Trust Level Portfolio Management Annual Program Review

Eric Baggesen Managing Investment Director

August 13, 2018



Trust Level Portfolio Management (TLPM) | Executive Summary

1. Annual Review: First Full Fiscal Year as TLPM

- > Advanced INVO 2020 Vision path toward more formal trust level investment decision making
- > Disciplined, organized approach to strategic and dynamic asset allocation
- > Focused on repeatable, predictable, and scalable total fund portfolios and practices

2. Adopted New Strategic Asset Allocation

- > Aligned with CalPERS 2012-17 Strategic Plan to strengthen long-term sustainability of the Fund
- > Maintains 7% discount rate while balancing market opportunity set and funded status

3. Integrated Behavior (not siloed)

Strategic management and business planning to enable cross-Enterprise/INVO diversity of talent



Performance | For Period Ending June 30, 2018

Total Fund Attribution	Average Weight 5 Year	Program Excess	Return (bps)	Contribution to Pl	an Excess (bps)	Volatility of Contribution
	Jicar	1 Year	5 Year	1 Year	5 Year	5 Year
Public Program Contribution				(11)	21	20
Global Equity	51.8%	(42)	4	(22)	(1)	16
Income	18.3%	38	73	8	13	10
Inflation	6.0%	36	53	3	3	4
Liquidity	3.3%	36	(15)	2	(0)	1
Sec Lending	0.0%	3	4	3	4	0
TLPM	0.4%			(3)	(1)	2
External MAC	0.4%	(464)	(237)	(2)	(1)	2
Completion Overlay (Pilot)	0.0%	(172)		(O)	(0)	0
Volatility Harvesting	0.0%	(248)		(0)	0	0
Risk Mitigation	0.0%			(1)	(0)	0
Other Plan Level	1.6%			(1)	3	4
Private Program Contribution				(4)	(25)	106
Private Equity	9.4%	(251)	(222)	(17)	(21)	53
Real Assets	10.4%	118	(23)	13	(4)	43
Allocation Management				9	5	12
Public Proxy Performance				(1)	(7)	26
Private Equity	0.7%			(5)	(3)	19
Real Assets	1.7%			4	(5)	14
Other				-	-	-
Total Excess Return (bps)				(6)	(7)	120



Business Update | Accomplishments & Initiatives

2017-2018 Major Accomplishments

- Conducted Asset Liability Management (ALM) review which balanced the pressures of increased pension costs with protecting the Fund's investments from risk in the capital markets.
- Strengthened long-term sustainability of the Fund's investment portfolio by adopting new strategic asset allocation for the next four years while maintaining existing 7% discount rate target.
- Completed all Affiliate Trust Asset Allocation Reviews.
- Completed external Multi-Asset Class Partner Portfolio alignment with the Board's Portfolio Priorities.

2018-2019 Major Initiatives

- Complete implementation of Board adopted Strategic Asset Allocation Targets/Ranges.
- Enhance capital allocation framework through plan level liquidity and leverage management.
- Refine Investment Strategy Group (ISG) role to support more formal trust level investment decision making.
- Explore implementation paths for Trust Level Portfolio Overlay, Currency, and Inflation strategies.



Appendix



Review Outline

	Dagaa	Investment Beliefs Alignment Map											
	Pages	1	2	3	4	5	6	7	8	9	10		
Review Outline													Investment Beliefs Map
Investment Beliefs Key												1	Liabilities
I. Program Overview												±.	
Strategic Plan & INVO 2020 Vision	9											2.	Long-Term Horizon
Trust Level Portfolio Management	10-11											3	. Stakeholders
Portfolio Priorities	12												
Governance	13											4.	. Three Forms of Capital
II. Investment Review												5.	Accountability
Strategic ALM 4-Year Cycle	15												
Strategic Asset Allocation	16-17											6.	Strategic Allocation
Allocation Management	18-21											7.	Risk Reward
Dynamic Asset Allocation	22-24											8	. Costs Matter
III. Business Review												0	
Business Philosophy	26											9.	Multi-faceted Risk
Staffing Overview	27-28											1	0. Resources/Process
Functional Organization Chart	29-32												<u></u>
Policy & Delegations Review	33-35												



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 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



I. Program Overview



Program Role | Execute CalPERS Strategic Plan & INVO 2020 Vision



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

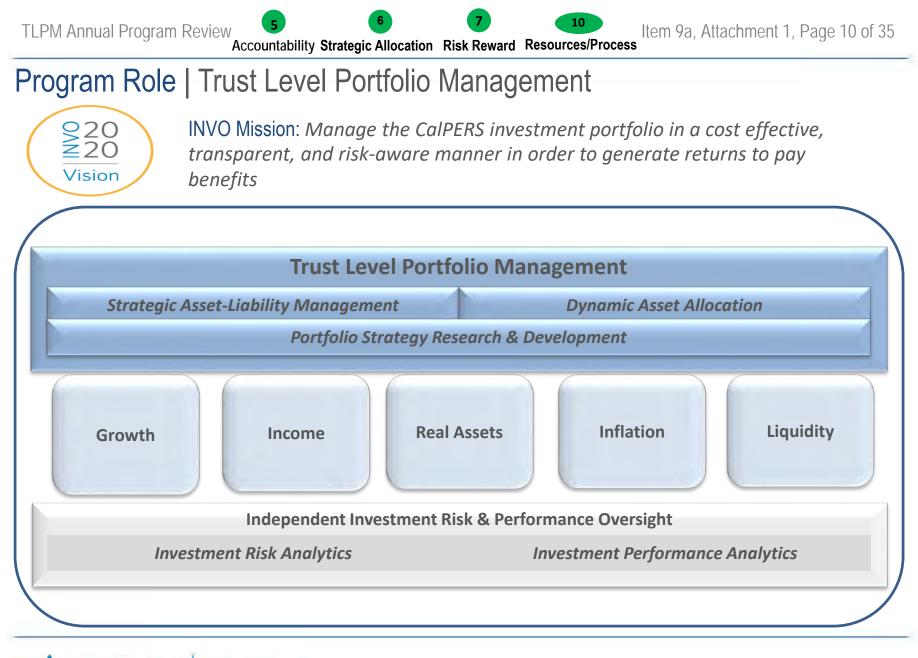
Vision

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





CalPERS Investment Office Trust Level Portfolio Management

Program Role | TLPM Responsibilities and Function

Responsible for delivering targeted, risk-adjusted, total fund level investment returns over the longterm, anchored by the belief that strategic asset allocation is the dominant determinant of portfolio risk and return.

- 1. Strategic Asset-Liability Management: Implementation of CaIPERS Public Employees' Retirement Fund (PERF) and Affiliate Funds' strategic Asset-Liability Management Policy in coordination with the System's Actuarial and Finance Offices, managing Strategic Asset Allocation exposures within ranges, developing capital market assumptions, evaluating risk targets and tolerances, benchmarking, and research into alternative asset allocation approaches.
- 2. Dynamic Asset Allocation: Internal and externally managed multi-asset class strategies which encompass investment risk mitigation, strategic exposures, liquidity and leverage management, replication, rebalancing, and strategic overlay portfolio management.
- 3. Portfolio Strategy Research and Development: Ongoing examination of macro-economic factors, longterm trends in capital markets, enhancing CalPERS' ability to model valuation factors, liabilities, regime shifts, and sustainability (ESG) issues that may impact the Total Fund.



Strategic Allocation

7 Risk Reward

Program Role | Implement Portfolio Priorities

Long-term Horizon

Specific to CalPERS, implementable, and will influence portfolio construction:

- Protect the Funded Ratio (*mitigate severe drawdowns*)
 Stabilize Employer Contribution Rates (*manage overall volatility*)
 "Asset allocation is the dominant determinant of portfolio risk and return" Investment Belief 6
- 3. Achieve Long-term Required Rate of Return

(over the long run, but not in every market environment)



Stakeholders



Item 9a, Attachment 1, Page 13 of 35

Program Role | Convene and Collaborate

Enable strong processes, teamwork and diverse resources.

CalPERS Board of Administration

Board Committees: Investment (IC), and Finance & Administration (FAC)

Asset Liability Management Advisory Committee (ALMAC)

Chair: Chief Risk Officer Membership: Investment, Actuarial, Financial, Legal, Communications & Stakeholder Relations Offices INVO Members: Chief Investment Officer, Chief Operating Investment Officer, TLPM Managing Investment Director

Investment Management Committee

Chair: Chief Investment Officer

Operating Committee

Chair: Chief Operating Investment Officer

Investment Strategy Group (ISG)

Chair: Managing Investment Director, TLPM

Four ISG Subcommittees

Portfolio Allocation: Provides organized approach to making asset class rebalance and dynamic position decisions Risk & Attribution: Ensures that investment risks are intended, understood, and compensated Investment Review: Non-core programs, business models, assets and investments Governance & Sustainability: Integration of ESG risk considerations into the investment-decision making process



II. Investment Review



Strategic Asset-Liability Management | 4-Year ALM Cycle Milestones

ALMAC coordinates planning of the Board's Asset Liability Management (ALM) Policy 4-Year cycle. TLPM manages the Investment Committee's authority to conduct strategic asset allocation, set the target rate of return, and select the asset allocation mix.

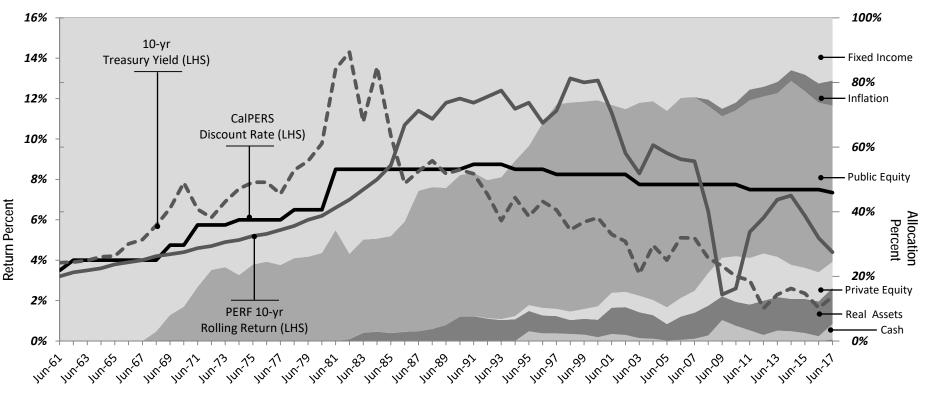
Five Milestones Describe 4-Year ALM Cycle





Strategic Asset Allocation | CalPERS Historical Allocation

Discount Rate, 10yr Rolling Return, and 10yr US Treasury Yield



Data Source:

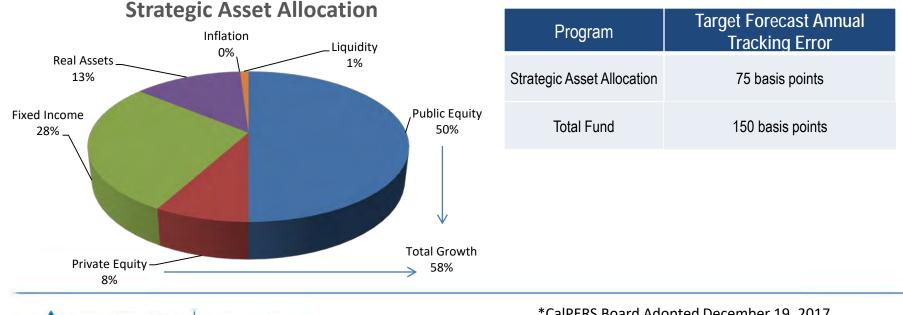
- CalPERS Comprehensive Annual Financial Reports (CAFR) for Discount rate, 10yr rolling returns and Asset Allocation, 1961 2016
- Allocation data for 2017 from CIO report
- Treasury Yield is Bloomberg 10YR US Treasury Constant Maturity Rate (H15T10Y Index)
- Inflation asset class was not provided as a separate line item in the 2014 & 2015 CAFRs, used market value data from State Street
- Total Fund Overlay allocation as of 6/30/2017 is 0.5%. Not labeled.

Strategic Allocation

Risk Reward

Strategic Asset Allocation | Policy Targets, Ranges, & Benchmarks

Asset Class	Policy Weight*	Policy Range Relative to Target	Benchmark
Total Growth	58%		
Public Equity	50%	+/- 7%	Custom Global Equity Benchmark + 20bps
Private Equity	8%	+/- 4%	
Fixed Income	28%	+/- 6%	Custom Global Fixed Income Benchmark
Real Assets	13%	+/- 5%	PREA IPD US Property Fund Index
Inflation	0%	+3% / -0%	Custom Inflation Assets Benchmark
Liquidity	1%	+3% / -6%	30-day Treasury Bill





Allocation Management | For Period Ending June 30, 2018

Total Fund Attribution	Average Weight 5 Year	Program Excess	Return (bps)	Contribution to P	lan Excess (bps)	Volatility of Contribution
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TLPM Performance | For Period Ending June 30, 2018

TLPM Summary	TLPM Summary Ending Market	% of Total Fund	1-Y	'ear	3-ү	'ear	5-Y	ear	10-\	/ear
	value (șivilvi)	Assets	Net	Excess	Net	Excess	Net	Excess	Net	Excess
			Return	bps	Return	bps	Return	bps	Return	bps
EXTERNAL MAC	1,535	0.4	2.9%	(464)	2.8%	(468)	5.1%	(237)	-	-
COMPLETION OVERLAY	999	0.3	6.9%	(172)	-	-	-	-	-	-
VOLATILITY HARVESTING	71	0.0	11.9%	(248)	-	-	-	-	-	-
RISK MITIGATION	133	0.0	-	-	-	-	-	-	-	-
TOTAL TLPM	2,738	0.8								



Allocation Management 1-Year | For Period Ending June 30, 2018

Program	Average Portfolio Weight	Average Target Weight	(Under) / Over Weight	Benchmark Return - 30 Tbill Return	Contribution (bps)
PUBLIC EQUITY	49.30%	48.30%	1.00%	10.69%	14.3
INCOME	19.77%	21.07%	(1.30%)	(1.23%)	2.4
INFLATION	7.52%	8.49%	(0.97%)	7.70%	(11.0)
LIQUIDITY	4.34%	3.75%	0.59%	0.11%	0.0
MULTI-ASSET CLASS	0.39%	0.00%	0.39%	6.30%	2.6
STRATEGIC OVERLAY	0.16%	0.00%	0.16%	7.44%	0.2
VOLATILITY	0.02%	0.00%	0.02%	13.17%	0.3
RISK MITIGATION	0.03%	0.00%	0.03%	0.00%	-
ABSOLUTE RETURN STRATEGIES	0.08%	0.00%	0.08%	4.76%	0.4
			Al	location Management	9.3



Public Proxy Performance 1-Year | For Period Ending June 30, 2018

Program	Average Portfolio Weight	Average Benchmark Weight	(Under)/Over Weight	Benchmark Return	Proxy Return	BM -Proxy Return	Contribution (bps)
PRIVATE EQUITY	7.74%	8.00%	(0.26%)	18.59%	11.89%	6.70%	(4.8)
REAL ESTATE	8.93%	10.75%	(1.82%)	7.11%	8.29%	(1.18%)	2.2
FORESTLAND	0.57%	1.00%	(0.43%)	3.79%	8.29%	(4.50%)	1.7
INFRASTRUCTURE	1.14%	1.00%	0.14%	6.45%	8.29%	(1.85%)	0.0
					Public Prox	y Performance	(0.8)

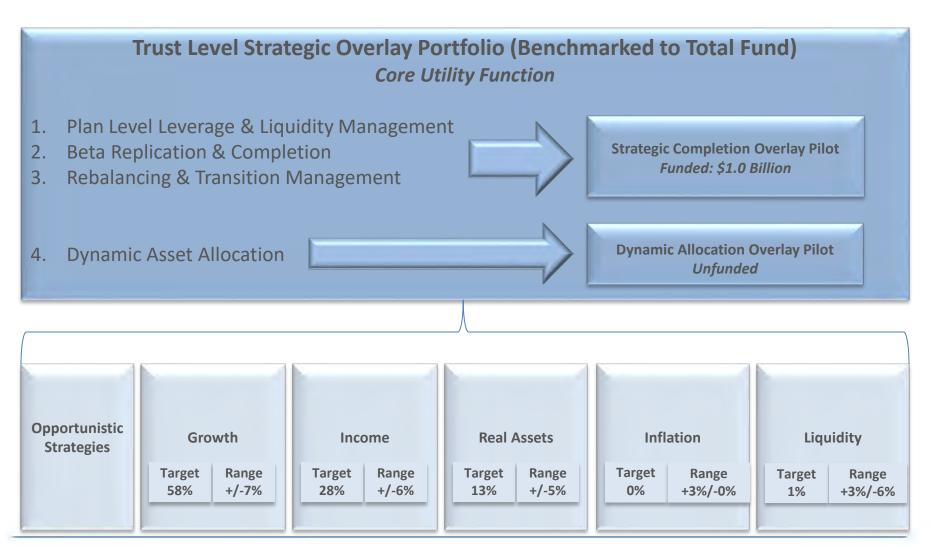


Accountability Costs Matter



Dynamic Asset Allocation | Strategic Overlay Capability

5





3 Forms of Capital Accountability Strategic Allocation Costs Matter

5

4

Dynamic Asset Allocation | Multi-Asset Class (MAC) Partner Strategies

Portfolio Priority		External Partner	Ending Market Value for Period ending June 30, 2018 (\$MM)
1	Mitigate Severe Drawdowns (Protect the Funded Ratio)	Left Tail Risk Mitigation Strategy*	\$133
2	Manage Overall Volatility	Perella Weinberg Partners	\$500
2	(Volatility Targeting)	Fidelity Institutional Asset Management	**
2	Achieve Long-Term Required Rate of Return	AQR Capital Management	\$732
3	(Dynamic Asset Allocation)	Aberdeen Standard Life Investments	\$303
		TOTAL EXTERNAL MAC	\$1.668

* Strategy Under Construction: External Partners to be disclosed at August 2019 TLPM Annual Review.

** Initial capital contribution of \$1.0B to Fidelity Institutional Asset Management completed in July 2018.



Dynamic Asset Allocation | MAC Partner Knowledge Transfer

To Influence:

More formal strategic and dynamic asset allocation decision making

- Multi-asset portfolio construction and systematic rebalancing
- Risk assumptions and management methodologies

Staff intellectual rigor and experience (strong processes and teamwork)

• Repeatable, predictable, and scalable portfolio construction strategies

Internally managed trust level (costs matter)

- Overlay strategies
- Ancillary strategies



III. Business Review



Business Philosophy: Trust Level Portfolio Management

Committed to enhanced transparency, accountability, and the highest ethical standards

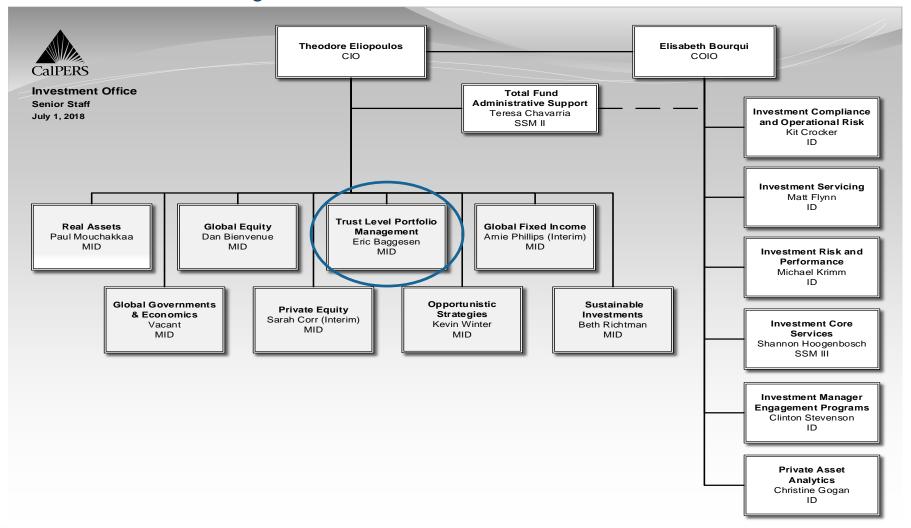


Enabling:

Enaomig.	
People	 To meet beneficiary and employer needs through trust level investment decision making Respected by Enterprise and Investment Office partners Relevance and connection to strategic planning
Operational Effectiveness	To support innovative thought leadership which advance disciplined asset allocation processes Implement sustainable, risk-aware strategic and dynamic asset allocation strategies
Performance	 To deliver targeted, risk-adjusted investment returns over the long-term Fiduciary duty is paramount Asset allocation is the dominant determinant of portfolio risk and return Broadly diversified to minimize the effect of short-term losses Prudent risk taking is appropriate within the context of overall diversification



Investment Office Organization Chart





Staffing Overview



Trust Level Portfolio Management Staff

- 1 Managing Investment Director (MID)
- 1 Investment Director (ID)
- 5 Investment Managers (IM)
- 3 Associate Investment Managers (AIM)
- 11 Investment Officers (4-IO3s, 3-IO2s, 4-IO1s)

Position Updates

- 2 New IOs
- 1 Exchanged AIM
- 1 Exited IM
- 2 Exited IOIIIs
- (Nancy Ying He, Adel Heiba)
- (AIM Position Exchange with OS¹)
- (Obtained IM with RA²)
- (Obtained IMs with OS and IRP³)

Recruitments

2 AIM Positions

Target Start Date: By 9/30/18



¹OS = Opportunistic Strategies ²RA = Real Assets Unit ³ IRP= Investment Risk & Performance





Functional Organizational Chart

Trust Level Portfolio Management | Strategic Asset-Liability Management (ALM)

Eric Baggesen, Managing Investment Director Ron Lagnado, Investment Director

ALM Policy Implementation

• INVO Role: 4-Year Cycle (ALMAC)

Leadership

Dianne Sandoval, Investment Manager

Key Resources

Adel Heiba, Investment Officer III Daniel Rodriguez, Investment Officer II

Strategic Asset Allocation

- Define Strategic Exposure
- Capital Market Assumptions
- Specification of Risk Targets & Tolerances
- Implementation (PERF, Affiliates)

Alternative Approaches

- Benchmark Selection & Development
- Portfolio Priority Linkage
- Asset & Liability Linkage



5 8 Accountability Costs Matter



Functional Organizational Chart

Trust Level Portfolio Management | Dynamic Asset Allocation

Eric Baggesen, Managing Investment Director Ron Lagnado, Investment Director

Leadership

Todd Eichman, Investment Manager Tom Sampson, Investment Manager

Key Resources

Arvind Rao, Associate Investment Manager Tamara Alexander, Investment Officer III Nancy Ying He, Investment Officer III Ryan Brewer, Investment Officer II Richard Lu, Investment Officer II Tumelo Nyoni, Investment Officer I Cathy Hua, Investment Officer I

Total Fund Portfolio Overlay

- Liquidity & Leverage
- Strategic Exposure (Allocation Control, Systematic Rebalancing)
- Synthetic Portfolio Replication
- Dynamic Portfolio Management: Active Allocation

Multi-Asset Class (MAC) Portfolio Strategies

- Internal MAC Strategies: Systematic, Ancillary Currency and Inflation
- External MAC Partner Portfolio: Left Tail Risk Mitigation, Volatility Targeting, Dynamic Asset Allocation





Functional Organizational Chart

Trust Level Portfolio Management | Portfolio Strategy Research & Development

Eric Baggesen, Managing Investment Director Ron Lagnado, Investment Director



Portfolio Strategy Research

- Knowledge Transfer
- Macro Econ (Fiscal, Monetary), Capital Markets, Long-term Trends
- ESG Awareness

Portfolio Strategy Development

• Modeling: Liability, Regime, Valuation, Pacing, Risk Factor



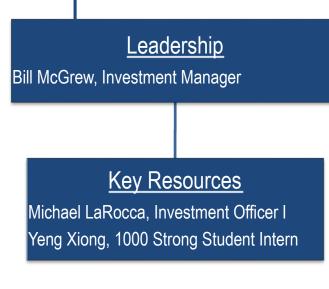
5 8 Accountability Costs Matter



Functional Organizational Chart

Trust Level Portfolio Management | Business Planning & Strategic Management

Eric Baggesen, Managing Investment Director Ron Lagnado, Investment Director



CalPERS Strategic Plan

• 5 Year Plan (2017-22) Strategic Initiatives

INVO 2020 Vision Alignment

- Business Effectiveness, Capital Allocation, Trust Level Investment Decision Making
- Roadmap Initiatives: Cross-Asset Class/Program

Trust Level Portfolio Management Business Model

- Workforce Planning
- Talent Management, Governance & Operations

Strategic Partnerships

• Academic, Asset Owner/Manager, Industry Forums



Policy Review | Investment Committee

The Total Fund Investment Policy*, adopted by CalPERS Investment Committee, includes Sections which provide the framework for TLPM's management of CalPERS assets. *For FY17-18, TLPM has no material Policy exceptions to report. Material changes relate to Policy amendments which reflect CalPERS newly adopted Strategic Asset Allocation Targets and Ranges.*

Resources/Process

Total Fund Investment Policy Section	Summary	Reporting Responsibility	Investment Responsibility
Total Fund	Focus on trust level investment decision making	Х	Х
Investment Beliefs	Provides basis for strategic management	Х	Х
Governance & Sustainability Strategy	Support achievement of sustainable investment (ESG)	Х	
Strategic Asset Allocation (SAA)	Implement SAA targets and ranges based on ALM review	Х	Х
Investment Risk Management	Manage total fund tracking error limits	Х	Х
Global Derivatives & Counterparty Risk	Strategic framework for managing use of derivatives		Х
Investment Leverage	Sets limits and standards for the use of leverage	Х	
Divestment	Economic impact analysis on total fund of divestment activity		Х
Opportunistic Program	Report on program investments, returns, risks, and activity	Х	Х
Terminated Agency Pool	Oversee reporting, rebalancing and restructuring activity	Х	Х

*https://www.calpers.ca.gov/docs/total-fund-investment-policy.pdf



5 Accountability



Policy Review | Finance & Administration Committee

The Asset Liability Management* and Funding Risk Mitigation** Policies, adopted by CalPERS Finance & Administration Committee (FAC), fall within the purview of ALMAC and contribute to TLPM's role in strategic asset-liability management. *For FY17-18, TLPM has no material Policy violations or changes to report on behalf of the Investment Office.*

FAC Policy	Summary	Reporting Responsibility	Investment Responsibility
Asset Liability Management	Seeks to fund System with an integrated view of pension assets and liabilities	х	х
Funding Risk Mitigation	Seeks to reduce CalPERS funding risk over time	Х	Х

* https://www.calpers.ca.gov/docs/asset-liability-management-policy.pdf

** https://www.calpers.ca.gov/docs/funding-risk-mitigation-policy.pdf





Delegations Review | Managing Investment Director

The TLPM Managing Investment Director is delegated to act finally on investment and business authorities subject to Investment Committee Policies.

Investment and Business Authorities (Summarized*)	
To Allocate Assets	Manage asset allocation within strategic ranges.
To Make Investment Decisions	 Transact in public securities. Make or dispose of investments in private investment vehicles. Negotiate partnership agreement terms, including fees and compensation. Undertake action pursuant to investor rights, partnership agreement amendments, consents, and waivers. Increase or decrease funding of externally managed portfolios. Select and terminate an external manager. Negotiate contract terms, fees, and compensation. Establish a spring-fed pool of external resources to meet program needs. Conduct and monitor the performance of service providers.
Administrative Management	Conduct and oversee activities required to carry out administrative and management functions.
To Represent CalPERS	 Testify on behalf of CalPERS before state and federal legislative committees. Communicate the Board's policies and positions before outside parties and organizations.

*Delegation No. INV-17-03; Effective June 30, 2017

