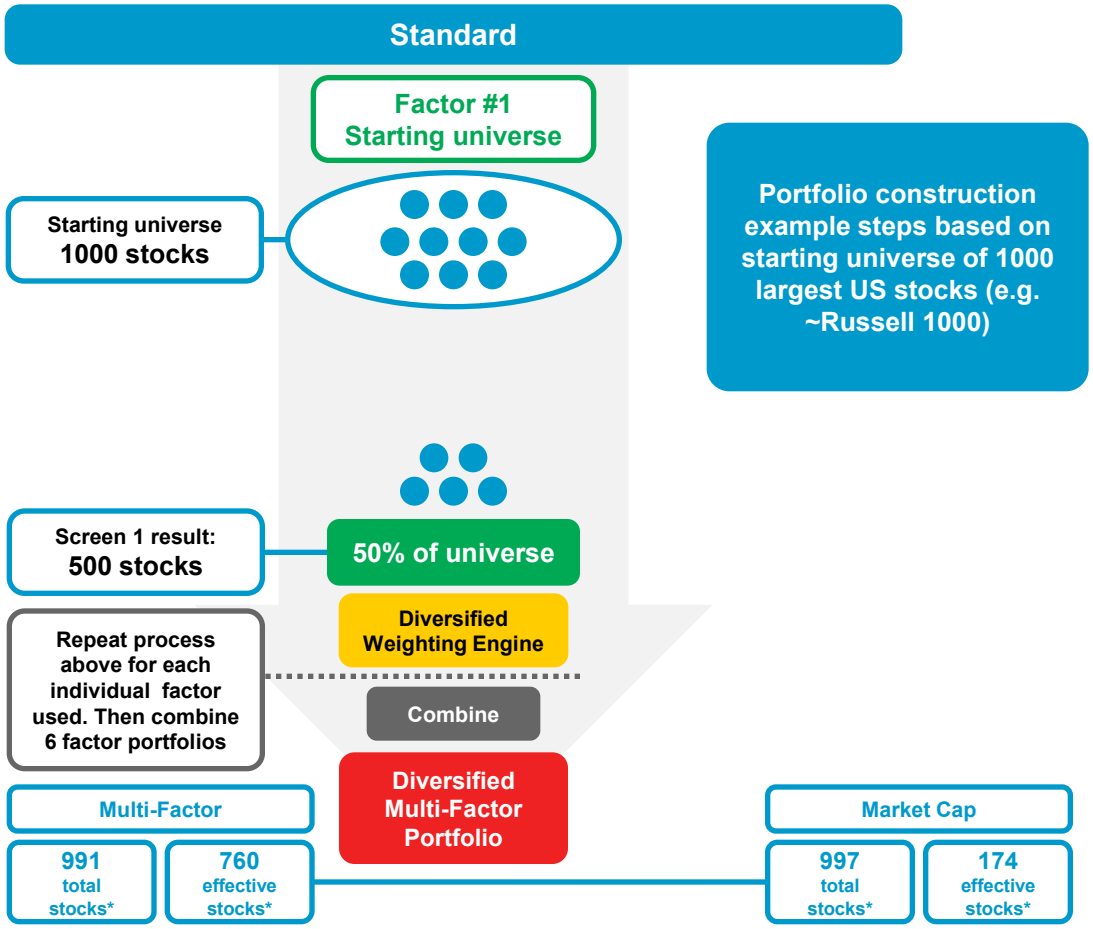


Source: EDHEC Risk Institute

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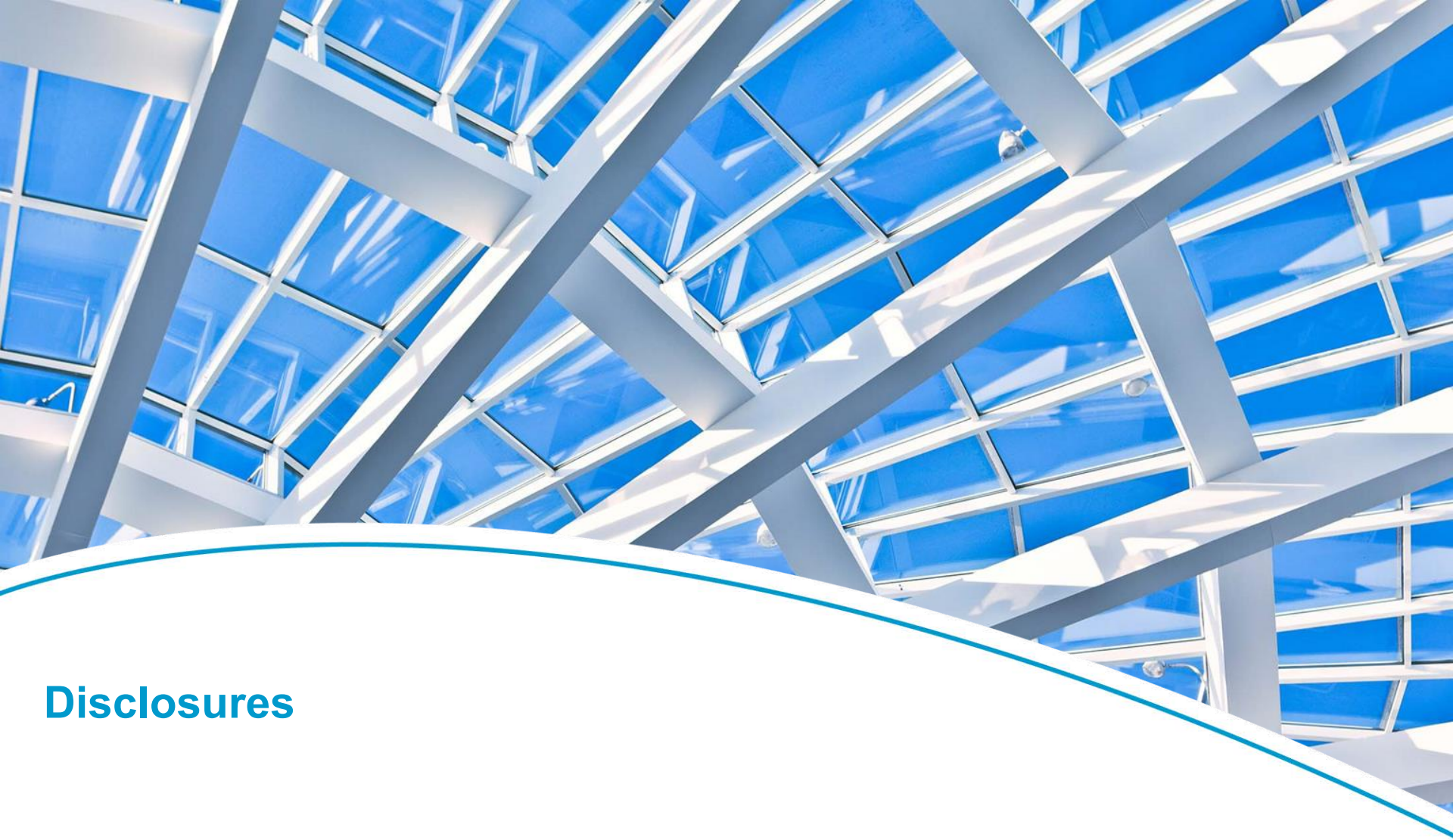
Scientific Beta's multi-beta offerings

Portfolio construction for two major types of smart factor indices



*Data as of June 30, 2017. Source: LGIMA, ERI Scientific Beta.

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Callan

September 21, 2018

ARMB Board Meeting

Investment Performance
Periods Ended June 30, 2018

Steve Center, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

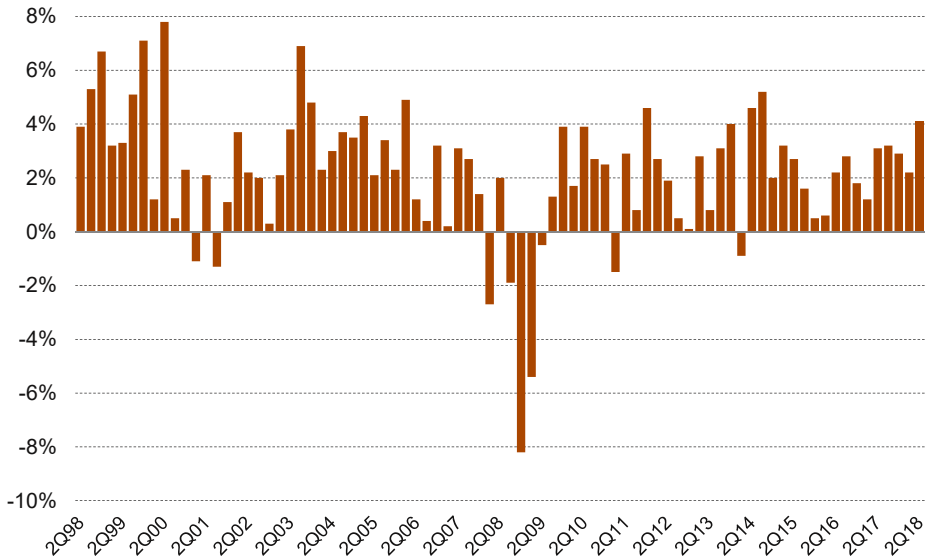
Agenda

- Market and Economic Environment
- Total Fund Performance
  - Major Asset Classes

U.S. Economy

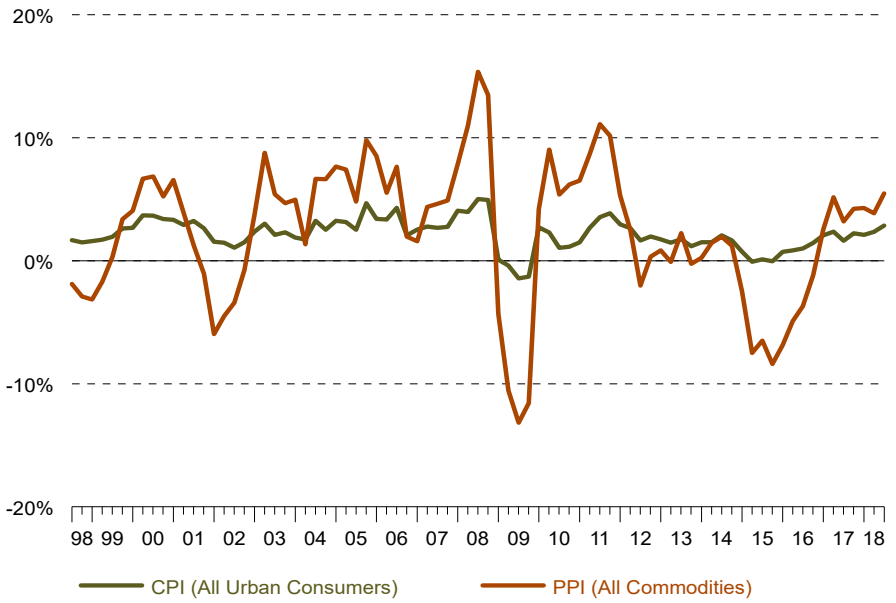
Periods Ending June 30, 2018

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

Inflation Year-Over-Year

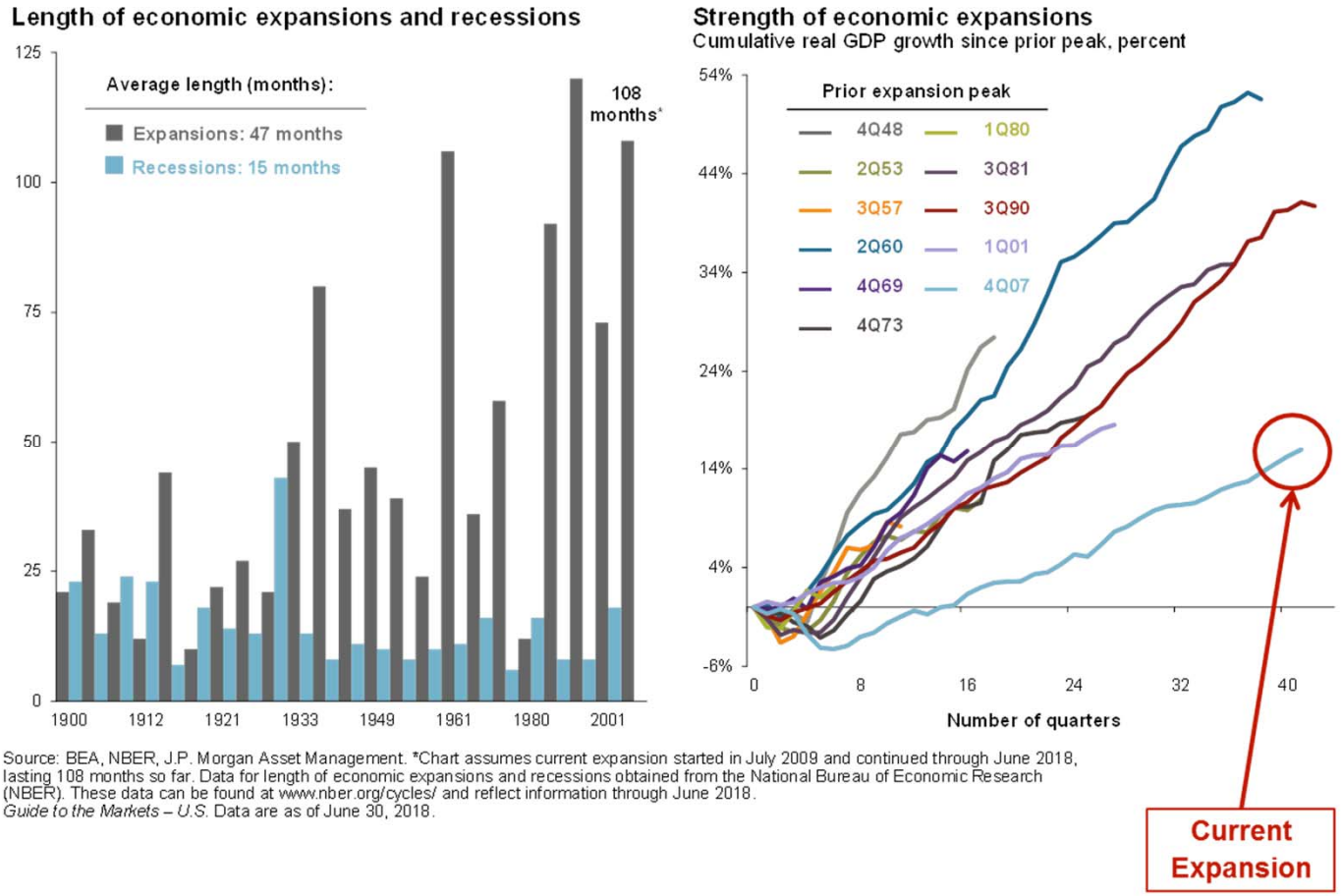


Source: Bureau of Labor Statistics

- The initial estimate of annualized second quarter GDP was 4.1%; below consensus, but dramatically exceeding the first quarter (2.2%). The second revised GDP estimate is 4.2%.
- June headline CPI rose 2.9% over the trailing twelve months. Core CPI increased 2.3%.
- The unemployment rate dropped (down 0.1%) from March levels to 4.0% in June.
- The Fed increased the target overnight rate by 25 basis points at its June meeting, bringing the target range to 1.75% to 2.00%. The core PCE deflator reached the Fed's target of 2% in June.

U.S. Expansion Continues

Expansions do not die of old age, but this one is getting close to being the longest



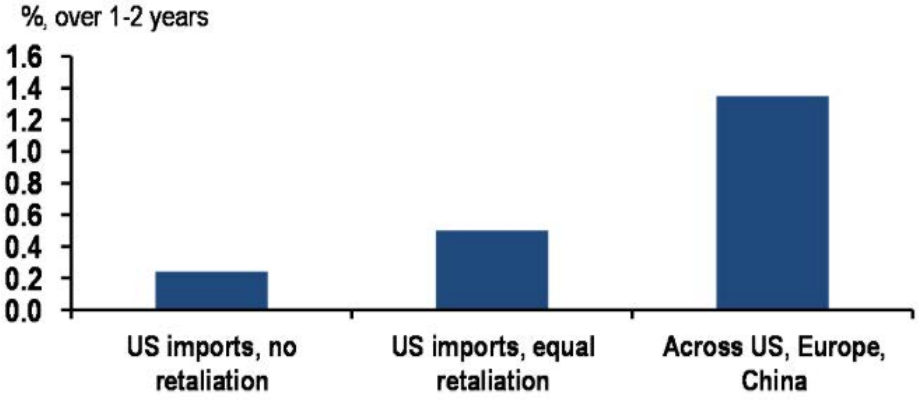
Source: BEA, NBER, J.P. Morgan Asset Management. *Chart assumes current expansion started in July 2009 and continued through June 2018, lasting 108 months so far. Data for length of economic expansions and recessions obtained from the National Bureau of Economic Research (NBER). These data can be found at www.nber.org/cycles/ and reflect information through June 2018.
Guide to the Markets – U.S. Data are as of June 30, 2018.

- The current recovery is one of the longest on record. However, it is also one of the least robust.
- The US's GDP growth has averaged just 2.2% during the current expansion..

Trade War Impact

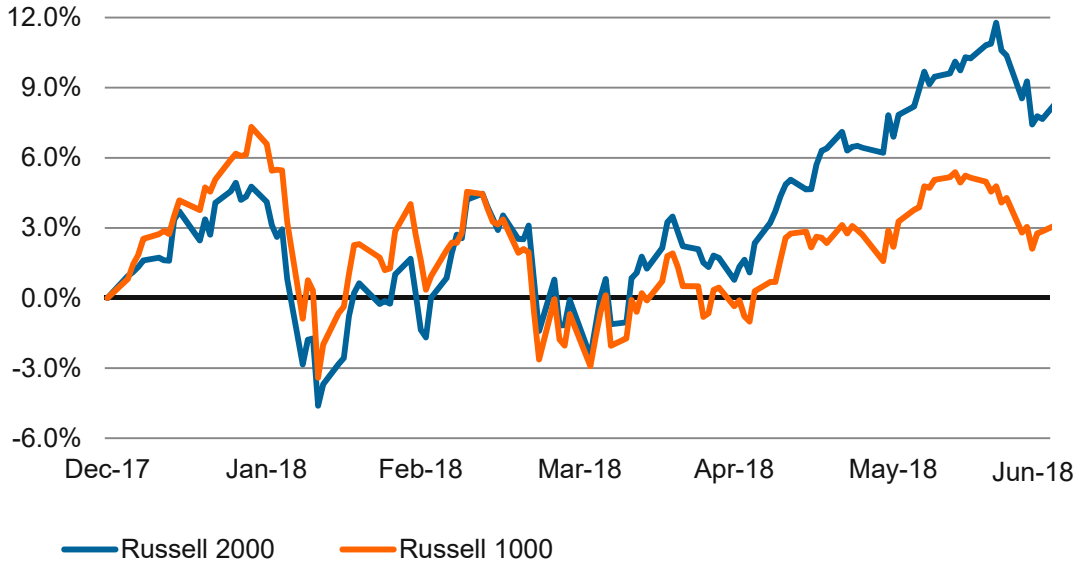
- Announced tariffs aren't expected to have a meaningful impact on growth; however, the magnitude ultimately depends on the degree to which other countries retaliate.
- An OECD study that looks at the far larger shock of a 10% across-the-board increase in tariffs by the U.S., euro zone, and China finds that global GDP would fall by 1.4%.
- The more impactful result may be an increase in uncertainty, which tends to precede weaker economic activity.
- Small caps are relatively immune from recent trade talk volatility.
  - Outperformance of small cap stocks in the U.S. year-to-date driven by rising dollar concerns and the higher percent of revenues generated at home (80% vs. 62% for the SP500).

Global GDP impact of 10%-pts tariff increase

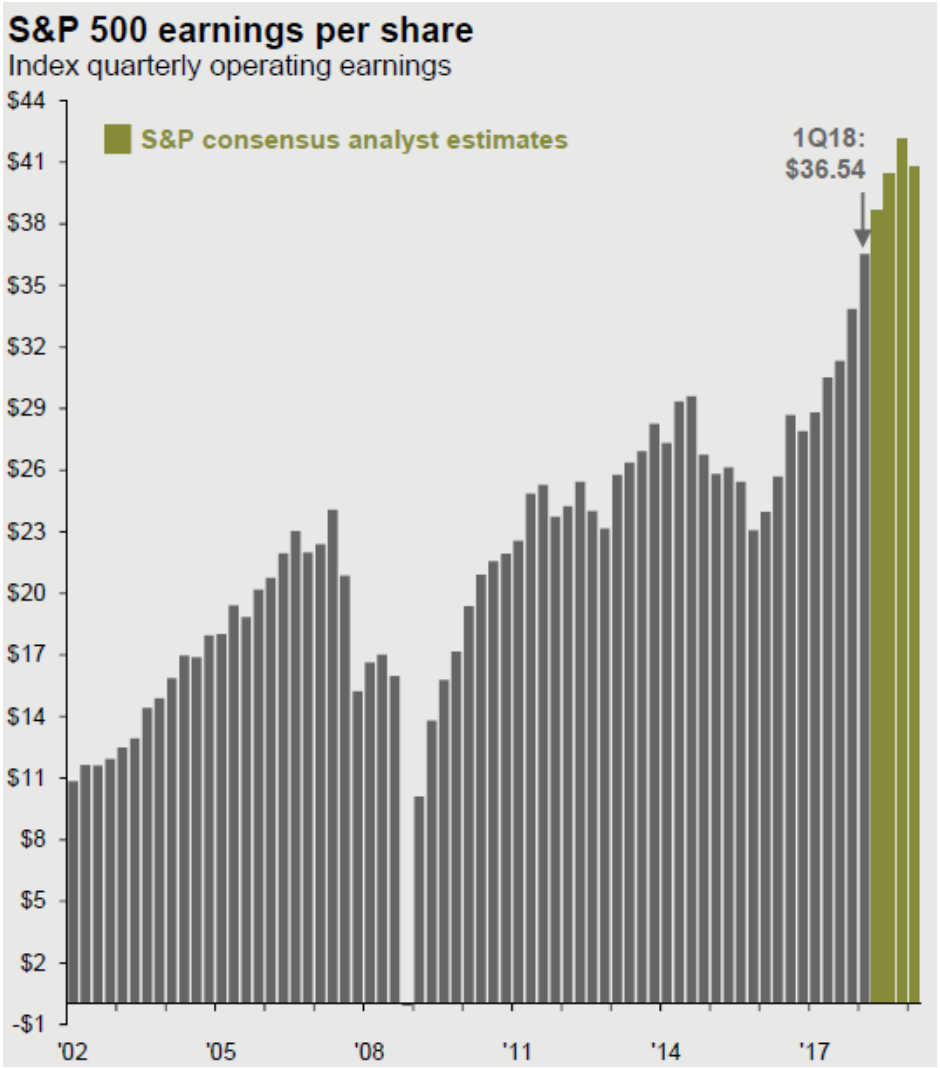


Source: IMF, OECD, J.P. Morgan

YTD Cumulative Performance of Small Cap vs. Large Cap



S&P 500 Earnings



- Through 08/10, 91% of companies in the S&P 500 have reported actual results for the second quarter.
- 79% of S&P 500 companies have reported positive EPS surprises and 72% have reported positive sales surprises.
- The blended earnings growth rate for the S&P 500 is 24.6%.
- All 11 sectors are reporting year-over-year earnings growth for the quarter, led by the Energy sector. Ten sectors are reporting double-digit earnings growth.
- Energy (+125%) and Materials (+56%) show the highest year-over-year earnings growth gains.

Source: FACTSET; Earnings Insight August 10, 2018

Source: JP Morgan Guide to the Markets, 3Q 2018 As of June 30, 2018

Asset Class Performance

Periodic Table of Investment Returns
for Periods Ended June 30, 2018

Best

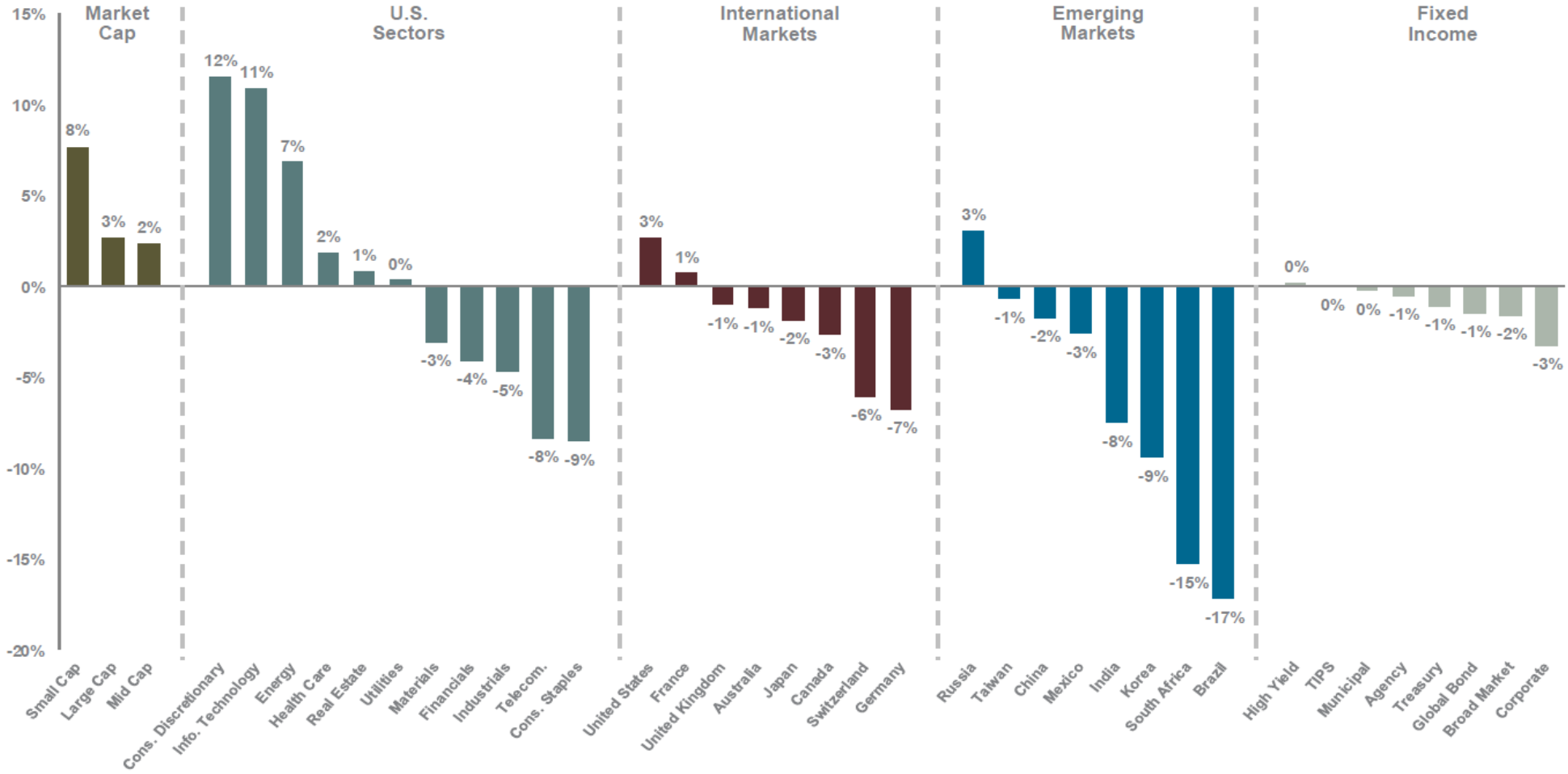
Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 20 Years
Russell:2000 Index 7.8%	Russell:2000 Index 17.6%	S&P:500 11.9%	S&P:500 13.4%	Russell:2000 Index 10.6%	MSCI:EM Gross 8.9%
S&P:500 3.4%	S&P:500 14.4%	Russell:2000 Index 11.0%	Russell:2000 Index 12.5%	S&P:500 10.2%	Russell:2000 Index 8.0%
3 Month T-Bill 0.5%	MSCI:EM Gross 8.6%	MSCI:EM Gross 6.0%	MSCI:EAFE 6.4%	Blmbg:Aggregate 3.7%	S&P:500 6.5%
Blmbg:Commodity Price Idx **(0.1%)**	MSCI:EAFE 6.8%	MSCI:EAFE 4.9%	MSCI:EM Gross 5.4%	MSCI:EAFE 2.8%	Blmbg:Aggregate 4.7%
Blmbg:Aggregate (0.2%)	Blmbg:Commodity Price Idx **5.8%**	Blmbg:Aggregate 1.7%	Blmbg:Aggregate 2.3%	MSCI:EM Gross 2.6%	MSCI:EAFE 4.3%
MSCI:EAFE (1.2%)	3 Month T-Bill 1.4%	3 Month T-Bill 0.7%	3 Month T-Bill 0.4%	3 Month T-Bill 0.4%	3 Month T-Bill 2.0%
MSCI:EM Gross (7.9%)	Blmbg:Aggregate (0.4%)	Blmbg:Commodity Price Idx **(5.2%)**	Blmbg:Commodity Price Idx **(6.8%)**	Blmbg:Commodity Price Idx **(9.3%)**	Blmbg:Commodity Price Idx **(0.5%)**

Worst

- Commodities returns have been improving following years of negative results..
- US large (S&P 500) and small cap (Russell 2000) stocks have delivered relatively strong returns.

Year-to-Date Performance of Various Asset Classes

As of June 30, 2018

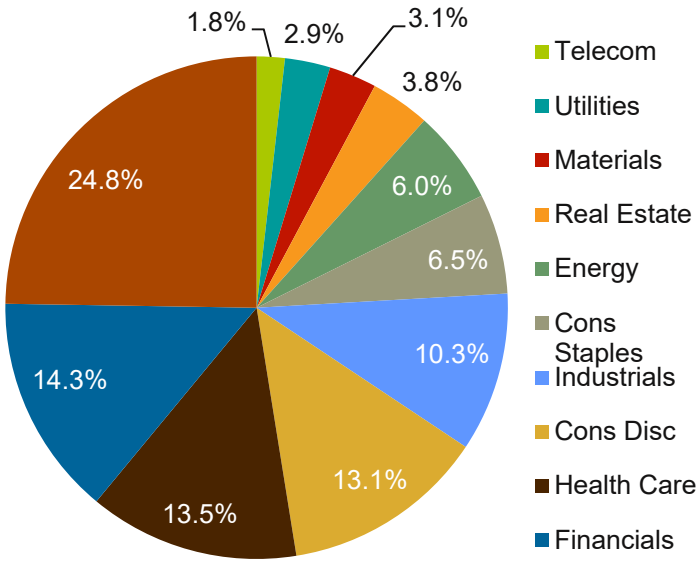


Source: Baird; Morningstar Direct. Asset classes are represented by the following benchmarks: Large Cap (S&P 500), Mid Cap (Russell Mid Cap), Small Cap (Russell 2000), Cons. Discretionary (S&P 500 Sectors/Consumer Discretionary), Cons. Staples (S&P 500 Sectors/Consumer Staples), Energy (S&P 500 Sectors/Energy), Financials (S&P 500 Sectors/Financials), Health Care (S&P 500 Sectors/Health Care), Industrials (S&P 500 Sectors/Industrials), Info. Technology (S&P 500 Sectors/Info. Technology), Materials (S&P 500 Sectors/Materials), Telecom. (S&P 500 sectors /Telecommunications), Utilities (S&P 500 Sectors/Utilities), Real Estate (S&P 500 Sectors/Real Estate), Australia ((MSCI Australia), Canada (MSCI Canada), France (MSCI France), Germany (MSCI Germany), Japan ((MSCI Japan), Switzerland ((MSCI Switzerland), United Kingdom (MSCI United Kingdom), United States (S&P 500), Brazil (MSCI Brazil), China (MSCI China), India (MSCI India), Korea (MSCI Korea), Mexico (MSCI Mexico), Russia (MSCI Russia), South Africa (MSCI South Africa), Taiwan (MSCI Taiwan), Agency (BBgBarc US Agency), Broad Market (BBgBarc US Agg. Bond), Corporate (BBgBarc US Corporate IG), High Yield (BBgBarc US Corporate HY), Municipal (BBgBarc Municipal), TIPS (BBgBarc US Treasury US TIPS), Treasury (BBgBarc US Treasury)

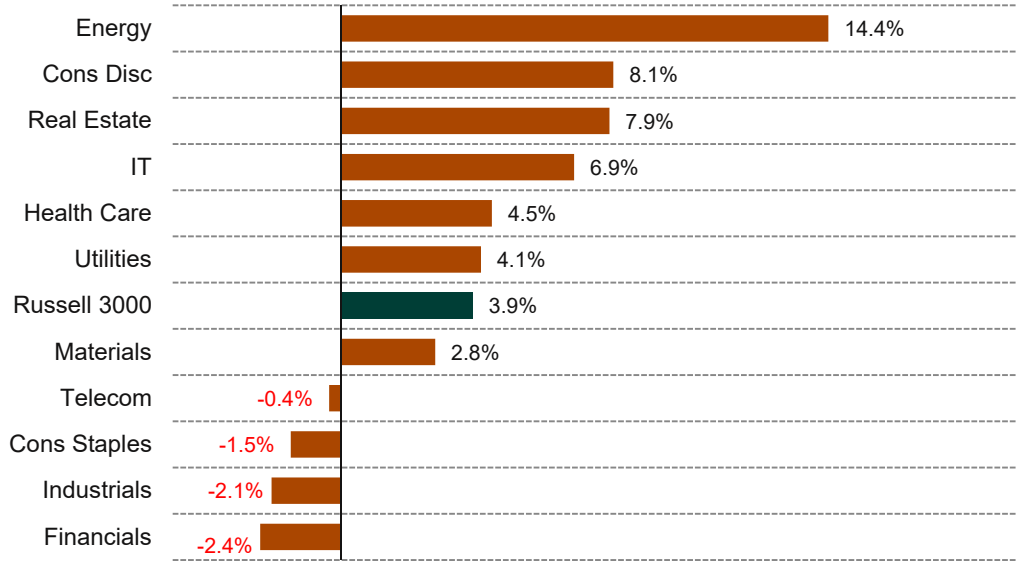
U.S. Equity Returns

Periods Ending June 30, 2018

Economic Sector Exposure (Russell 3000)



Quarterly Returns (Russell 3000)



- The RU 1000 was up 3.6% in the second quarter. Energy (14.1%) drove gains, while Financials (-3.1%) and Industrials (-2.7%) weighed on returns.
- The RU 2000 was up 7.8%. All sectors in the index were positive for the quarter with Energy (20.4%) and Real Estate (13.3%) generating the strongest performance.
- After a volatile first quarter, the VIX generally trended lower to finish the second quarter at 16.

U.S. Equity Style Returns

Periods Ending June 30, 2018

Q2 2018	Value	Core	Growth
Large	1.2%	3.6%	5.8%
Mid	2.4%	2.8%	3.2%
Small	8.3%	7.8%	7.2%

Annualized 1 Year Returns	Value	Core	Growth
Large	6.8%	14.5%	22.5%
Mid	7.6%	12.3%	18.5%
Small	13.1%	17.6%	21.9%

Represents 3 best performing asset classes in time period

Represents 3 middle performing asset classes in time period

Represents 3 worst performing asset classes in time period

- Last Quarter: Small outperformed large- and mid-cap; growth continued to outpace value in the larger capitalizations, but underperformed among small-caps.
- Last Year: Small-capitalization outperformed large and mid caps; growth outperformed across the cap structure.

Large Cap Core is represented by the Russell 1000 Index, Large Cap Value is represented by the Russell 1000 Value Index and Large Cap Growth is represented by the Russell 1000 Growth Index. Mid Cap Core is represented by the Russell Midcap Index, Mid Cap Value is represented by the Russell Midcap Value Index and Mid Cap Growth is represented by the Russell Midcap Growth Index. Small Cap Core is represented by the Russell 2000 Index, Small Cap Value is represented by the Russell 2000 Value Index and Small Cap Growth is represented by the Russell 2000 Growth Index.

Concentration of Index Returns

As of June 30, 2018

Top 10 contributors to S&P 500 YTD return

Ticker	Company	Index weight	% of SPX Return
AMZN	Amazon.com Inc.	2.1 %	36 %
MSFT	Microsoft Corp.	2.9	18
AAPL	Apple Inc.	3.8	15
NFLX	Netflix Inc.	0.4	15
FB	Facebook Inc.	1.9	8
GOOGL	Alphabet Inc.	2.8	7
MA	Mastercard Inc.	0.6	7
V	Visa Inc.	0.9	6
ADBE	Adobe Systems Inc.	0.4	5
NVDA	NVIDIA Corp.	0.5	5
Top 10 contributors		**16 %**	**123 %**
S&P 500		**100**	**100**

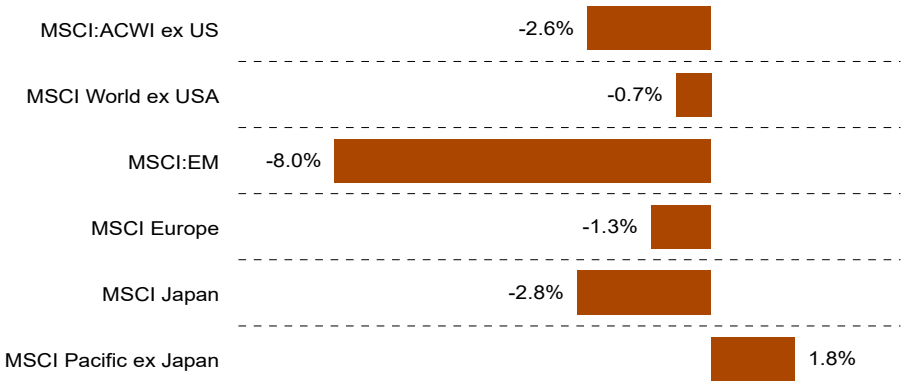
Source: FactSet, Goldman Sachs Global Investment Research

- Amazon was responsible for 36% of the S&P 500's return year-to-date through the second quarter.
- The top 10 contributors to the S&P 500 comprise 16% of the index, but are responsible for 123% of the return.
- Because so few stocks drove the index's results, the implication is that diversification detracted from returns.

International Equity Returns

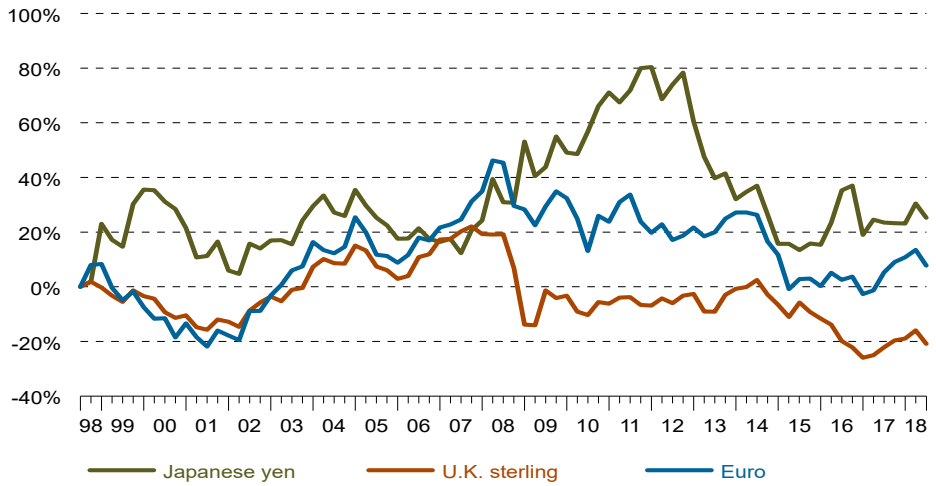
Periods Ending June 30, 2018

Regional Quarterly Performance (U.S. Dollar)



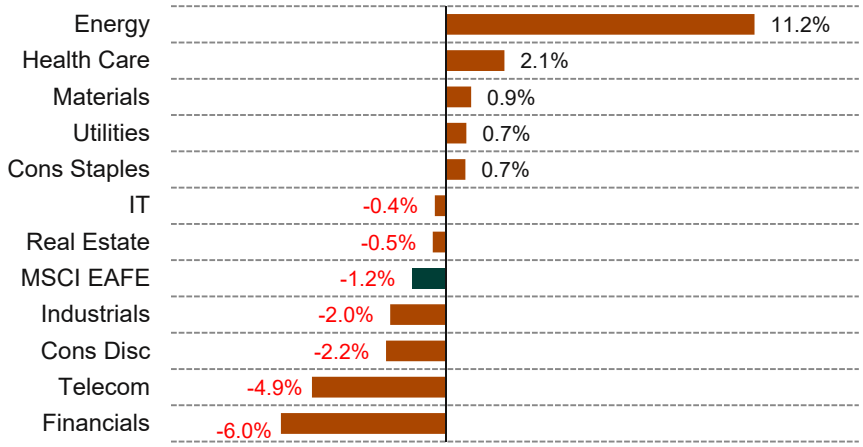
Source: MSCI

Major Currencies' Cumulative Returns (vs. U.S. Dollar)



*Euro returns from 1Q99. German mark prior to 1Q99.
Source: MSCI

MSCI EAFE Sector Returns



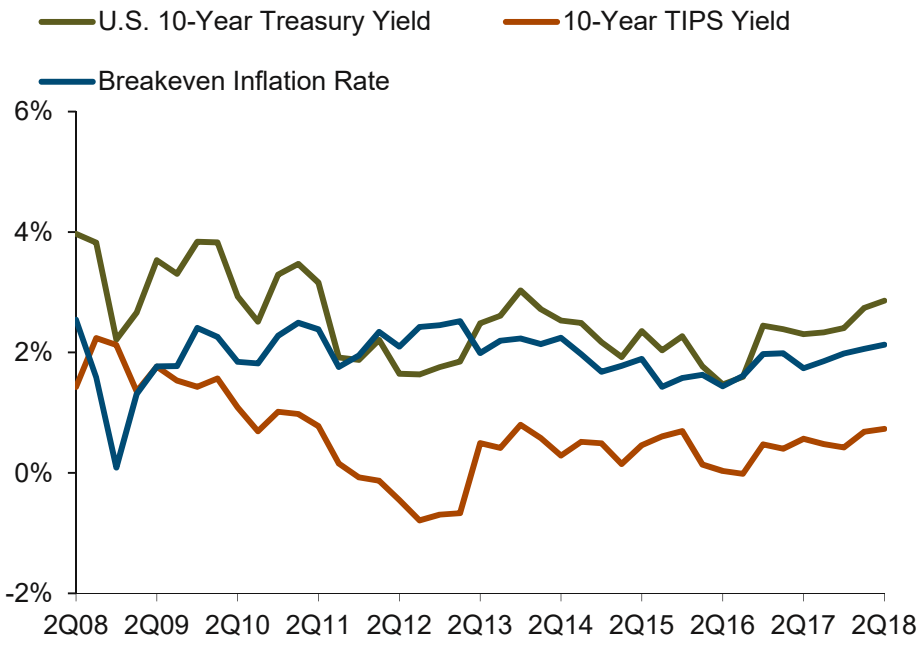
Source: Barrow Hanley Quarterly Benchmark Review

- Pacific ex Japan was the strongest performing region (+1.8%).
- The dollar appreciated against most major currencies in the second quarter. The pound fell by 5.9%, the euro dropped 5.1% and the yen depreciated by 4.0% against the dollar.
- Energy outshined other sectors in the second quarter, while Financials and Telecom lagged.

Yield Curve Changes

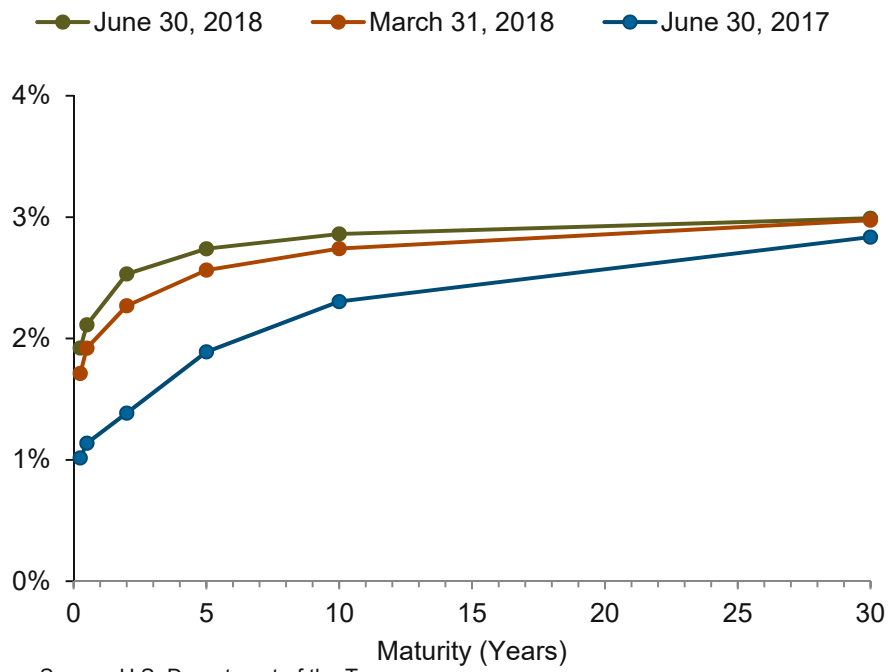
Periods Ending June 30, 2018

Historical 10-Year Yields



Source: Bloomberg

U.S. Treasury Yield Curves



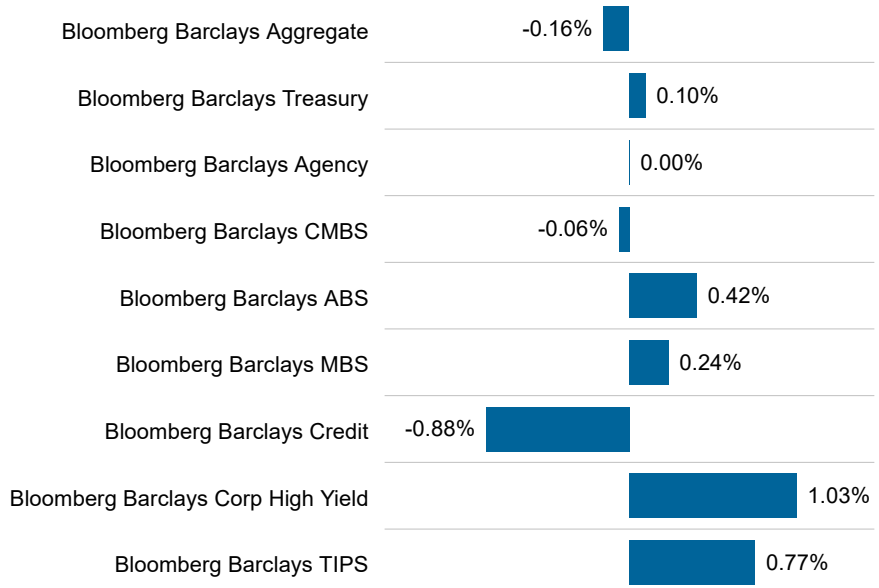
Source: U.S. Department of the Treasury

- The Treasury yield curve continued to flatten during the second quarter. The 2-year yield increased 25 bps while the 10-year only increased by 11 bps and the 30-year by 1 bp.
- The spread between the 2- and 10-year is down from 47 bps last quarter to 33 bps.

Total Rates of Return by Bond Sector

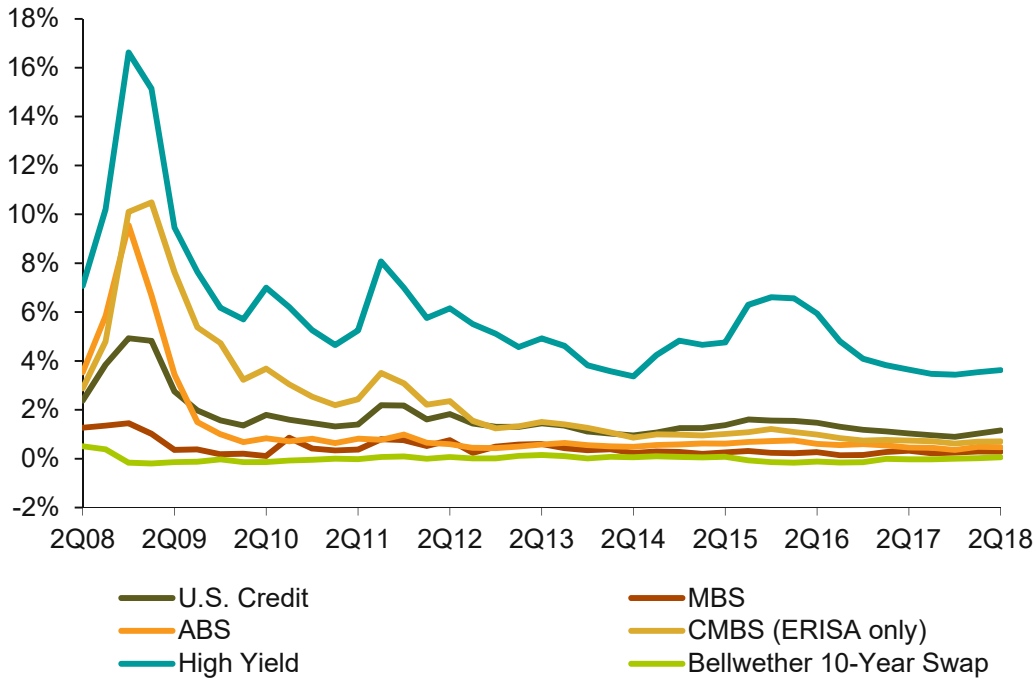
Periods Ending June 30, 2018

Total Returns



Source: Bloomberg Barclays

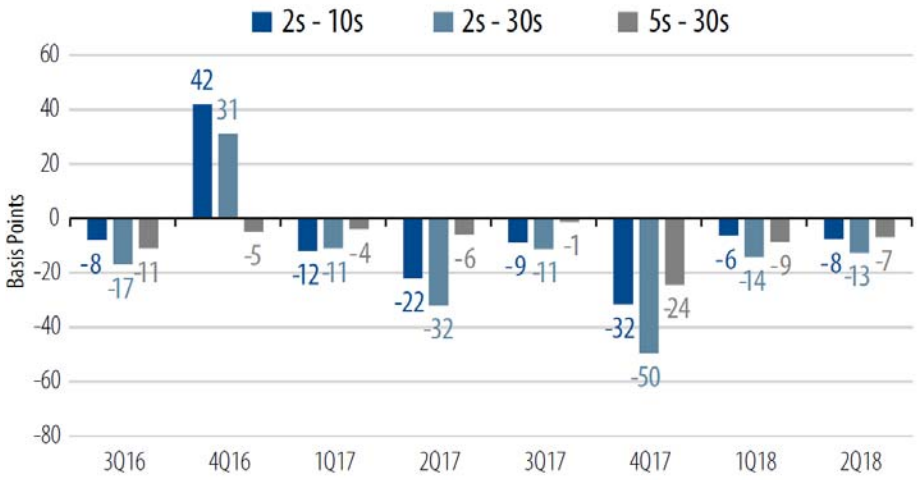
Effective Yield Over Treasuries



- Fixed income sectors produced mixed results, as strong economic growth and inflation expectations pushed rates higher in the second quarter.
- Investment grade credit was the worst performing sector during the quarter, with spreads widening to their highest levels since 2016.
- High yield credit performed relatively well, as interest payments were only modestly offset by spread widening. TIPS also generated positive returns; fueled by heightened inflation.

Yield Curve Flattening

Quarterly Yield Curve Slope Changes



Source: Western Asset; U.S. Department of the Treasury

Treasury Yields

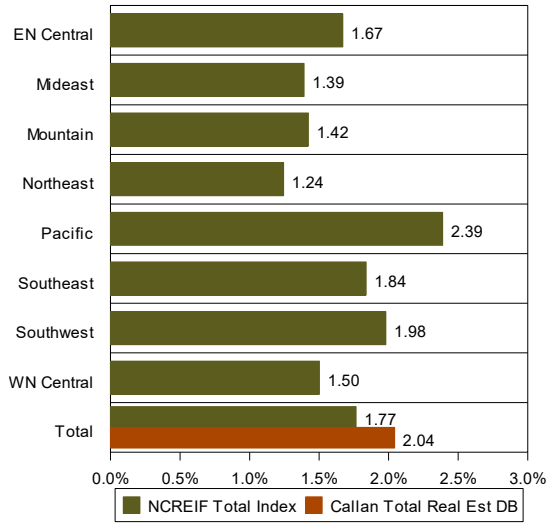


Source: Western Asset; Bloomberg

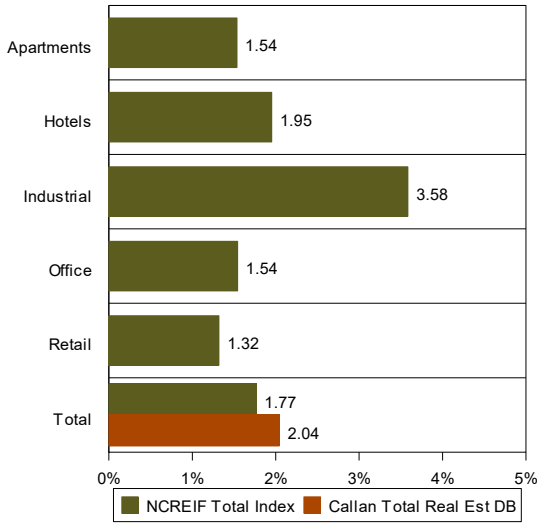
- With the Federal Reserve Bank hiking short-term interest rates, the yield curve is gradually flattening. Many investors are weary of the trend due to the ominous threat of recession which has historically followed an inverted curve.
- The spread between the 2- and 10-year treasury yields is now down to 0.33% from 0.47% at the end of last quarter. The spread between the 10- and 30-year yields shrunk 10 basis points from last quarter to end June at 13 basis points.

Real Estate Overview

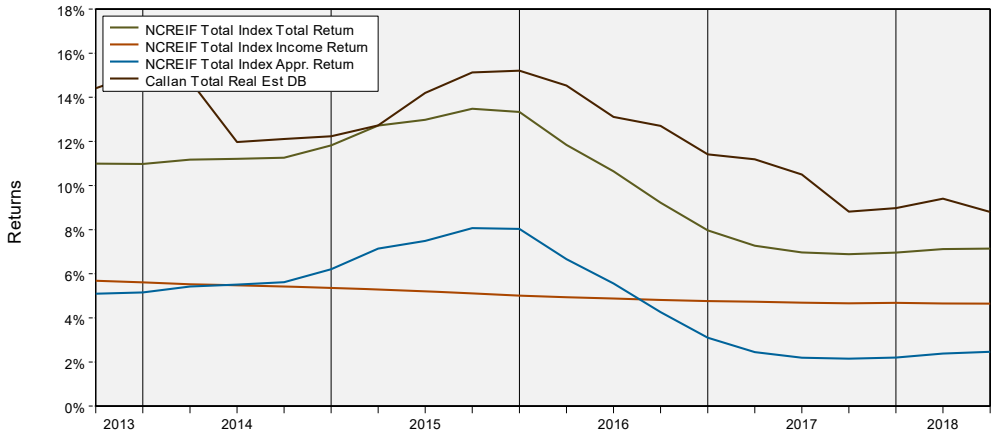
NCREIF Total Index Returns by Geographic Area
Quarter Ended June 30, 2018



NCREIF Total Index Returns by Property Type
Quarter Ended June 30, 2018



Rolling 1 Year Returns



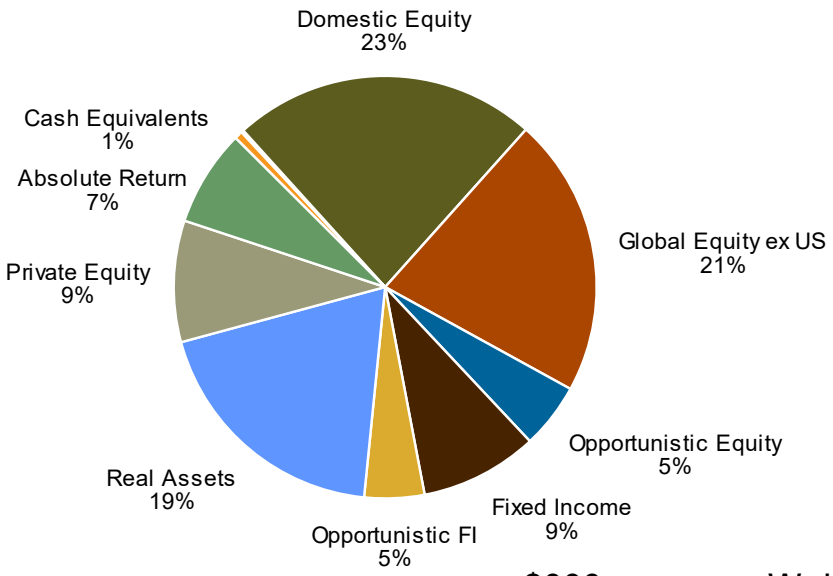


Pension Plan

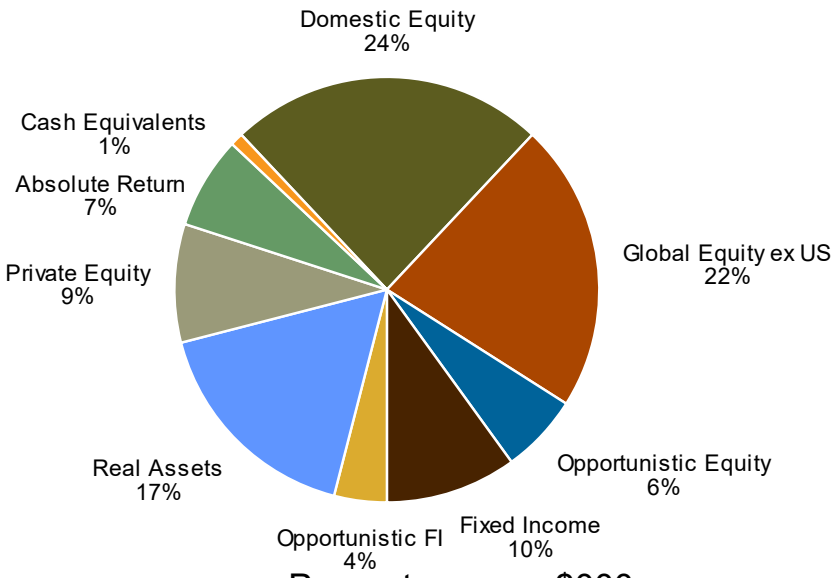
Asset Allocation – Public Employees' Retirement System

Quarter Ending June 30, 2018

Actual Asset Allocation



Target Asset Allocation



Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
Domestic Equity	2,171,777	23.3%	24.0%	(0.7%)	(61,753)
Global Equity ex US	1,991,118	21.4%	22.0%	(0.6%)	(56,284)
Opportunistic Equity	469,256	5.0%	6.0%	(1.0%)	(89,127)
Fixed Income	841,582	9.0%	10.0%	(1.0%)	(89,055)
Opportunistic FI	432,061	4.6%	4.0%	0.6%	59,806
Real Assets	1,788,971	19.2%	17.0%	2.2%	206,888
Private Equity	864,745	9.3%	9.0%	0.3%	27,171
Absolute Return	689,462	7.4%	7.0%	0.4%	38,015
Cash Equivalents	57,403	0.6%	1.0%	(0.4%)	(35,661)
Total	9,306,374	100.0%	100.0%		

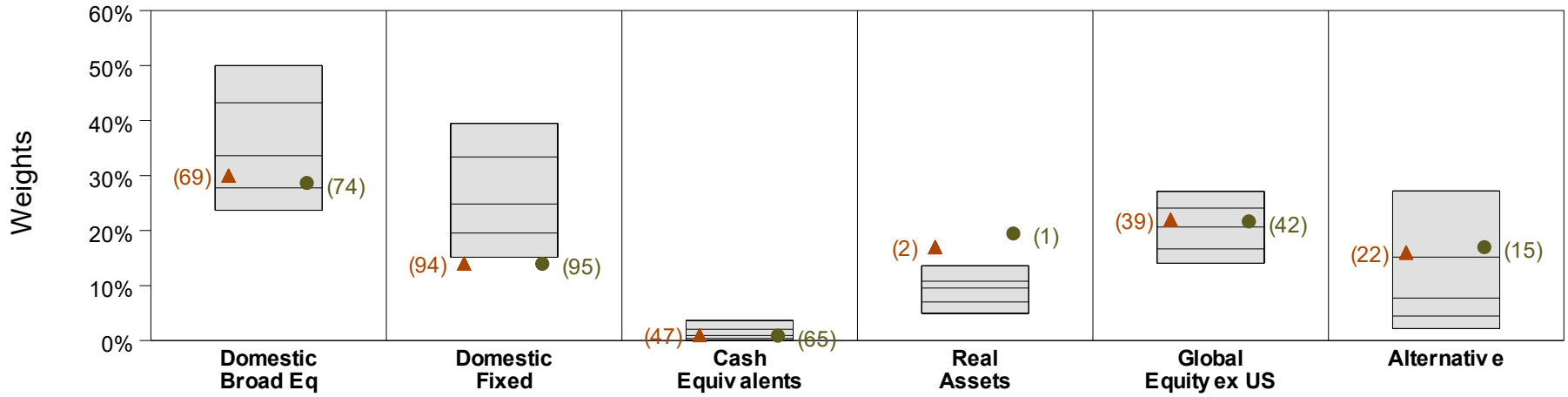
PERS is used as illustrative throughout the presentation.

The other plans exhibit similar modest and understandable variations from strategic target allocations.

Asset Allocation vs. Public Funds (PERS)

Callan Public Fund Database

Asset Class Weights vs Callan Public Fund Sponsor Database



	Domestic Broad Eq	Domestic Fixed	Cash Equivalents	Real Assets	Global Equity ex US	Alternative
10th Percentile	50.00	39.49	3.66	13.61	27.12	27.21
25th Percentile	43.24	33.40	2.06	10.78	24.09	15.20
Median	33.62	24.83	0.93	9.56	20.65	7.75
75th Percentile	27.78	19.56	0.37	7.03	16.68	4.46
90th Percentile	23.70	15.15	0.05	4.94	14.08	2.18
Fund ●	28.38	13.69	0.62	19.22	21.40	16.70
Target ▲	30.00	14.00	1.00	17.00	22.00	16.00

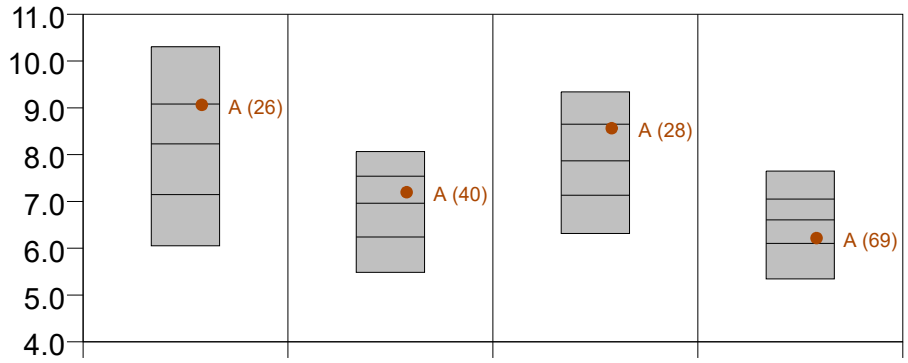
- Real Assets and Alternatives are overweight while other asset classes are slightly underweight. Fixed income is close to target but well below the “average” weighting of other public funds.
- Weightings to real assets and alternatives remain high relative to other public funds.
- ARMB’s pension funds’ asset allocation targets reflect a “growth” orientation.

*Note that “Alternative” includes private equity and absolute return

Total Fund Return vs Public Funds (PERS)

Callan Public Fund Database

Returns
for Periods Ended June 30, 2018
Group: Callan Public Fund Sponsor Database



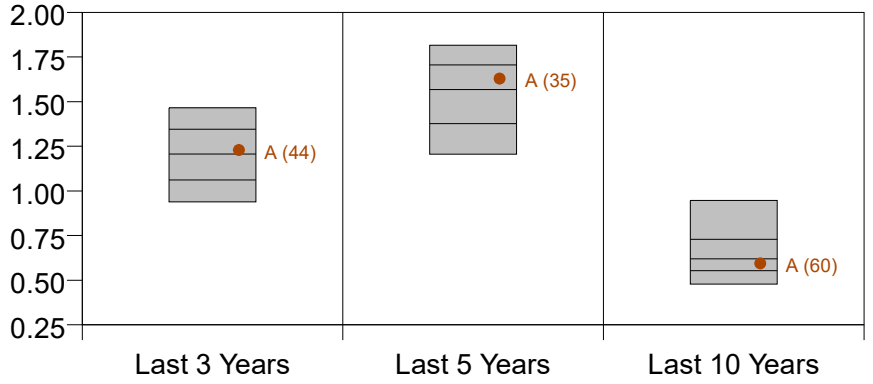
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	10.31	8.07	9.34	7.65
25th Percentile	9.09	7.54	8.66	7.05
Median	8.23	6.96	7.87	6.61
75th Percentile	7.15	6.24	7.14	6.11
90th Percentile	6.06	5.49	6.32	5.35
Member Count	186	185	176	160
ARMB - PERS - Total Fund ● A	9.07	7.20	8.57	6.22

- As displayed on the previous slide, ARMB's pension portfolio allocation policy reflects an orientation toward capital growth as opposed to income generation.
- It is worth noting that the Funds' lower weighting to Domestic Equity compared to Public Fund peers will reflect relative return rankings versus that peer group based on domestic equity results.

Total Fund Sharpe Ratio Rankings vs Public Funds (PERS)

Callan Public Fund Database

Sharpe Ratio
for Periods Ended June 30, 2018
Group: Callan Public Fund Sponsor Database



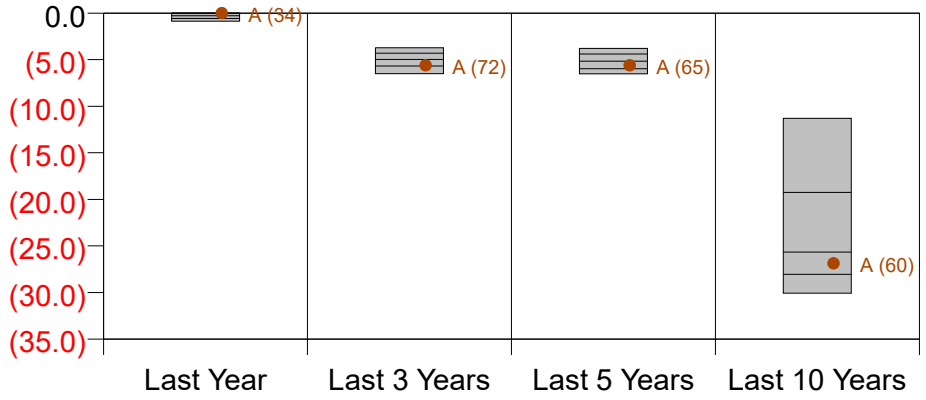
	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	1.47	1.82	0.95
25th Percentile	1.35	1.71	0.73
Median	1.21	1.57	0.62
75th Percentile	1.06	1.38	0.55
90th Percentile	0.94	1.21	0.48
Member Count	185	176	160
ARMB - PERS - Total Fund ● A	1.23	1.63	0.59

- Sharpe ratio is a risk-adjusted measure of return.
- ARMB's risk-adjusted return (Sharpe ratio) was above the Public Funds median for the three- and five-year periods.
- ARMB's Sharpe ratio was below median for the ten-year period ended June 30, 2018.

Total Maximum Drawdown Rankings vs Public Funds (PERS)

Callan Public Fund Database

Maximum Drawdown
for Periods Ended June 30, 2018
Group: Callan Public Fund Sponsor Database



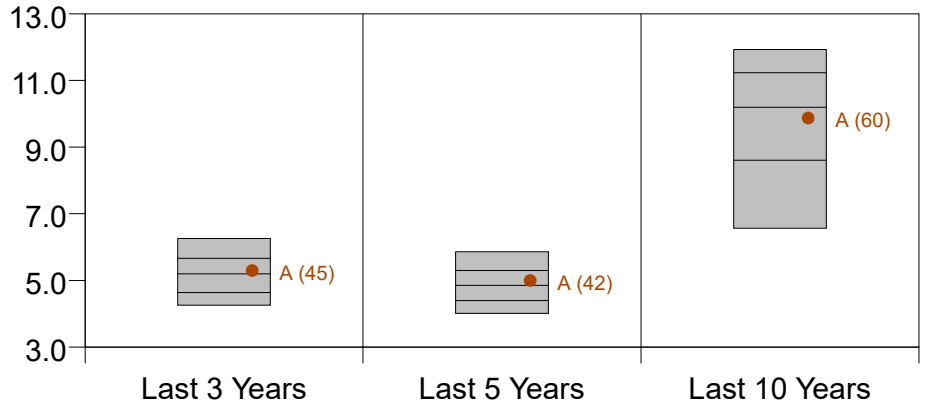
	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	0.00	(3.70)	(3.79)	(11.28)
25th Percentile	0.00	(4.30)	(4.38)	(19.23)
Median	(0.27)	(4.97)	(5.16)	(25.65)
75th Percentile	(0.56)	(5.66)	(5.95)	(28.04)
90th Percentile	(0.85)	(6.48)	(6.51)	(30.07)
Member Count	186	185	176	160
ARMB - PERS - Total Fund ● A	0.00	(5.60)	(5.60)	(26.85)

- "Maximum drawdown" is a measure of the largest loss from peak to trough in a given period.
- Lower rankings reflect larger drawdowns (i.e. bigger losses). ARMB's below-median rankings reflect the higher potential drawdowns associated with the growth orientation.
- Drawdowns in the last year are very small across the majority of Public Pension Plan sponsors.

Standard Deviation Ranking vs Public Funds (PERS)

Callan Public Fund Database

Standard Deviation
for Periods Ended June 30, 2018
Group: Callan Public Fund Sponsor Database



	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	6.26	5.86	11.93
25th Percentile	5.67	5.30	11.24
Median	5.20	4.86	10.20
75th Percentile	4.64	4.40	8.61
90th Percentile	4.26	4.01	6.57
Member Count	185	176	160
ARMB - PERS - Total Fund ● A	5.30	5.00	9.88

- "Standard deviation" measures variability of returns. It is one measurement of investment risk.
- Less standard deviation results in lower rankings. A lower ranking of standard deviation is good.
- ARMB's portfolio diversification has resulted in moderate levels of volatility compared to peers.

PERS Performance – 2nd Quarter 2018 & Trailing Year

Relative Attribution Effects for Quarter ended June 30, 2018

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	23%	24%	4.23%	3.89%	0.08%	(0.02%)	0.06%
Opportunistic	10%	10%	1.37%	2.08%	(0.07%)	(0.00%)	(0.07%)
Fixed-Income	8%	10%	0.08%	0.06%	0.00%	0.02%	0.03%
Real Assets	19%	17%	3.05%	3.16%	(0.02%)	0.03%	0.01%
Global Equity ex US	23%	22%	(3.08%)	(2.61%)	(0.11%)	(0.03%)	(0.14%)
Private Equity	9%	9%	0.88%	3.32%	(0.22%)	0.00%	(0.22%)
Absolute Return	7%	7%	1.50%	0.41%	0.08%	(0.00%)	0.08%
Cash Equivalents	1%	1%	0.51%	0.45%	0.00%	0.00%	0.00%
Total			**1.19%**	**= 1.44%**	**+ (0.26%)**	**+ 0.01%**	**(0.25%)**

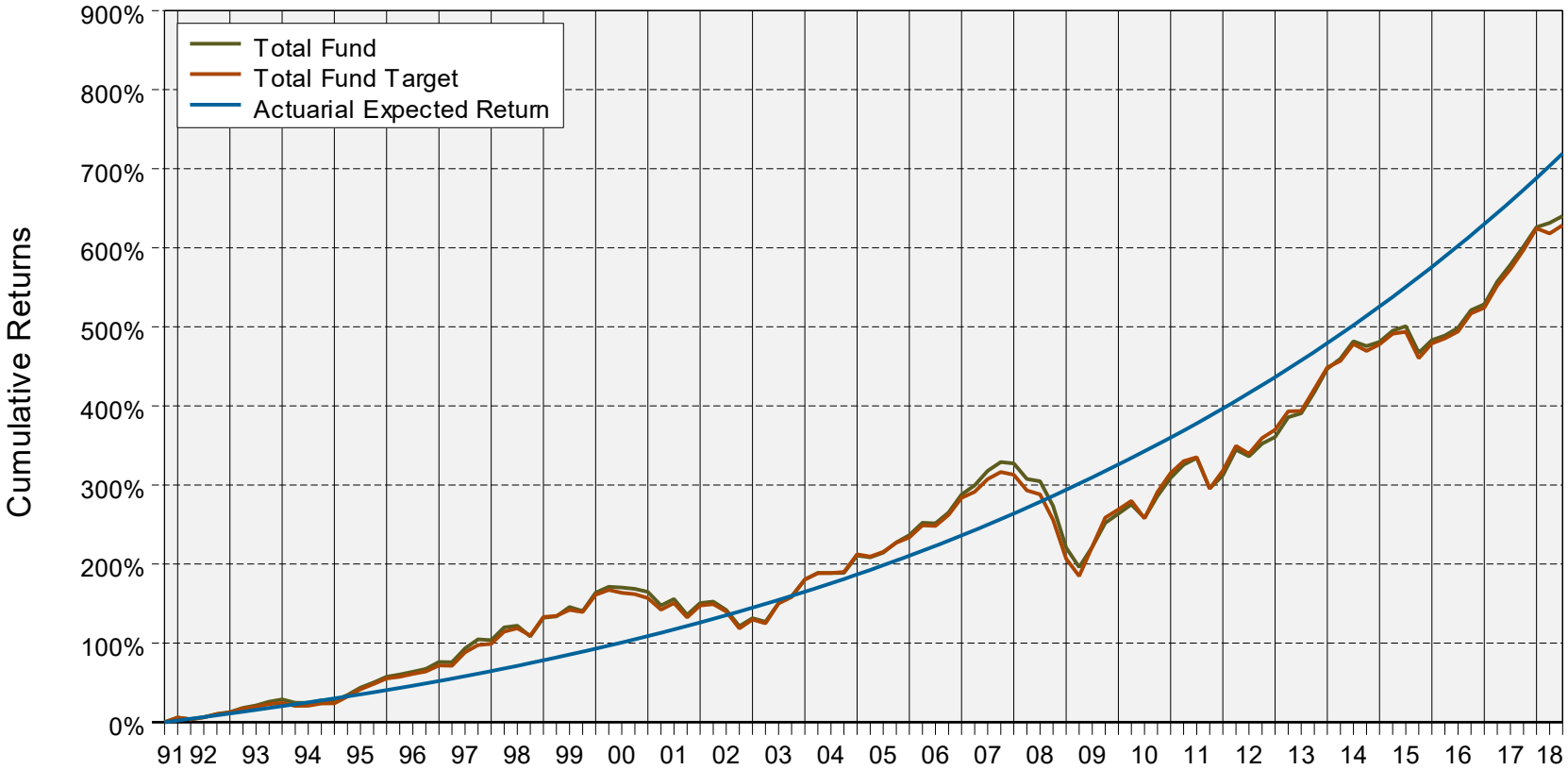
One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	23%	24%	15.21%	14.78%	0.10%	(0.08%)	0.02%
Fixed-Income	10%	10%	(0.71%)	(0.76%)	0.01%	(0.06%)	(0.06%)
Opportunistic	9%	10%	5.64%	8.39%	(0.23%)	0.03%	(0.20%)
Real Assets	17%	17%	7.71%	4.72%	0.50%	0.03%	0.53%
Global Equity ex US	23%	22%	7.97%	7.75%	0.06%	(0.01%)	0.05%
Private Equity	9%	9%	19.87%	12.92%	0.56%	(0.01%)	0.55%
Absolute Return	7%	7%	4.72%	5.14%	(0.02%)	0.00%	(0.01%)
Alternative Equity	1%	0%	-	-	0.00%	(0.11%)	(0.11%)
Cash Equivalents	1%	1%	1.51%	1.36%	0.00%	(0.02%)	(0.02%)
Total			**9.07%**	**= 8.32%**	**+ 0.97%**	**+ (0.22%)**	**0.74%**

- The long-term benchmark for private equity is the Russell 3000 Index plus 350 basis points

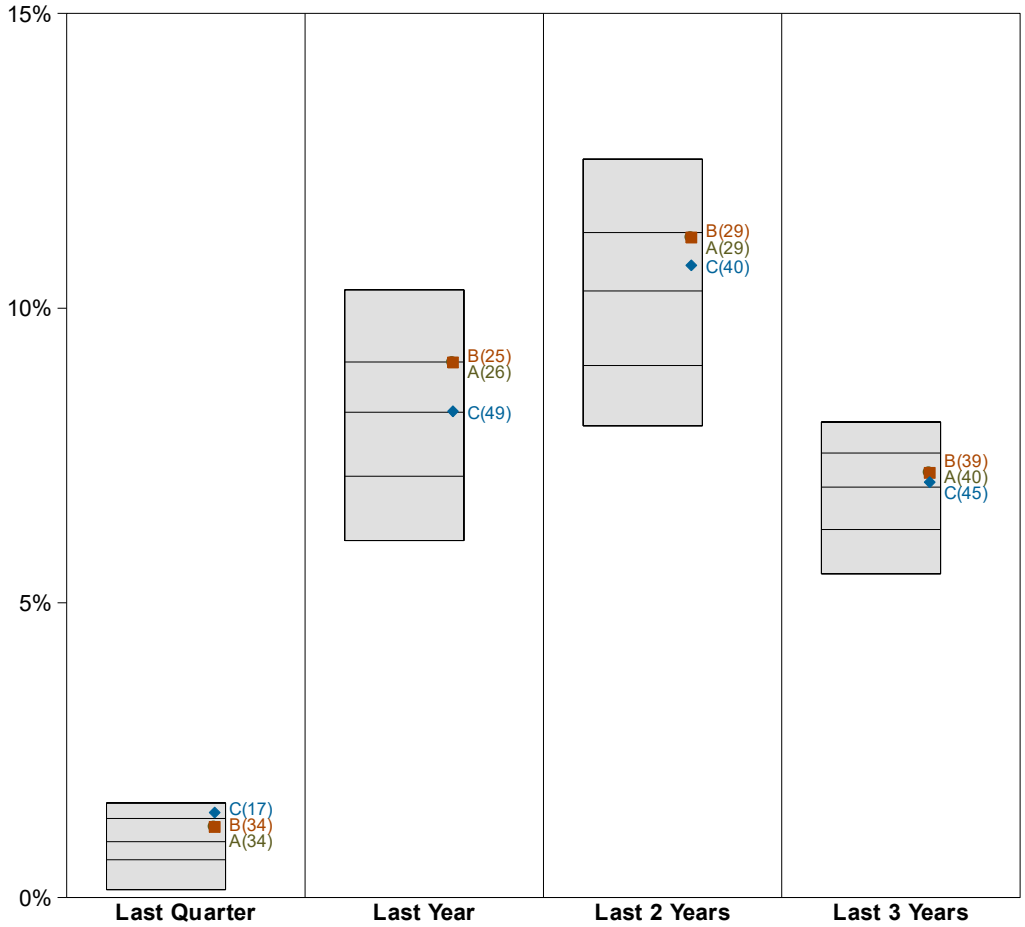
PERS Long-Term Total Fund Performance as of 6/30/18

Cumulative Returns Actual vs Target



- Each Fund has two targets: the asset allocation policy return and the actuarial return.
- Total Fund returns continue to closely track the strategic allocation target.
- Since the volatile 2008/2009 period, though it suffered a setback in 3Q15, Total Fund performance had been closing the gap versus the actuarial return.

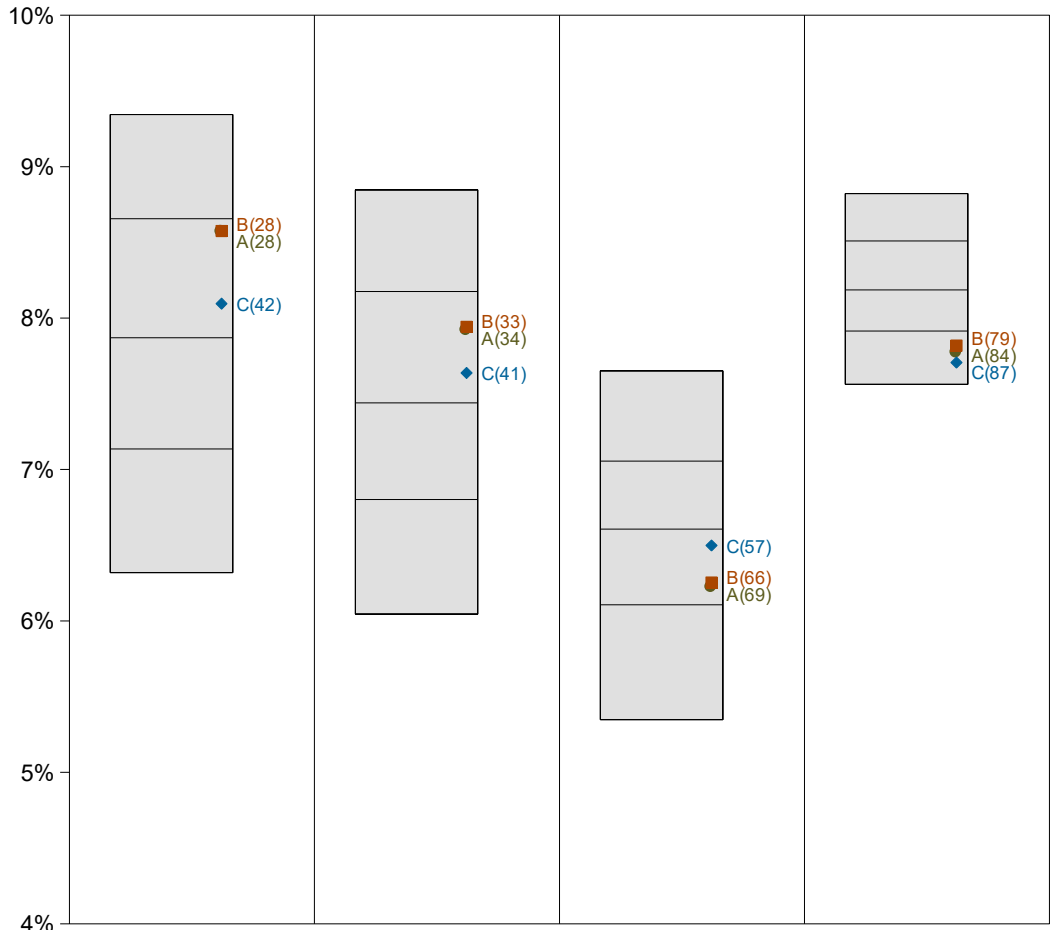
Annualized Total Fund Returns as of 6/30/18



	Last Quarter	Last Year	Last 2 Years	Last 3 Years
10th Percentile	1.60	10.31	12.53	8.07
25th Percentile	1.34	9.09	11.28	7.54
Median	0.95	8.23	10.29	6.96
75th Percentile	0.64	7.15	9.03	6.24
90th Percentile	0.13	6.06	8.00	5.49
PERS Total Plan ● A	1.19	9.07	11.19	7.20
TRS Total Plan ■ B	1.20	9.08	11.20	7.20
Target Index ◆ C	1.44	8.25	10.73	7.05

- PERS and TRS have outperformed their target for the last year, two year, and three year periods.
- PERS 2nd quarter performance trailed the target by 25 basis points. Underperformance in Global Equity (ex-US) and Private Equity were the primary detractors.

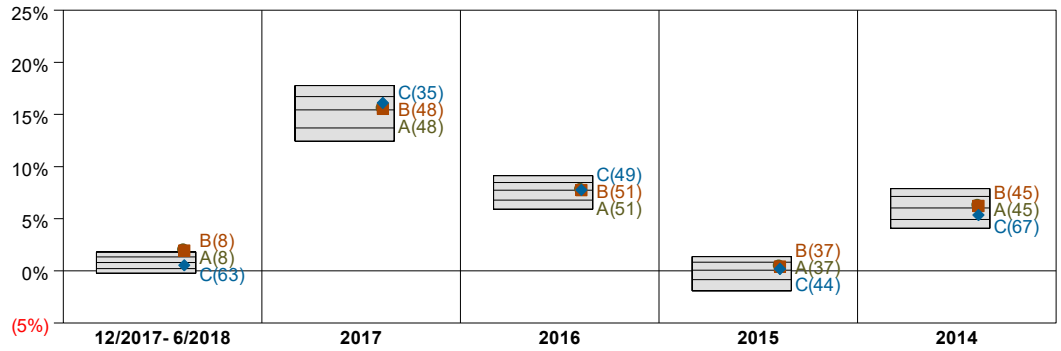
Longer-Term Total Fund Returns as of 6/30/18



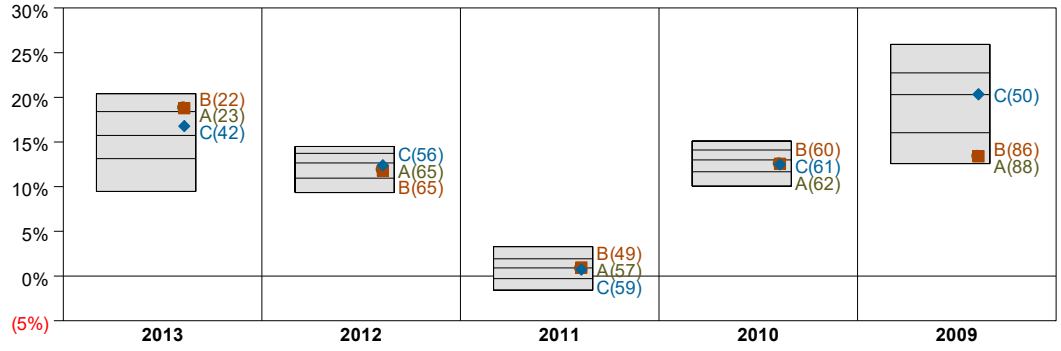
	Last 5 Years	Last 7 Years	Last 10 Years	Last 26-3/4 Years
10th Percentile	9.34	8.85	7.65	8.82
25th Percentile	8.66	8.18	7.05	8.51
Median	7.87	7.44	6.61	8.19
75th Percentile	7.14	6.80	6.11	7.91
90th Percentile	6.32	6.05	5.35	7.56
PERS Total Plan ● A	8.57	7.92	6.22	7.77
TRS Total Plan ■ B	8.58	7.94	6.25	7.82
Target Index ◆ C	8.10	7.64	6.50	7.71

- Five-year performance is above target and median.
- Seven-year performance is also above target and median.
- 10-year return is below target and median. PERS trails the target return by 28 basis points.
- 26-3/4 year return for PERS beats the target by six basis points.

Calendar Period Total Fund Performance



	12/2017- 6/2018	2017	2016	2015	2014
10th Percentile	1.81	17.77	9.13	1.35	7.89
25th Percentile	1.33	16.72	8.47	0.83	7.14
Median	0.80	15.45	7.75	0.06	6.03
75th Percentile	0.22	13.70	6.79	(0.84)	4.93
90th Percentile	(0.24)	12.43	5.90	(1.92)	4.08
PERS Total Plan (A)	1.94	15.52	7.74	0.40	6.22
TRS Total Plan (B)	1.95	15.54	7.74	0.41	6.22
Target Index (C)	0.53	16.11	7.77	0.18	5.35

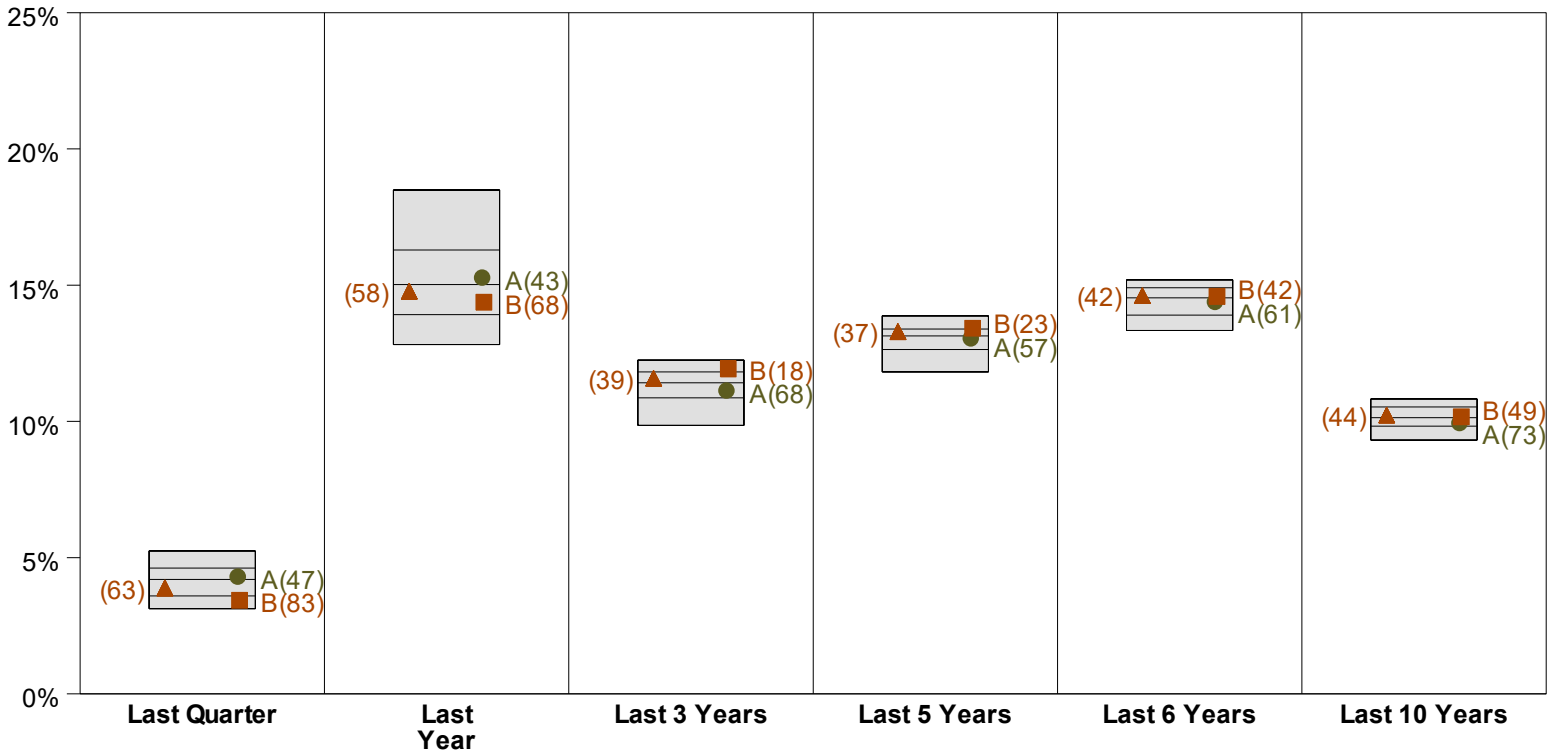


	2013	2012	2011	2010	2009
10th Percentile	20.41	14.49	3.29	15.11	25.92
25th Percentile	18.40	13.73	1.93	14.10	22.73
Median	15.73	12.66	0.91	12.99	20.29
75th Percentile	13.13	10.96	(0.30)	11.68	16.03
90th Percentile	9.45	9.34	(1.58)	10.07	12.59
PERS Total Plan (A)	18.74	11.81	0.77	12.45	13.31
TRS Total Plan (B)	18.79	11.79	0.95	12.55	13.40
Target Index (C)	16.78	12.38	0.72	12.49	20.33

- Peer group range of returns during 2016, 2015, and 2014 were very tight.
- Wide range of peer group returns during calendar 2013 due to varying fixed-income allocations within the Public Fund universe.
- PERS ranks above median in five and TRS ranks above median in six of the ten periods shown.

Total Domestic Equity through 6/30/18

Performance vs Public Fund - Domestic Equity (Gross)



		Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		5.25	18.49	12.25	13.87	15.20	10.82
25th Percentile		4.62	16.30	11.82	13.39	14.91	10.54
Median		4.20	15.02	11.41	13.14	14.54	10.14
75th Percentile		3.59	13.92	10.86	12.64	13.91	9.83
90th Percentile		3.12	12.82	9.86	11.82	13.34	9.31
Domestic Equity Pool	A	4.24	15.22	11.07	12.99	14.32	9.87
Standard & Poor's 500	B	3.43	14.37	11.93	13.42	14.59	10.17
Russell 3000 Index		3.89	14.78	11.58	13.29	14.62	10.23

Domestic Equity Component Returns

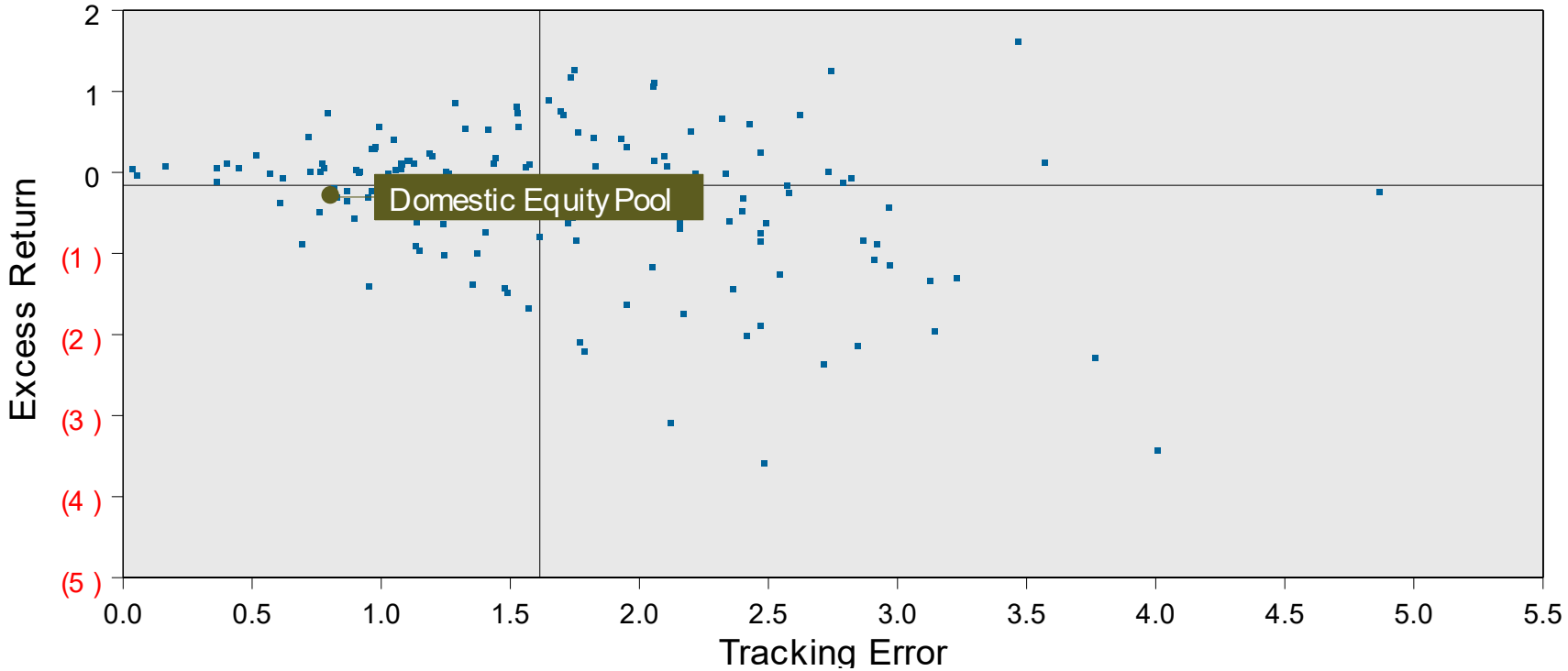
Returns for Periods Ended June 30, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years
Total Dom Equity Pool	4.24%	15.22%	11.07%	12.99%	14.32%
Russell 3000 Index	3.89%	14.78%	11.58%	13.29%	14.62%
Large Cap Managers	3.32%	14.28%	11.14%	13.28%	14.52%
Large Cap Active	2.60%	12.94%	10.60%	13.34%	14.53%
Large Cap Passive	3.69%	14.64%	11.72%	13.43%	14.68%
Russell 1000 Index	3.57%	14.54%	11.64%	13.37%	14.65%
Small Cap Managers	8.55%	20.82%	11.48%	13.19%	15.34%
Small Cap Active	8.43%	21.98%	11.48%	13.42%	15.56%
Small Cap Passive	8.81%	16.56%	12.02%	11.99%	13.87%
Russell 2000 Index	7.75%	17.57%	10.96%	12.46%	14.34%
Opportunistic Equity	3.49%	8.88%	7.85%	8.97%	8.98%

- The active large cap allocation (fourth line in the table above) has trailed its benchmark (the Russell 1000 index) over all periods shown.
- The overall small cap allocation has contributed positive excess return when compared to its benchmark (the Russell 2000 index).

Domestic Equity Excess Return and Risk

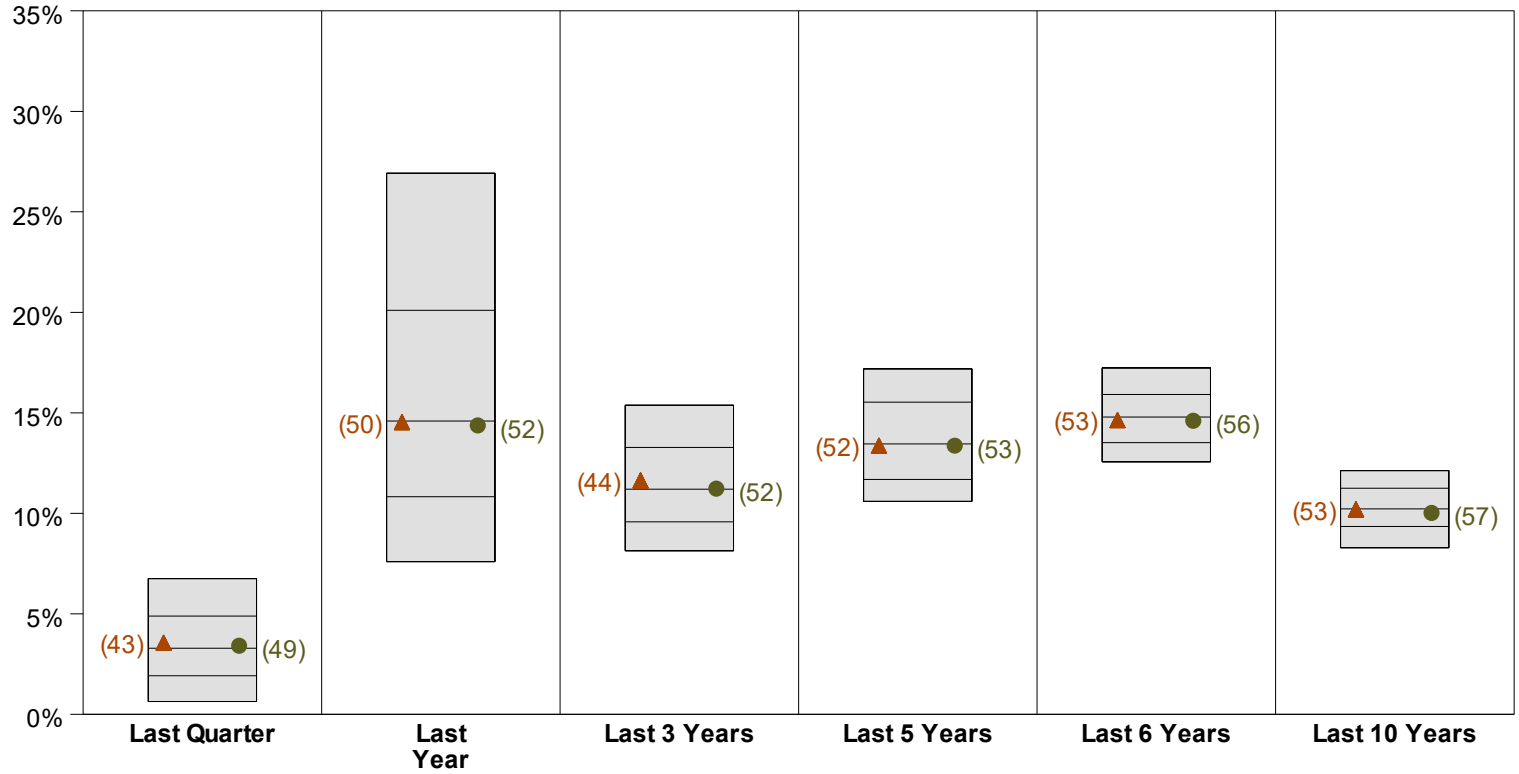
Risk Analysis vs. Public Fund – Domestic Equity (Gross)
Five Years Ended June 30, 2018



- The Domestic Equity Pool has slightly underperformed the Russell 3000 Index over five years but exhibits very tight tracking (low tracking error) to the benchmark relative to public fund peers.

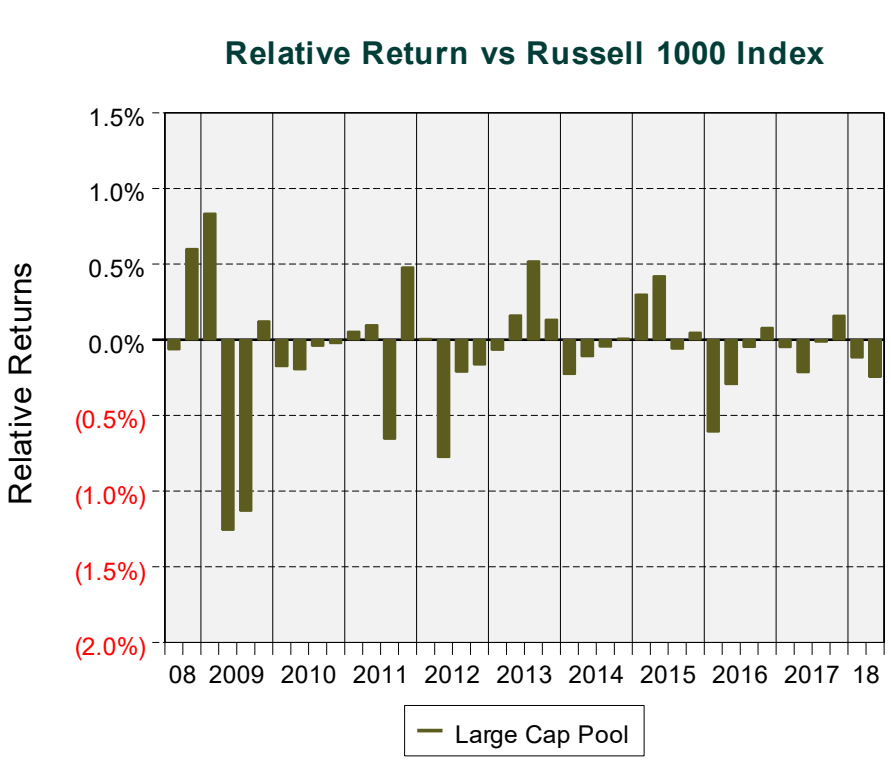
Large Cap Domestic Equity through 6/30/18

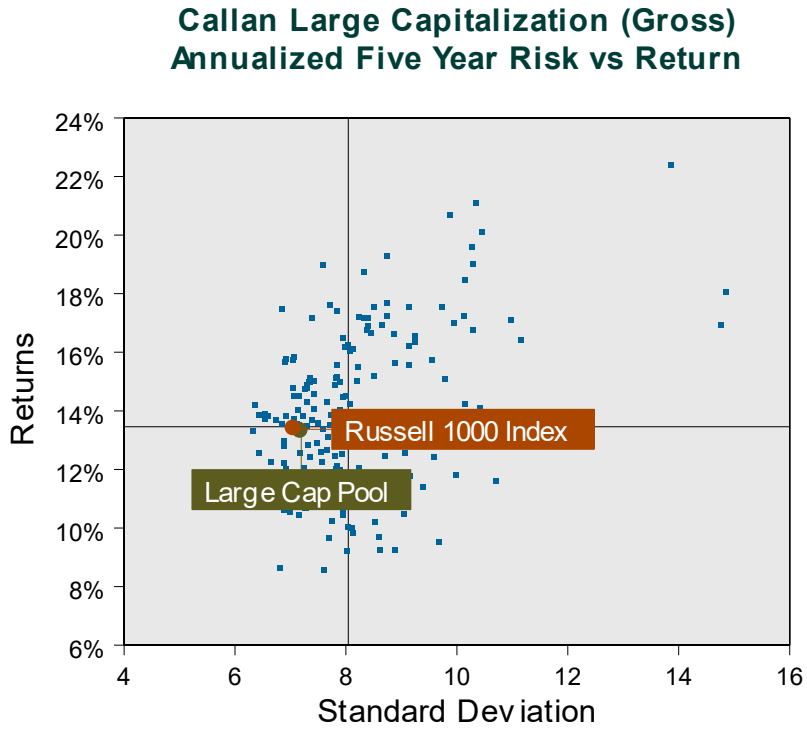
Performance vs Callan Large Capitalization (Gross)



	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	6.76	26.92	15.38	17.18	17.23	12.12
25th Percentile	4.89	20.10	13.28	15.53	15.91	11.25
Median	3.29	14.59	11.20	13.46	14.79	10.23
75th Percentile	1.91	10.83	9.58	11.68	13.52	9.34
90th Percentile	0.63	7.60	8.13	10.60	12.57	8.29
Large Cap Pool ●	3.32	14.28	11.14	13.28	14.52	9.93
Russell 1000 Index ▲	3.57	14.54	11.64	13.37	14.65	10.20

Large Cap Domestic Equity as of 6/30/18

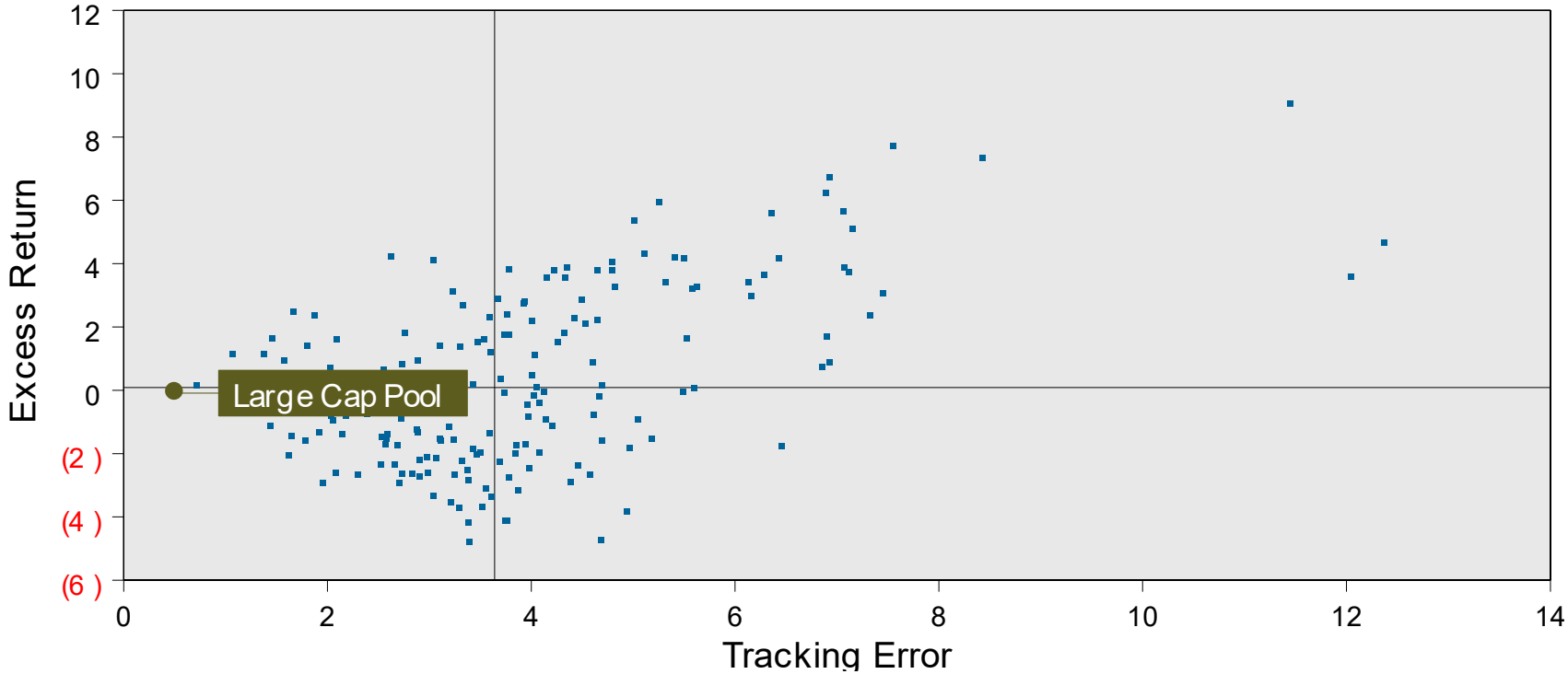




- About 50% of the large cap allocation is passively managed.
- Long-term performance exhibits market-like returns with similar risk.

Large Cap Domestic Equity Excess Return and Risk

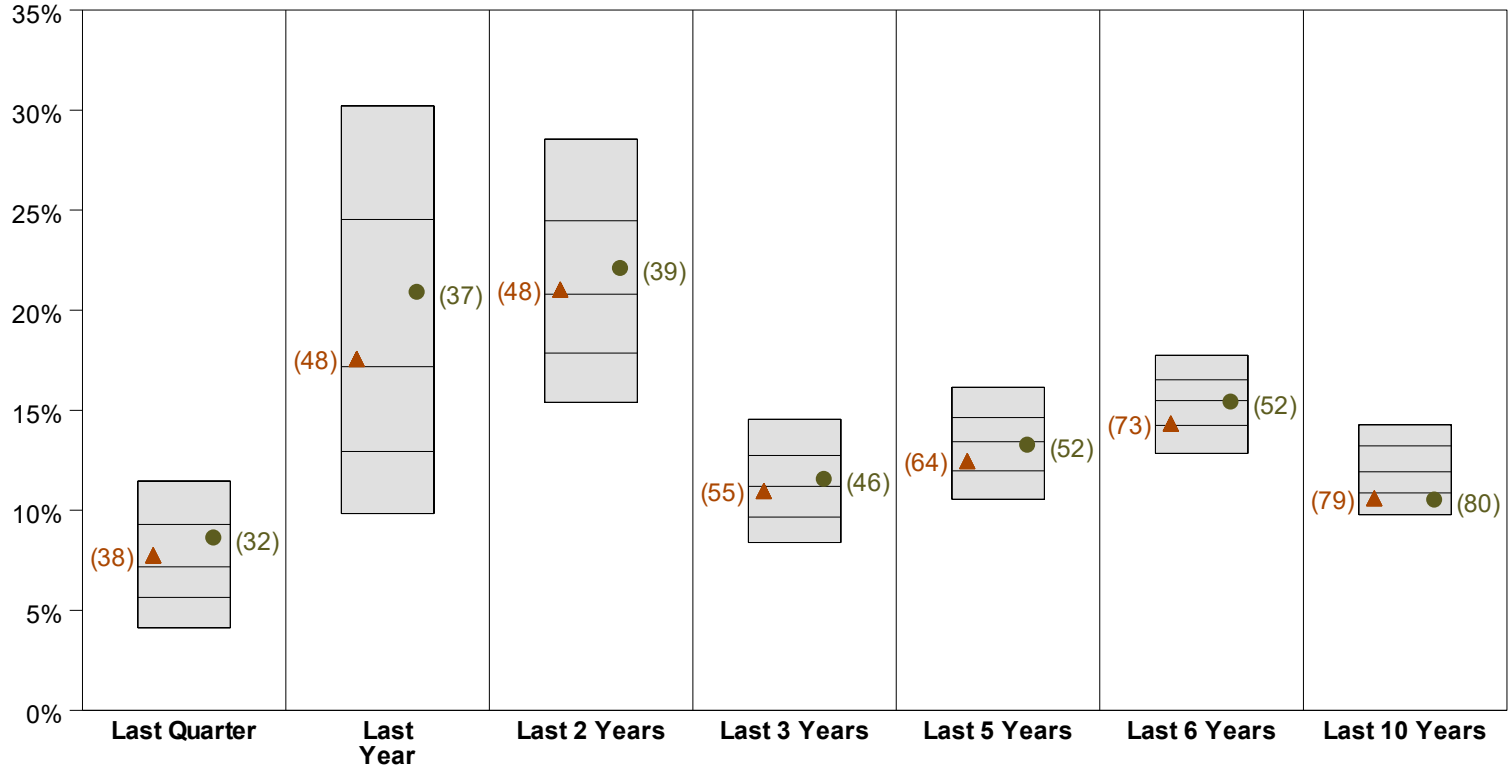
Risk Analysis vs. Callan Large Capitalization (Gross)
Five Years Ended June 30, 2018



- The Large Cap Domestic Equity Pool has performed in line with the Russell 1000 Index over five years but exhibits extremely tight tracking (low tracking error) to the benchmark relative to large cap peers.

Small Cap Domestic Equity through 6/30/18

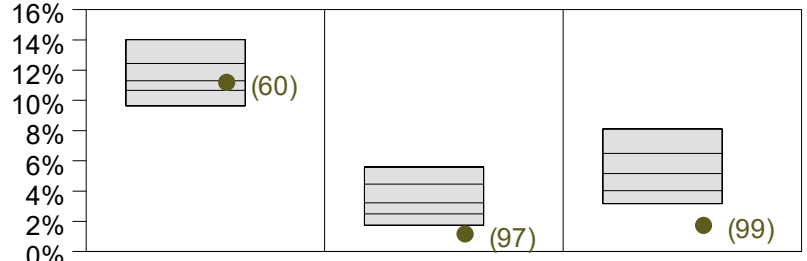
Performance vs Callan Small Capitalization (Gross)



	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	11.46	30.21	28.55	14.54	16.15	17.75	14.27
25th Percentile	9.29	24.53	24.47	12.74	14.63	16.52	13.22
Median	7.17	17.18	20.80	11.20	13.43	15.48	11.93
75th Percentile	5.65	12.94	17.86	9.66	11.97	14.24	10.87
90th Percentile	4.12	9.83	15.39	8.39	10.54	12.84	9.78
Small Cap Pool ●	8.55	20.82	22.02	11.48	13.19	15.34	10.44
Russell 2000 Index ▲	7.75	17.57	21.03	10.96	12.46	14.34	10.60

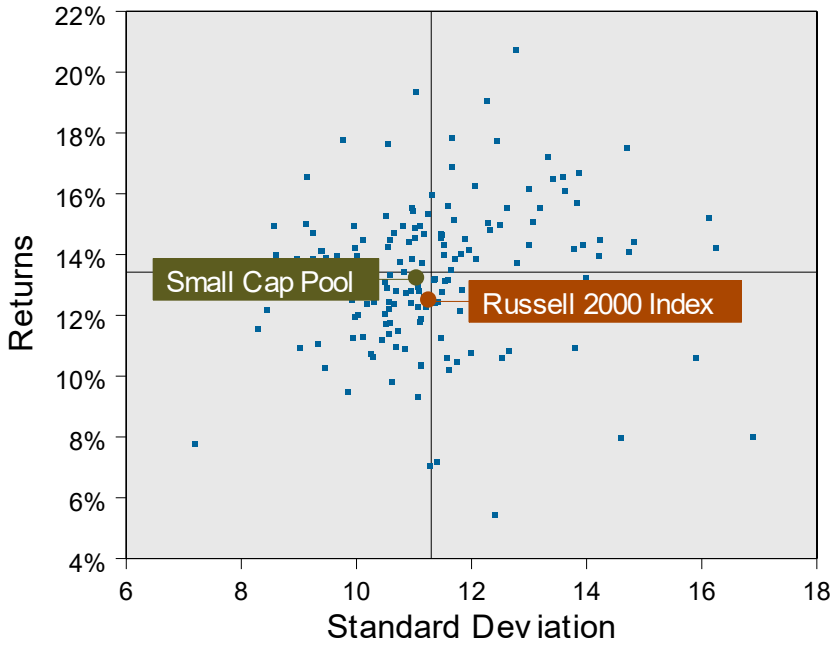
- Recent returns have outperformed the index and compare favorably across the five and six-year time frames. 10-year performance is in line with the benchmark.

Small Cap Domestic Equity through 6/30/18



	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	14.02	5.60	8.12
25th Percentile	12.44	4.46	6.49
Median	11.29	3.23	5.16
75th Percentile	10.67	2.49	4.04
90th Percentile	9.64	1.75	3.17
Small Cap Equity Pool	11.07	1.05	1.62

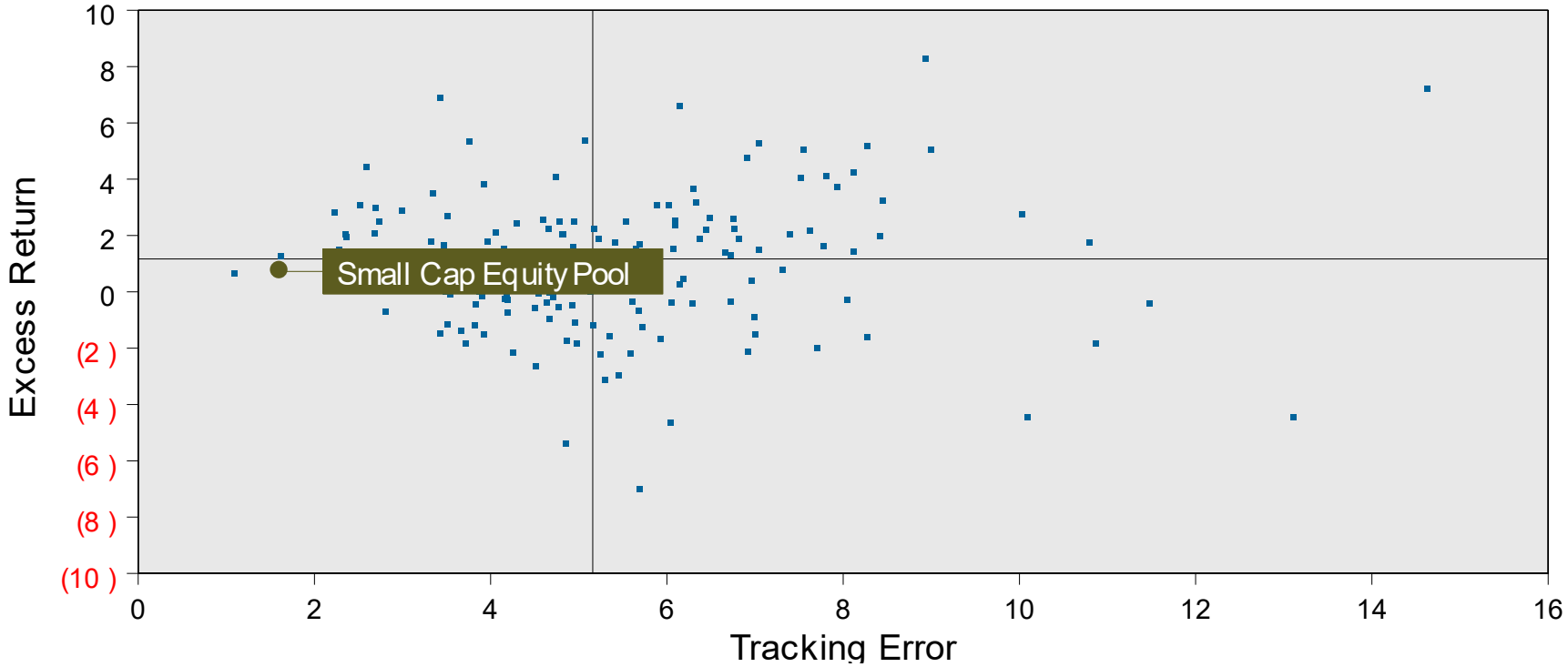
Callan Small Capitalization (Gross)
Annualized Five Year Risk vs Return



- The five-year risk statistics of standard deviation, downside risk, and tracking error compare favorably versus the peer group of small cap managers.

Small Cap Domestic Equity Excess Return and Risk

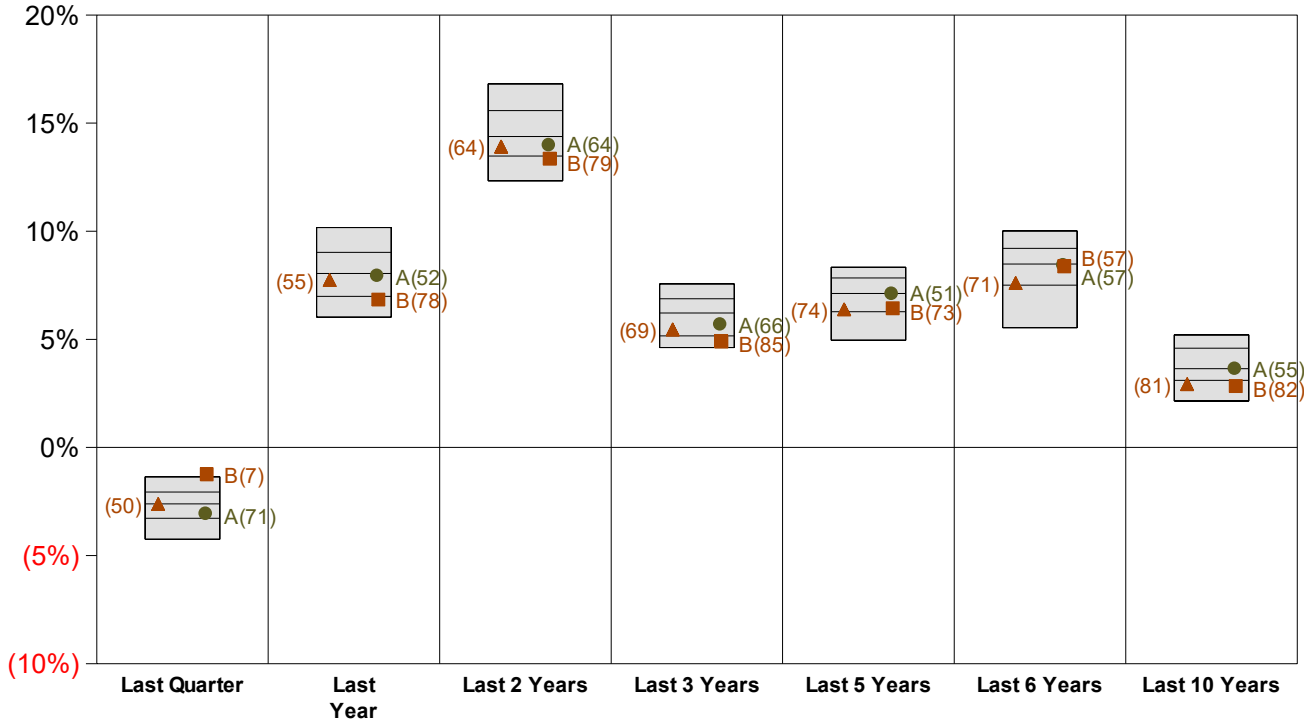
Risk Analysis vs. Callan Small Capitalization (Gross)
Five Years Ended June 30, 2018



- The Small Cap Domestic Equity Pool has outperformed the Russell 2000 Index over five years while exhibiting very tight tracking (low tracking error) to the benchmark relative to small cap peers.

International Equity through 6/30/18

Performance vs Public Fund - International Equity (Gross)

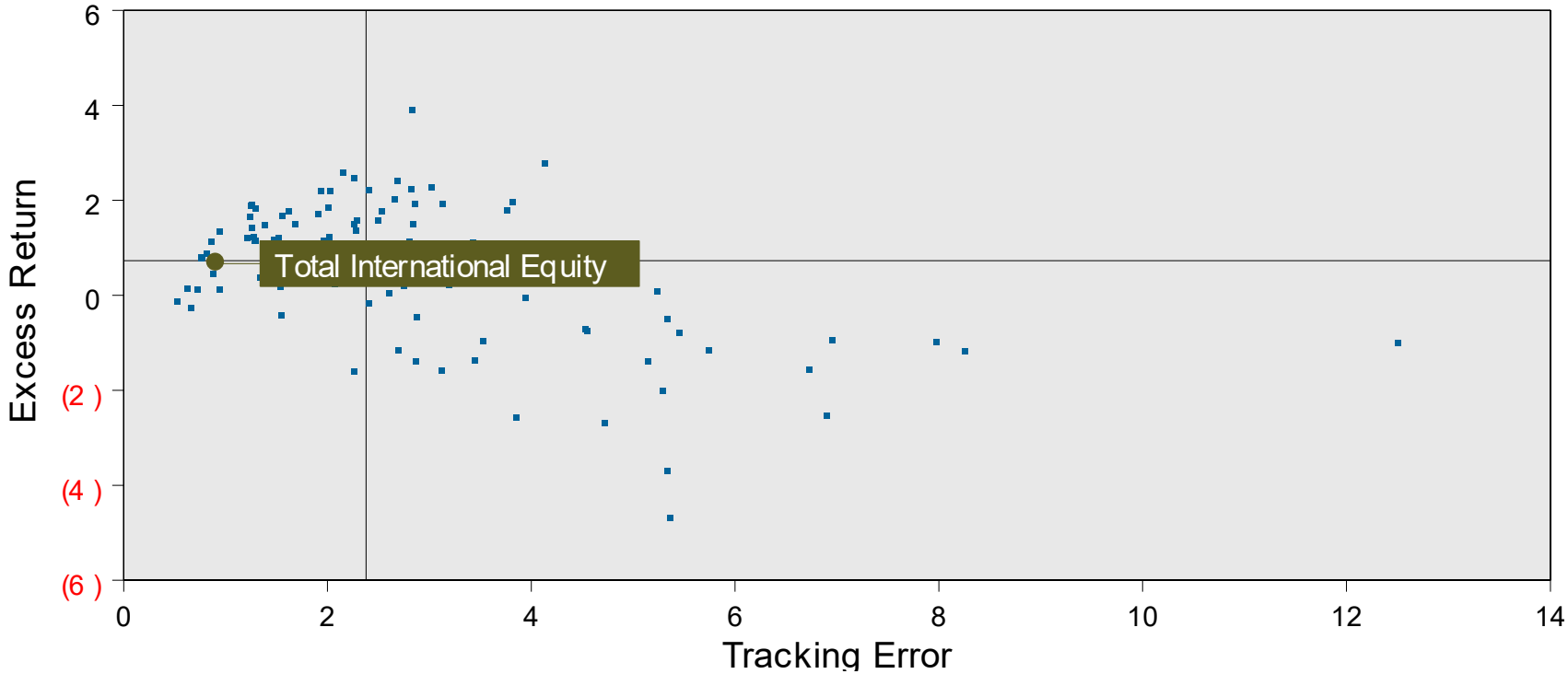


		Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		(1.36)	10.17	16.82	7.56	8.34	10.02	5.21
25th Percentile		(2.06)	9.02	15.57	6.87	7.84	9.21	4.59
Median		(2.61)	8.05	14.38	6.22	7.12	8.49	3.64
75th Percentile		(3.28)	6.99	13.48	5.16	6.28	7.51	3.10
90th Percentile		(4.24)	6.03	12.33	4.62	4.96	5.54	2.15
Total International Equity	● A	(3.12)	7.89	13.93	5.65	7.06	8.37	3.60
MSCI EAFE Index	■ B	(1.24)	6.84	13.36	4.90	6.44	8.38	2.84
MSCI ACWI ex US IMI	▲	(2.61)	7.75	13.91	5.46	6.39	7.61	2.93

- The composite has outperformed the benchmark over all trailing periods of one year and longer.

International Equity Excess Return and Risk

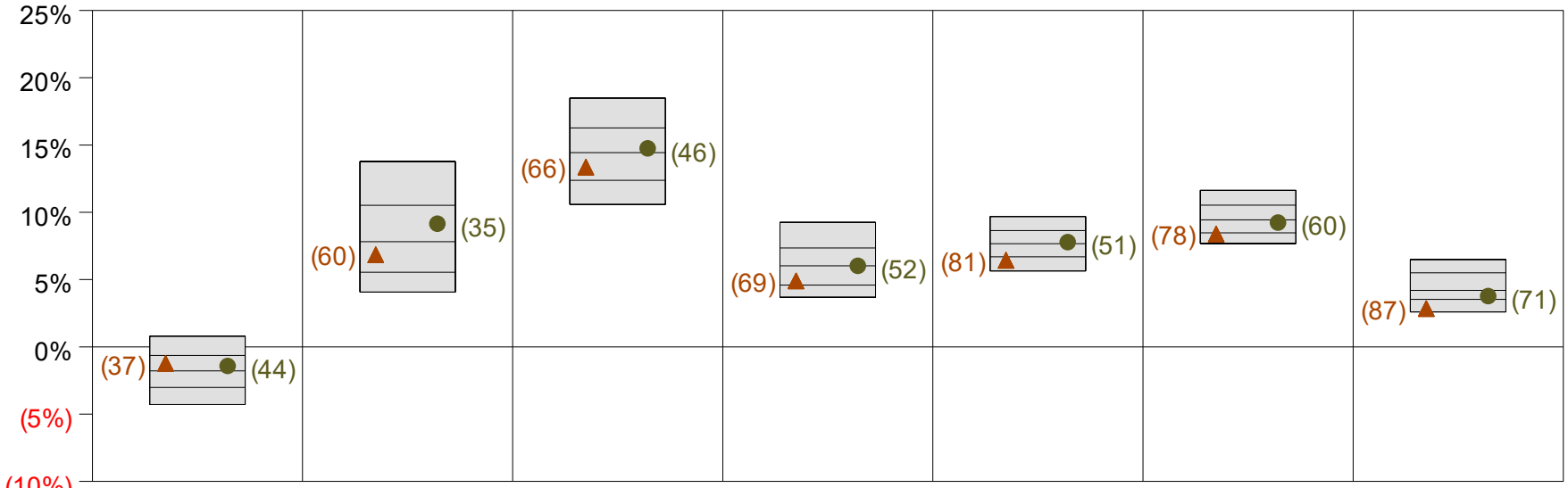
Risk Analysis vs. Public Fund – International Equity (Gross)
Five Years Ended June 30, 2018



- The Total International Equity portfolio has outperformed the MSCI ACWI ex US IMI over five years while exhibiting very tight tracking (low tracking error) to the benchmark relative to public fund peers.

International Equity ex Emerging Markets through 6/30/18

Performance vs Callan Non-US Equity (Gross)



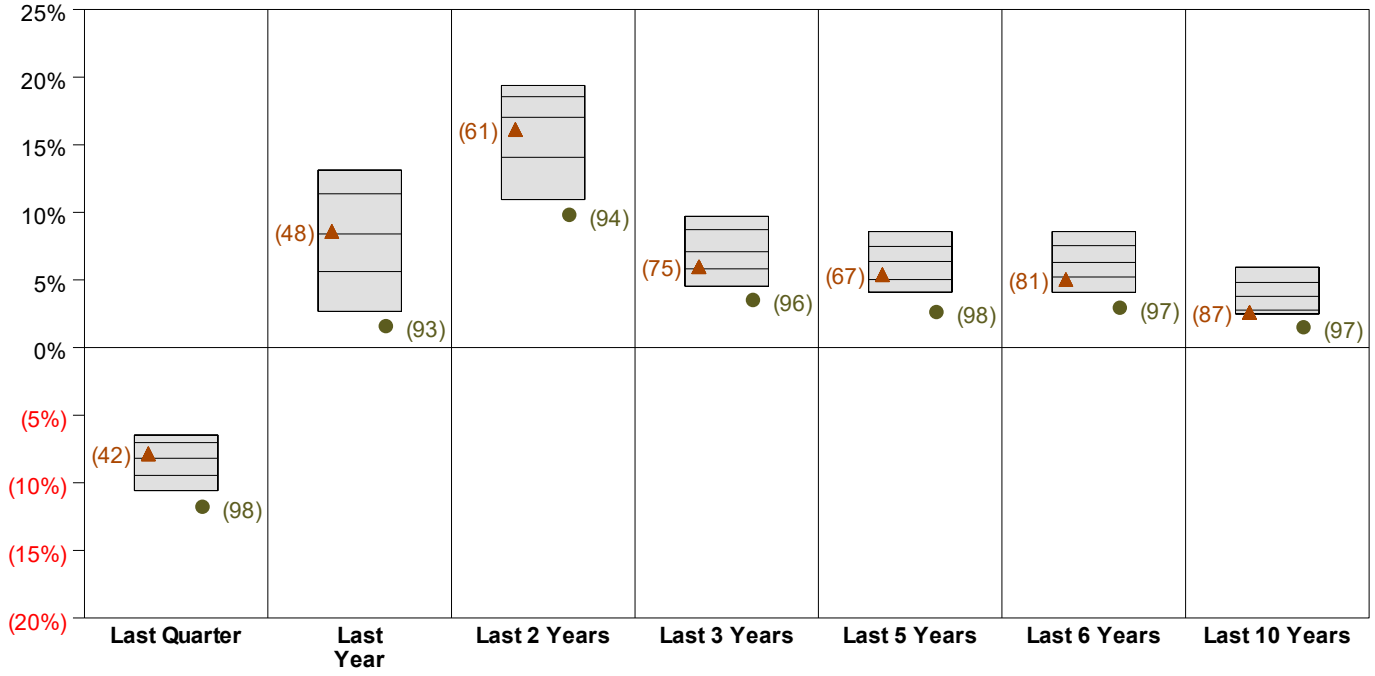
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	0.79	13.78	18.49	9.26	9.68	11.63	6.49
25th Percentile	(0.64)	10.52	16.26	7.35	8.65	10.53	5.50
Median	(1.79)	7.81	14.43	6.02	7.66	9.43	4.20
75th Percentile	(3.01)	5.54	12.37	4.58	6.70	8.47	3.52
90th Percentile	(4.28)	4.07	10.58	3.69	5.64	7.67	2.59
Int'l Equity Pool (ex Emerging. Mkt) ●	(1.56)	9.02	14.61	5.88	7.64	9.11	3.64
MSCI EAFE ▲	(1.24)	6.84	13.36	4.90	6.44	8.38	2.84

International Equity ex Emerging Markets through 6/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Int'l Equity Pool (ex Emerging Market)	**(1.56%)**	**9.02%**	**5.88%**	**7.64%**	**3.64%**
Arrowstreet ACWI ex -US	(3.71%)	9.48%	6.23%	-	-
Baillie Gifford ACWI ex US	0.31%	10.12%	8.43%	-	-
Blackrock ACWI ex US IMI	(2.29%)	8.07%	5.73%	6.64%	-
Brandes Investment	(0.33%)	8.52%	4.98%	8.04%	4.34%
Capital Guardian	1.68%	13.70%	7.99%	8.48%	4.57%
Lazard Asset Intl	(4.40%)	6.55%	3.71%	6.52%	4.46%
McKinley Capital	(2.18%)	8.84%	6.70%	9.64%	2.51%
SSgA Int'l	(2.48%)	7.96%	5.70%	6.67%	-
Schroder Inv Mgmt	(0.81%)	12.11%	10.41%	12.54%	-
Mondrian Intl Sm Cap	2.25%	13.45%	9.68%	9.59%	-
MSCI EAFE Index	(1.24%)	6.84%	4.90%	6.44%	2.84%
MSCI ACWI ex-US IMI Index	(2.61%)	7.75%	5.46%	6.39%	2.93%

Emerging Markets through 6/30/18

Performance vs Callan Emerging Broad (Gross)



		Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile		(6.47)	13.12	19.38	9.70	8.58	8.58	5.95
25th Percentile		(7.03)	11.38	18.55	8.72	7.47	7.53	4.82
Median		(8.19)	8.41	17.03	7.08	6.37	6.31	3.79
75th Percentile		(9.45)	5.62	14.08	5.83	5.03	5.22	2.77
90th Percentile		(10.58)	2.67	10.95	4.53	4.09	4.08	2.48
Emerging Markets Pool	●	(11.89)	1.46	9.70	3.39	2.50	2.84	1.38
MSCI EM Gross	▲	(7.86)	8.59	16.12	5.98	5.39	5.03	2.60

- After underperforming by 3.76% in 2Q17, 1.38% in 3Q17, 1.68% in 4Q17, and 4.03% this quarter, the Emerging Markets Pool lags the benchmark and ranks in the bottom decile for all trailing periods shown.

Emerging Markets Pool through 6/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Emerging Markets Pool	**(11.89%)**	**1.46%**	**3.39%**	**2.50%**	**1.38%**
DRZ Emerging (net)	(10.59%)	-	-	-	-
Lazard Emerging (net)	(13.61%)	0.07%	3.15%	2.43%	1.82%
Eaton Vance Emerging (net)	(9.25%)	3.56%	3.43%	2.84%	1.37%
MSCI Emerging Mkts Idx	(7.86%)	8.59%	5.98%	5.39%	2.60%

Total Fixed Income as of 6/30/18

Performance vs Public Fund - Domestic Fixed (Gross)



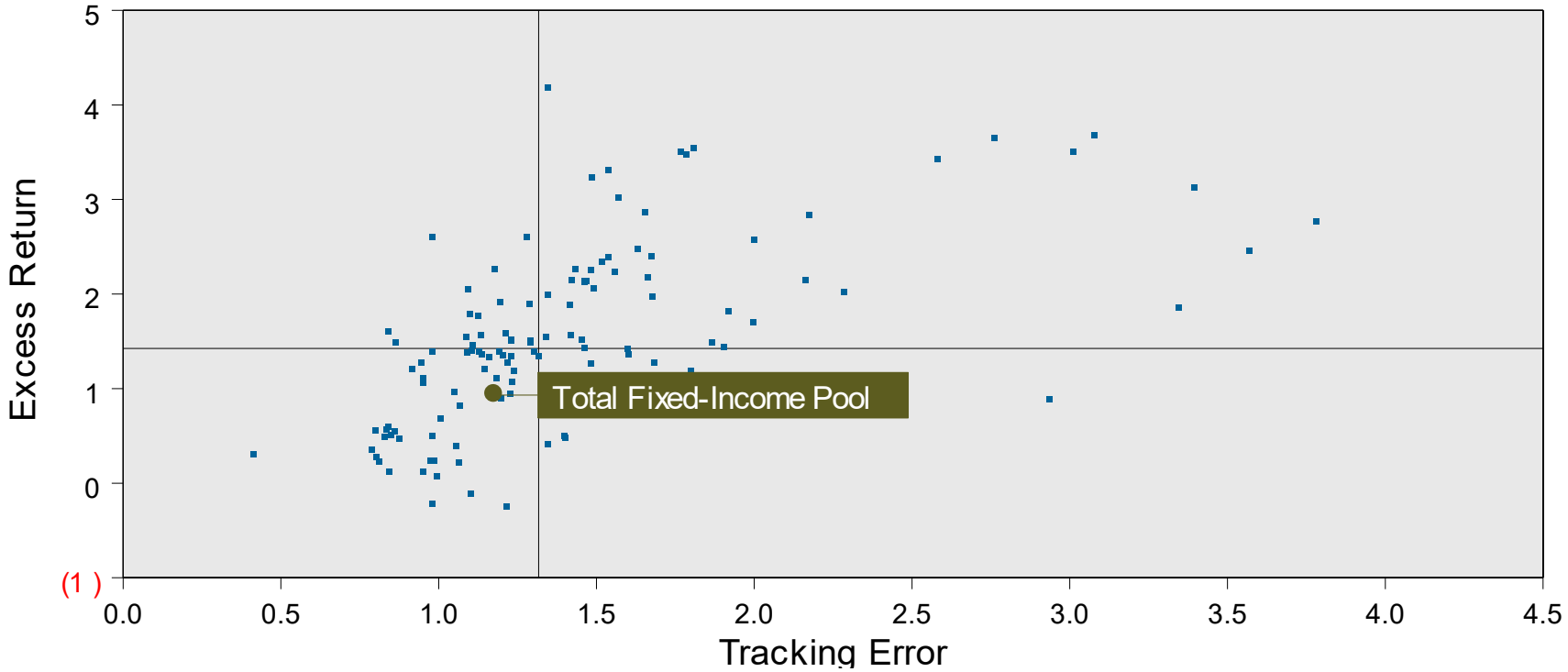
	Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years
10th Percentile	0.44	2.34	3.43	4.01	4.36	4.28	5.71
25th Percentile	0.30	1.36	2.44	3.28	3.47	3.15	5.05
Median	0.06	0.26	1.11	2.39	2.82	2.49	4.42
75th Percentile	(0.12)	(0.09)	(0.03)	1.78	2.30	1.72	3.45
90th Percentile	(0.39)	(0.42)	(0.34)	1.32	1.67	1.36	2.86
Total Fixed-Income Pool ●	0.08	(0.71)	1.07	2.41	2.31	2.01	3.73
Fixed-Income Target ▲	0.06	(0.76)	(0.51)	1.24	1.38	1.12	3.21

- The Total Bond portfolio has a custom target, intermediate in nature, that reflects a cautious view on the risk of rising rates.
- The composite's returns outperform the benchmark over all time periods shown.

Includes In-House and External Portfolios

Total Fixed Income Excess Return and Risk

Risk Analysis vs. Public Fund – Domestic Fixed (Gross)
Five Years Ended June 30, 2018



- The Total Fixed Income portfolio has outperformed the Fixed Income Target over five years and exhibits modest tracking error to the benchmark relative to public fund peers despite the custom nature of the benchmark.

Opportunistic through 6/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Opportunistic	**1.28%**	**5.23%**	**-**	**-**	**-**
Opportunistic Equity	**3.49%**	**8.88%**	**7.85%**	**8.97%**	**-**
ARMB Large Cap	3.97%	10.15%	-	-	-
Analytic SSgA/Buy Write	3.59%	7.26%	8.19%	8.39%	-
Russell 1000 Index	3.57%	14.54%	11.64%	13.37%	10.20%
Taxable Muni Composite	**(0.32%)**	**3.41%**	**6.04%**	**-**	**-**
Western Asset Taxable Muni	(0.15%)	3.92%	6.22%	-	-
Blmbg Gov/Credit Bd	(0.33%)	(0.63%)	1.83%	2.29%	3.78%
Blmbg Aggregate Index	(0.16%)	(0.40%)	1.72%	2.27%	3.72%
Blmbg Intmdt Treas	0.06%	(0.76%)	0.62%	1.03%	2.43%
Blmbg Muni Tax Bd Idx	(0.36%)	3.21%	5.57%	6.27%	6.64%
International Fixed Income Pool	**(5.43%)**	**0.82%**	**2.33%**	**(0.04%)**	**1.67%**
Lazard Emerging Income	(5.37%)	(0.77%)	0.91%	(0.46%)	-
Mondrian Int'l FI	(5.53%)	2.47%	3.58%	0.55%	2.44%
Citi Non-US Gvt Bd Idx	(5.11%)	3.22%	3.74%	1.01%	1.78%
Mondrian Benchmark	(6.70%)	1.56%	3.29%	0.34%	1.63%
Tactical FI					
FIAM Tactical Bond	(0.28%)	1.61%	4.10%	-	-
Schroders Insurance Linked	1.03%	(5.41%)	-	-	-
Blmbg Aggregate Index	(0.16%)	(0.40%)	1.72%	2.27%	3.72%
T-Bills + 6%	1.90%	7.36%	6.68%	6.42%	6.35%
High Yield	**1.02%**	**3.07%**	**4.91%**	**5.36%**	**7.53%**
FIAM High Yield CMBS	0.95%	2.97%	-	-	-
MacKay Shields	0.65%	3.84%	6.81%	6.50%	8.18%
High Yield Target(1)	1.00%	2.53%	5.55%	5.50%	8.03%

(1) ML Hi Yield Master II from 12/31/06; ML Hi Yield Cash Pay prior to 12/31/06.

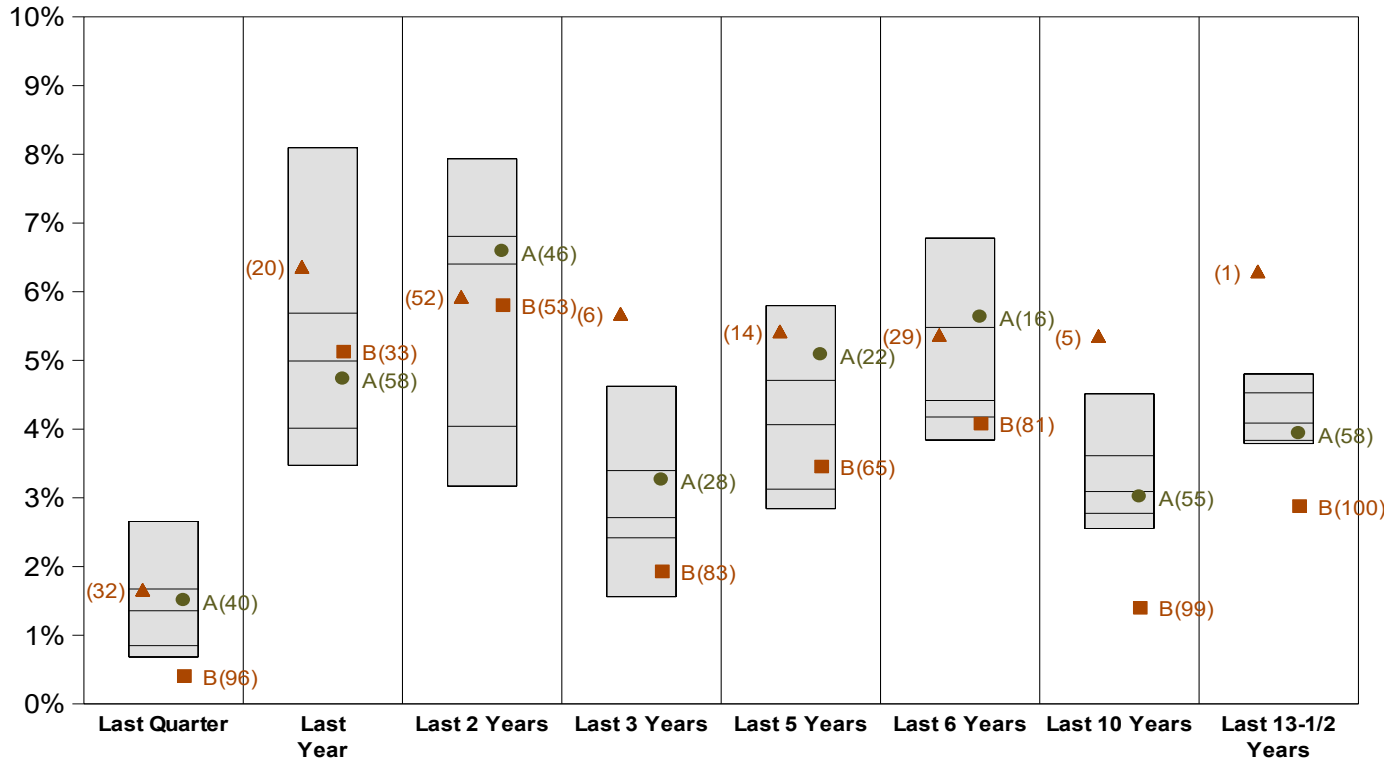
Real Assets through 6/30/18

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 6 Years
Real Assets	**3.01%**	**7.79%**	**6.19%**	**7.04%**	**7.56%**
Real Assets Target (1)	3.16%	4.29%	6.25%	7.53%	7.67%
Real Estate Pool	2.79%	7.39%	8.99%	10.09%	9.85%
Real Estate Target (2)	2.48%	7.01%	8.37%	9.74%	9.90%
Private Real Estate	1.51%	7.93%	8.87%	10.28%	9.99%
NCREIF Total Index	1.81%	7.19%	8.25%	9.77%	9.93%
ARMB REIT	8.27%	4.77%	9.01%	8.82%	8.94%
NAREIT Equity Index	8.50%	4.93%	9.14%	8.88%	9.10%
Total Farmland	1.32%	3.81%	4.54%	5.44%	7.06%
UBS Farmland	1.59%	3.76%	4.90%	6.00%	8.04%
Hancock Agricultural	0.76%	3.91%	3.78%	4.42%	5.38%
ARMB Farmland Target (3)	1.78%	6.13%	5.95%	7.09%	8.79%
Total Timber	1.02%	4.57%	1.31%	4.48%	4.92%
Timberland Investment Resources	1.15%	4.54%	1.61%	4.41%	4.65%
Hancock Timber	0.67%	4.78%	0.49%	4.33%	5.28%
NCREIF Timberland Index	0.48%	3.57%	3.43%	6.00%	6.55%
TIPS Internal Portfolio	0.81%	2.36%	2.02%	1.72%	0.63%
BC US TIPS Index	0.77%	2.11%	1.93%	1.68%	0.57%
Total Energy Funds *	5.48%	5.98%	(3.89%)	(6.74%)	(4.79%)
CPI + 5%	2.31%	8.09%	6.74%	6.37%	6.44%
MLP Composite *	9.26%	(3.44%)	(6.45%)	(0.60%)	-
Advisory Research (FKA FAMCO) MLP	8.97%	(3.68%)	(8.58%)	(2.42%)	-
Tortoise Capital Adv MLP	9.56%	(3.19%)	(4.48%)	1.09%	-
Alerian MLP Index	11.80%	(4.58%)	(5.93%)	(4.09%)	0.68%
Total Infrastructure *	4.72%	11.59%	10.11%	-	-
Brookfield	4.02%	1.99%	3.60%	-	-
Lazard	2.01%	6.39%	14.33%	-	-
JPM Infrastructure	3.26%	15.43%	8.83%	-	-
IFM Infrastructure	6.44%	15.30%	11.85%	-	-
Global Infrastructure Idx	2.60%	1.82%	5.98%	8.04%	8.32%

Real estate returns are provided to Callan by ARMB's real estate consultant.

Absolute Return Composite through 6/30/18

Performance vs Callan Absolute Rtn Hedge Fund of Funds (Net)



		Last Quarter	Last Year	Last 2 Years	Last 3 Years	Last 5 Years	Last 6 Years	Last 10 Years	Last 13-1/2 Years
10th Percentile		2.66	8.10	7.93	4.62	5.80	6.78	4.51	4.80
25th Percentile		1.67	5.69	6.81	3.40	4.71	5.48	3.61	4.53
Median		1.36	4.99	6.40	2.71	4.07	4.42	3.09	4.09
75th Percentile		0.85	4.01	4.04	2.42	3.13	4.18	2.77	3.84
90th Percentile		0.68	3.47	3.17	1.56	2.84	3.84	2.55	3.79
Absolute Return HFRI Fund of Funds Compos	● A	1.50	4.72	6.58	3.25	5.07	5.62	3.00	3.93
	■ B	0.41	5.13	5.80	1.93	3.45	4.08	1.40	2.88
T-Bills + 5%	▲	1.66	6.36	5.92	5.68	5.42	5.37	5.35	6.30

- The absolute return composite outperformed the HFRI FoF Index for all trailing periods shown except for the last year.

Absolute Return Composite through 6/30/18

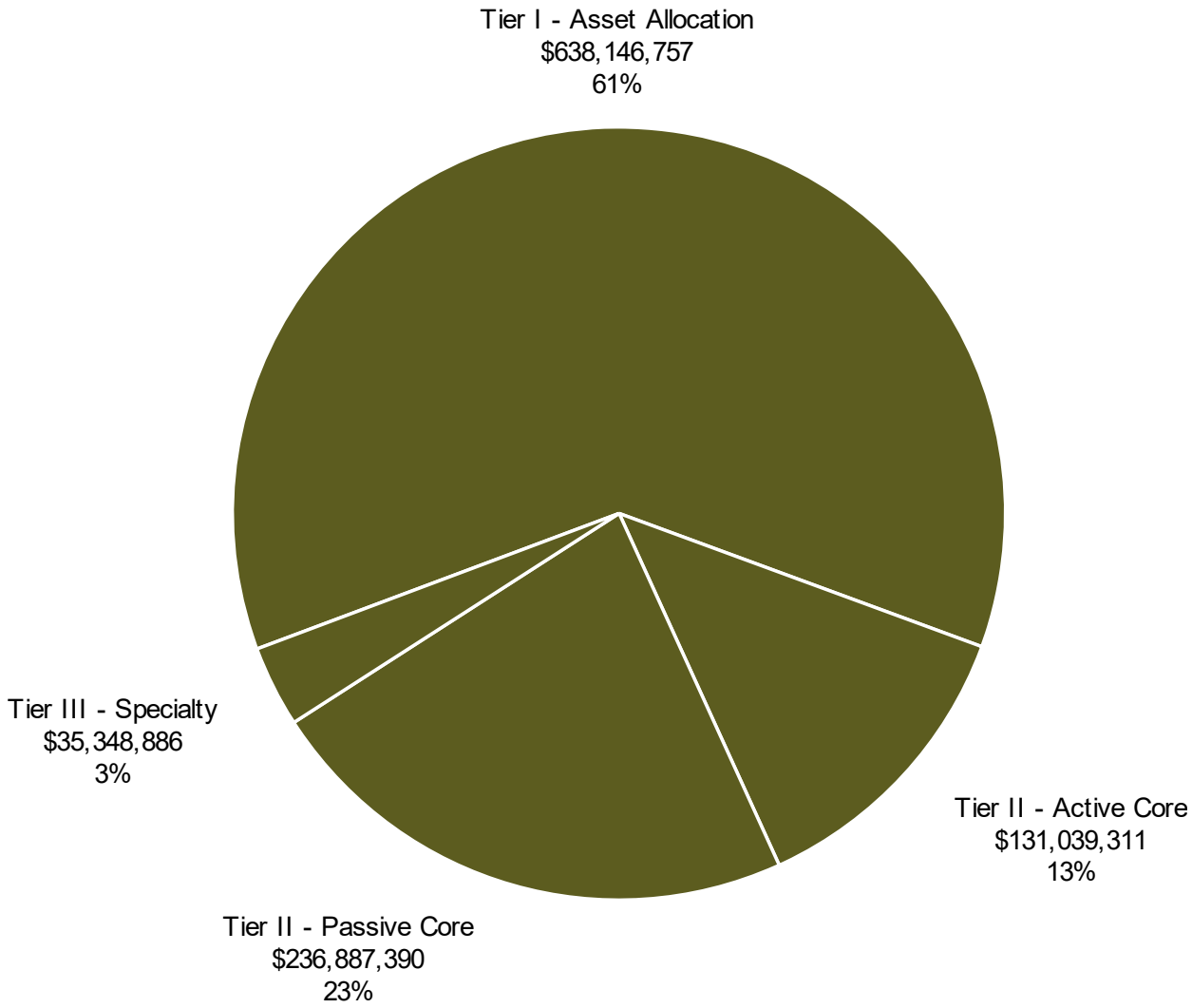
	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Absolute Return	**1.50%**	**4.72%**	**3.25%**	**5.07%**	**3.00%**
Crestline ABS	1.63%	4.78%	7.10%	8.72%	4.36%
Glob Asset Mgt	0.24%	1.55%	0.39%	2.49%	-
Prisma ABS	0.78%	4.45%	0.92%	3.55%	-
Allianz Stuctured Alpha 1000+	6.53%	6.74%	8.78%	-	-
KKR Apex Equity Fund	(2.96%)	4.35%	(0.48%)	-	-
Crestline Specialty Lending Fund	3.30%	14.01%	6.46%	-	-
Zebra Global Equity	(3.02%)	(5.99%)	-	-	-
Zebra Global Advantage	(6.26%)	(13.37%)	-	-	-
JP Morgan Systematic Alpha	(3.54%)	-	-	-	-
Man Group Alternative Risk Premia	1.96%	-	-	-	-
HFRI Fund of Funds Index	0.41%	5.13%	1.93%	3.45%	1.40%



Defined Contribution Plan

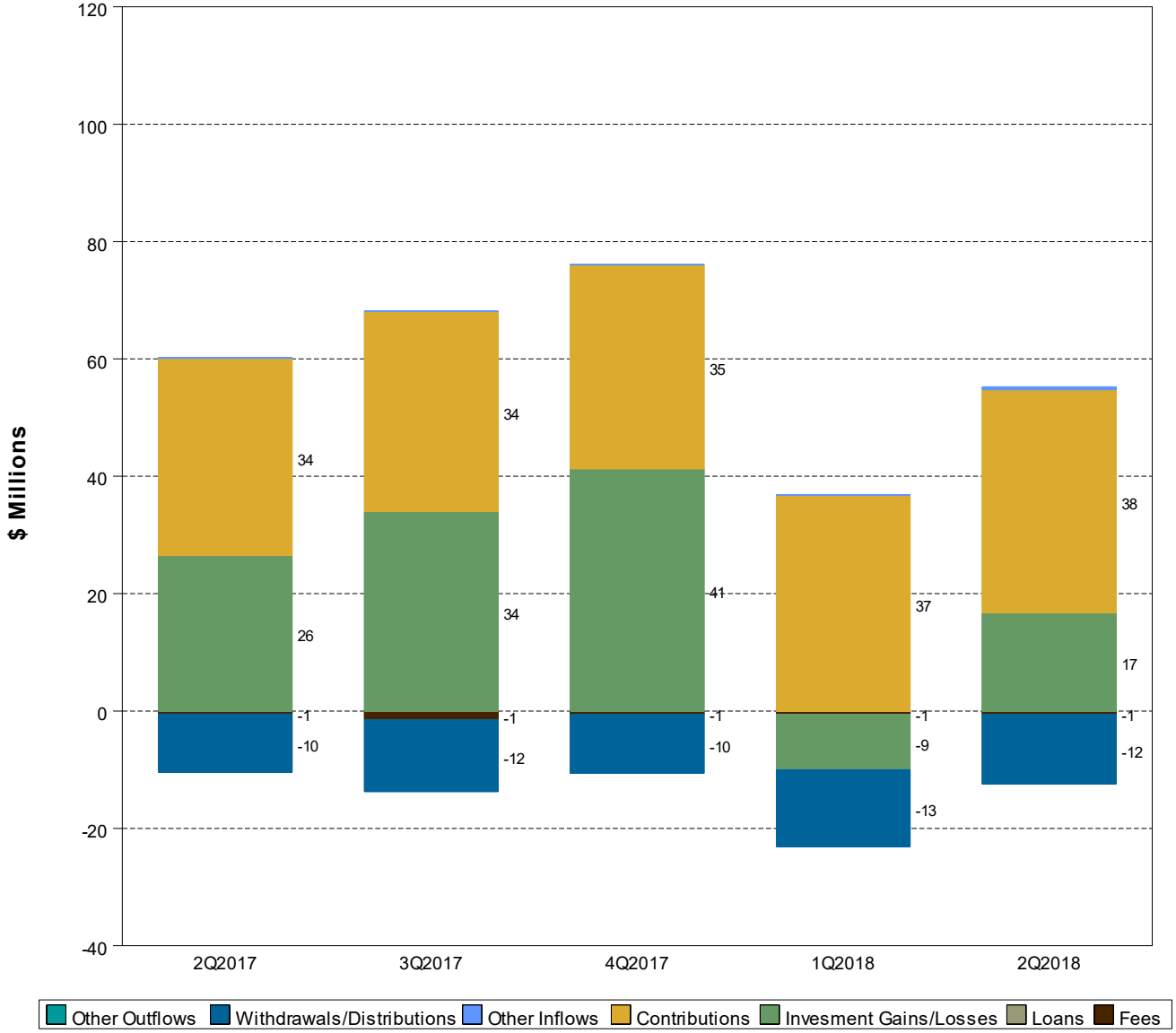
PERS DC Plan

June 30, 2018



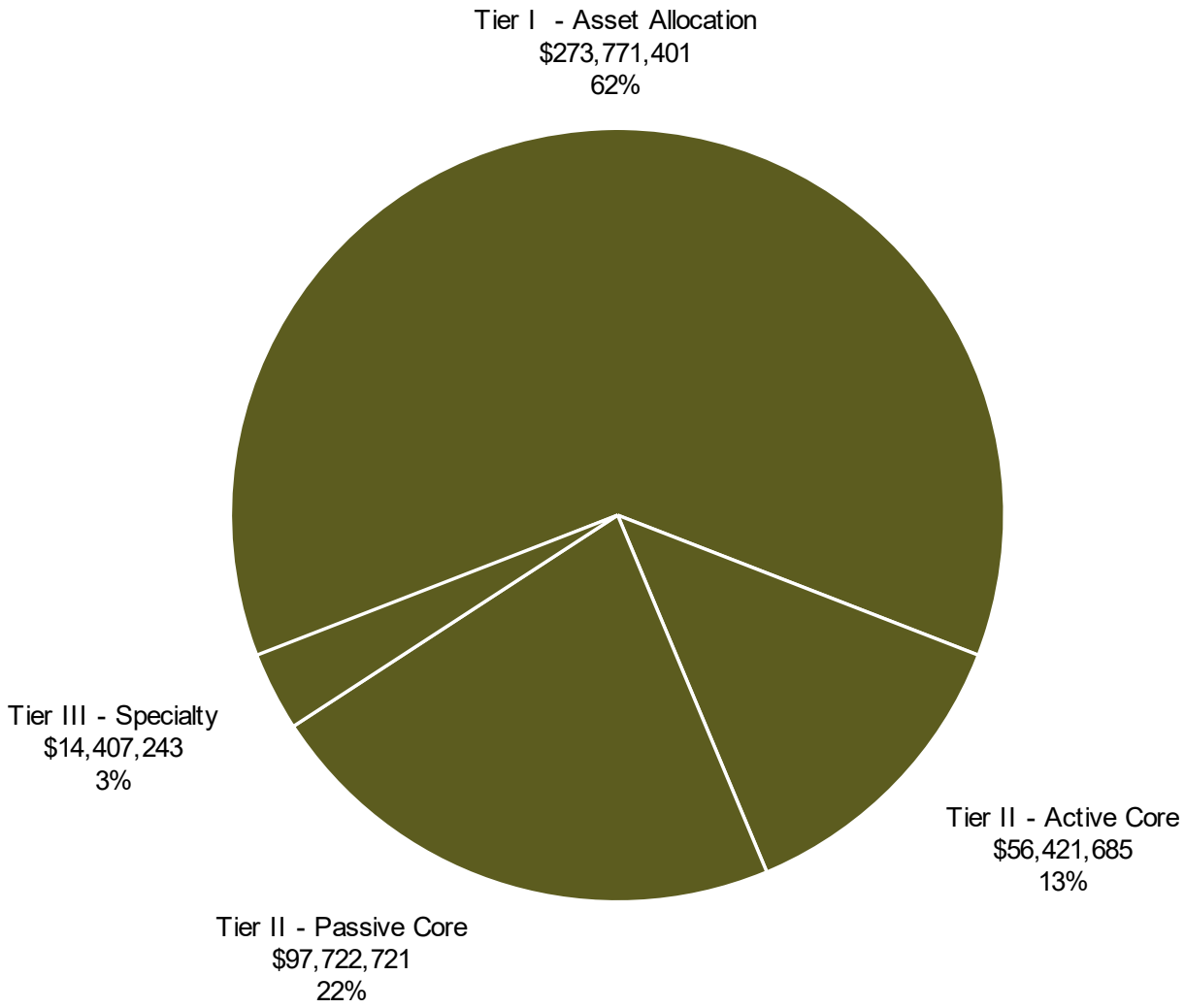
PERS DC Plan: Asset Changes

June 30, 2018



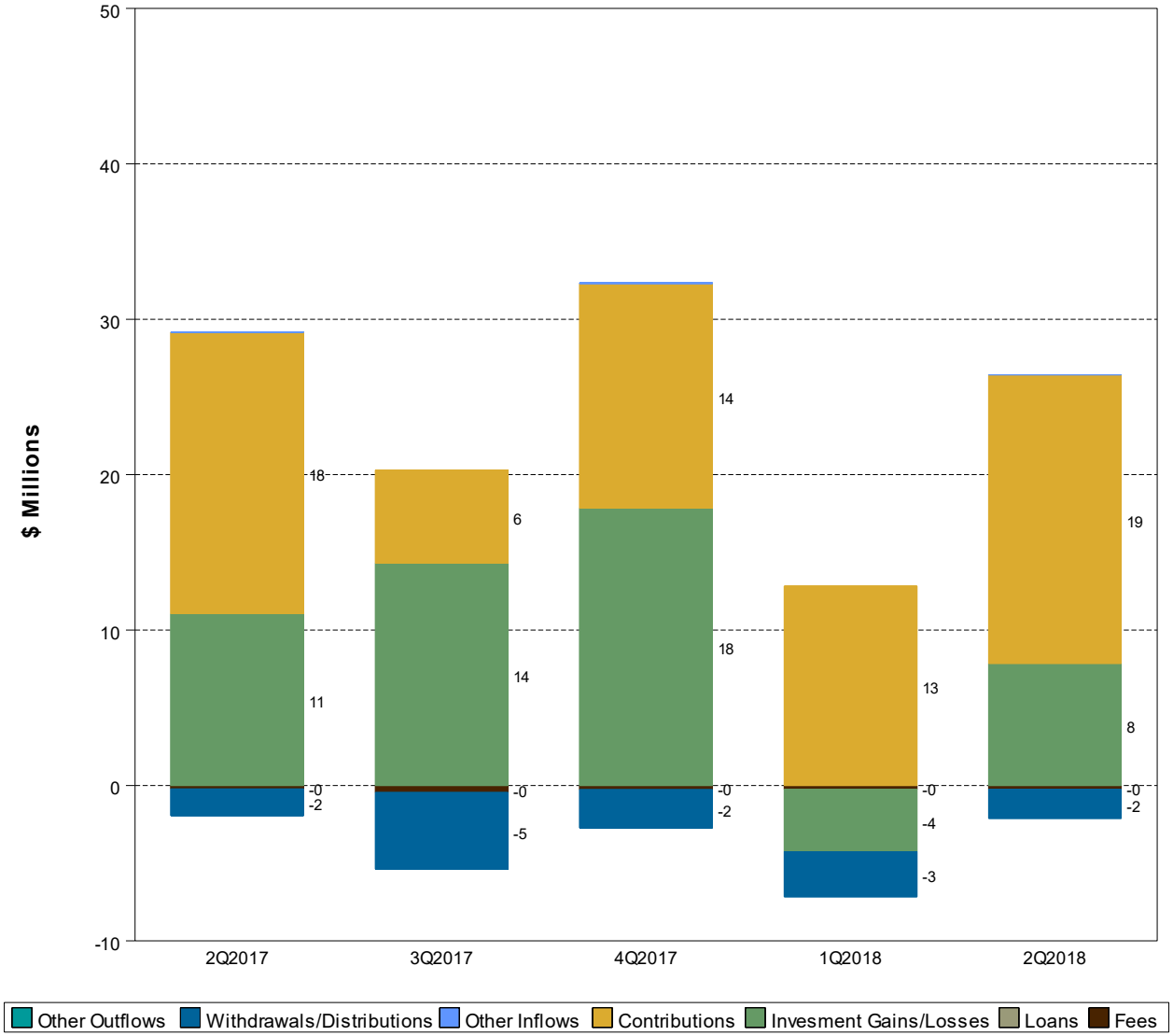
TRS DC Plan

June 30, 2018



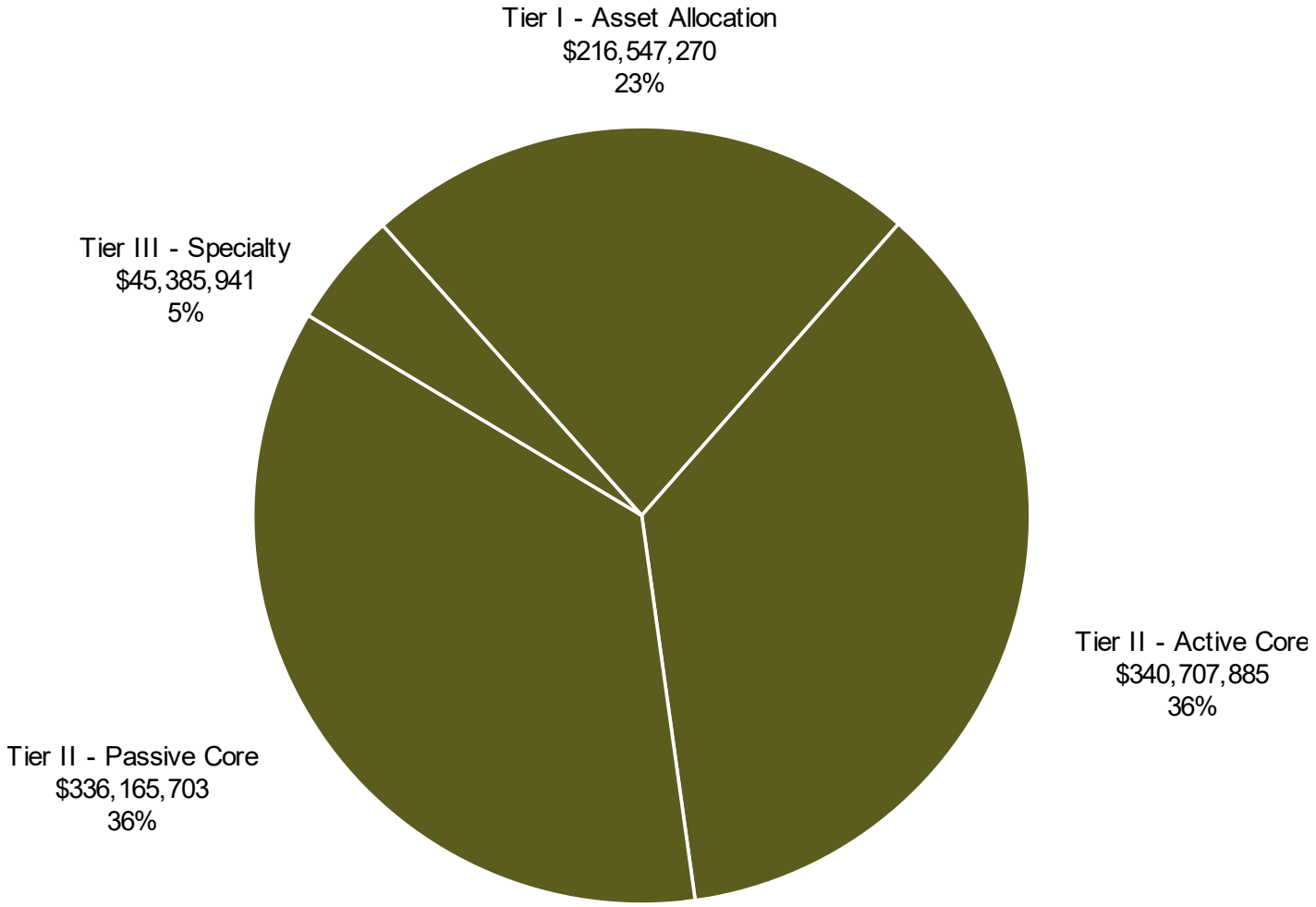
TRS DC Plan: Asset Growth Changes

June 30, 2018



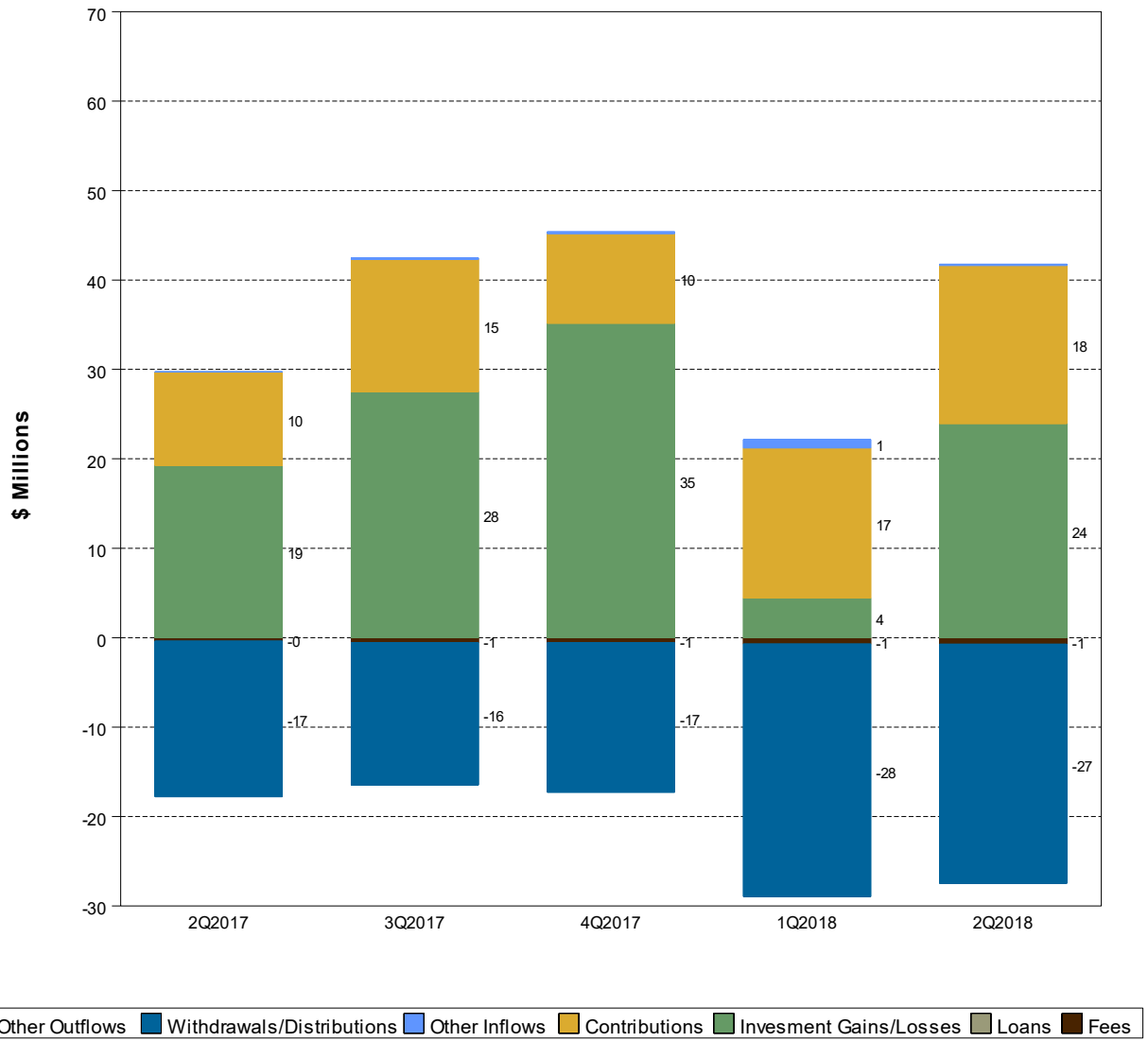
Deferred Comp Plan

June 30, 2018



Deferred Comp Plan: Quarterly Asset Changes

June 30, 2018



Individual Account Option Performance: 6/30/18

Balanced & Target Date Funds

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Tier I - Asset Allocation										
Alaska Balanced Trust	**0.7** 24	**4.3** 29	**4.4** 28	**5.3** 24	**5.5** 24	**2.9** 82		**-0.2** 66	**0.2** 100	**1.7** 24
CAI MA Tgt Alloc Cons MFs										
Passive Target	0.8 17	4.5 24	4.4 27	5.3 23	5.5 25	3.0 78				1.7 25
Alaska Long-Term Balanced	**1.0** 38	**7.2** 30	**6.3** 24	**7.6** 23	**7.7** 19	**4.6** 67		**-0.5** 72	**0.3** 100	**1.5** 42
CAI MA Tgt Alloc Mod MFs										
Passive Target	1.3 29	7.6 23	6.5 22	7.7 22	7.7 18	4.7 63				1.6 42
Target 2010 Trust	**0.8** 22	**5.5** 20	**5.0** 33	**6.1** 30	**6.2** 18	**3.6** 68		**-0.3** 69	**0.2** 100	**1.6** 21
CAI Tgt Date 2010										
Custom Index	1.0 15	5.7 16	5.0 32	6.1 29	6.2 18	3.7 64				1.5 41
Target 2015 Trust	**1.0** 15	**6.5** 13	**5.7** 24	**7.0** 19	**7.2** 7	**4.3** 44		**0.0** 36	**0.2** 100	**1.6** 29
CAI Tgt Date 2015										
Custom Index	1.1 9	6.7 11	5.7 28	7.0 19	7.1 7	4.4 41				1.5 44
Target 2020 Trust	**1.1** 10	**7.6** 8	**6.6** 9	**8.0** 8	**8.0** 4	**4.9** 31		**-0.0** 16	**0.3** 100	**1.5** 32
CAI Tgt Date 2020										
Custom Index	1.3 4	7.9 4	6.6 9	8.0 8	8.0 4	5.0 21				1.5 49
Target 2025 Trust	**1.2** 13	**8.5** 9	**7.3** 7	**8.7** 9	**8.7** 4	**5.5** 30		**-0.1** 22	**0.3** 99	**1.5** 28
CAI Tgt Date 2025										
Custom Index	1.4 6	8.8 4	7.3 7	8.8 9	8.7 4	5.6 25				1.5 53
Target 2030 Trust	**1.3** 12	**9.4** 13	**7.8** 9	**9.4** 10	**9.3** 4	**6.0** 37		**-0.2** 30	**0.3** 100	**1.5** 28
CAI Tgt Date 2030										
Custom Index	1.6 11	9.7 7	7.9 8	9.5 9	9.3 4	6.2 31				1.5 43
Target 2035 Trust	**1.4** 18	**10.1** 16	**8.4** 13	**9.9** 12	**9.8** 3	**6.4** 53		**-0.2** 31	**0.4** 99	**1.5** 20
CAI Tgt Date 2035										
Custom Index	1.7 7	10.5 11	8.4 12	10.0 11	9.8 3	6.6 35				1.4 36
Target 2040 Trust	**1.5** 21	**10.7** 21	**8.8** 11	**10.3** 10	**10.1** 2	**6.8** 60		**-0.2** 37	**0.4** 99	**1.5** 19
CAI Tgt Date 2040										
Custom Index	1.8 7	11.1 11	8.8 8	10.4 8	10.1 2	7.0 38				1.4 36
Target 2045 Trust	**1.5** 21	**10.9** 30	**8.9** 12	**10.4** 12	**10.2** 3	**6.8** 72		**-0.2** 41	**0.4** 98	**1.5** 17
CAI Tgt Date 2045										
Custom Index	1.8 6	11.4 12	9.0 10	10.5 11	10.2 2	7.0 58				1.4 30

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:



Excess Return Ratio:
- above median
- third quartile
- fourth quartile

Tracking Error:
- below median
- second quartile
- first quartile

Sharpe Ratio:
- above median
- third quartile
- fourth quartile

Individual Account Option Performance: 6/30/18

Balanced & Target Date Funds

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Target 2050 Trust	**1.5** 23	**10.9** 34	**8.9** 12	**10.4** 12	**10.2** 4	**6.8** 79		**-0.3** 54	**0.4** 100	**1.5** 21
CAI Tgt Date 2050 Custom Index	1.8 7	11.4 14	9.0 10	10.5 12	10.2 4	7.0 63				1.4 29
Target 2055 Trust	**1.5** 23	**10.9** 39	**8.9** 14	**10.4** 15	**10.2** 7	**6.8** 81		**-0.2** 60	**0.4** 99	**1.5** 15
CAI Tgt Date 2055 Custom Index	1.8 8	11.4 20	9.0 10	10.5 14	10.2 7	7.0 67				1.4 34
Target 2060 Trust	**1.5** 31	**10.8** 52								
CAI Tgt Date 2060 Custom Index	1.8 7	11.4 25								

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:



Excess Return Ratio:
- above median
- third quartile
- fourth quartile

Tracking Error:
- below median
- second quartile
- first quartile

Sharpe Ratio:
- above median
- third quartile
- fourth quartile

Other Options: 6/30/18

Active Equity, Stable Value, and Interest Income

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Active and Other Funds										
International Equity Fund	**-1.9** 50	**6.5** 58	**1.3** 99						**2.7** 87	
CAI Mut Fd: Non-U.S. Equity Style										
MSCI ACWI ex US Index	-2.4 61	7.8 31	5.6 36	6.5 54	4.3 77	10.6 61				0.6 55
Allianz/RCM Socially Responsible	**0.4** 87	**13.4** 51	**9.9** 61	**11.2** 72	**10.4** 86	**6.9** 87		**-0.4** 86	**2.6** 61	**1.6** 65
CAI Mut Fd: Core Equity Style										
Custom Benchmark	2.6 61	13.7 46	11.0 33	12.1 64	12.3 48	6.7 95				1.7 30
T. Rowe Price Small Cap	**6.7** 50	**18.5** 45	**12.0** 19	**13.3** 29	**13.1** 14	**9.9** 85		**0.4** 10	**2.8** 95	**1.3** 14
CAI Mut Fd: Sm Cap Broad Style										
Russell 2000 Index	7.8 38	17.6 50	11.0 35	12.5 42	11.8 38	11.3 62				1.1 33
T. Rowe Price Stable Value	**0.6** 14	**2.4** 1	**2.4** 1	**2.4** 1	**2.6** 1	**0.0** 91		**16.6** 15	**0.1** 17	**46.7** 8
CAI Stable Value Database										
5 Yr U.S. Treas Rolling	0.4 92	1.5 96	1.4 97	1.4 98	1.6 92	0.1 72				16.5 60
Def Comp Interest Income Fund	**0.6** 1	**2.5** 1	**2.6** 1	**2.6** 1	**2.8** 1	**0.1** 70		**16.0** 17	**0.1** 9	**36.0** 12
CAI Stable Value Database										
5 Yr U.S. Treas Rolling	0.4 92	1.5 96	1.4 97	1.4 98	1.6 92	0.1 72				16.5 60

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:



Excess Return Ratio:
- above median
- third quartile
- fourth quartile

Tracking Error:
- below median
- second quartile
- first quartile

Sharpe Ratio:
- above median
- third quartile
- fourth quartile

Passive Options: 6/30/18

Investment Manager	Last Quarter Return	Last Year Return	3 Year Return	5 Year Return	7 Year Return	5 Year Risk	5 Year Risk Quadrant	5 Year Excess Rtn Ratio	3 Year Tracking Error	5 Year Sharpe Ratio
Index Funds										
SSgA S&P 500 Index Fund (i)	**3.4** 24	**14.4** 14	**11.9** 7	**13.4** 6	**13.2** 6	**7.0** 22		**-0.9** 5	**0.0** 83	**1.8** 9
Callan S&P 500 Index MFs										
S&P 500 Index	3.4 11	14.4 8	11.9 5	13.4 1	13.2 6	7.0 45				1.9 1
BlackRock S&P 500 Index Fund (i)	**3.4** 14	**14.4** 11	**11.9** 12	**13.4** 5	**13.2** 6	**7.0** 22		**-1.1** 6	**0.0** 98	**1.8** 9
Callan S&P 500 Index MFs										
S&P 500 Index	3.4 11	14.4 8	11.9 5	13.4 1	13.2 6	7.0 45				1.9 1
SSgA Russell 3000 Index Fund (i)	**3.8** 41	**14.7** 52	**11.6** 41	**13.3** 48	**13.0** 41	**7.2** 90		**0.0** 47	**0.1** 100	**1.8** 15
CAI Mut Fd: Large Cap Broad Style (Net)										
Russell 3000 Index	3.9 41	14.8 52	11.6 41	13.3 48	13.0 41	7.2 90				1.8 16
SSgA World Equity ex-US Index Fund (i)	**-2.9** 71	**7.5** 34	**5.2** 41	**6.1** 62	**3.9** 81	**10.5** 61		**0.2** 47	**0.8** 99	**0.5** 59
CAI MF: Non-U.S. Equity Style										
MSCI ACWI x U.S. Index (Net)	-2.6 68	7.3 43	5.1 45	6.0 63	3.8 82	10.6 61				0.5 62
SSgA Long US Treasury Bond (i)	**0.3** 39	**-0.2** 28	**3.4** 76	**4.5** 76	**6.1** 72	**10.6** 34		**-0.1** 75	**0.1** 96	**0.4** 61
CAI Mut Fd: Extended Mat Fixed Income										
Blmbg Long Treasury Index	0.3 39	-0.1 27	3.4 77	4.5 76	6.1 72	10.5 38				0.4 61
SSgA US TIPS (i)	**0.8** 38	**2.1** 44	**1.8** 45	**1.6** 34	**2.0** 31	**3.6** 59		**-3.3** 96	**0.0** 99	**0.3** 31
CAI TIPS MFs										
Blmbg U.S. TIPS Index	0.8 37	2.1 41	1.9 29	1.7 22	2.1 23	3.6 58				0.3 24
SSgA World Gov't Bond ex-US (i)	**-5.2** 94	**3.2** 1	**3.7** 20	**0.9** 86	**-0.1** 92	**9.1** 2		**-1.2** 99	**0.1** 100	**0.1** 89
CAI Mut Fd: Global Fixed Income Style										
Citi WGBI Non-U.S. Index	-5.1 94	3.2 1	3.7 19	1.0 86	-0.1 92	9.0 2				0.1 88
SSgA US REIT Index Fund (i)	**9.9** 5	**4.2** 44	**7.5** 41	**8.1** 46	**8.7** 44	**12.3** 11		**-2.6** 99	**0.1** 100	**0.6** 59
CAI Mut Fd: Real Estate Database										
DJ US Select REIT Index	10.0 5	4.2 39	7.7 37	8.3 40	8.9 31	12.3 6				0.6 54
BlackRock Govt/Credit (i)	**-0.3** 77	**-0.7** 69	**1.8** 42	**2.2** 70	**2.7** 63	**3.3** 1		**-1.3** 100	**0.0** 100	**0.5** 87
CAI Mut Fd: Core Bond Style										
Blmbg Govt/Credit Bd	-0.3 76	-0.6 68	1.8 41	2.3 45	2.8 41	3.3 1				0.6 86
BlackRock Intermediate Gov't Bond (i)	**0.1** 38	**-0.7** 83	**0.6** 84	**1.0** 87	**1.3** 79	**1.9** 53		**-1.8** 98	**0.0** 97	**0.3** 89
CAI MF: Intermediate Fixed Income Style										
Blmbg Gov Inter	0.1 38	-0.7 84	0.6 83	1.0 80	1.4 74	2.0 52				0.3 87

Returns:
- above median
- third quartile
- fourth quartile

Risk:
- below median
- second quartile
- first quartile

Risk Quadrant:



Excess Return Ratio:
- above median
- third quartile
- fourth quartile

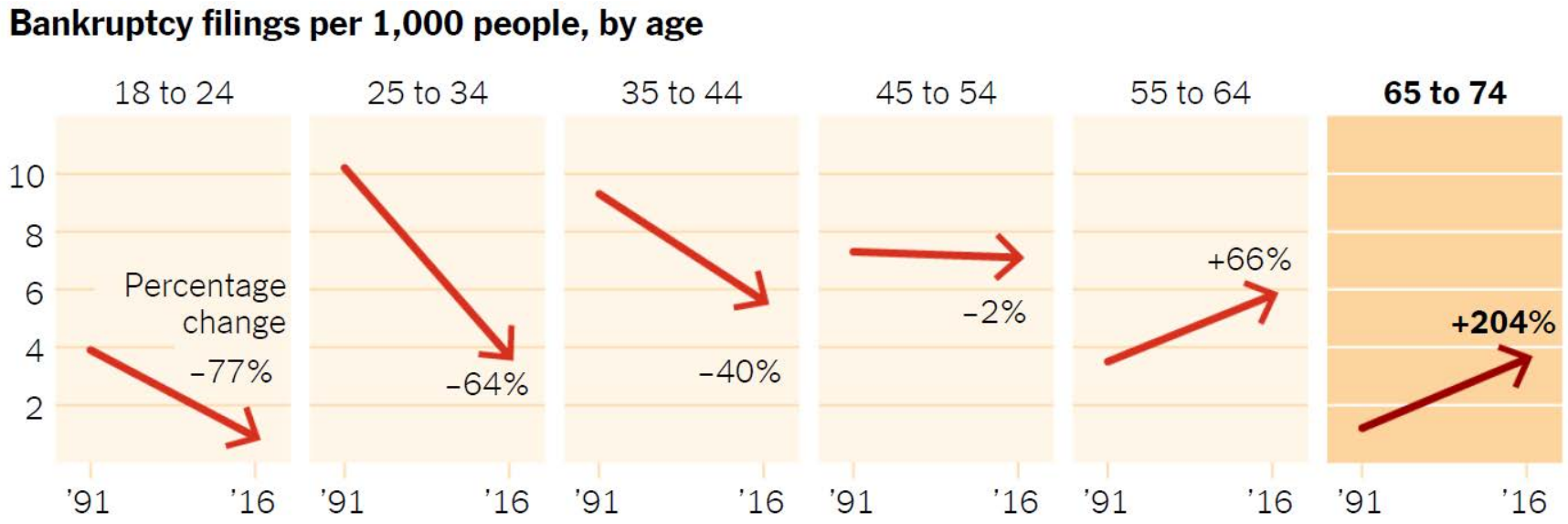
Tracking Error:
- below median
- second quartile
- first quartile

Sharpe Ratio:
- above median
- third quartile
- fourth quartile

(i) – Indexed scoring method used. Green: manager & index differ by less than +/- 10 percentiles; Yellow: manager and index differ by +/- 20 percentiles; Red: manager & index differ by more than 20 percentiles.

Why What the ARMB Does Matters

‘Too Little Too Late’: Bankruptcy Booms Among Older Americans



Source: The Federal Reserve’s survey of consumer finances, via the Consumer Bankruptcy Project

- Bankruptcy filings by older Americans are increasing significantly due to higher health care costs and expenses that exceed some individual’s income.
- From February 2013 to November 2016, there were 3.6 bankruptcy filers per 1,000 people between the ages of 65 and 74. In 1991, the incidence rate was one-third the current level: 1.2.
- See:https://www.nytimes.com/2018/08/05/business/bankruptcy-older-americans.html?rref=collection%2Ftimestopic%2FElderly&action=click&contentCollection=timestopics&region=stream&module=stream_unit&version=latest&contentPlacement=1&pgtype=collection

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Global Equity ex-USA Scientific Beta Indices, Manager Selection	ACTION:	X
DATE:	September 20-21, 2018	INFORMATION:	

BACKGROUND:

Factors can be described as characteristics that explain where risk and return are generated from a group of securities. Several decades of research suggests that long-term equity portfolio performance can be explained by factors, also known as betas, or risk premia.

Specific equity factors have historically earned a long-term risk premium, including high book/market value, small market capitalization, low price volatility and price momentum. Transparent, rules-based indices have become available over the last decade, providing the potential to outperform market capitalization-weighted indices at costs below traditional active management.

Scientific Beta has created a set of indices that attempt to provide exposure to historically rewarded risk factors in a diversified manner. Indices have also been created that seek exposure to multiple factors in an attempt to achieve more consistent relative outperformance.

At the June 2016 Alaska Retirement Management Board (ARMB) meeting, ARMB authorized staff to contract with Scientific Beta to receive constituents of the multi-beta, multi-strategy indices and internally manage a portfolio against the index. As of July 31, 2018, staff manages approximately $385 million in a portfolio closely tracking the Scientific Beta United States Multi-Beta Multi-Strategy Four-Factor EW Index.

At the April 2017 ARMB meeting, the board authorized staff to broaden its contract with Scientific Beta to internally manage an international equity strategy reflecting a similar approach. This strategy is currently not funded.

At the June 2018 ARMB meeting, staff presented several recommended changes to the Global Equity ex-USA asset class. These changes included selecting an external investment manager to manage a portfolio closely tracking the Scientific Beta Developed ex-US Multi-Beta Multi-Strategy Four-Factor EW Index and Scientific Beta Emerging Multi-Beta Multi-Strategy Four-Factor EW Index.

STATUS:

In consultation with Scientific Beta, staff developed a list of managers known to manage mandates according to Scientific Beta indices. Staff evaluated each manager based on fees, tracking error, vehicle type, experience, methodology, customer service, and if there is an existing ARMB relationship.

RECOMMENDATION:

The Alaska Retirement Management Board directs staff to contract with Legal and General to manage a passive mandate benchmarked against the Scientific Beta Developed ex-US Multi-Beta Multi-Strategy Four-Factor EW Index and the Scientific Beta Emerging Multi-Beta Multi-Strategy Four-Factor EW Index, subject to successful contract and fee negotiations.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Global Equity ex-USA Passive Modifications	ACTION:	**X**
DATE:	September 20-21, 2018	INFORMATION:	

BACKGROUND:

As of June 30, 2018, the Alaska Retirement Management Board (ARMB) invests in two passive mandates benchmarked against the MSCI All Country World ex-USA Investable Market Index. These mandates are managed by State Street Global Advisors (SSGA) and BlackRock with combined total assets of approximately $1.6 billion.

At the June 2018 ARMB meeting, staff presented several recommended changes to the Global Equity ex-USA asset class, including terminating the existing two passive mandates benchmarked against the MSCI All Country World ex-USA Investable Market Index and consolidating into a passive mandate benchmarked against the MSCI World ex-USA Investable Market Index and a passive mandate benchmarked against the MSCI Emerging Markets Index.

Staff expects this change to lower fees and simplify manager monitoring as well as lessen the trading costs of allocating between developed non-US and Emerging Markets.

STATUS:

In consultation with Callan, staff developed a list of managers specializing in passive mandates and evaluated each manager based on fees, tracking error, vehicle type, experience and methodology, customer service, and the existing ARMB relationship.

Staff recommends terminating the existing mandates with SSGA and BlackRock benchmarked against the MSCI All Country World ex-USA IMI. Additionally, staff recommends contracting with SSGA to manage a passive mandate benchmarked against the MSCI World ex-USA Investable Market Index and a passive mandate benchmarked against the MSCI Emerging Markets Index.

RECOMMENDATION:

The Alaska Retirement Management Board directs staff to terminate the existing mandates with SSGA and BlackRock benchmarked against the MSCI All Country World ex-USA IMI. Additionally, ARMB directs staff to contract with SSGA to manage a passive mandate benchmarked against the MSCI World ex-USA Investable Market Index and a passive mandate benchmarked against the MSCI Emerging Markets Index subject to successful contract and fee negotiations.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Analytic Investors LLC Buy-Write Strategy Investment in U.S. Treasuries	ACTION:	X
DATE:	September 20-21, 2018	INFORMATION:	

BACKGROUND

Analytic Investors LLC (Analytic) manages a Buy-Write strategy for the Alaska Retirement Management Board. The strategy involves purchasing shares of an S&P 500 Index fund from SSgA and selling calls on the S&P 500. The combined portfolio has a return pattern that truncates performance upside to allow for a lessened downside due to the receipt of the option premium. The strategy is benchmarked against the CBOE S&P 500 Buy-Write Index.

This strategy requires that two accounts be maintained. One account holds the portfolio of equity securities closely tracking the S&P 500 Index which is managed by State Street Global Advisors. The other account, is managed by Analytic and holds the call option.

STATUS

Rising markets may require cash in the Morgan Stanley account to cover the liabilities resulting from the call option at expiration. Additionally, a buffer cash position is maintained in the Morgan Stanley account to reduce the frequency of liquidations from the index fund investment. This cash position is equitized to reduce cash drag for the overall portfolio. However, currently the cash is not invested.

U.S. Treasuries could be used to invest the cash balances in the Morgan Stanley account, but are not a permissible investment covered under the current contract with Analytic.

RECOMMENDATION

The Alaska Retirement Management Board direct staff to modify the contract with Analytic to allow investment in U.S. Treasuries with maturities up to 12 months, and, that U.S. Treasury positions count toward the existing 10% limit on cash equivalents in the portfolio.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT: Asset-Liability Study

ACTION: X

DATE: September 20-21, 2018

INFORMATION: ____

BACKGROUND:

In September 2002, the Alaska State Pension Investment Board (ASPIB) included funding in its proposed budget for an asset-liability study to be conducted by Callan. In March 2003, Independent Fiduciary Services presented its fiduciary audit report to ASPIB. The report contained a recommendation that ASPIB complete such a study – noting further that best practices suggest conducting these studies every five years.

In 2009, the ARMB engaged Callan to conduct an asset-liability study of the public employees' (PERS) and teachers' retirement systems (TRS).

An asset-liability study would provide the Alaska Retirement Management Board with a more robust analysis of its options with respect to its strategic asset allocation because the study would model the interaction of the investment portfolio and the projected liabilities of the plans. Additionally, the study would provide additional information on the impact of the portfolio's illiquidity on portfolio performance and its ability to pay its liabilities.

STATUS:

Staff has held preliminary discussions with Jay Kloepfer at Callan LLC regarding the scope for such a study.

RECOMMENDATION:

That the Alaska Retirement Management Board authorize an asset-liability study to be conducted by Callan LLC.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	General Consulting Contract	ACTION:	X
DATE:	September 20-21, 2018	INFORMATION:	

BACKGROUND:

The Alaska Retirement Management Board (ARMB) has a consulting contract with Callan LLC (Callan) for general investment consulting services.

STATUS:

The current consulting contract with Callan is effective through June 30, 2019. No extension options remain on the current contract. Given the time frame necessary for preparing and issuing an RFP, evaluating responses and negotiating a contract with a successful respondent, staff is advising the ARMB at this time.

RECOMMENDATION:

The Alaska Retirement Management Board direct staff to issue an RFP for a general consultant in a time frame that will result in a general consultant contract being in place by July 1, 2019. The performance period of the contract will be for three years, with two optional one-year extensions.

ALASKA RETIREMENT MANAGEMENT BOARD

SUBJECT:	Real Assets Consulting Contract	ACTION:	X
DATE:	September 20-21, 2018	INFORMATION:	

BACKGROUND:

The Alaska Retirement Management Board (ARMB) has a consulting contract with The Townsend Group (Townsend) to provide real estate consulting services, and with Callan LLC to provide general consulting services, including the real asset strategies other than real estate.

The real asset class has evolved over time to include real estate, farmland, timberland and infrastructure. Broadening the scope of this specialist consultant to include all real assets allows for an integrated evaluation of the asset class.

STATUS:

The current consulting contract with Townsend expires June 30, 2019. No extension options remain on the current contract. Given the time frame necessary for preparing and issuing an RFP, evaluating responses and negotiating a contract with a successful respondent, staff is advising the ARMB at this time.

RECOMMENDATION:

The Alaska Retirement Management Board direct staff to prepare and issue an RFP for a real assets consultant for the Board in a time frame that will result in a real assets consultant contract being in place by July 1, 2019. The performance period of the contract will be for three years, with two optional one-year extensions.