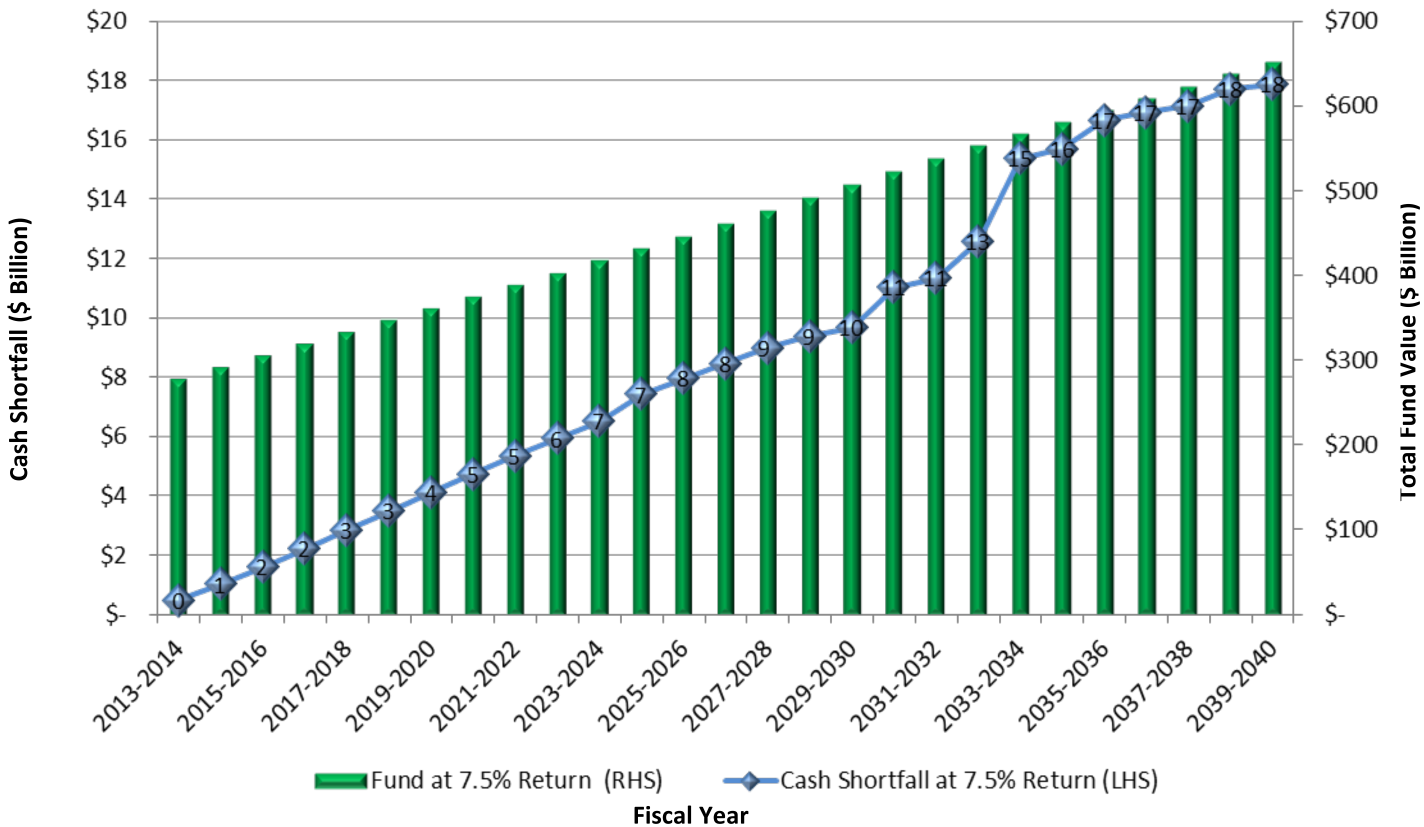
Cash Yield and Liquidity Considerations

Asset Allocation

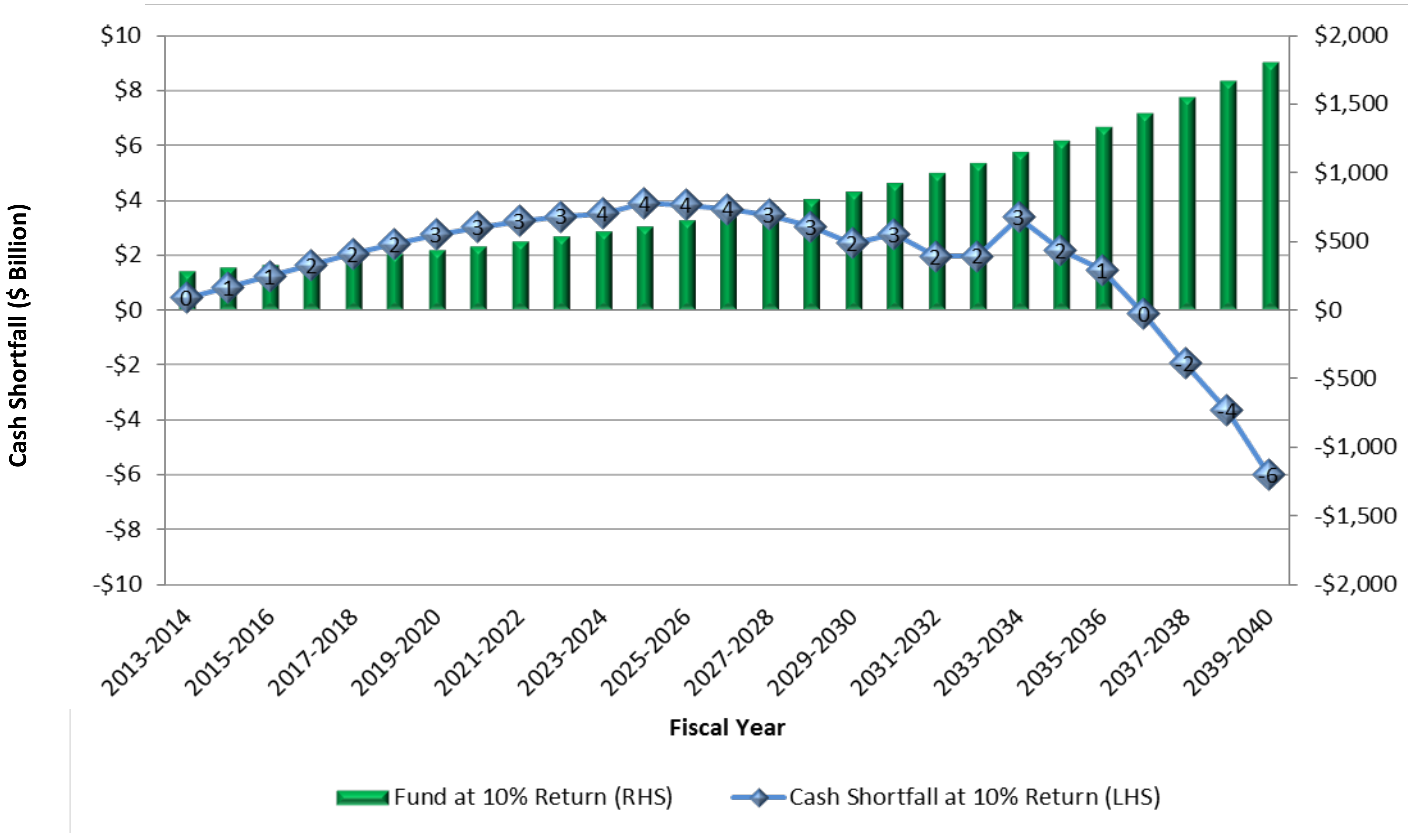
June 17, 2013

Cash-Flow Shortfall* : Base Case (7.5% Asset Returns)

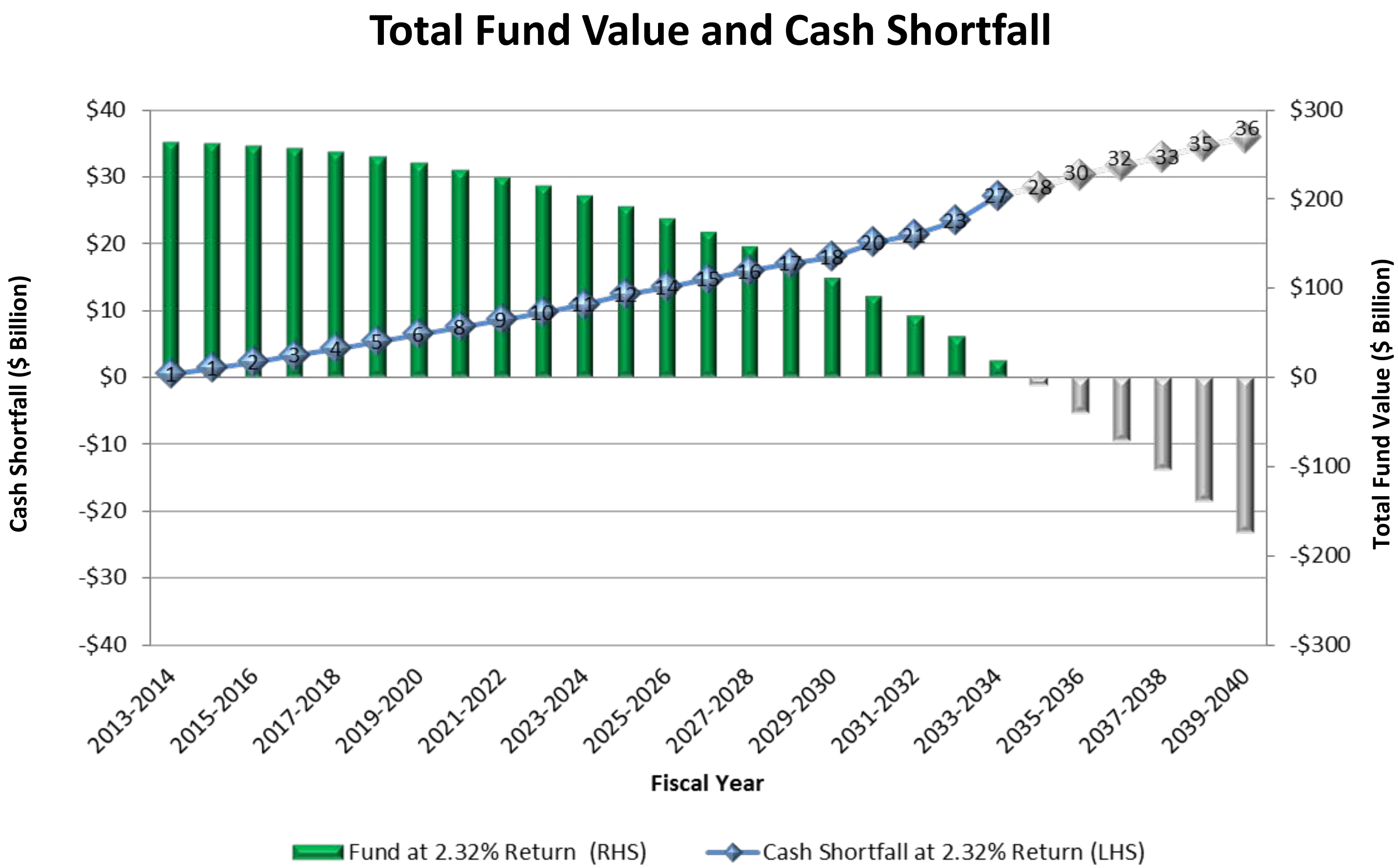


* Cash-Flow Shortfall: Total Deductions – Total Contributions - Current Cash Yield

Cash-Flow Shortfall: Good Case (10% Asset Returns)



Cash-Flow Shortfall: Bad Case (2.32% Asset Returns*)



*Asset Returns come from cash yield only, no contribution from capital appreciation.

Major Questions

The projected cash-flow shortfall is steadily increasing. This non-investment cash drain brings the question of cash yield and liquidity management to the front and center of our vision:

– Are we incorporating cash yield into our strategic asset allocation?
– Is liquidity centrally managed and allocated efficiently across the organization?

Three Approaches to Fill in the Cash-flow Shortfall

1. Increase Contributions

2. Increase Cash Yield: Increase strategic allocation to cash generating asset classes.

3. Liquidate Portfolio: Maintain appropriate Fund liquidity.

Comparison of Approaches

Solutions	Pro	Con
Increase Contributions	• Straight-forward and reliable.	• Limits to the increase.
Increase Cash Yield	• Investment income is more stable and thus more reliable. • Portfolio managers can focus more on long-term asset growth.	• It might be difficult to obtain sufficient yield under the current low interest rate environment. • Some asset classes might not have income, while other asset classes might have cash yield that is difficult to estimate. • Current valuations of income-generating assets are on the rich side.
Liquidate Portfolios	• A liquid portfolio is likely to serve the Fund better during periods of market stress with dry powder available for deployment. • A liquid portfolio can be liquidated timely to meet benefit payments.	• Cash generated by liquidating positions are dependent on market conditions and thus uncertain. • There is no universally agreed liquidity measurement for private asset classes. • The Fund lacks an explicit “portfolio liquidation” policy.

Current Practice Managing Cash Flows

- There is no consistent practice to fund non-investment cash outflows.
  - Recently, the liquidation and rebalancing of the private asset classes has funded the outflows.
  - We recommend sensitizing our Strategic Asset Allocation process to cash yield and liquidity requirements.
- There is no consistent practice to manage cash flows within the Total Fund across asset classes.
  - Consider pooling overall collateral and liquidity management in one centralized hub.

- Introduction
- **Examine Cash Yield Approach**
- Examine Liquidity Approach
- Next Steps
- Appendix

Cash Yield Approach

- Non-Investment Cash Outflows are estimated at 2.68% of the Fund value over the next three fiscal years.

Fiscal Year	Asset* ($B)	Non-Investment Cash Outflows** ($B)	Required Cash Yield (%)
2013-14	$ 279.47	$ 6.65	2.50%
2014-15	$ 292.94	$ 7.49	2.68%
2015-16	$ 306.53	$ 8.38	2.86%

- If investment income funds the projected gap between total contributions and deductions, the Policy Portfolio would be required to generate a 2.68% cash yield.
- The required cash yield is expected to continue growing over the next 30 years to 5.12% as shown in the appendix.

*Assets start at $263.94 billion as of April 30, 2013 and are assumed to grow at discount rate of 7.5%.
**Non-investment cash outflows are projections from ACTO.

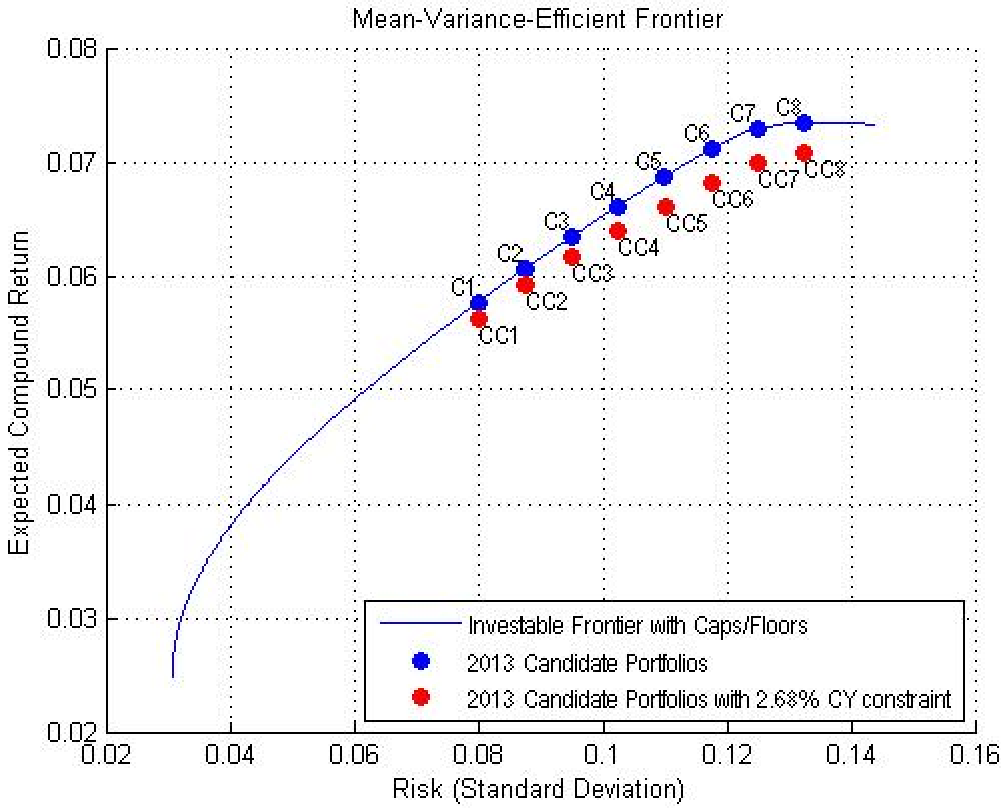
Cash Yield of the Current Policy Portfolio

- Required cash yield to meet projected non-investment cash outflow is 2.68%.
- Using the Policy weight targets, the projected cash yield is 2.32%, leaving a $3.08 billion shortfall over three years.

Asset Class	Policy Portfolio Weight	2013 Compound Est. Return	2013 Asset Class Est. Risk	2013 Asset Class Est. Cash Yield	Est. Portfolio Cash Yield Contribution
Global Equity	49.10%	7.75%	17.40%	2.73%	1.34%
Private Equity	14.00%	9.33%	25.00%	0.00%	0.00%
Fixed Income	15.90%	2.76%	7.00%	3.70%	0.59%
Real Estate	10.00%	7.00%	14.00%	2.00%	0.20%
Infra. & Forest.	3.00%	7.00%	11.00%	2.50%	0.08%
Inflation Assets	4.00%	2.95%	7.25%	0.88%	0.04%
Liquidity	4.00%	1.95%	3.00%	2.02%	0.08%
ARS	0.00%	5.89%	7.00%	0.00%	0.00%
Total	100.00%				2.32%

Anticipated Return Impact

- Adding a cash yield requirement of 2.68% lowers returns by up to 30 bp for given levels of risk using the proposed 2013 CMAs.



Anticipated Policy Portfolio Impact

- While maintaining an equivalent risk to the current Policy Portfolio, adding a 2.68% cash yield requirement results in the following:
  - Portfolio return is reduced by 0.21%;
  - Weighs to asset classes generating higher cash yield are increased; and,
  - Asset classes, such as Private Equity, that have no projected cash yield are given lower allocations.

Asset Class	Adjusted Weight	Adjusted Cash Yield Contribution
Global Equity	61.85%	1.69%
Private Equity	3.19%	0.00%
Fixed Income	16.96%	0.63%
Real Estate	10.00%	0.20%
Infra. & Forest.	3.00%	0.08%
Inflation Assets	1.00%	0.01%
Liquidity	4.00%	0.08%
ARS	0.00%	0.00%
Total	100.00%	2.68%

Anticipated Impact

- Begin tracking asset class income in conjunction with centrally managing Fund liquidity and collateral.
- Separate out income in our internal accounting.
- Benchmark construction (currently income is re-invested in some asset classes).
- Develop a plan for the funding of future pension distributions when private asset classes finalize the re-structuring of their portfolios.
- Gain more understanding about opportunity costs of capital of our Total Fund.
- Build a valuation framework to opportunistically time our migration to higher cash-yielding asset classes.

Cash Yield Approach Summary

Adding a cash yield requirement:

- lowers the expected returns for given levels of risk, but significantly lowers the solvency risk;
- may not be appropriate in the current low interest rate environment; and
- significantly impacts asset allocation decisions.

Introduction

Examine Cash Yield Approach

Examine Liquidity Approach

Next Steps

Appendix

Background on Liquidity

- What is Liquidity?
  - From a general investment perspective, liquidity is the degree by which an asset can be bought or sold in a market without impacting its price[1].

1. Source: http://www.investopedia.com/terms/l/liquidity.asp#axzz2Lenhx6Fx

Liquidity of Asset Classes

73% of current Policy Portfolio is invested in the more liquid asset classes

Asset Class	Current Policy Weight	Time to Liquidate $1 B‡
Liquidity	4.0%	< Half an hour
Inflation Assets	4.0%	< Half an hour
Fixed Income	15.9%	< Half an hour
Global Equity	49.1%	< One hour
Hedge Funds	*n/a*	Three months
Private Equity	14.0%	Six months
Infrastructure and Forestland	3.0%	Six months
Real Estate	10.0%	Six months

More Liquid

Less Liquid

‡ Information for time to liquidate was provided by each of the asset classes

Meeting the Cash-Flow Shortfall by Liquidating Portfolio

- An alternative to the Cash Yield approach to meet the cash-flow shortfall is to liquidate portfolio holdings.
- If liquidating portfolio holdings is the preferred approach, a valuation framework is desired to inform us on the optimal timing of liquidation of different asset classes.
- Pacing models and strategic plans of private asset classes need to accommodate the liquidation plan to maintain strategic asset allocation policy weights.

Liquidity Summary

- The liquidity of the asset classes shows a broad spectrum ranging from the very liquid Global Equity and Global Fixed Income to the least liquid assets, such as Real Estate.

- Although the current Policy Portfolio holds over 70% in liquid asset classes, this does not eliminate our liquidity concerns.
  - Market volatility increases the uncertainty and cost of this approach;
  - Valuation framework is desired for the timing of liquidation;
  - Private asset classes are impacted by the schedule of liquidation.

Introduction

Examine Cash Yield Approach

Examine Liquidity Approach

Next Steps

Appendix

Next Steps

- Enhance our understanding of Cash Flow and Liquidity needs and opportunity cost of our Capital.
- Centrally manage liquidity for the Total Fund.
- Establish a valuation framework to inform us about relative pricing of income and capital appreciation.
- Tilt towards high cash yield asset classes when valuation of those asset classes becomes favorable.

Discussion Touch Point

- Key Thoughts and Insights
- Questions and Answers

Required Cash Yield Projections – 7.5% return

Fiscal Year	Asset* ($B)	Non-Investment Cash Outflows** ($B)	Required Cash Yield (%)	Projected Shortfall per Fiscal Year	
				(%)	($B)
2013-14	$ 279.47	$ 6.65	2.50%	0.18%	$ 0.48
2014-15	$ 292.94	$ 7.49	2.68%	0.36%	$ 1.01
2015-16	$ 306.53	$ 8.38	2.86%	0.54%	$ 1.59
2016-17	$ 320.19	$ 9.32	3.04%	0.72%	$ 2.21
2017-18	$ 333.94	$ 10.27	3.21%	0.89%	$ 2.84
2018-19	$ 347.76	$ 11.22	3.36%	1.04%	$ 3.47
2019-20	$ 361.67	$ 12.17	3.50%	1.18%	$ 4.11
…	…	…	…	…	…
2024-25	$ 432.75	$ 17.13	4.09%	1.77%	$ 7.42
2029-30	$ 508.02	$ 21.09	4.28%	1.96%	$ 9.67
2034-35	$ 581.49	$ 28.87	5.09%	2.77%	$ 15.70
2039-40	$ 652.99	$ 32.67	5.12%	2.80%	$ 17.87

CalPERS Investment Office Asset Allocation

**Assets start at $263.94 billion as of April 30, 2013 and are assumed to grow at discount rate of 7.5%.*
***Non-investment cash outflows are projections from Actuarial Office.*

Required Cash Yield Projections – 10% return

Fiscal Year	Asset* ($B)	Non-Investment Cash Outflows** ($B)	Required Cash Yield (%)	Projected Shortfall per Fiscal Year	
				(%)	($B)
2013-14	$ 287.25	$ 6.65	2.49%	0.17%	$ 0.45
2014-15	$ 308.49	$ 7.49	2.61%	0.29%	$ 0.83
2015-16	$ 330.95	$ 8.38	2.72%	0.40%	$ 1.23
2016-17	$ 354.72	$ 9.32	2.82%	0.50%	$ 1.65
2017-18	$ 379.93	$ 10.27	2.89%	0.57%	$ 2.04
2018-19	$ 406.70	$ 11.22	2.95%	0.63%	$ 2.41
2019-20	$ 435.20	$ 12.17	2.99%	0.67%	$ 2.74
…	…	…	…	…	…
2024-25	$ 610.27	$ 17.13	3.00%	0.68%	$ 3.89
2029-30	$ 864.03	$ 21.09	2.62%	0.30%	$ 2.42
2034-35	$ 1,236.59	$ 28.87	2.51%	0.19%	$ 2.19
2039-40	$ 1,800.63	$ 32.67	1.96%	-0.36%	$ (5.99)

*Assets start at $263.94 billion as of April 30, 2013 and are assumed to grow at discount rate of 10%.
**Non-investment cash outflows are projections from Actuarial Office.

Required Cash Yield Projections – 2.32% return

Fiscal Year	Asset* ($B)	Non-Investment Cash Outflows** ($B)	Required Cash Yield (%)	Projected Shortfall per Fiscal Year	
				(%)	($B)
2013-14	$ 263.44	$ 6.65	2.52%	0.20%	$ 0.53
2014-15	$ 262.06	$ 7.49	2.84%	0.52%	$ 1.38
2015-16	$ 259.76	$ 8.38	3.20%	0.88%	$ 2.30
2016-17	$ 256.46	$ 9.32	3.59%	1.27%	$ 3.30
2017-18	$ 252.14	$ 10.27	4.00%	1.68%	$ 4.32
2018-19	$ 246.77	$ 11.22	4.45%	2.13%	$ 5.37
2019-20	$ 240.32	$ 12.17	4.93%	2.61%	$ 6.45
…	…	…	…	…	…
2024-25	$ 191.04	$ 17.13	8.42%	6.10%	$ 12.41
2029-30	$ 111.73	$ 21.09	16.25%	13.93%	$ 18.08
2034-35***	$ (8.88)	$ 28.87	147.75%	145.43%	$ 28.42
2039-40***	$ (174.23)	$ 32.67	-23.61%	-25.93%	$ 35.88

CalPERS Investment Office Asset Allocation

*Assets start at $263.94 billion as of April 30, 2013 and are assumed to grow at discount rate of 2.32%.
**Non-investment cash outflows are projections from Actuarial Office.
***The Fund is insolvent at this point.

Candidate Portfolios with 2.68% Cash Yield Requirement

	CC1	CC2	CC3	CC4	CC5	CC6	CC7	CC8
Global Equity	26.4%	32.3%	40.7%	45.5%	49.9%	55.7%	62.9%	68.3%
Private Equity	6.0%	5.9%	3.7%	4.4%	5.3%	4.8%	2.9%	3.9%
Fixed Income	42.7%	38.8%	32.6%	29.0%	25.8%	21.5%	16.2%	15.0%
Real Estate	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	4.9%
Infra. & Forest.	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Inflation Assets	2.9%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Liquidity	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
ARS	5.0%	5.0%	5.0%	3.1%	1.0%	0.0%	0.0%	0.0%
Total Compound Return	5.62%	5.91%	6.17%	6.39%	6.61%	6.81%	7.00%	7.07%
Volatility	8.00%	8.75%	9.50%	10.25%	11.00%	11.75%	12.50%	13.25%

Candidate Portfolios without a Cash Yield Requirement

	C1	C2	C3	C4	C5	C6	C7	C8
Global Equity	20.5%	25.1%	29.5%	33.9%	39.1%	44.3%	49.2%	55.4%
Private Equity	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Fixed Income	16.7%	19.2%	22.0%	24.5%	20.9%	15.7%	15.0%	15.0%
Real Estate	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	7.6%
Infra. & Forest.	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Inflation Assets	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	1.0%	1.0%
Liquidity	26.7%	19.7%	12.4%	5.5%	4.0%	4.0%	4.0%	4.0%
ARS	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	3.8%	0.0%
Total Compound Return	5.77%	6.06%	6.34%	6.61%	6.87%	7.11%	7.29%	7.35%
Volatility	8.00%	8.75%	9.50%	10.25%	11.00%	11.75%	12.50%	13.25%
Cash Yield	2.03%	2.10%	2.18%	2.26%	2.23%	2.18%	2.26%	2.38%