Long-Term Investment Pool & Similar Funds (LTIP)

Investment Review for Fiscal 2015 — Submitted September 2015

This cover page provides a summary overview of the Pennsylvania State University Long-Term Investment Pool (see next page for details) for Fiscal Year 2015. The second page summarizes LTIP-related data that is discussed on the remaining pages, along with performance analysis.

Executive Overview

Long-Term Investment Pool (LTIP) Performance

Annualized *net* investment returns for the Penn State University LTIP (adjusted for the impact of gifts and spending, and after external investment management expenses) for periods ending June 30, 2015 are:

Fiscal 15	3 Years	5 Years	10 Years
3.1%	10.6%	11.5%	7.8%

Long-Term Investment Pool Market Value (pg 3)

As of June 30, 2015, Penn State University's LTIP was valued at $3.63 billion, which includes $2.38 billion in endowment assets and $1.25 billion in non-endowed funds. An additional $116 million was held as Similar Funds (see page 2 for details). Endowment spending is reviewed on pages 2 and 3.

Review of Investment Markets (pg 4)

The graph below compares respective returns for the 12-months ending June 30, 2015 and June 30, 2014 for the S&P500, MSCI All Country World (ACWI) ex-US, Dow Jones UBS Commodities, Barclays Aggregate Bonds, and publicly-traded Real Estate Investment Trusts (REITs) Indexes. As shown below, investment market returns for Fiscal 2015 broadly lagged respective returns for June 30, 2014.

Investment Diversification and Asset Mix (pg 5)

At fiscal year-end, 53% of LTIP assets were invested in public equities (domestic and foreign) and 21% in private equity and venture capital, in combination representing 74% of LTIP in growth-oriented assets. In addition, 14% was invested in fixed income/cash, 4% in real assets, and 8% in diversifying (hedged) strategies.

Comparative Fund Performance (pg 6)

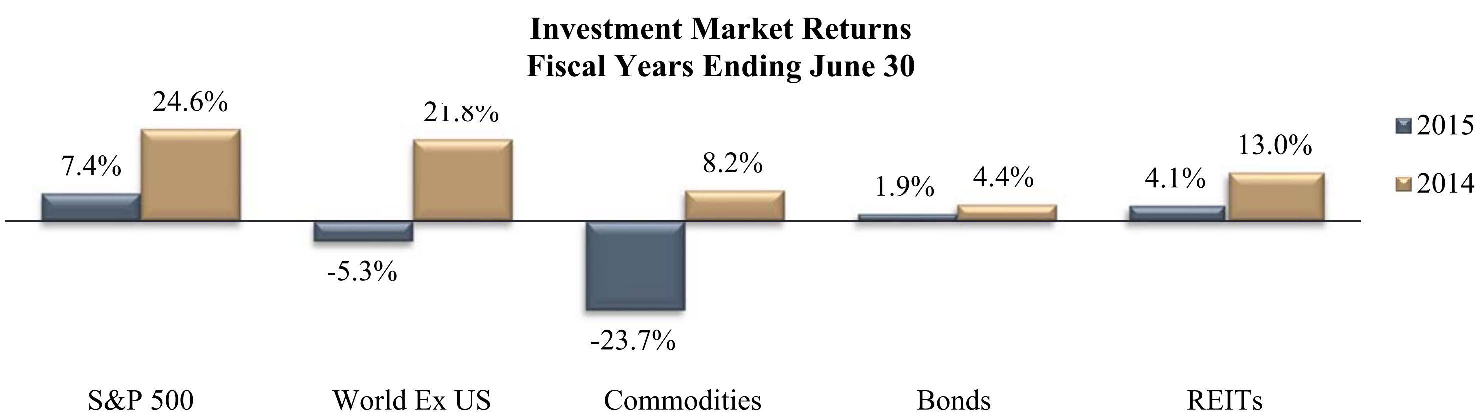
Penn State's LTIP returned 3.1% net for the year ending June 30, 2015, outpacing the 2.3% return of the Passive Policy Portfolio, while LTIP's 3-yr and 5-yr relative performance was notably better than the respective passive benchmark returns.

LTIP Liquidity (pg 7)

With nearly one-half of assets convertible to cash in a matter of days, the LTIP maintains adequate liquidity to satisfy anticipated cash requirements.

LTIP Performance and Spending (pg 8)

LTIP's average annual net returns of 7.8% and 8.6% for the last 10-year and 20-year periods, respectively, have allowed LTIP to earn inflation-adjusted returns in excess of spending, achieving long-term intergenerational equity.



5-Year LTIP Facts and Figures

	Annual Periods Ending June 30				
	2015	2014	2013	2012	2011
Investment Performance					
Endowment[1] (annualized net returns)	3.1%	17.9%	11.3%	3.5%	23.2%
Market Values ($ millions)					
Endowment[1]	2,375.7	2,286.0	1,933.2	1,765.0	1,708.4
Similar Funds[2]	115.9	113.5	95.7	90.0	122.7
Endowment and Similar Funds	2,491.6	2,398.5	2,028.9	1,855.0	1,831.1
Gifts & Other Additions ($ mils)	130.3	92.2	73.9	76.2	136.3
Current Spending ($ mils)	84.0	75.4	71.5	70.8	66.0

As described in footnote #3 below, funds earmarked for FAS 106 liabilities (post-retirement health care benefits for PSU retirees) were commingled into the University's Long-Term Investment Pool (LTIP) between September 2009 and January 2013. Prospectively, the reported market value, and related analysis, for LTIP will include all commingled funds, as shown below for June 30, 2015.

	2015	2014	2013	2012	2011
Non-Endowed Funds[3]	1,252.2	1,140.6	1,004.8	239.8	143.3
Total LTIP[4] & Similar Funds	3,743.8	3,539.1	3,033.7	2,094.8	1,974.4

1) Endowment — donor-restricted gifts

2) Similar Funds — deferred gifts and donor-restricted funds in transit to Endowment

3) Non-Endowed Funds earmarked for FAS 106 liability (employee post-retirement health care benefits) & President's Strategic Fund

4) Commingled assets over which Penn State's Office of Investment Management (OIM) has investment responsibility, as approved by the Penn State Investment Council (PSIC), exclusive of Similar Funds

Penn State Investment Council (PSIC) Meetings

February 18, 2015:

- Committing $20M to: OCM Opportunities Fund Xb, L.P.
- Committing $15M each to: EnCap Energy Capital Fund X, L.P.; Franklin Park International Vehicle 2015, L.P.
- Committing $10M each to: OCM Power Opportunities Fund IV, L.P.; Emergence Capital Partners IV, L.P.; Atlas Fund X, L.P.

June 24, 2015:

- Committing $15M each to: Foundry 2016 Fund, L.P.; Townsend Real Estate Alpha Fund II, L.P.; Commonfund Emerging Markets 2013, L.P.

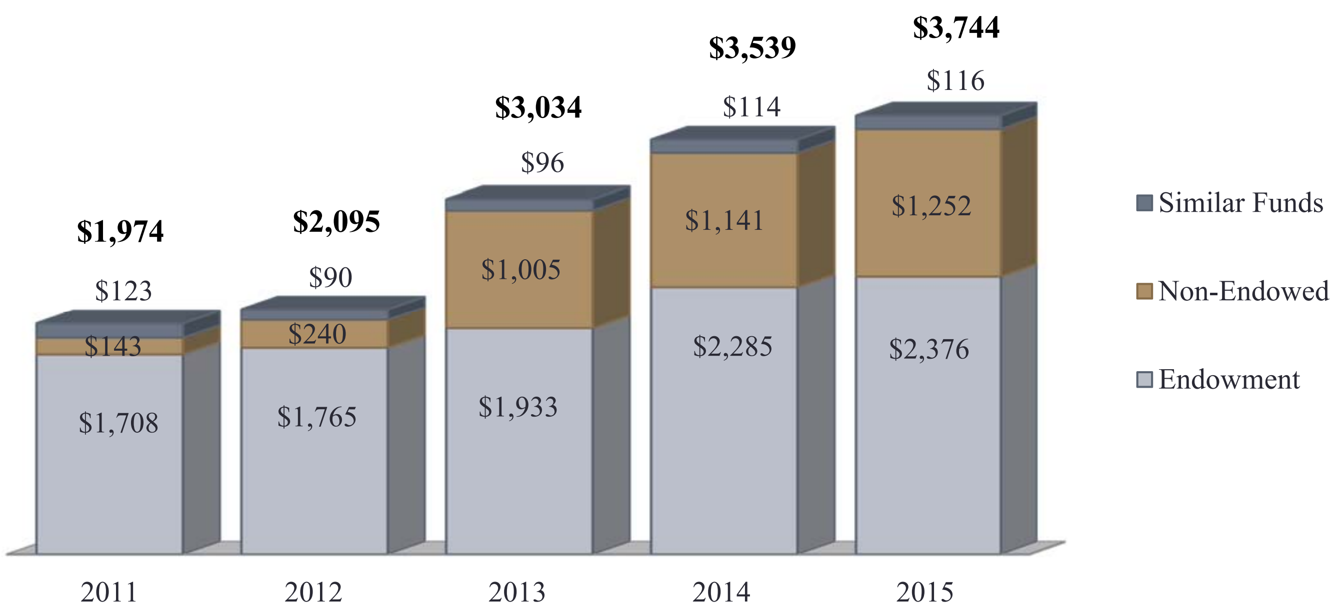
- Investing $60M in: Blackstone Strategic Opportunities Fund Ltd.
- Investing $50M in each: Pershing Square International, Ltd.; Lyrical Long-Only Partners, L.P.
- Investing $30M to: Symphony Japan Special Opportunities Fund, L.P.

Please note that commitments made to Limited Partnerships (LPs) are not immediately invested and are called (paid in) over several years until commitment is satisfied, except as noted.

Long-Term Investment Pool Market Value

As of June 30, 2015, Penn State's Long-Term Investment Pool was valued at $3.63 billion, including non-endowed funds in the amount of $1.25 billion that have been commingled into the LTIP. Non-pooled assets — charitable remainder trusts, charitable gift annuities, and other life income funds in addition to donor restricted funds — accounted for an additional $116 million, shown below as Similar Funds, for a total $3.74 billion in assets.

Long-Term Investment Pool Market Value
Fiscal Years Ending June 30
($ millions)



Endowment Assets

Endowment assets increased by $90.7 million during fiscal 2015, from $2.28 billion to $2.38 billion. As seen in the table on page 2, endowed gifts added over the last 12 months totaled $130 million, while endowment program support (spending) amounted to $84 million. Current endowment spending has been approved by the Board of Trustees to remain at an annual rate of 4.5%.

Long-Term Investment Pool

As of June 30, 2015, the market value of the Long-Term Investment Pool (LTIP) totaled $3.74 billion. In addition to Endowment assets of $2.38 billion, LTIP includes $1.25 billion in non-endowed assets that have been commingled for investment purposes, but are restricted to the on-going funding of the University's FAS 106 liability.

The remainder of this report will focus on the Long-Term Investment Pool, including all commingled funds.

Review of Investment Markets in Fiscal 2015

In the table below, representative financial market returns are listed for 1-, 3-, and 5-year periods covering four major asset categories: Global Equities (divided into US Equities and Non-US Equities), Fixed Income, Commodities, and Private Capital. The performance of investment markets that impact Penn State University's Long-Term Investment Pool (LTIP) is discussed below.

Annualized Percentage Returns as of June 30, 2015	1 Year	3 Year	5 Year
Global Equities U.S.			
S&P 500 Index (US Large Cap Equities)	7.4	17.3	17.3
Russell 3000 Index (Total US Equities)	7.3	17.7	17.5
Russell 2000 Index (US Small Cap Equities)	6.5	17.8	17.1
Global Equities Non-U.S.			
MSCI All Country Ex-U.S. Index (ACWI)	-5.3	9.4	7.8
MSCI Developed Non-U.S. Index (EAFE)	-4.2	12.0	9.5
MSCI Emerging Markets Index (EME)	-5.1	3.7	3.7
Fixed Income			
Barclays US Aggregate Bond Index	1.9	1.8	3.3
Barclays US Treasury TIPS Bond Index	-1.7	-0.8	3.3
JP Morgan Global Bond Index	-9.0	-2.4	1.0
Commodities			
Bloomberg Commodities Index	-23.7	-8.8	-3.9
Gold (SPDR GLD)	-12.2	-9.8	-1.3
Private Capital (3/31/15)			
Venture Capital (Cambridge Associates)	20.4	18.3	17.2
Private Equity (Cambridge Associates)	10.5	14.4	15.2
Private Real Estate (NCREIF)	12.7	11.5	12.8

Market Notes:

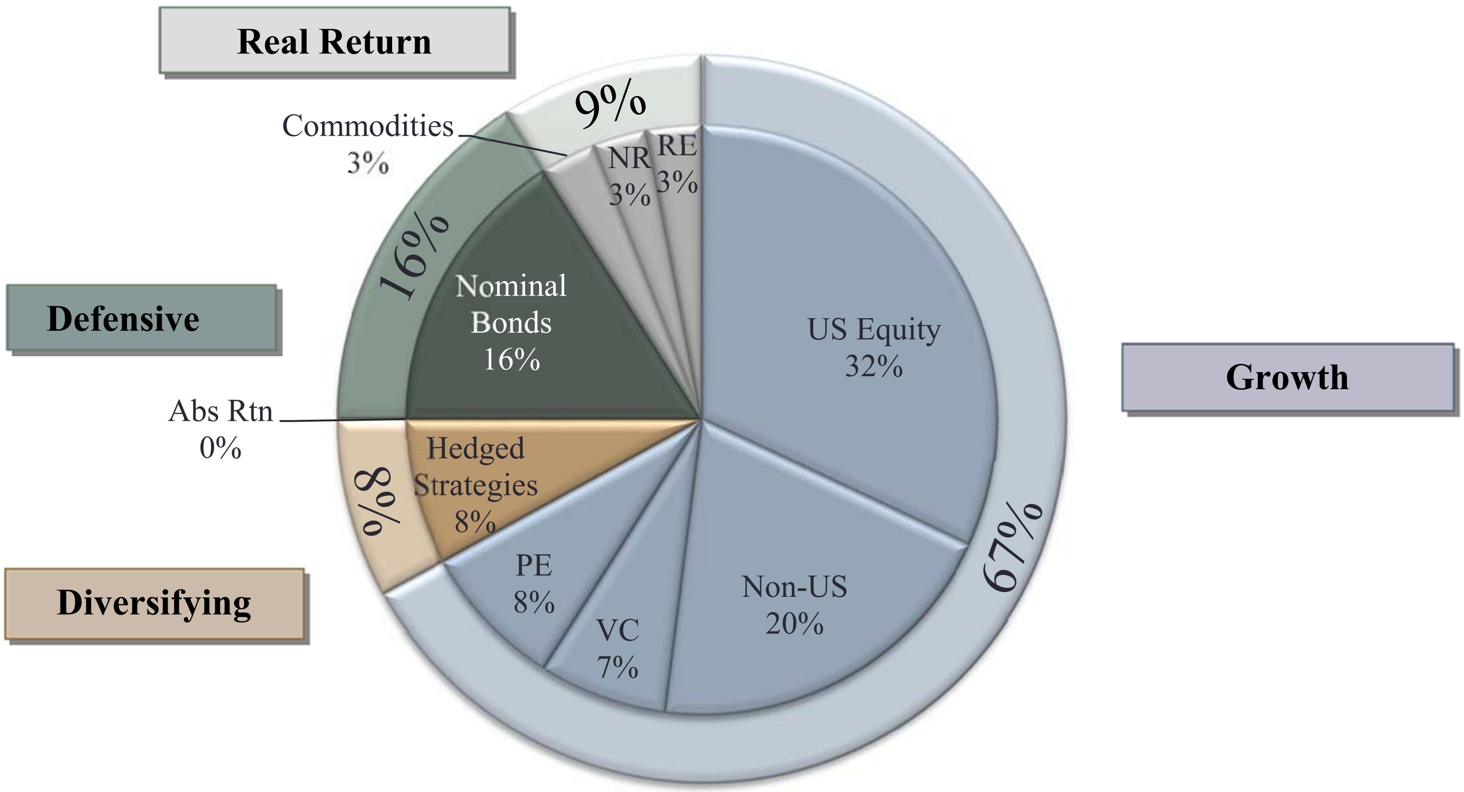
- **Global Equities:** US Equities recording single-digit advances for the fiscal year ended June 30, 2015, with stronger double-digit returns for the 3-, and 5-year periods. US Equities continued to outpace non-US Equities over all three periods. Non-US Equities were down -5.3% in fiscal 2015, with Developed Markets, as measured by EAFE, returning -4.2% and Emerging Market Equities retuning -5.1%.
- **Fixed Income:** US Fixed Income continued a pace of modest, positive gains while US TIPS were slightly negative, -1.7%, and Global Bonds declined markedly, -9.0, in Fiscal 2015.
- **Commodities:** The Bloomberg Commodities Index continued its negative trend, registering losses of -23.7%, -8.8%, and -3.9% for the trailing 1-, 3-, 5-years, while Gold's -12.2% return outpaced commodities overall.
- **Private Capital:** Private Equity, Venture Capital, and Private Real Estate all continued their double-digit gains for each of the 1-, 3-, 5-year periods ending 3/31/2015, which is the latest reporting period for non-marketable investments.

Economic and Market Outlook

On the following two pages, LTIP's broad and detailed asset mix is discussed, followed by the composite investment returns for each of the four above asset categories compared to the corresponding LTIP returns.

Investment Diversification and Asset Mix

Asset allocation is a primary determinant of investment performance and risk control. LTIP's asset mix combines four strategic investment themes – growth (economic-sensitive), diversifying (low sensitivity to economic/investment market fluctuations), real (inflation-sensitive), and defensive (counter-sensitive to market turbulence) – to maximize potential returns, while tempering volatility. In the graph below, the four macro investment themes are shown in the outermost ring with their June 30, 2015 allocations of 67%, 8%, 16% and 9%, respectively. Over time, the percentages vary depending on market trends and allocations approved by the Penn State Investment Council.



At a more granular level, LTIP's diversified portfolio includes a variety of traditional asset classes that comprise the four strategic themes, as shown by the slices within the inner pie (percentages are rounded):

- Growth (67%): 32% in publicly-traded US and 20% in publicly-traded non-US common stocks, as well as 7% in venture capital and 8% in private equity funds.
- Diversifying (8%): 6% in credit-related, and 2% in equity-related strategies.
- Defensive (16%): 10% in US government and investment grade corporate bonds, and 6% in global bonds.
- Real Return (9%): 3% in real estate, 3% in natural resources, and 3% in commodities.

The above grouping by investment themes provides insight to the functional role of the various asset classes within LTIP. The relative allocations represent comparative long-term return expectations, tempered by risk-mitigating assets to offset capital market turbulence. Hence, the approximately 67% currently allocated to growth is intended to take advantage of the capital appreciation and purchasing power protection historically offered by higher returning equity investments. Given the sometimes volatile nature of equity returns, 16% is invested in defensive (fixed income) and 8% in various hedged strategies to provide stability and diversification during times of market turbulence and uncertain economic conditions. In addition, 9% of LTIP is allocated to real return in order to help neutralize inflationary episodes.

LTIP Performance Compared to Passive Portfolio

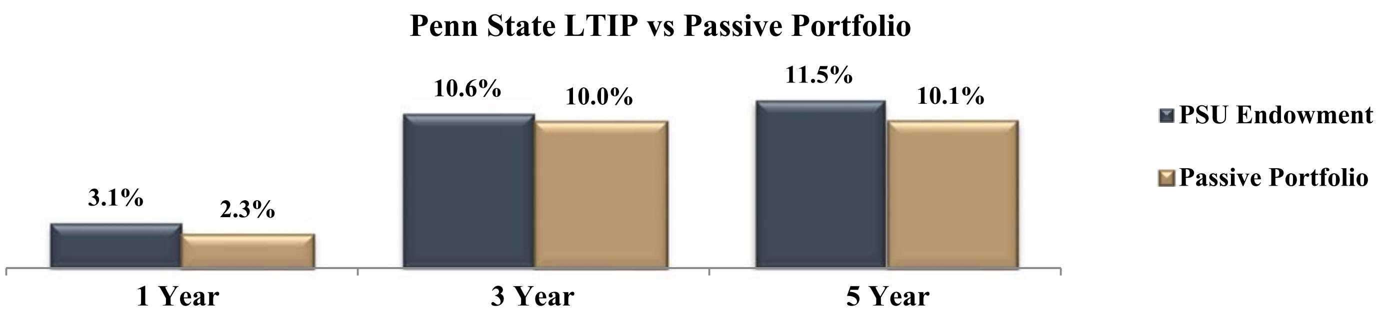
The Long-Term Investment Pool's investment performance is measured against a hypothetical *Passive Portfolio,* comprised of four broad asset categories: Public Equities, Private Capital, Fixed Income and Commodities. This passive portfolio serves as a blended benchmark against which the performance of the actual, actively-managed, and more broadly-diversified LTIP portfolio is monitored. This analysis is distinct from the foregoing conceptual, strategic themes which do not lend themselves to benchmarks analysis.

These categories are very broadly defined: the equity and fixed income categories include hedge funds whose strategies are equity and/or credit oriented, respectively, while commodities include hedged and long-only strategies. The custom index for Private Capital includes representative private equity, venture capital, and private real estate partnership time-weighted returns.

In the table below, the respective static weightings of the four asset categories are associated with corresponding market benchmarks and their respective index returns to generate *Passive Portfolio* returns over 1-, 3-, and 5-year horizons:

			Annualized Benchmark Returns		
Asset Class	**Benchmark**	**Weighting**	**1 Year**	**3 Years**	**5 Years**
Public Equities	MSCI All Country World	55%	0.7	13.0	11.9
Total Private Capital	Custom Index	20	10.5	14.4	15.2
Fixed Income	Barclays Aggregate Bond Index	20	1.9	1.8	3.3
Commodities	Dow Jones UBS Commodities	5	-23.7	-8.8	-3.9
Total Passive Portfolio (net)		**100%**	**2.3%**	**10.0%**	**10.1%**

Note: The weightings used above are assumed to be constant over the entire 5-yr.

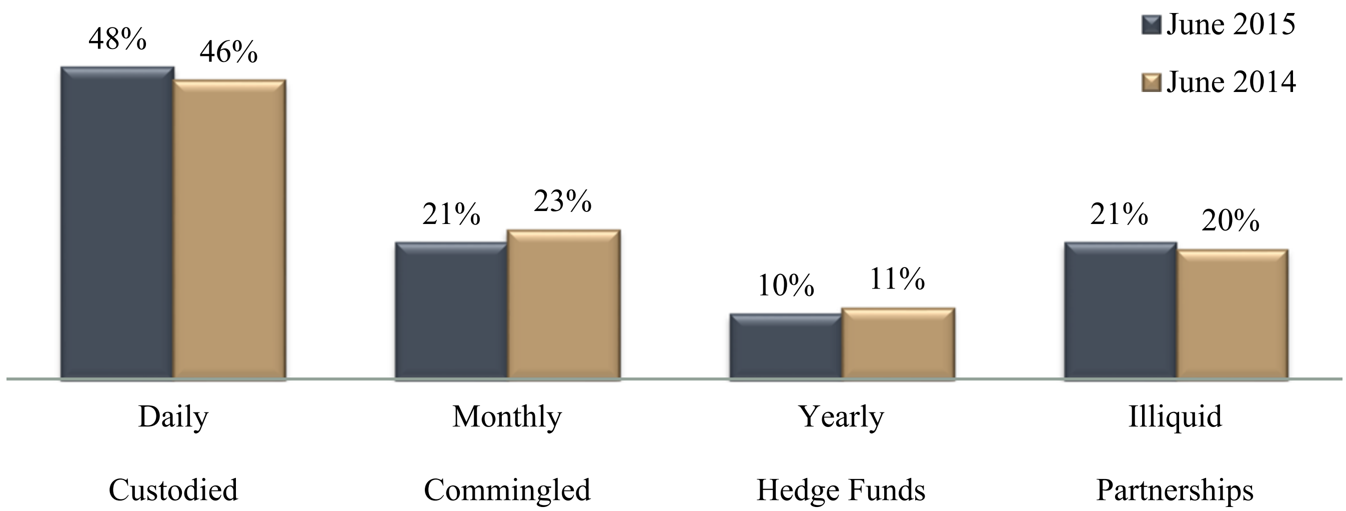


As shown above, Penn State's LTIP returned 3.1% net for fiscal 2015, surpassing the 2.3% return of the Passive Portfolio over the trailing 12 months. For the 3- and 5-year periods, the Long-Term Investment Pool's annualized returns of 10.6% and 11.5% outpaced the Passive Portfolio's returns of 10.0% and 10.1%, respectively. These returns indicate that, over the long term, LTIP was able to outperform passive indexes through selection of active investment managers and broad diversification of assets as shown on the previous page.

The Passive Portfolio provides a guidepost to help achieve long-term results that are consistent with the twin objectives of purchasing-power preservation, along with stable LTIP spending. LTIP's performance varies from the *static* Passive Portfolio as a consequence of several factors, including, but not limited to, the timing of cash-flows, tactical shifts in asset mix, and individual investment manager performance and turnover.

Long-Term Investment Pool Liquidity

Financial crises are characterized, among other considerations, by lack of liquidity, as institutions are unable to meet current obligations due to lack of available cash. In the graph below, LTIP assets are classified according to how quickly they can be converted to cash. Securities listed on exchanges or traded over-the-counter, and held in custody as separately managed accounts, can be liquidated on a daily basis (typically 1- and 3-day settlement for bonds and stocks, respectively). Commingled portfolios, i.e., collectively-managed investment pools of publicly-traded securities, are eligible for purchase or sale at least once a month. Hedge fund partnerships are typically open for at least partial liquidation once a year, with a few having more and/or less frequent liquidity "windows." Non-marketable partnerships are considered illiquid primarily because of the inability of limited partner investors to transact at will.



Observations from the blue (left) bars of each of the four pairs above for the period ending June 30, 2015:

- 48% percent of LTIP assets are invested in stocks and bonds that can be converted to cash in a matter of days. Of this, about 1% is held in money market accounts, along with approximately 4% in "securitized cash" (i.e., fully-collateralized S&P and Treasury futures), which can be readily converted to cash in order to satisfy day-to-day and/or unforeseen cash requirements.
- Commingled portfolios, primarily non-US public equities, comprise 21% of LTIP assets and can be converted to cash within 30 days or, in some cases, sooner. Commingled investment structures are used for non-US holdings in lieu of registering in individual countries where foreign companies are headquartered.
- 10% of LTIP assets are invested in various diversifying hedge fund partnerships and can be at least partially converted to cash annually or, in many cases, quarterly.
- 21% percent of LTIP assets are invested in more than 100 different partnership funds or other non-marketable investments that are considered illiquid because underlying holdings are typically not readily marketable or the timing of future realizations into cash distributions are uncertain.

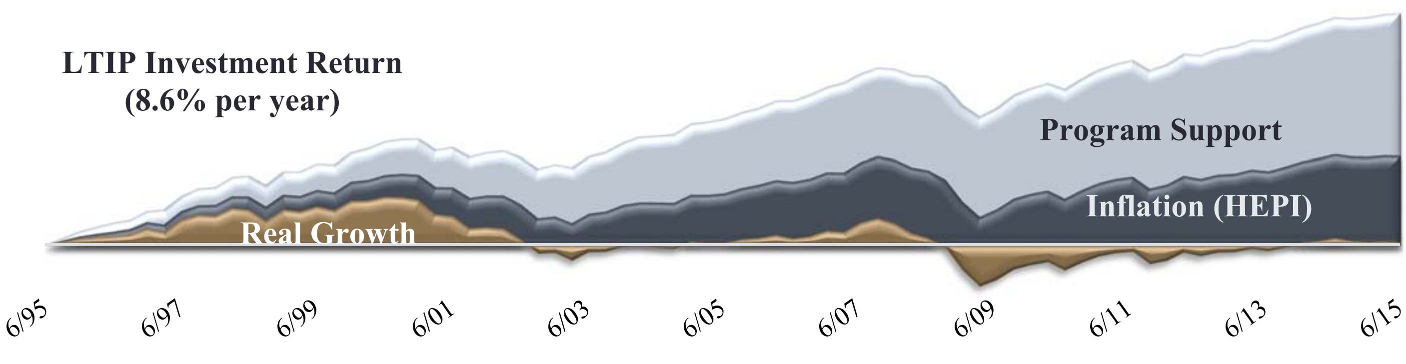
The foregoing indicates that LTIP maintains sufficient liquidity to satisfy anticipated cash requirements.

Liquidity Trends

As shown above, the liquidity profile of Penn State's LTIP has shifted somewhat from the end of fiscal 2014 (tan bars) to the end of fiscal 2015 (blue bars). Daily liquidity increased slightly from 46% to 48%, while monthly liquidity decreased from 23% to 21%, largely owing to the outperformance of US stocks relative to non-US equities. Yearly liquidity dropped marginally from 11% to 10%, while illiquid non-marketable alternative assets increased from 20% to 21%. Over time, stepped up commitments to partnerships will gradually result in larger representation by non-marketable investments.

Long-Term LTIP Growth and Spending

In the chart below, the top line represents the cumulative net investment return of the Penn State Long-Term Investment Pool (LTIP) over the last 20 years, averaging 8.6% per year. The layers illustrate investment return apportioned to program support (spending, as previously discussed on pages 2 and 3) and inflation (as measured by the Higher Education Price Index [HEPI]), with the remaining residual representing net, real (inflation-adjusted) growth.



Cumulative 20-year Returns (Base 100 Index)

LTIP's primary investment goal is to earn a long-term rate of return sufficient to support *current* spending and to preserve *future* purchasing power. This two-pronged objective is illustrated by apportioning total nominal (i.e., before adjusting for inflation) investment return (topmost line above) into discrete layers, representing program support and inflation, along with a residual layer corresponding to net *real* growth. Because investment returns periodically fluctuate (illustrated by the jagged topography above), real growth, which nets out program support and inflation from total LTIP return, oscillates across the horizontal "intergenerational equity" line. While market fluctuations have caused the growth layer to swing positive and negative around the horizontal line, intergenerational equity has largely been achieved.

Two Different Decades of Market Performance

The variable nature of investment returns is characterized in the table below, which bifurcates the last 20 years into two successive 10-year periods, whose respective investment returns have been narrowing. The 10 years ending June 2005 (second row) benefitted from an extended equity bull market during the 1990s, while the 10 years ending June 2015 (first row) suffered a large sell-off in equities, before rebounding over the last 6.3 years. The return disparity between decades is visibly reflected by comparing the 10-year average returns for the period ending June 30, 2015 versus the period ending June 30, 2005 for both the S&P 500 and Barclays Aggregate Bond Indexes below:

10-Year Periods	Annual *Nominal* Returns				Annual *Real* Returns		
Ending June 30	***S&P 500***	***Bond Index***	***LTIP***	***HEPI***	***S&P***	***Bonds***	***LTIP***
2005 to 2015	7.9%	4.4%	7.8%	2.7%	5.2%	1.8%	5.1%
1995 to 2005	12.0	6.8	9.4	3.6	8.4	3.2	5.8
Difference:	**-4.1%p**	**-2.4%p**	**-1.6%p**	**-0.9%p**	**-3.2%p**	**-1.4%p**	**-0.7%p**

As shown by the negative differentials in the third row above, market index returns for the most recent 10 years lagged those for the previous 10 years: S&P 500's 7.9% annualized nominal return for the 10 years ending June 30, 2015 trailed its 12.0% pace for the prior 10-year period by 4.1% (percentage points); meanwhile, Barclays Aggregate Bond Index returned 4.4% for the June 30, 2015 10-year period versus 6.8% for the prior 10-year period. LTIP's 7.8% annualized net return for the 10 years ending June 30, 2015 essentially matched equity returns and broadly outpaced bond returns. For the 10-year period ending June 30, 2005, LTIP's return of 9.4% was midway between corresponding stock and bond returns, while LTIP's return differential of -1.6%p was narrower, i.e., more consistent, decade to decade.

On an inflation-adjusted basis relative to HEPI (boxed column in middle of above table), LTIP's net real return decade difference was -0.7%p compared to real differences of -3.2% for stocks and -1.7% for bonds (the third row of the right three columns above). Over the last decade, replacing public market investments with a variety of "alternative investments" has enabled LTIP to outperform both stocks and bonds for the 10 years ending June 2015. More importantly, LTIP's inflation-adjusted returns (5.1% and 5.8%) exceeded Penn State's annual spending rate (4.5%).