

Real Assets
Annual Program Review

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Annual Program Review Outline

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Executive Summary | Real Assets (RA)

1. 5-Year Performance at 7.5%, but lagged benchmark

- **Real Assets Performance:** 4.1% (10-Yr), 7.5% (5-Yr), and 3.7% (1-Yr)
- **Core Performance:** 7.0% (10-Yr), 9.8% (5-Yr), and 4.5% (1-Yr)
- Program performance adversely impacted by non-strategic/legacy exposure
- Staff reviewing options related to non-strategic/legacy investments to facilitate Total Fund goals

2. Portfolio positioning substantially aligned with role

- **Quality:** Core exposure was grown to 85% from 46% over 5 years
- **Control:** Vehicles with enhanced governance increased to 91% of portfolio
- **Infrastructure:** Portfolio grown to ~\$5B with scalability

3. Unified team executing repeatable, scalable and disciplined business model

- Strong and integrated team focused on role and impact to the Total Fund
- Inclusive and collaborative culture within Real Assets, INVO, and CalPERS
- Committed to strong governance, control provisions, transparency, ESG integration, and cost efficiency

Executive Summary | Major Accomplishments 2018-19

Category	Accomplishments
Organization & Governance	<ul style="list-style-type: none"> Completed all Segment Plans Expanded preferred business model of separate accounts in Infrastructure
Portfolio Positioning	<ul style="list-style-type: none"> Grew Core exposure to 85% from 78% Reduced non-strategic/legacy exposure by \$1.1B
Alignment and Costs	<ul style="list-style-type: none"> Continued to implement alignment model providing greater transparency and control Realized fee savings of \$202M in FY 2018-19
Sustainable Investment – ESG	<ul style="list-style-type: none"> Formalized Energy Optimization Program for economically attractive energy opportunities across Real Estate Enhanced climate risk analysis and assessment capabilities
Real Estate Emerging & Transition Manager Program	<ul style="list-style-type: none"> Invested \$277M across five Real Estate Emerging Managers Finalized due diligence to engage a Real Estate Transition Manager to execute niche office strategy

Executive Summary | Major Initiatives 2019-20

Category	Initiatives
Organization & Governance	<ul style="list-style-type: none"> • Strengthen investment process to be more responsive to market and regulatory conditions • Refine research and portfolio construction frameworks
Portfolio Positioning	<ul style="list-style-type: none"> • Further strengthen and align portfolio with role • Continue to reduce non-strategic/legacy portfolio exposure
Alignment and Costs	<ul style="list-style-type: none"> • Maintain focus on cost efficiency • Expand and refine alignment model across additional partnerships
Sustainable Investment – ESG	<ul style="list-style-type: none"> • Finalize Energy Optimization Program • Complete RA portfolio carbon footprint assessment by FY 2019-20
Real Estate Emerging & Transition Manager Program	<ul style="list-style-type: none"> • Evaluate additional commitment to Emerging Manager partnership • Select Transition Manager to execute niche office strategy

Performance | Real Assets Performance

For Period Ending June 30, 2019

Asset Class	Net Asset Value (\$ Billions)	10-Yr		5-Yr		3-Yr		1-Yr	
		Net Return (%)	Excess bps	Net Return (%)	Excess bps	Net Return (%)	Excess bps	Net Return (%)	Excess bps
Total Real Assets	40.9	4.1	(430)	7.5	(111)	6.4	(42)	3.7	(283)
Real Estate	34.8	4.0	(551)	7.6	(153)	5.9	(107)	3.4	(314)
Infrastructure	4.8	17.9	1170	12.7	704	13.8	728	11.1	454
Forestland	1.3	-2.2	(640)	-3.7	(915)	-2.8	(742)	-10.7	(1721)

Appendix

I. Program Overview



I. Program Overview

II. Investment Review

III. Business Review

Program Role | Execute CalPERS Strategic Plan

CalPERS 2017-22 Strategic Goal

Strengthen the **long-term sustainability** of the pension fund, cultivate a **risk-intelligent** organization, and **reduce cost and complexity**.



Investment Office Mission (Generate Returns to Pay Benefits)

Manage portfolio in a cost effective, transparent, and risk-aware manner

Vision

- **Investment Beliefs** and **CalPERS Core Values**: principles underlying our investment decisions
- Operate with a focus on **repeatable, predictable, and scalable** portfolios and practices
- Seek **alignment of interests** with our primary stakeholders, our business partners, and ourselves
- Use clearly articulated **performance, risk, and cost metrics** to evaluate our value-add to the funds
- Investment and business activities are supported by a **solid platform of effective risk management and controls**

Program Role | Real Assets

The Real Assets Program plays a strategic role within the Total Fund by providing benefits of:

- Stable and predictable cash yield
- Diversification of equity risk
- Inflation protection

Investment Beliefs | Alignment and Integration

The Investment Beliefs are not a checklist to be applied by rote to every decision. They are a guide for making judgmental decisions that often require balancing multiple, inter-related decision factors.

	Short Name	Investment Belief
1	Liabilities	Liabilities must influence the asset structure
2	Long-Term Horizon	A long time investment horizon is a responsibility and an advantage
3	Stakeholders	CalPERS investment decisions may reflect wider stakeholder views
4	Three Forms of Capital	Long-term value creation requires effective management of three forms of capital: financial, physical, and human
5	Accountability	CalPERS must articulate its investment goals and performance measure, and ensure clear accountability for their execution
6	Strategic Allocation	Strategic asset allocation is the dominant determinant of portfolio risk and return
7	Risk Reward	CalPERS will take risk only where we have a strong belief we will be rewarded
8	Costs Matter	Costs matter and need to be effectively managed
9	Multi-faceted Risk	Risk to CalPERS is multi-faceted and not fully captured through measures such as volatility or tracking error
10	Resources / Process	Strong processes and teamwork and deep resources are needed to achieve CalPERS goals and objectives

Governance & Sustainability | Real Assets Integration

RA and Sustainable Investments (SI) continue to work collaboratively on a number of key sustainability initiatives and process enhancements including:

Initiative	Description / Status
Global Real Estate Sustainability Benchmark (GRESB)	<ul style="list-style-type: none"> RA represented on both the infrastructure and real estate advisory boards of GRESB Portfolio outperformed GRESB scores: Real Estate (70 vs. 68 sector average) and Infrastructure (60 vs. 48 sector average) 80% of the portfolio to submit into GRESB, up from 75% last year
ESG Matrix	<ul style="list-style-type: none"> Continue to refine framework for assessing ESG risks for all acquisitions through separate accounts
Energy Optimization (EO) Program	<ul style="list-style-type: none"> Formalized a systematic approach for identifying economically attractive energy opportunities across Real Estate Over the past three years, 113 EO opportunities were identified
Climate Risk Review & Carbon Footprint	<ul style="list-style-type: none"> Incorporated in CalPERS' Strategic ESG Initiatives and Real Assets Strategic Plan Complete RA portfolio carbon footprint assessment by FY 2019-20
Responsible Contractor Program (RCP)	<ul style="list-style-type: none"> CalPERS Separate Account operating agreements include provisions requiring compliance with the RCP Policy
Other	<ul style="list-style-type: none"> Contribute to SI research initiatives Member of the G7 Infrastructure Fellowship Participation on the Governance and Sustainability Subcommittee

II. Investment Review



Investment Objective

RA is managed in alignment with the CalPERS Total Fund Policy's investment objectives:

- The Program's strategic objective is to provide stable and predictable cash yield, diversification of equity risk, and inflation protection

Performance | Public Employees' Retirement Fund (PERF)

For Period Ending June 30, 2019

Asset Class	As of June 30, 2019			10-Yr			5-Yr			3-Yr			1-Yr		
	Ending Market Value (bil)	% of Total Fund Assets	Interim Policy Weight % ¹	Net Return	BM Return	Excess Bps	Net Return	BM Return	Excess Bps	Net Return	BM Return	Excess Bps	Net Return	BM Return	Excess Bps
Growth	\$ 212.4	57.4%	58.00%	11.6%	12.1%	(49)	7.1%	7.5%	(37)	12.3%	12.9%	(60)	6.3%	6.3%	6
Public Equity	\$ 185.9	50.2%	50.0%	11.1%	10.9%	20	6.7%	6.7%	(8)	12.3%	12.5%	(25)	6.1%	6.2%	(16)
Cap Weighted	\$ 131.4	35.5%	35.0%	11.0%	10.8%	20	6.5%	6.5%	(9)	11.9%	12.2%	(27)	5.1%	5.3%	(20)
Factor Weighted	\$ 54.6	14.7%	15.0%	-	-	-	-	-	-	-	-	-	13.4%	13.5%	(10)
Private Equity	\$ 26.5	7.1%	8.0%	14.0%	16.6%	(254)	9.6%	10.3%	(80)	12.5%	14.1%	(156)	7.7%	4.0%	368
Income	\$ 106.3	28.7%	28.0%	6.6%	5.2%	137	4.1%	3.5%	56	3.3%	2.7%	62	9.6%	9.3%	31
Long Spread	\$ 56.7	15.3%	10.0%	-	-	-	-	-	-	-	-	-	9.5%	9.0%	49
Long Treasury	\$ 37.8	10.2%	15.0%	-	-	-	-	-	-	-	-	-	10.5%	10.5%	(3)
High Yield	\$ 11.7	3.2%	3.0%	-	-	-	-	-	-	-	-	-	8.4%	8.0%	40
Real Assets	\$ 40.9	11.0%	13.0%	4.1%	8.4%	(430)	7.5%	8.6%	(111)	6.4%	6.8%	(42)	3.7%	6.5%	(283)
Inflation ²	\$ 0.0	0.0%	0.0%	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Liquidity	\$ 3.7	1.0%	1.0%	1.1%	1.2%	(9)	1.3%	1.2%	10	1.7%	1.3%	37	2.6%	2.2%	45
Trust Level ³	\$ 7.0	1.9%	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Fund	\$ 370.3	100.0%	100.0%	9.1%	9.5%	(33)	5.8%	6.1%	(23)	8.8%	9.0%	(21)	6.7%	7.1%	(42)

1. Interim policy weight reflects the weights in effect at the beginning of the first day of the subsequent month.

2. As of February 2019, the Inflation program has been liquidated and subsequently linked historical returns are no longer meaningful.

3. Trust Level includes Multi Asset Class, Completion Overlay, Risk Mitigation, Absolute Return Strategies, Plan Level Transition and other Total Fund level portfolios.

Portfolio Positioning

For Period Ending June 30, 2019

Risk Classifications ¹	% Policy Range
Core	75-100%
Value Add	0-25%
Opportunistic	0-25%

% NAV	Policy Compliance
85.2%	✓
7.8%	✓
7.1%	✓

Geography ¹	% Policy Range
United States	70-100%
International Developed Markets	0-30%
International Emerging Markets	0-15%
International Frontier Markets	0-5%

% NAV	Policy Compliance
86.7%	✓
8.1%	✓
4.9%	✓
0.3%	✓

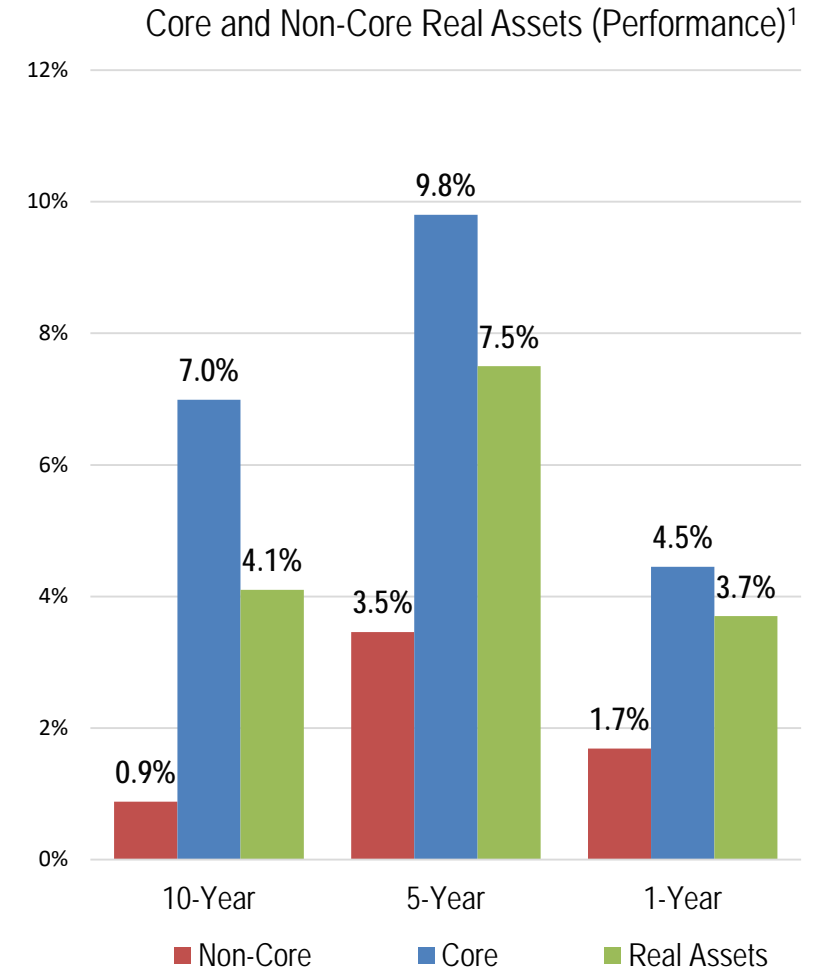
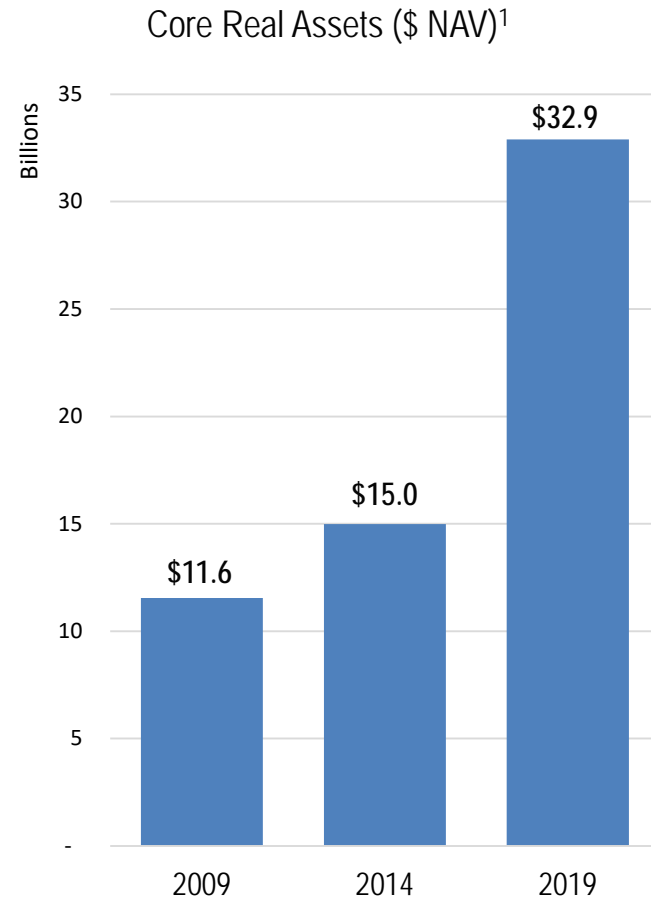
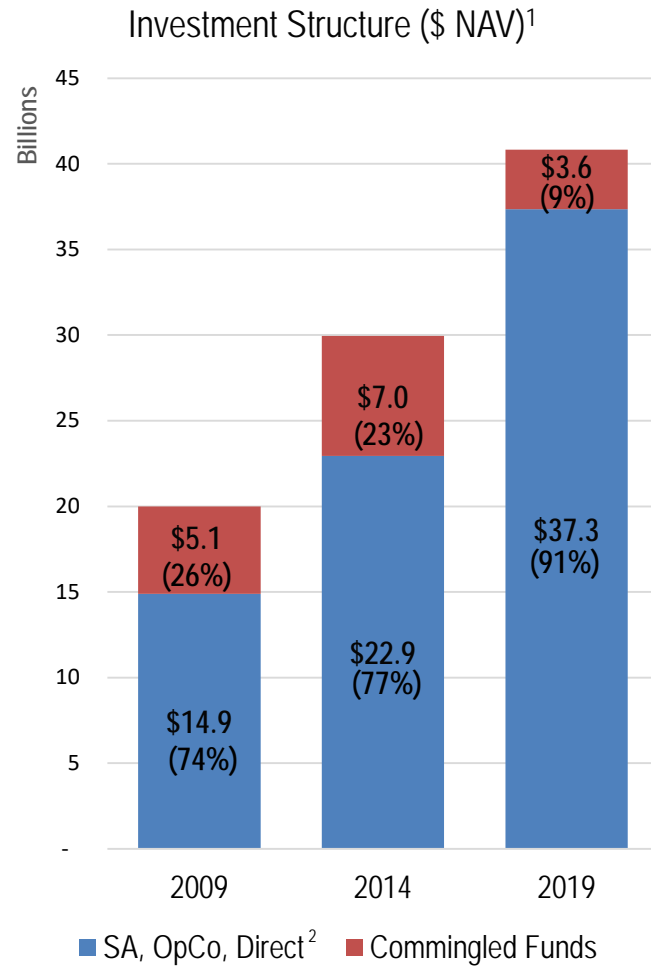
Leverage ²	Policy Limit
LTV	55%
DSCR Total (minimum)	1.4

Current	Policy Compliance
32.5%	✓
2.8	✓

Investment Review | Program Characteristics

- **Total Net Asset Value (NAV)¹: \$40.9B**
 - Real Assets accounts for 11.3% of the Total Fund NAV
 - Real Assets NAV increased 7.7% to \$40.9B from \$37.9B
- **Unfunded¹: \$7.9B (\$7.4B revocable at CalPERS' discretion)**
- **Leverage¹: 32.5% LTV, 2.8x DSCR**
- **Structure¹:**
 - 26 External Managers
 - 33 Separate Accounts (75%), 1 Operating Company (12%), 4 Direct Investments (4%) and 14 Commingled Funds (9%)
- **Geographic NAV Exposure²:**
 - 87% U.S., 8% International Developed Markets, 5% International Emerging Markets
 - 26% invested in California

Investment Review | Portfolio Evolution



¹ Investment Structure, Core and Non-Core Real Assets at partnership level

² Separate Account, Operating Company, Direct Investments

Investment Review | Program Role Report Card

Role - Cash Yield

FY	5-Year Net Income Return Real Assets ¹ (%)	5-Year Net Income Return Core ¹ (%)	5-Year Net Income Return Non-Core ¹ (%)	Core Exposure ² (%)
FY 18/19	3.5%	4.0%	2.3%	85%
FY 17/18	3.5%	4.1%	2.4%	78%
FY 16/17	3.3%	4.0%	2.4%	75%
FY 15/16	2.8%	3.8%	1.8%	70%
FY 14/15	2.4%	3.6%	1.3%	50%
FY 13/14	1.7%	3.2%	0.2%	46%
FY 12/13	-0.4%	2.6%	-4.2%	43%
FY 11/12	-1.9%	2.1%	-7.4%	42%

Role - Inflation Protection

FY	5-Year rolling Net Appreciation Real Assets ¹ (%)	5-Year rolling Net Appreciation Core ¹ (%)	5-Year rolling Net Appreciation Non-Core ¹ (%)	5-Year rolling CPI (%)
FY 18/19	3.9%	5.6%	1.1%	1.5%
FY 17/18	5.7%	7.2%	3.4%	1.4%
FY 16/17	6.5%	8.9%	3.4%	1.2%
FY 15/16	8.1%	9.8%	5.9%	1.3%
FY 14/15	9.1%	11.8%	6.1%	1.6%
FY 13/14	-0.5%	1.0%	-1.7%	2.1%
FY 12/13	-8.7%	-5.7%	-12.1%	1.7%
FY 11/12	-8.6%	-5.9%	-12.0%	2.2%

Role of Real Assets

- Stable and predictable cash yield
- Inflation protection
- Diversification of equity risk

Role - Diversification of Equity Risk

	Volatility 5-Year	Correlation 5-Year
Real Assets	3.4%	-0.14
FTSE Global All Cap Custom Net	11.2%	

III. Business Review

Program Overview

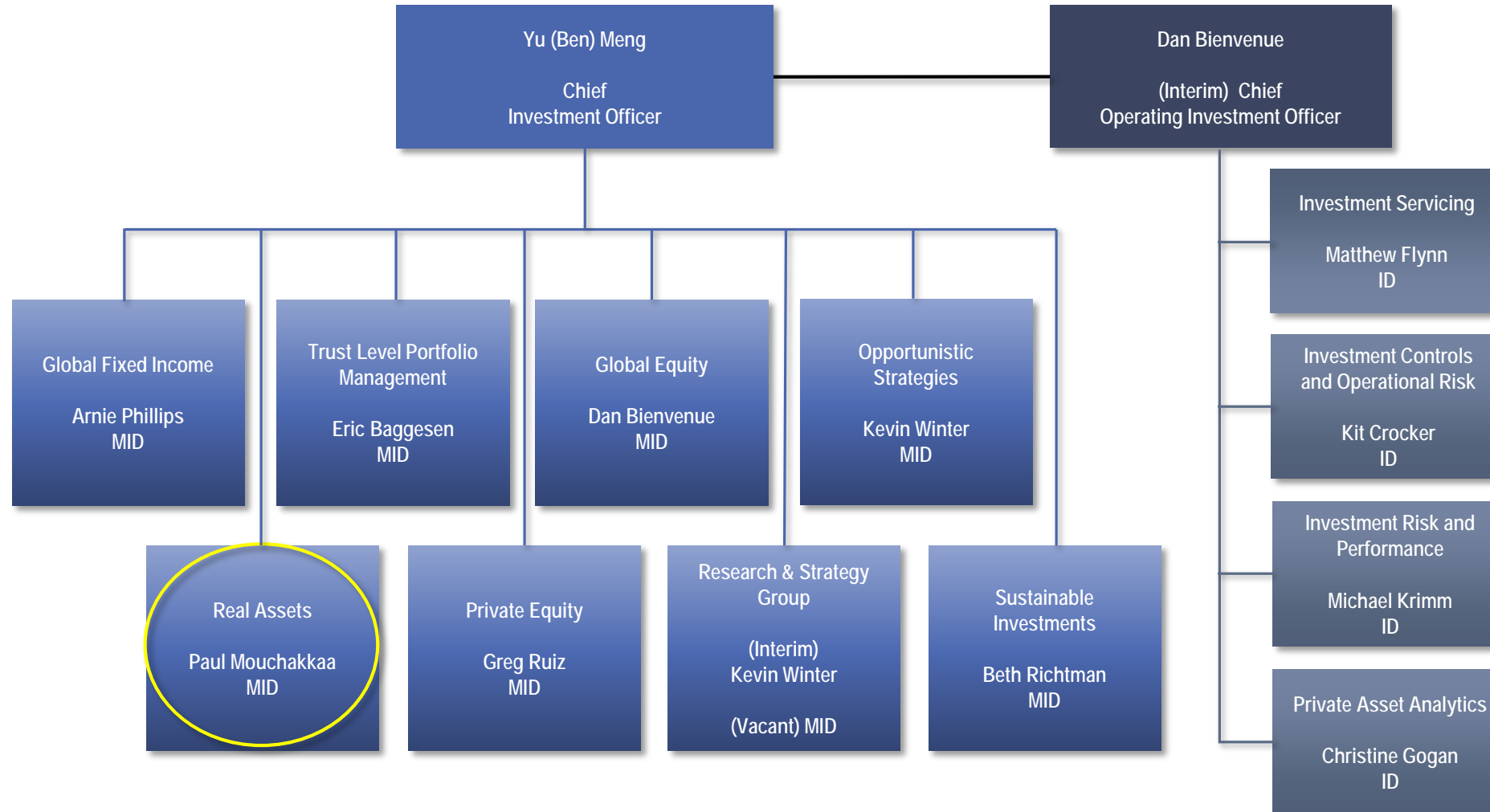
Investment Review

▶ Business Review

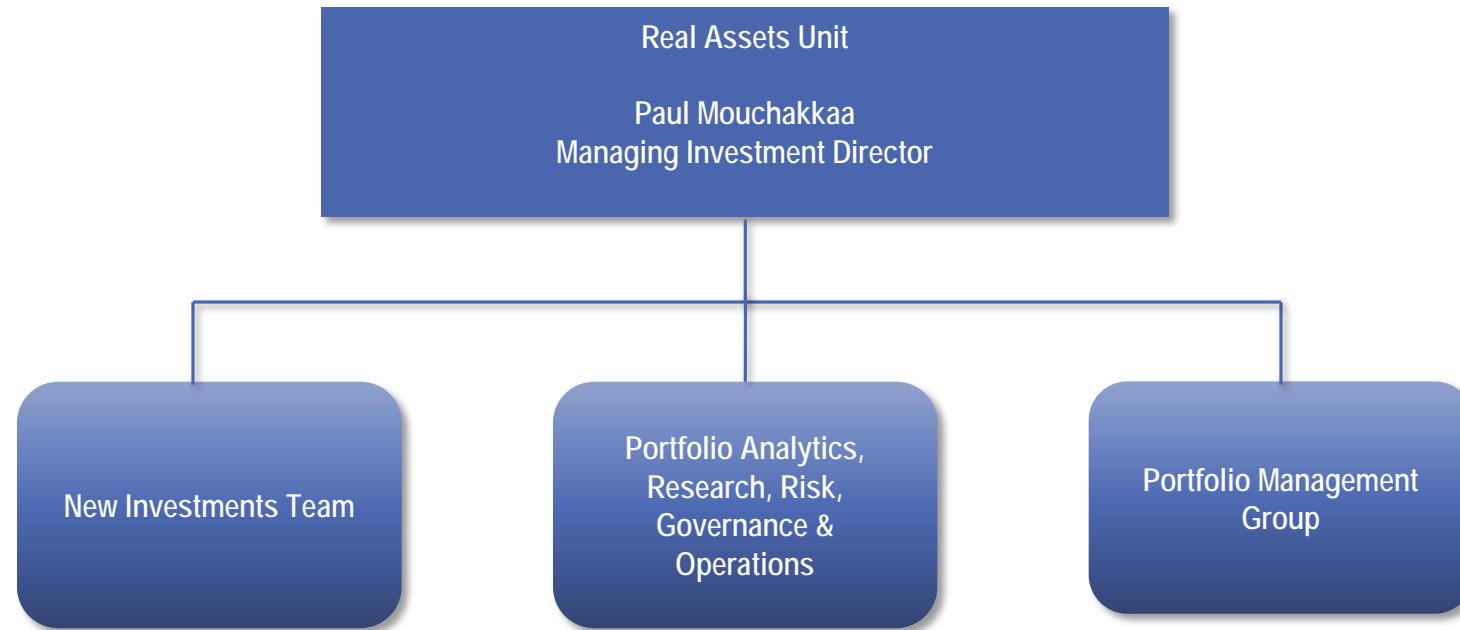
Real Assets Business Philosophy

- Invest in high-quality, well located, essential core assets with stable cash flows held through business cycles
- Preference for separate accounts with highly reputable, market-leading managers with strong execution capabilities
- Emphasis on strong governance with focus on economic alignment, transparency, and cost efficiency
- Moderate leverage across the portfolio
- Sustainable investment practices for selection, contracting, monitoring, and management of assets and managers

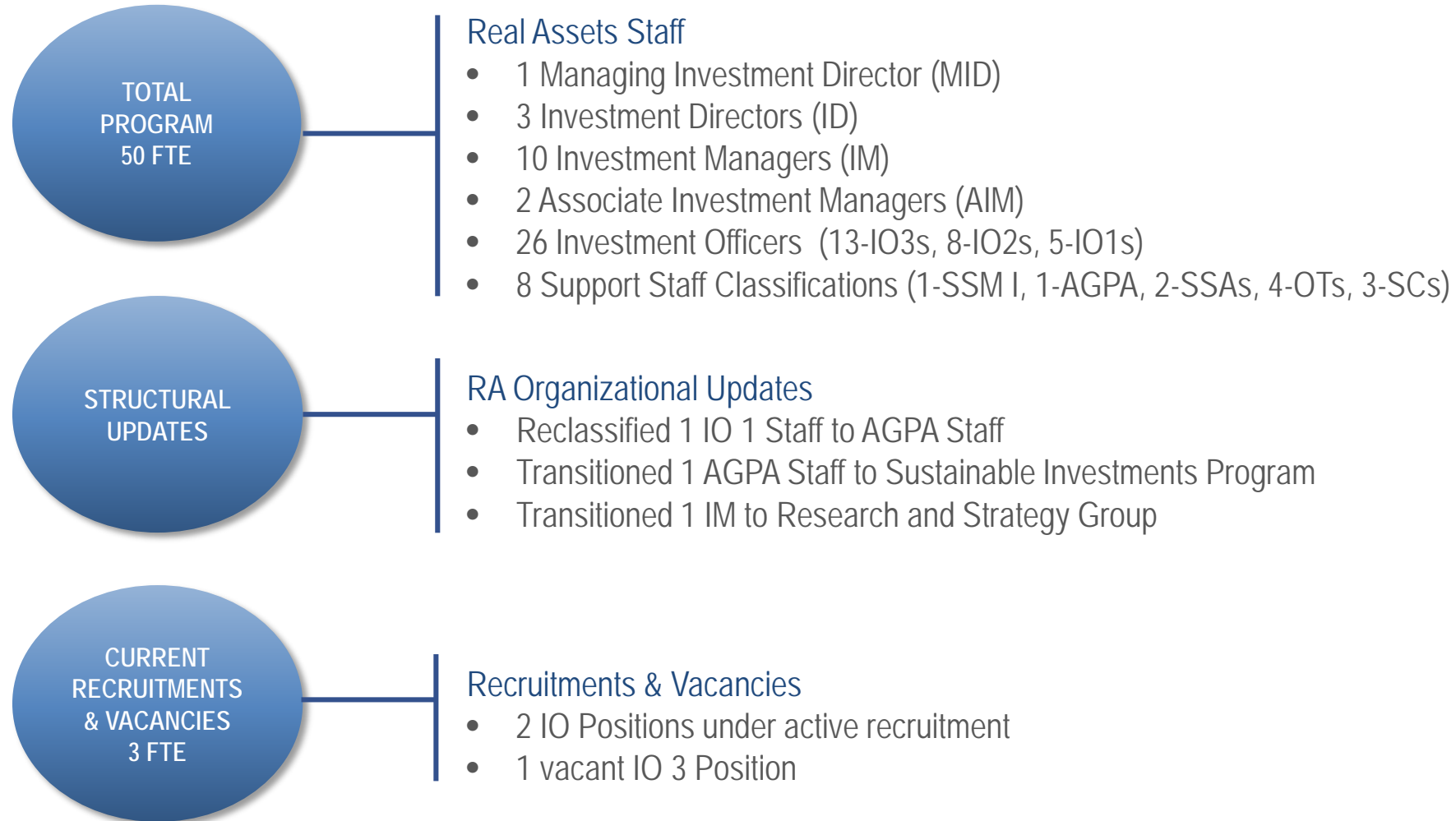
Investment Office Organization Chart



Functional Organization Chart



Staffing Overview



Business Overview | Real Assets Functions

Real Assets Unit

The Real Assets Program plays a strategic role within the Total Fund by providing benefits of stable and predictable cash yield, diversification of equity risk, and inflation protection

Portfolio Management Group

Proactively manages the Real Assets portfolio and oversees governance of operating agreements

New Investments Team

Oversees segment planning, manager due diligence, underwriting new investments, and structuring of agreements

Portfolio Analytics, Research, Risk, Governance & Operations

Analyzes portfolio statistics, performs research and portfolio construction, oversees internal governance and policy compliance, operations and administration

Program Expenses

	FY 2018-19			FY 2017-18		
	AUM (\$ millions)	Fees and Profit Sharing (\$ millions)	Fees and Profit Sharing ^a (BPS)	AUM (\$ millions)	Fees and Profit Sharing (\$ millions)	Fees and Profit Sharing ^a (BPS)
Internal Management	\$ 0	\$ 11.1	3	\$ 0	\$ 9.7	3
External Management ^b	\$ 40,866	\$ 313.7	77	\$ 38,099	\$ 315.8	83
Asset Management Fee Paid		\$ 188.1	46		\$ 191.8	50
Profit Sharing Paid		\$ 84.0	21		\$ 62.3	16
Profit Sharing Accrued		\$ 41.6	10		\$ 61.7	16
Consultants Expense	N/A	\$ 3.1	1	N/A	\$ 2.1	1
Technology & Operating Expense	N/A	\$ 7.8	2	N/A	\$ 8.4	2
Total Program	\$ 40,866	\$ 335.6	82	\$ 38,099	\$ 336.0	88

FY 2018-19 CalPERS (\$ millions)

Realized and Unrealized Gains	\$292.8
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^a All BPS fees and expenses paid are calculated on Total Program AUM defined as NAV (Net Asset Value)

^b External Management totals include asset management fees and profit sharing fees (paid and accrued)

Note: Total profit sharing liabilities are \$452 million as of March 31, 2019 and were \$711 million as of March 31, 2018

Note: Some totals may not reconcile due to rounding. Four quarters of data ending on March 31, 2019 and March 31, 2018 respectively