

Real Assets Annual Program Review

September 24, 2018

Real Assets Annual Program Review

Executive Summary – Real Assets Program Performance

As of June 30, 2018	NAV (millions)	1 Year Net Return	3 Year Net Return	5 Year Net Return	10 Year Net Return	20 Year Net Return
Real Assets	\$38,099	8.0%	7.1%	9.4%	-0.5%	6.7%
Policy Index		6.8%	8.3%	9.6%	6.3%	9.4%
Excess Return		1.2%	-1.2%	-0.2%	-6.9%	-2.7%
Real Estate	\$31,790	6.8%	7.2%	9.8%	-1.0%	6.4%
Policy Index		7.1%	9.0%	10.4%	7.1%	9.8%
Excess Return		-0.3%	-1.8%	-0.7%	-8.1%	-3.4%
Infrastructure	\$4,333	20.6%	13.0%	15.0%	14.4%	
Policy Index		6.4%	5.9%	5.5%	5.9%	
Excess Return		14.1%	7.1%	9.5%	8.5%	
Forestland	\$1,976	1.9%	-2.4%	-1.0%	-1.1%	
Policy Index		3.8%	3.4%	6.1%	4.1%	
Excess Return		-1.9%	-5.8%	-7.1%	5.1%	

Real Assets outperformed the 2013 ALM expected return of 7% for the 1-year, 3-year and 5-year periods*

Real Assets Annual Program Review

Executive Summary – Real Assets Program Performance (Cont'd)

Role - Cash Yield

FY	1 Year Net Income Return *	5 Year Net Income Return *	RA Core Exposure
FY 17/18	3.5%	3.5%	78%
FY 16/17	3.3%	3.3%	75%
FY 15/16	3.7%	2.8%	65%
FY 14/15	3.6%	2.4%	46%
FY 13/14	3.4%	1.7%	42%
FY 12/13	2.6%	-0.4%	39%
FY 11/12	0.6%	-1.9%	38%

Role - Inflation Protection

FY	5 Year rolling Net Appreciation *	5 Year rolling CPI
FY 17/18	5.7%	1.4%
FY 16/17	6.5%	1.2%
FY 15/16	8.1%	1.3%
FY 14/15	9.1%	1.6%
FY 13/14	-0.5%	2.1%
FY 12/13	-8.7%	1.7%
FY 11/12	-8.6%	2.2%

Role - Diversification of Equity

	Volatility 5 Year	Correlation 5 Year
Real Assets	4.2	0.02
FTSE Global All Cap Custom Net	8.4	

Role of Real Assets

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

Real Assets Annual Program Review

Executive Summary – Portfolio Attribution & Position

Program	Core vs. Non-Core	Core vs. Non-Core Net Return			LTV / DSCR	1-Year Change in LTV
		1 year	3 year	5 year		
Real Assets	78% / 22%	7.9% / 6.6%	9.1% / 3.1%	11.5% / 5.9%	33.5% / 2.65	+0.5%
Real Estate	79% / 21%	6.4% / 7.4%	9.6% / 2.7%	12.5% / 5.6%	32.1% / 2.95	+0.6%
Infrastructure	81% / 19%	24.8% / 6.0%	16.6% / 5.9%	17.3% / 10.6%	45.8% / 2.13	-0.8%
Forestland	49% / 51%	13.4% / -5.0% ^a	4.5% / -6.5% ^a	5.0% / -4.5% ^a	20.5% / 0.99 ^c	-1.8%

- Real Assets returns normalizing in the latter part of current cycle
- Infrastructure is early in its portfolio construction, doubling in size over last three years
- 88% of Real Estate properties are Stabilized compared to 73% three years ago^b

Real Assets Annual Program Review

Executive Summary – FY 2017/18 Accomplishments

Initiatives	Accomplishments
Organization & Governance	<ul style="list-style-type: none"> Completed the Consumer, Commercial and Essential Segment Plans Implemented Assembly Bill 2833 reporting
Portfolio Repositioning	<ul style="list-style-type: none"> Real Assets Core exposure at 77.5% (Policy limit minimum 75%), now within Policy Developed Infrastructure portfolio construction plan Acquired first wind power renewable asset
Alignment and Costs	<ul style="list-style-type: none"> Continued to implement New Alignment Model providing greater alignment with Real Assets role and benchmark Expected fee savings resulting from 2016 contract renegotiations in excess of \$200M through FY 2018-19
Sustainable Investment – ESG	<p><u>Energy Optimization Initiative</u></p> <ul style="list-style-type: none"> Implemented Energy Optimization in 2017-2018 Annual Investment Plan <p><u>Sustainability Objectives</u></p> <ul style="list-style-type: none"> Implemented sustainability performance assessment and benchmarking tool across the Real Assets portfolio Rolled out Real Estate ESG Consideration Matrix for underwriting new assets
Real Estate Emerging & Transition Manager Program	<p><u>Real Estate Emerging Managers</u></p> <ul style="list-style-type: none"> Committed additional \$350 million to Emerging Manager Program <p><u>Real Estate Transition Managers</u></p> <ul style="list-style-type: none"> Defined Strategy and Sector focus for launch of Request For Proposals (RFP)

Real Assets Annual Program Review

Executive Summary – FY 2018/19 Initiatives

Category	Initiatives
Organization & Governance	<ul style="list-style-type: none"> • Complete Segment Plans – Specialized segment • Strengthen investment process to be more responsive to market and regulatory conditions • Strengthen governance of logistics platform
Portfolio Repositioning	<ul style="list-style-type: none"> • Continue to strengthen and align portfolio • Restructure Forestland portfolio • Continue Retail Study
Alignment and Costs	<ul style="list-style-type: none"> • New Alignment Model - Continue to expand new alignment model across additional partnerships as applicable • Expand preferred business model in Infrastructure to facilitate deployment
Sustainable Investment – ESG	<p><u>Energy Optimization Initiative</u></p> <ul style="list-style-type: none"> • Create and begin piloting Energy Optimization Policy/Plan for systematic approach to economically attractive energy opportunities across Real Estate <p><u>Sustainability Objectives:</u></p> <ul style="list-style-type: none"> • Enhance Climate Risk Analysis & Assessment Capabilities • G7 Initiative (Infrastructure Fellowship)
Real Estate Emerging & Transition Manager Program	<p><u>Real Estate Emerging Managers</u></p> <ul style="list-style-type: none"> • Evaluate additional Real Estate Emerging Managers <p><u>RE Transition Managers</u></p> <ul style="list-style-type: none"> • Select Transition Manager(s) to execute niche office strategy

Appendix

Real Assets Annual Program Review

Review Outline – Investment Beliefs Map

Section	Pages Real Assets	Pages Real Estate	Pages Infras	Pages Forest	1	2	3	4	5	6	7	8	9	10
Executive Summary	2-6													
Review Outline	8													
Investment Beliefs Key	9													
I. Program Overview	11-18													
Program Roles	11				Yellow	Green								
Program Investment Philosophy	12					Green					Green		Yellow	
Policy Benchmarks	13				Yellow				Yellow					
Program Performance	14-15				Yellow	Green							Yellow	
Volatility Profile	16										Green		Yellow	
Program Characteristics/Positioning	17-18									Yellow	Green		Yellow	
II. Investment Review	20-26	28-34	36-42											
Past Year Environment Review	20	28	36								Green			
Program Performance	21-22	29-30	37-38		Green								Yellow	
Volatility Profile	23	31	39								Green		Yellow	
Program Characteristics/Positioning	24-26	32-34	40-42							Yellow			Yellow	
III. Business Review	44-53													
Investment Decision Process	44											Green		Green
Functional Organizational Chart	45													Green
Staffing Overview	46													Green
Strategic Plans/Projects Update	47-48							Yellow						Green
Emerging Manager Program	49					Green		Yellow						Green
Program Expenses	50-51	52-53	52-53						Yellow			Green		
IV. Governance & Sustainability	55													
ESG	55					Green	Green	Yellow						

- 1 Liabilities
- 2 Long-Term Horizon
- 3 Stakeholders
- 4 Three Forms of Capital
- 5 Accountability
- 6 Strategic Allocation
- 7 Risk Reward
- 8 Costs Matter
- 9 Multi-faceted Risk
- 10 Resources/Process

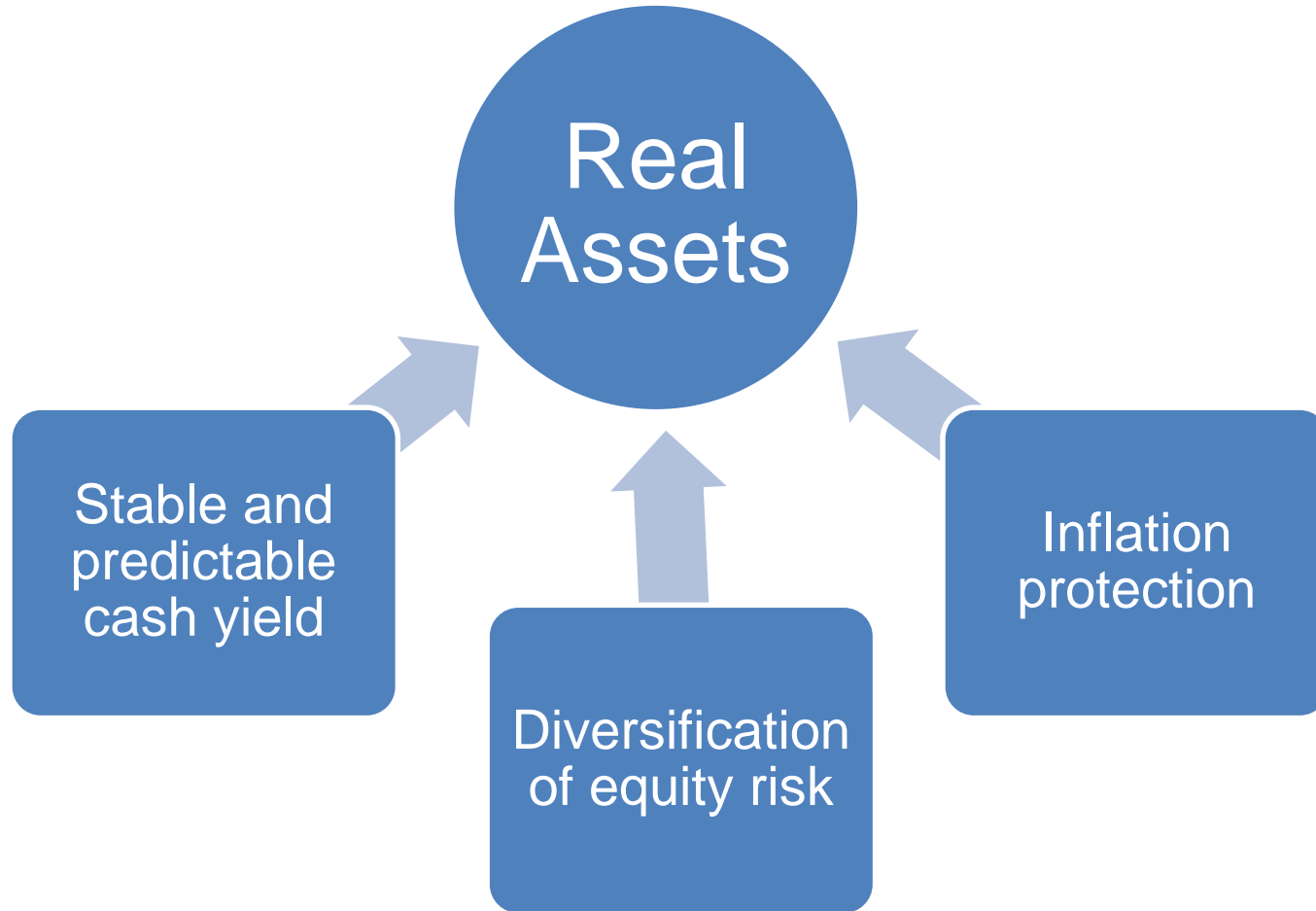
Real Assets Annual Program Review

Investment Beliefs Key

	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 of 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

I. Program Overview

Program Roles



Program Investment Philosophy

- Invest in high-quality, well located assets held through business cycles
- Core assets with stable and predictable cash flows
- 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
- Movement toward fewer and larger external manager relationships
- Moderate leverage across the portfolio
- Sustainable investment practices for selection, contracting, monitoring, and management of assets and managers

Policy Benchmarks (as of June 30, 2018)

Real Assets Policy Benchmark

- 84.6% Real Estate Benchmark
- 7.7% Infrastructure Benchmark
- 7.7% Forestland Benchmark

Real Estate Policy Benchmark

National Council of Real Estate Investment Fiduciaries Open-End Diversified Core Fund Index (NCREIF ODCE)

Infrastructure Policy Benchmark

Consumer Price Index (CPI) + 4% lagged one quarter

Forestland Policy Benchmark

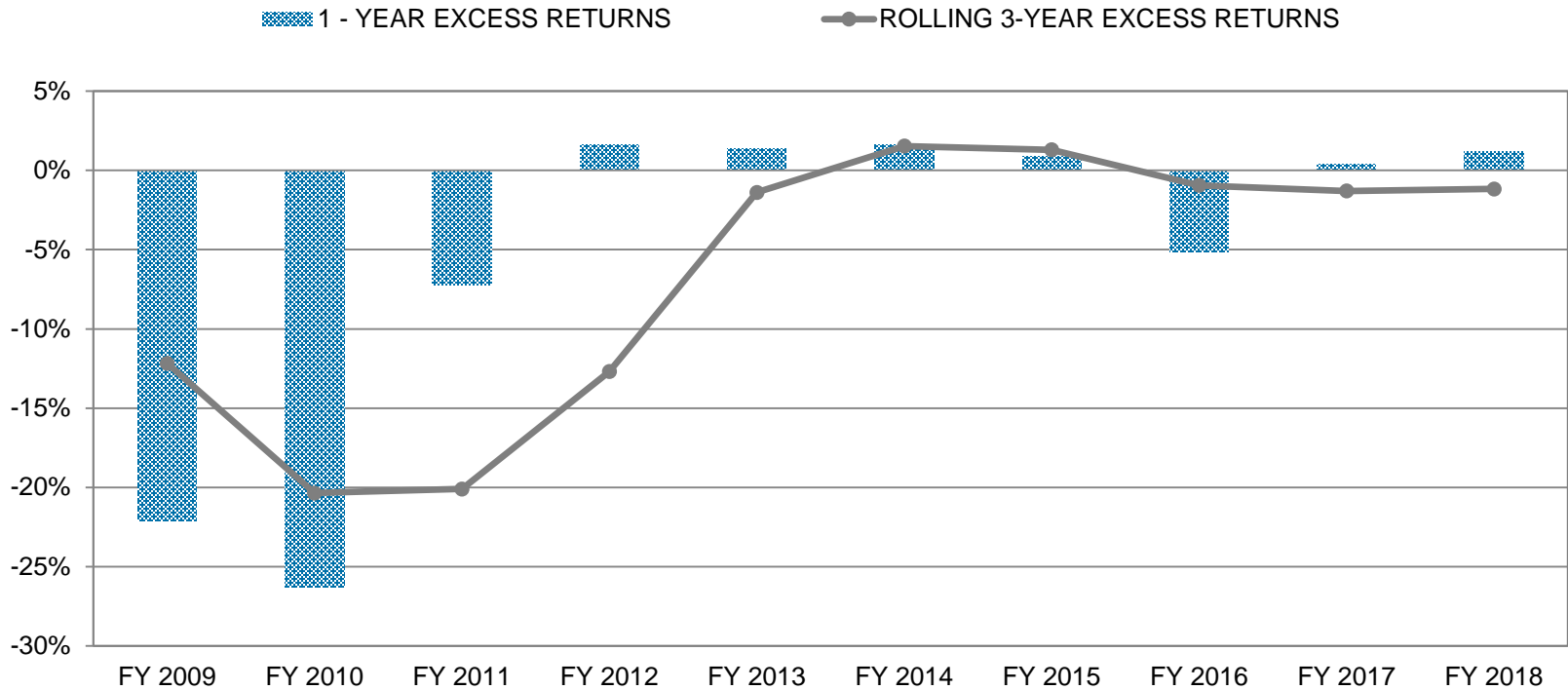
National Council of Real Estate Investment Fiduciaries (NCREIF) Timberland Index

Program Performance Review – Real Assets

As of June 30, 2018	1-YR	3-YR	5-YR	10-YR	20-YR
	Net Return	Net Return	Net Return	Net Return	Net Return
REAL ASSETS	8.0%	7.1%	9.4%	-0.5%	6.7%
POLICY INDEX	6.8%	8.3%	9.6%	6.3%	9.4%
Excess Return	1.2%	-1.2%	-0.2%	-6.9%	-2.7%

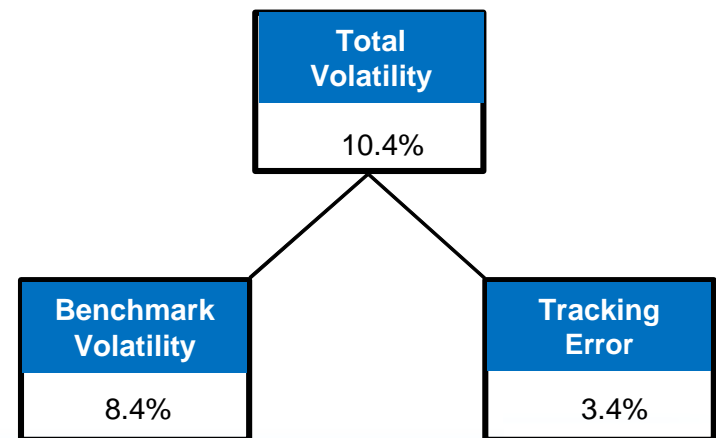
- Real Assets outperformed the 2013 ALM expected return of 7% for the 1-, 3-, and 5-year periods*

Performance: Real Assets 3-Year Rolling Excess Return



Volatility Profile – Real Assets

- Real Assets Forecast Volatility is 10.4%
- Forecast Tracking Error is 3.4%
- Forecast Correlation vs. the entire PERF portfolio is 0.74



Program Characteristics – Real Assets

- **Total Net Asset Value (NAV):** \$38.1 billion
 - Real Assets accounts for 10.8% of the Total Fund NAV
 - The NAV increased 5.0% to \$38.1 billion from \$36.3 billion
- **Unfunded:** \$8.4 billion (\$7.6 billion revocable at CalPERS discretion)
- **Structure:**
 - 30 External Managers across Program
 - 34 Separate Accounts, 19 Commingled Funds, 3 Direct Investments, and 1 Operating Company
 - NAV Basis: 75% Separate Accounts, 11% Operating Company, 10% Commingled Funds, 4% Direct Investments
- **Geographic Exposure:**
 - 86% U.S., 8% International Developed Markets, 6% International Emerging Markets
 - 26% NAV invested in California

Program Positioning – Real Assets

Risk Classification	%Policy Range	%NAV	Policy Compliance
Core	75-100%	77.5%	✓
Value Add	0-25%	11.2%	✓
Opportunistic	0-25%	11.2%	✓
Development or Build-to-Core	0-10%	4.9%	✓

Geography	%Policy Range	%NAV	Policy Compliance
United States	70-100%	86.2%	✓
International Developed Markets	0-30%	7.6%	✓
International Emerging Markets	0-15%	5.9%	✓
International Frontier Markets	0-5%	0.3%	✓

Public Securities	%Policy Range	%NAV	Policy Compliance
Real Assets	0-10%	1.4%	✓

Leverage	Policy Limit	Current	Policy Compliance
LTV	55%	33.5%	✓
DSCR Total (minimum)	1.40	2.65	✓

II. Investment Review

a. Real Estate

Past Year Environment Review – Real Estate

- Capital Markets
 - Overall Commercial Real Estate transaction volumes slowed in 2017
 - Commitments to Non-Core strategies increased significantly over the last 4 quarters
 - Commitments to Core strategies stayed relatively flat
 - Divergence of returns across four major property types
 - Three of four property sectors experiencing limited capital appreciation (Apartment, Office, Retail)
 - Industrial experiencing significant capital appreciation

- Property Fundamentals
 - Real Estate normalizing in latter part of current cycle
 - Operating fundamentals moderating:
 - New construction starts are slowing
 - Net Operating Income (NOI)* growth continuing to moderate
 - Vacancy rates remain below historic average

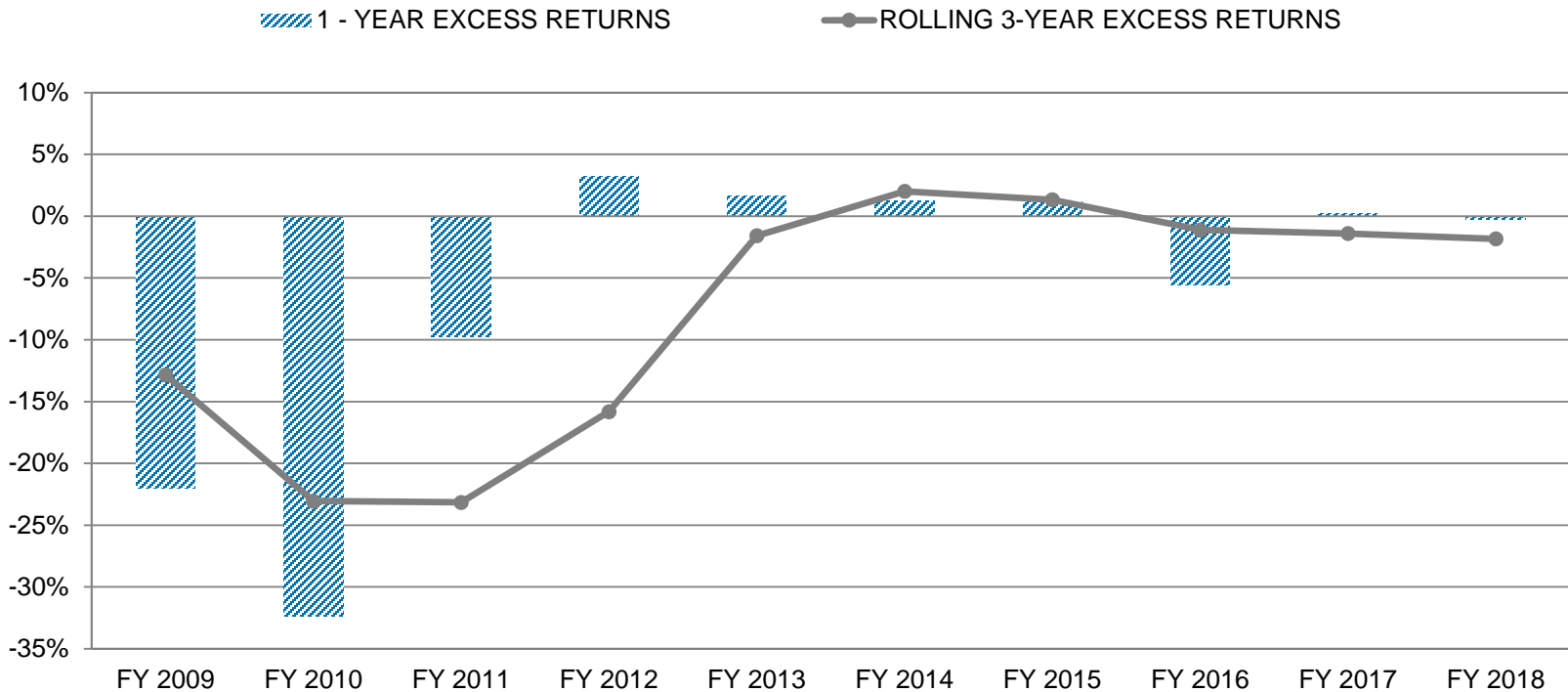
Portfolio Performance Review – Real Estate

As of June 30, 2018	1-Year Net Return	3-Year Net Return	5-Year Net Return	10-Year Net Return	20-Year Net Return
Real Estate	6.8%	7.2%	9.8%	-1.0%	6.4%
Policy Index	7.1%	9.0%	10.4%	7.1%	9.8%
Excess Return	-0.3%	-1.8%	-0.7%	-8.1%	-3.4%

- Real Estate outperformed the 2013 ALM expected return of 7% for the 3-, and 5-year periods
- Non-Core holdings in domestic land, housing, and international investments negatively impacted overall performance
- Core performance in 3- and 5-year periods was 9.6% and 12.5%, respectively. Core outperformed the Real Estate Policy Index by 63 bps and 209 bps, respectively

Portfolio Performance Review – Real Estate (Cont'd)

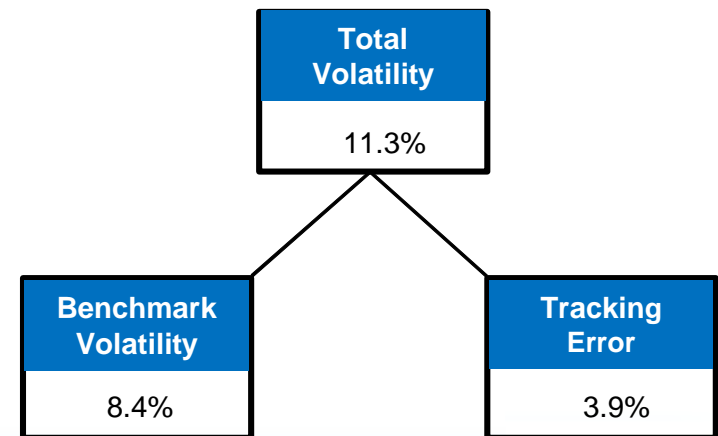
3-Year Rolling Excess Return



Real Assets Annual Program Review

Volatility Profile – Real Estate

- Real Estate Forecast Volatility is 11.3%
- Forecast Tracking Error is 3.9%
- Correlation vs. the entire PERF portfolio is 0.70

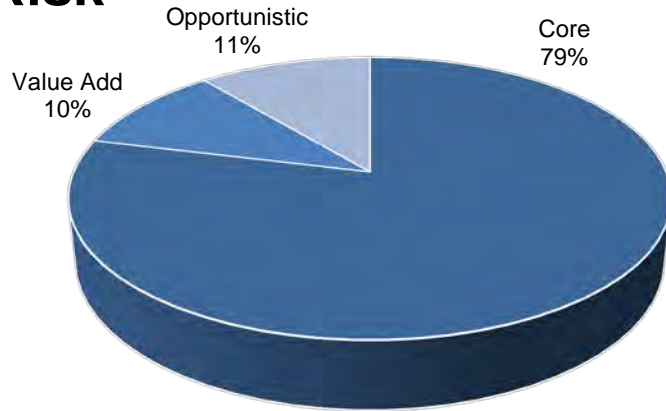


Portfolio Characteristics – Real Estate

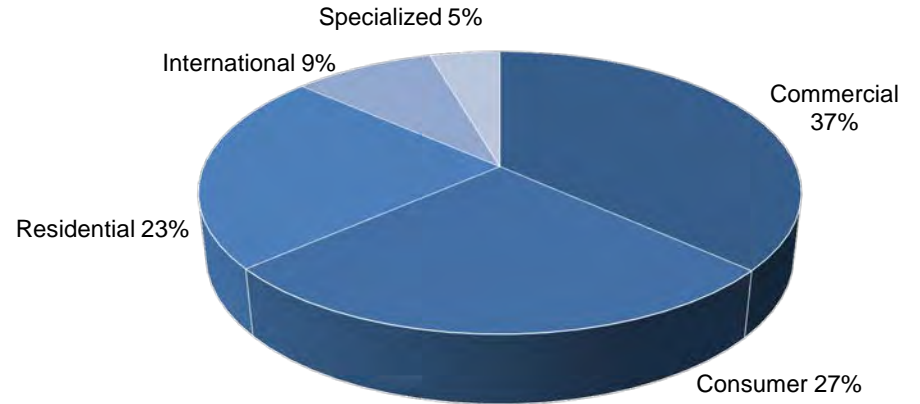
- **Total NAV:** \$31.8 billion
 - Portfolio NAV is 9.0% of Total Fund, versus 10% target
 - Portfolio NAV increased 4.1% to \$31.8 billion from \$30.5 billion
- **Unfunded:** \$7.0 billion (\$6.5 billion revocable at CalPERS discretion)
- **Structure:**
 - 21 External Managers
 - 30 Separate Accounts, 11 Commingled Funds, 1 Operating Company
 - NAV Basis: 79% Separate Accounts, 13% Operating Company, 8% Commingled Funds
- **Geographic Exposure:**
 - 91% U.S., 6% International Emerging Markets, 3% International Developed Markets
 - 29% NAV invested in California

Portfolio Characteristics – Real Estate by NAV

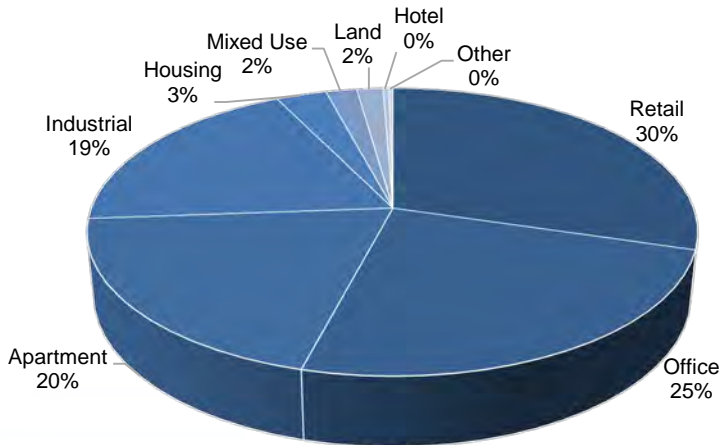
Risk



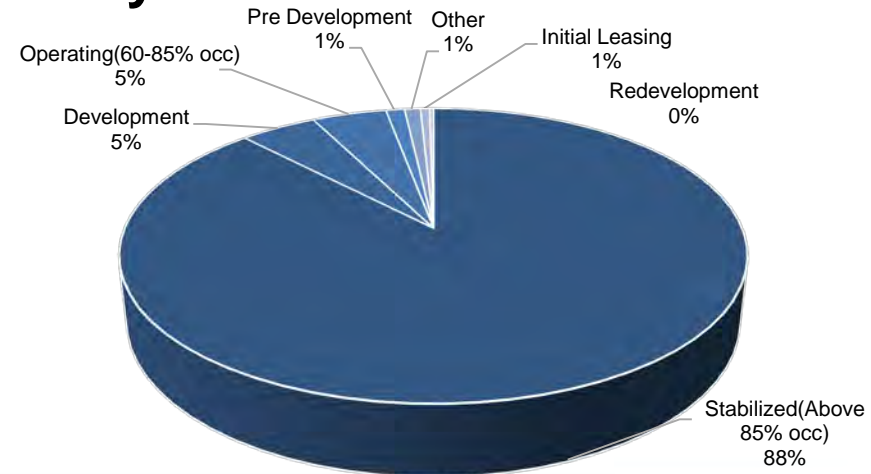
Segment



Property Type



Life Cycle



Portfolio Positioning – Real Estate

Risk Classification	%Policy Range	%NAV	Policy Compliance
Core	75-100%	78.9%	✓
Value Add	0-25%	10.1%	✓
Opportunistic	0-25%	11.0%	✓
Development or Build-to-Core	0-10%	5.8%	✓

Geography	%Policy Range	%NAV	Policy Compliance
United States	75-100%	91.0%	✓
International Developed Markets	0-25%	2.7%	✓
International Emerging Markets	0-15%	6.3%	✓
International Frontier Markets	0-5%	0.0%	✓

Leverage	Policy Limit	Current	Policy Compliance
LTV	50%	32.1%	✓
DSCR Total (minimum)	1.50	2.95	✓
DSCR Core (minimum)	2.00	3.13	✓

II. Investment Review

b. Infrastructure

Past Year Environment Review – Infrastructure

- Growing institutional investor appetite for Infrastructure
 - Significant dry powder available
- Fierce competition for new investments, especially Core
- Supportive credit markets
- Transition to “clean” power generation continues to accelerate
- Energy companies continue to divest assets and utilize private capital to capitalize projects
- Non-Power and Energy deals remain scarce in the U.S.

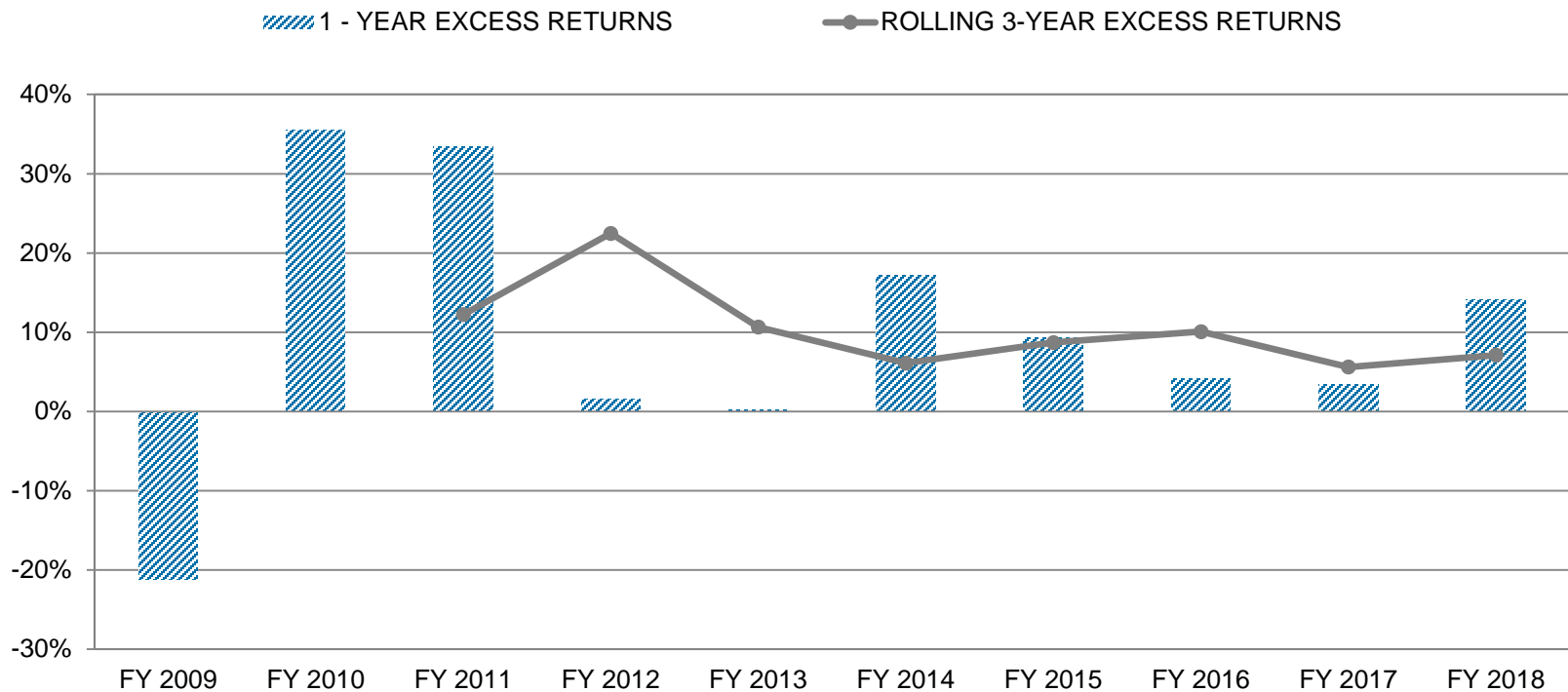
Portfolio Performance Review – Infrastructure

As of June 30, 2018	1-Year Net Return	3-Year Net Return	5-Year Net Return	10-Year Net Return
Infrastructure	20.6%	13.0%	15.0%	14.4%
Policy Index	6.4%	5.9%	5.5%	5.9%
Excess Return	14.1%	7.1%	9.5%	8.5%

- Infrastructure outperformed the 2013 ALM expected return of 7%
- Infrastructure outperformed across all measured periods. Strong performance was primarily driven by Core holdings

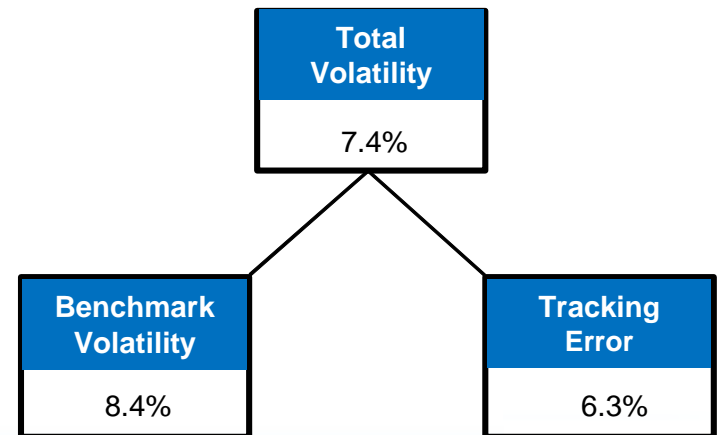
Portfolio Performance Review – Infrastructure (Cont'd)

3-Year Rolling Excess Return



Volatility Profile – Infrastructure

- Infrastructure Forecast Volatility is 7.4%
- Forecast Tracking Error is 6.3%
- Correlation vs. the entire PERF portfolio is 0.79

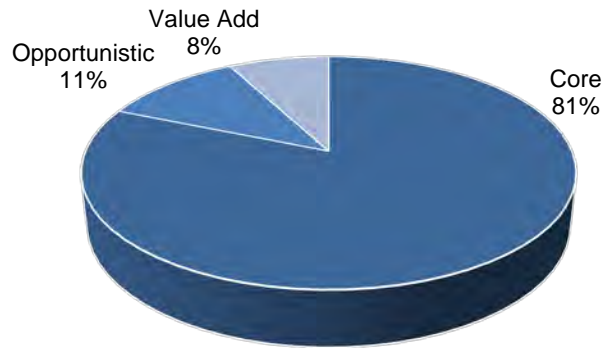


Portfolio Characteristics – Infrastructure

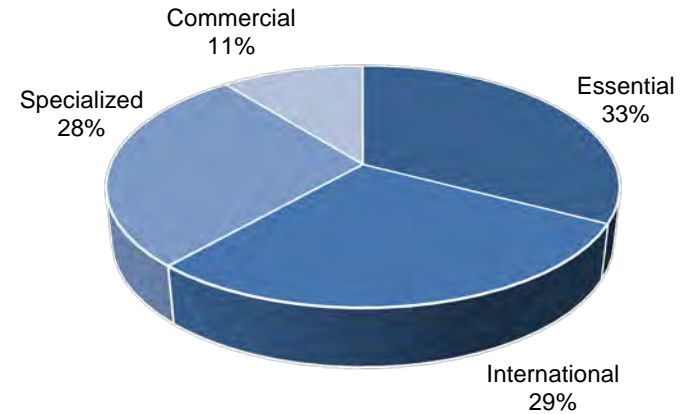
- **Total NAV:** \$4.3 billion
 - Portfolio NAV is 1.2% of Total Fund, versus 1% interim target
 - Portfolio NAV increased 14.8% to \$4.3 billion from \$3.8 billion
- **Unfunded:** \$1.4 billion (\$1.1 billion revocable at CalPERS discretion)
- **Structure:**
 - 8 External Managers
 - 8 Commingled Funds, 3 Direct Investments, and 2 Separate Accounts
 - NAV Basis: 36% Separate Accounts, 34% Direct Investments, 30% Commingled Funds
- **Geographic Exposure:**
 - 54% U.S., 45% International Developed Markets, 1% International Emerging Markets
 - 9% NAV invested in California

Portfolio Characteristics – Infrastructure by NAV

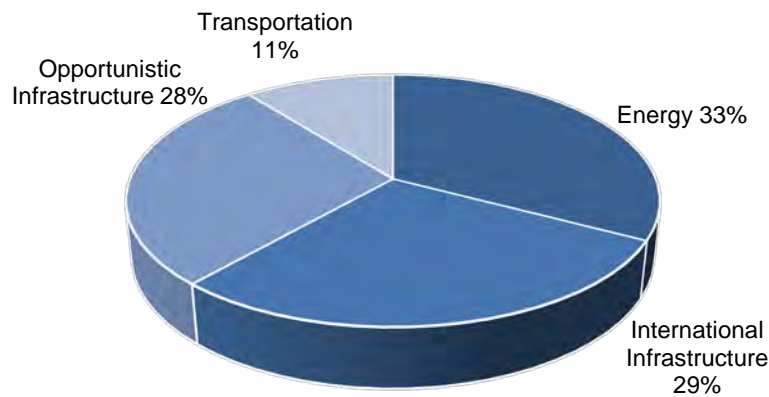
Risk



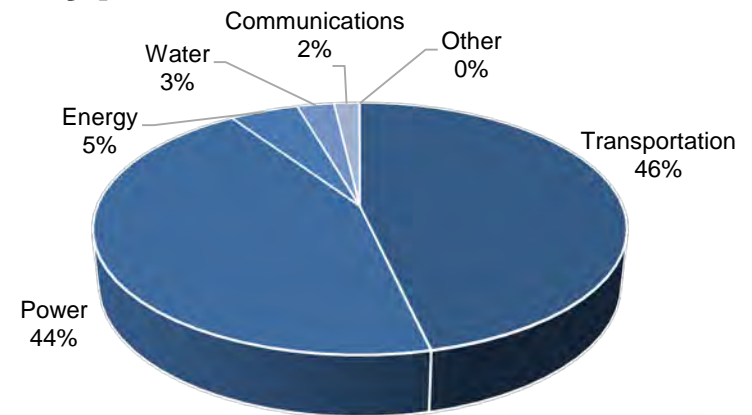
Segment



Sector



Asset Type



Portfolio Positioning – Infrastructure*

Risk Classification	%Policy Range	%NAV	Policy Compliance
Core	60-100%	81.2%	✓
Value Add	0-25%	7.9%	✓
Opportunistic	0-25%	10.9%	✓
Development or Build-to-Core	0-10%	0.0%	✓

Geography	%Policy Range	%NAV	Policy Compliance
United States	50-100%	53.9%	✓
International Developed Markets	0-50%	44.9%	✓
International Emerging Markets	0-15%	1.2%	✓
International Frontier Markets	0-5%	0.0%	✓

Leverage	Policy Limit	Current	Policy Compliance
LTV	65%	45.8%	✓
DSCR Total (minimum)	1.25	2.13	✓

II. Investment Review

c. Forestland

Past Year Environment Review - Forestland

- Forestland transaction activity was low
- U.S. housing starts continue to recover which have strong correlation to timber prices
- Pacific Northwest timber prices have been escalating over the past 3 years
- Southeast timber prices have been flat over the past 3 years

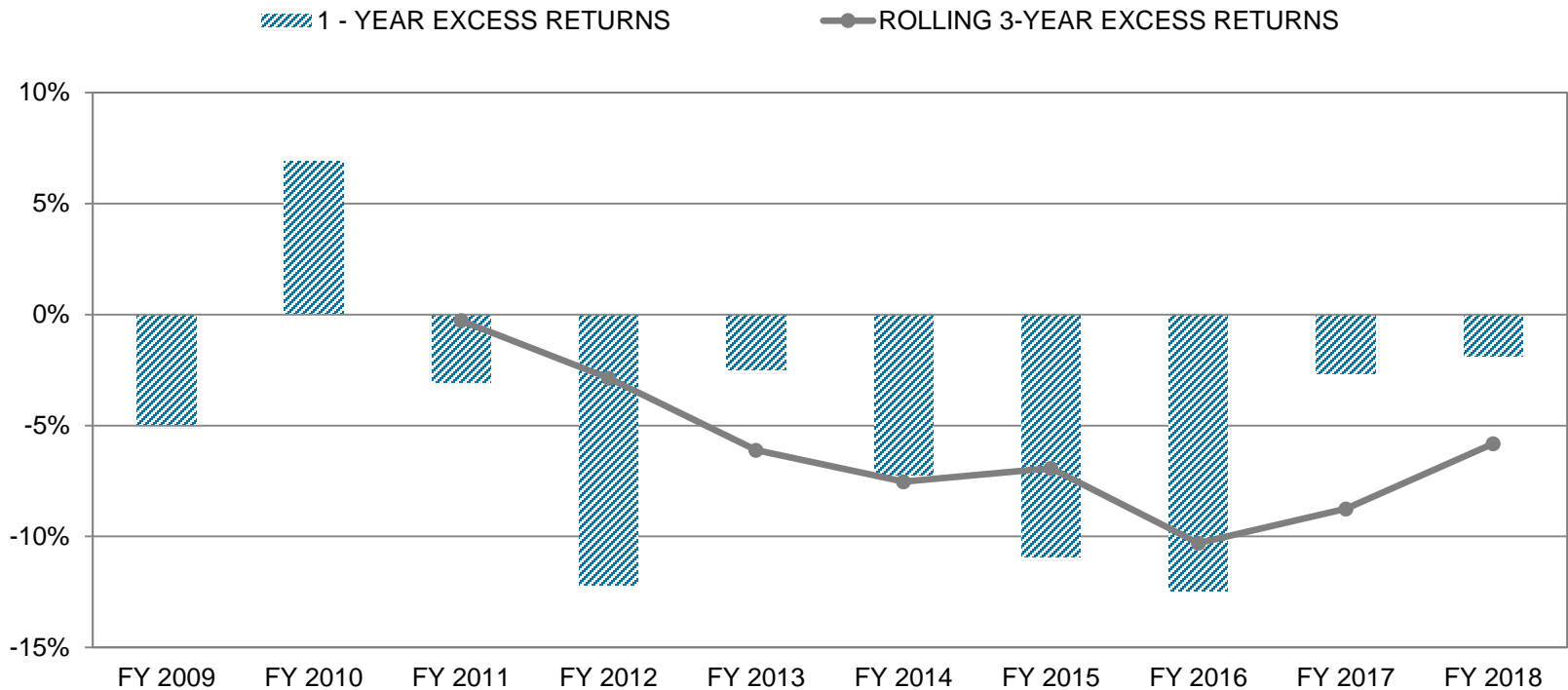
Portfolio Performance Review – Forestland

As of June 30, 2018	1-Year Net Return	3-Year Net Return	5-Year Net Return	10-Year Net Return
Forestland	1.9%	-2.4%	-1.0%	-1.1%
Policy Index	3.8%	3.4%	6.1%	4.1%
Excess Return	-1.9%	-5.8%	-7.1%	-5.1%

- Forestland underperformed the 2013 ALM expected return of 7%

Portfolio Performance Review – Forestland (Cont'd)

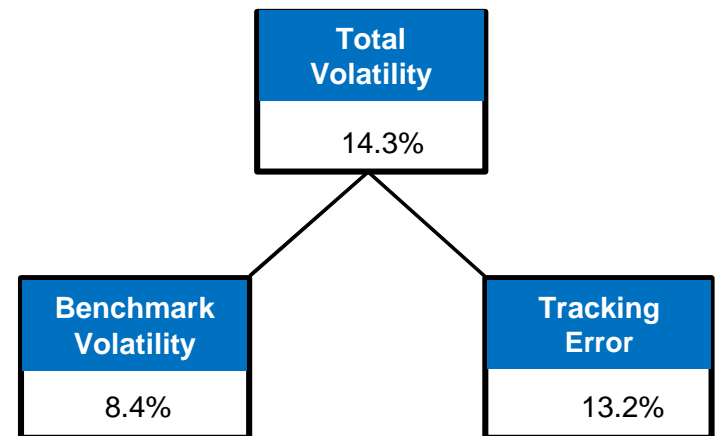
3-Year Rolling Excess Return



Real Assets Annual Program Review

Volatility Profile – Forestland

- Forestland Forecast Volatility is 14.3%
- Forecast Tracking Error is 13.2%
- Correlation vs. the entire PERF portfolio is 0.57

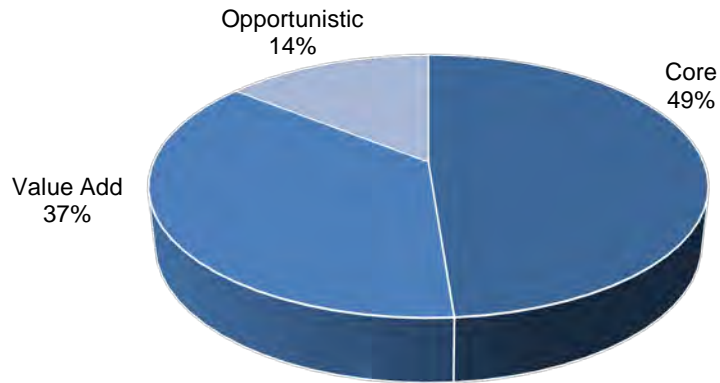


Portfolio Characteristics – Forestland

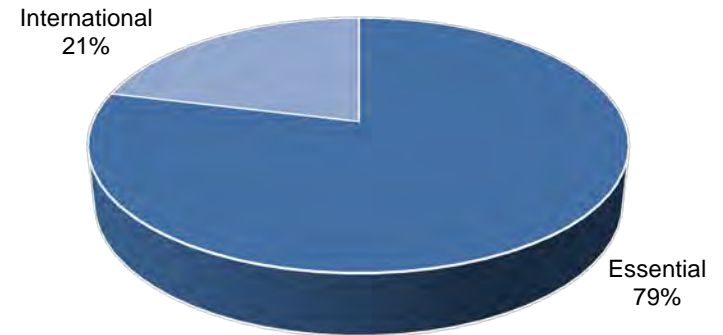
- **Total NAV:** \$1.98 billion
 - Portfolio NAV is 0.6% of Total Fund, versus 1% target
 - Portfolio NAV decreased 0.2% to \$1.98 billion
- **Unfunded:** \$0
- **Structure:**
 - 2 External Managers
 - 2 Separate Accounts
 - NAV Basis: 100% Separate Accounts
- **Geographic Exposure:**
 - 79% U.S., 9% International Emerging Markets, 7% International Developed Markets, 5% International Frontier Markets

Portfolio Characteristics – Forestland by NAV

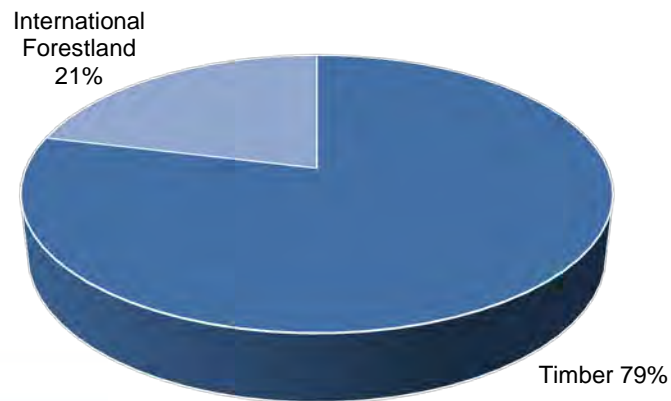
Risk



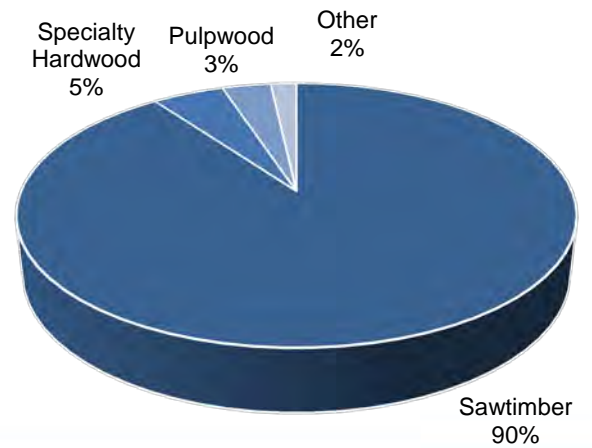
Segment



Sector



Primary Product



Portfolio Positioning – Forestland*

Risk Classification	%Policy Range	%NAV	Policy Compliance
Core	75-100%	48.8%	✘
Value Add	0-25%	37.0%	✘
Opportunistic	0-25%	14.3%	✓
Development or Build-to-Core	0-10%	0.0%	✓

Geography	%Policy Range	%NAV	Policy Compliance
United States	50-100%	78.8%	✓
International Developed Markets	0-50%	6.9%	✓
International Emerging Markets	0-15%	9.4%	✓
International Frontier Markets	0-5%	4.9%	✓

Leverage	Policy Limit	Current	Policy Compliance
LTV	40%	20.5%	✓
DSCR Total (minimum)	1.25	0.99	✘

III. Business Review

Real Assets Annual Program Review

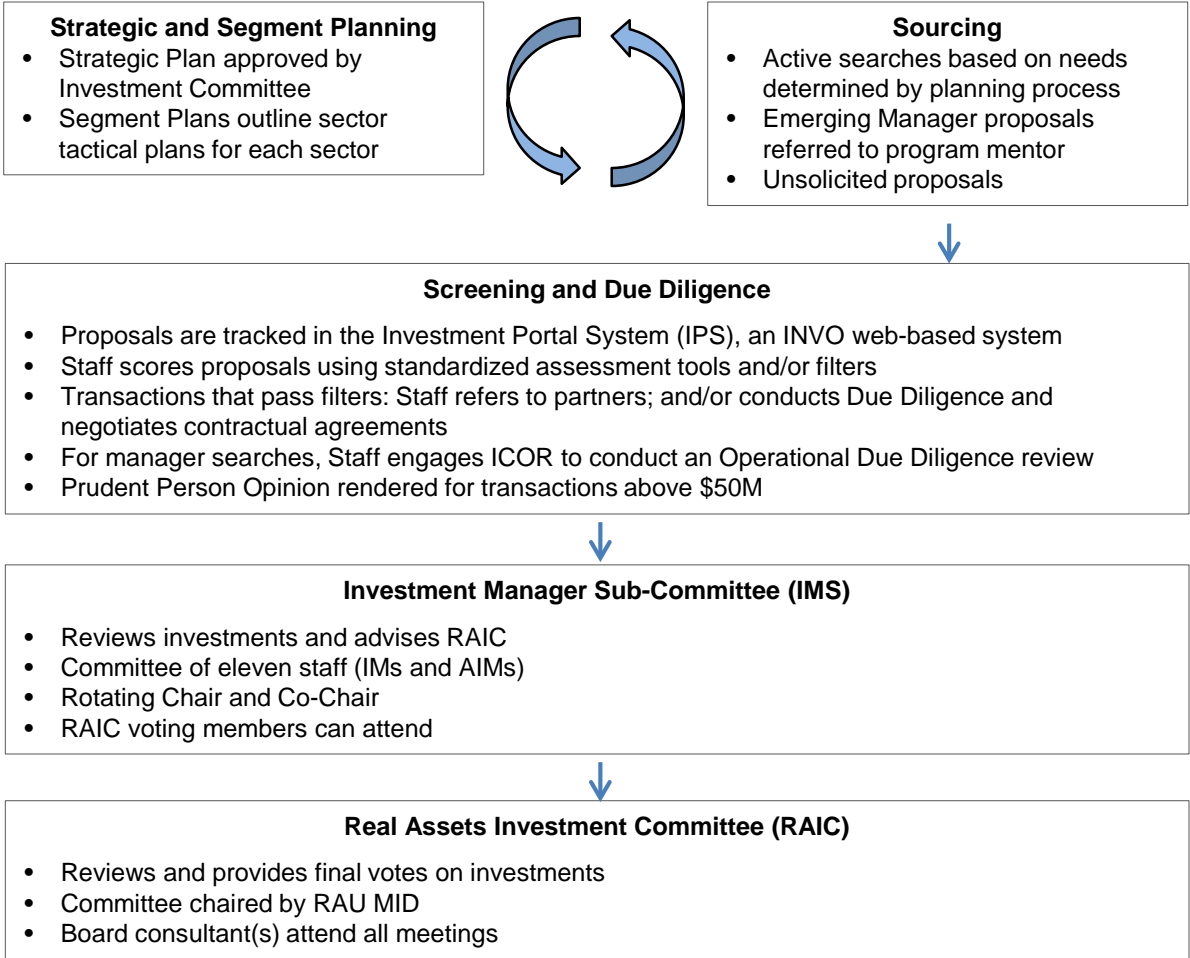
Real Assets Investment Decision Process

Real Assets Investment Committee (RAIC):

- Reviews all investment decisions
- Voting members:
 - RAIC Chair (RAU MID)
 - RAU ID (3)
 - RAU IM (2)
 - External INVO MID (2)
 - External INVO ID (1)

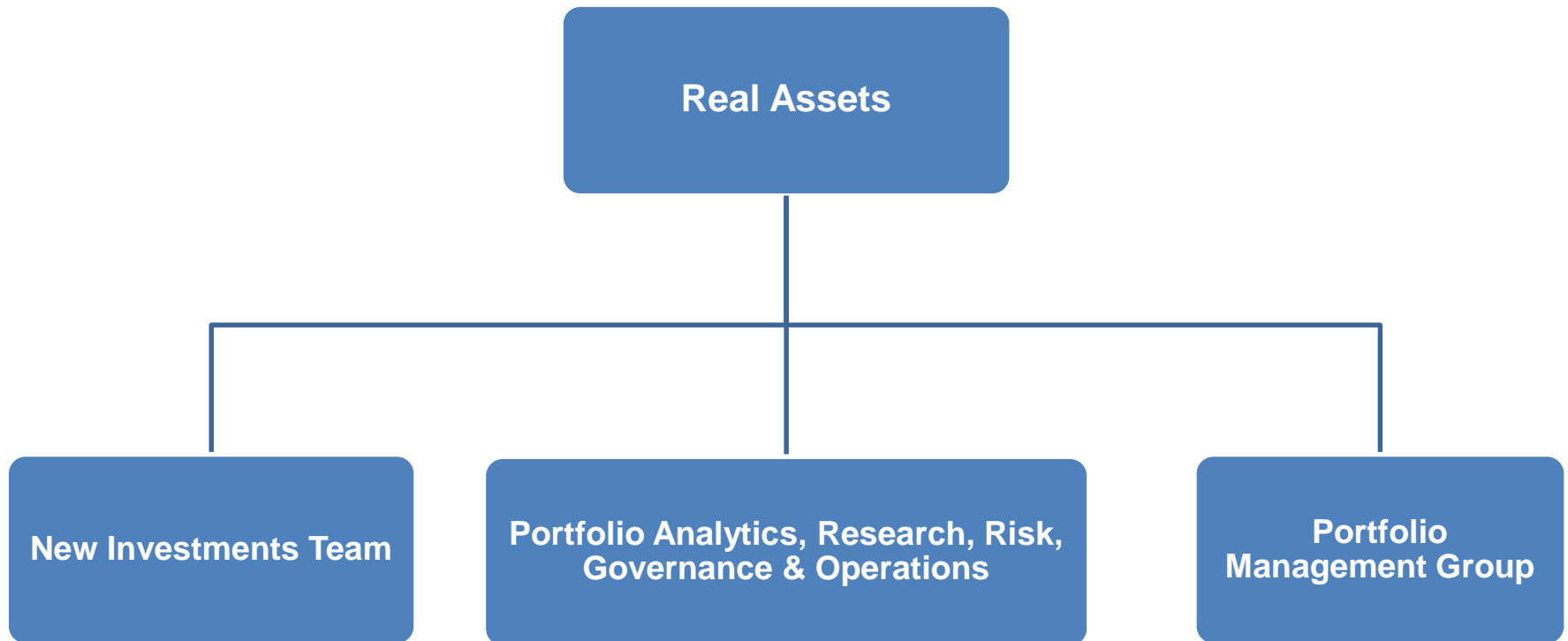
Investment Manager Sub Committee (IMS):

- Deliberative body to RAIC
- Reviews all investment decisions prior to RAIC
- Voting members:
 - All RAU IM and RAU AIM
 - Rotating Chair/Co Chair (quarterly)



• In fiscal year 2017-2018, RAIC made investment decisions representing \$10.7 billion of investment, disposition, and debt decisions

Functional Organizational Chart



Real Assets Annual Program Review

Staffing Overview

TOTAL PROGRAM ¹

- 55 total positions within Real Assets; same number of positions in 2016-2017

STAFFING UPDATES ¹

- Appointed 1 Investment Director
- Appointed 1 Investment Manager
- Appointed 4 Investment Officer IIIs
- Appointed 2 Investment Officer IIs
- Appointed 3 Investment Officer Is
- Appointed 1 Staff Services Manager I
- Appointed 1 Staff Services Analyst
- Appointed 2 Office Technicians
- Appointed 3 Seasonal Clerks
- Transferred 1 Associate Governmental Program Analyst position to other INVO program area

CURRENT VACANCIES ²

- 1 Investment Officer I
- 1 Investment Manager

Strategic Plans

	Policy Requirement	Investment Committee Approval
Real Assets	Strategic Plan updated at a minimum every five years, setting forth CalPERS' long-term objectives for investment and management of the Program	April 2016

- Role of asset class and benchmark are inputs into strategic planning process provided by Asset Allocation framework
- Integrated Real Assets Strategic Plan harmonizing underlying portfolios:
 - Real Estate
 - Infrastructure
 - Forestland
- Established Real Assets parameters; Harmonizing nomenclature; Reducing risk, costs, and complexity; Increasing transparency
- Consistent with Vision 2020 of reducing complexity

Strategic Projects Update

Initiatives	Activities
Strategic Plan Updates	<ul style="list-style-type: none"> • Continued implementation of strategic plan, including segment/sector planning • Segment plans for International, Essential, Consumer, Commercial and Residential Segments completed • Specialized Segment Plan underway
Real Assets Investment Policy	<ul style="list-style-type: none"> • Revised Investment Policy for Real Assets Program approved March 19, 2018 • Continue to evaluate policies and procedures annually
Portfolio Repositioning	<ul style="list-style-type: none"> • Continue Real Estate and Infrastructure portfolio growth through new investments • Continue to grow exposure in Core investments consistent with Real Assets Role • Restructure and partial divestment of Forestland portfolio • External manager reduction
RE Emerging & Transition Manager Program	<ul style="list-style-type: none"> • Committed additional \$350 million to Emerging Manager Program • Evaluate additional Real Estate emerging managers • First Transition Manager solicitation underway

Emerging & Transition Manager Programs in Real Estate

- **FY 2017/18 Significant Events**

- CalPERS committed an additional \$350M to the Emerging Manager Program
- Total commitments equal \$915M

- **Current Status/Update**

- Completed sixth year of Innovative Mentoring Manager Model
- Continued favorable feedback to our programmatic joint venture structure
- Mentoring managers are evaluating the transition readiness of existing emerging managers and maintain outreach efforts to the broader emerging manager community
- Through its first six years, the program has performed above expectations
- Emerging Manager Program broadened to include new geographies and property types

Real Assets Annual Program Review

Program Expenses – Real Estate

	FY 2017-18			FY 2016-17		
	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	\$ 9.8	3	\$0	\$ 9.3	3
External Management^b	\$ 31,790	\$ 220.8	69	\$ 30,536	\$ 186.5	61
Asset Management Fee Paid	N/A	\$ 167.9	53	N/A	\$ 159.8	52
Profit Sharing Paid	N/A	\$ 32.0	10	N/A	\$ 75.4	25
Profit Sharing Accrued	N/A	\$ 20.8	7	N/A	-\$ 48.7 ^c	-16
Consultants Expense	N/A	\$ 1.3	0	N/A	\$ 1.3	0
Technology & Operating Expense	N/A	\$ 8.0	3	N/A	\$ 11.3	4
Total Program	\$ 31,790	\$ 239.9	75	\$ 30,536	\$ 208.4	68

FY 2017 18 CalPERS (\$millions)

Realized and Unrealized Gains \$976.2



^a All BPS fees and expenses paid figures 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)

^c Negative performance fees are due to the reversal of accruals caused by the fluctuation in market

Note: Total profit sharing liabilities are \$617 million as of March 31, 2018 and were \$687 million as of March 31, 2017

Note: Some totals may not reconcile due to rounding. Four quarters of data ending on March 31, 2018 and March 31, 2017 respectively

Program Expenses – Real Estate

- Overall External Management Fees increased by 18.4% (\$34.3M) Y-o-Y largely due to a reversal of incentive accrual of \$48.7M in FY 16-17
 - Adjusting for accrual reversal, the External Management Fees declined by 6.1% Y-o-Y
- The sum of Asset Management Fees Paid and Profit Sharing Paid declined by 15.0% Y-o-Y
- Implementation of new fee alignment structure with strategic managers facilitates better alignment and drives cost efficiency and predictability

Program Expenses – Infrastructure & Forestland

FY 2017-18

FY 2016-17

	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	-\$ 0.1 ^b	0	\$0	-\$ 0.4 ^b	-1
External Management^c	\$ 6,309	\$ 95.1	151	\$ 5,755	\$ 57.1	99
Asset Management Fee Paid	N/A	\$ 23.9	38	N/A	\$ 27.2	47
Profit Sharing Paid	N/A	\$ 30.3	48	N/A	\$ 0.0	0
Profit Sharing Accrued	N/A	\$ 40.9	65	N/A	\$ 29.9	52
Consultants Expense	N/A	\$ 0.8	1	N/A	\$ 0.1	0
Technology & Operating Expense	N/A	\$ 0.4	1	N/A	\$ 1.0	2
Total Program	\$ 6,309	\$ 96.1	152	\$ 5,755	\$ 57.8	100

FY 2017 18 CalPERS (\$millions)

Realized and Unrealized Gains \$580.8

^a All BPS fees paid figures are calculated on Total Program AUM defined as NAV (Net Asset Value)

^b Negative amount due to accrual reversals and corrections in accounting

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

Note: Total profit sharing liabilities are \$92.7 million as of March 31, 2018 and were \$83.9 million as of March 31, 2017

Note: Some totals may not reconcile due to rounding. Four quarters of data ending on March 31, 2018 and March 31, 2017 respectively

Program Expenses – Infrastructure & Forestland

- Overall External Management Fees increased by 66.5% (\$38M) Y-o-Y due to increases in Profit Sharing Paid and Profit Sharing Accrued
- Strategic Separate Account partnerships continue to carry better economic terms and governance than commingled funds
- Separate Accounts are anticipated to be the primary mode of new investment

IV. Governance & Sustainability Integration

Progress on Strategic Plan Initiatives

Total Fund ESG Strategic Plan Category	RAU Strategic Plan Targets Established April 2016	Progress this past year
Manager Expectations	<ul style="list-style-type: none"> • ESG factor consideration matrix utilized • ESG monitoring and benchmarking tools utilized • Climate and Resource Scarcity Risk Assessment for Core Portfolio 	<ul style="list-style-type: none"> • Matrix utilized for all new real estate and infrastructure direct investments and acquisitions through separate accounts • GRESB survey utilized by 17 partners during 2018 • Piloting Climate Risk Assessment Tools • Collaborating with Sustainable Investments Program on Total Fund Climate Risk Mapping Project • RAU Staff co-leading Total Fund Water Research project
Research	<ul style="list-style-type: none"> • Year 2-5: develop and implement priority initiatives for clean power & energy efficiency (aka Energy Optimization("EO") Initiative) 	<ul style="list-style-type: none"> • Incorporated EO Initiative into the AIP process • Consultant surveying current portfolio practices and assessing potential energy optimization strategies for systematic deployment across Real Estate portfolio
Responsible Contractor Program (RCP)	<ul style="list-style-type: none"> • Continue Responsible Contractor Program (RCP) 	<ul style="list-style-type: none"> • CalPERS Separate Account operating agreements continue to include provisions requiring compliance with the Responsible Contractor Program Policy