Committee Chair Sherman stated that having fewer external managers would distinguish the portfolio from the index.

Mr. Sterman discussed the UC Retirement Plan (UCRP), which had excellent returns for the fiscal year. As of May 31, 2017, UCRP had assets of $61.4 billion, up from $54.1 billion as of June 30, 2016. He noted that the discount rate had been reduced the prior year from 7.5 percent to 7.25 percent. At this July meeting, the Regents would consider a proposal to increase the employer contribution from 14 percent to 15 percent. A year prior UCRP's funding ratio was in the low 80 percent range. With the increase in assets from market gains and active management, Mr. Sterman anticipated that the funding ratio would improve several points. The demographics of UCRP indicate an increase in the number of retirements over the upcoming five to ten years, putting pressure on UCRP's payout ratio.

Committee Chair Sherman asked about demographic projections, given that UCRP currently had two active employees for every retired employee. Mr. Sterman commented that the proportion of retired employees would increase. Regent Makarechian commented that the Accountability Report indicated that a large number of active employees were currently at retirement age. He asked if comparable statistics were available for other institutions. Mr. Bachher said he would provide information from a study on the health of UCRP conducted at the request of the Office of the CIO; that study contained information about comparable programs. Regent Makarechian requested information about the effect of the new pension tier on UCRP.

Mr. Sterman reported that $6.5 billion of UCRP's gains for the fiscal year were market gains, and $1 billion was value added. Net cash flow was slightly negative, at minus $200 million, reflecting offsetting contributions, payouts, and infusion of a $450 million loan from STIP. In the 2017-18 fiscal year, STIP would lend UCRP an additional $391 million, as approved by the Regents three years prior.

Faculty Representative White commented that any comparison of UCRP to other institutions' retirement plans should take into account the fact that UCRP had a 20-year contribution holiday. This lack of contributions was more the cause of UCRP's current funding status than impending retirements.

Regent Makarechian commented that UCRP was 100 percent funded during the period of no contributions. Mr. White agreed that UCRP was more than 100 percent funded at that time; in hindsight it would have been preferable to reduce rather than eliminate contributions. In addition, contributions should have been restarted more quickly when UCRP's funding status changed.

Mr. Sterman said that UCRP's asset allocation was the same as at the last report to the Subcommittee in May. The portfolio continued to be slightly overweight in public equities and cash, and underweight in private alternatives. Over several years, the public equity portfolio would be reduced when private equity opportunities become available.

An agreement had been made with a strategic partner, a large asset manager that would help the Office of the CIO find private equity opportunities.

Committee Chair Sherman asked about UCRP's long-term target allocation of zero cash and how future cash outflows would be funded. Mr. Bachher said this question involved the projected cash flows from the pension plan and whether the cash flows would be negative. Ms. Ardeshir responded that, as a result of the proposed increase in contributions and borrowing from STIP, cash flows were not projected to be negative for the upcoming three to five years, but could be negative thereafter depending on contribution levels.

Regent Zettel asked for the rationale for the difference between the UCRP current public equity allocation of 56.6 percent that would be reduced to a long-term allocation of 50 percent, and the GEP's 45 percent public equity allocation that would be reduced to a long-term allocation of 30 percent. Mr. Bachher commented that in the past the GEP's asset allocation resembled that of a pension plan. Changes to the GEP asset allocation made it more appropriate for a long-term portfolio, which could hold more illiquid, private assets. Compared with the top 20 U.S. endowments UC's endowment still would have twice as much public equity and half as much private equity. In UCRP, the increase to 56.6 percent public equity had largely been a function of market gains.

Regent Makarechian asked what employer and employee contributions to UCRP would have been required if STIP had not loaned UCRP $2.3 billion. Ms. Ardeshir expressed her belief that an additional four to six percent in aggregate contribution from employer and employees would have been necessary. She would verify that information.

Mr. Sterman reported that UCRP returned 13.6 percent for the fiscal year through May 31. The main driver of returns was public equities, which gained 21 percent. Mr. Chan added that the public equity allocation in UCRP gained $7.4 billion for the fiscal year, including $6.3 billion from market gains and more than $1 billion of value added through active management. Drivers in public equity were similar to those described for the GEP public equity portfolio. The number of active external managers in UCRP had been reduced from 60 to 28, moving from investing an average of $370 million per manager to $620 million per manager. That increase in scale enabled the Office of the CIO to negotiate management fee discounts. He pointed out that the UCRP portfolio has different scale and objectives from the GEP. The UCRP public equity portfolio is $34 billion, compared with GEP's $5 billion public equity portfolio. Mr. Chan intended to shift more UCRP public equity assets from U.S. stocks to non-U.S., and increase passive management from the current 40 percent to about 60 percent. The portfolio would be well positioned if market conditions favored fundamentals such as earnings, cash flow, and valuations.

Mr. Sterman summarized that UCRP gained 13.6 percent for the year, but he did not expect those returns to continue. Over 20 years, UCRP had earned 6.8 percent annually, which he pointed out was below the 7.25 percent discount rate. Mr. Bachher noted that Mr. Sterman oversees the working capital portfolios in addition to fixed income.

Chief Operating Officer Arthur Guimaraes discussed the UC Retirement Savings Program (UCRSP) with assets of $22.1 billion, having increased by $500,000 since the May meeting and by $2 billion over the past year, including $1 billion in contributions. The UCRSP includes participant investment options of target date funds, a group of core funds, and a brokerage window, and serves 310,000 participants. UCRSP includes the 403(b) pre-tax plan, the 457(b) plan, and a defined contribution plan. The target date funds became the default investment in 2014 and currently comprise almost one-third of all UCRSP assets.

Mr. Guimaraes reviewed the history of UCRSP. State Street Global Advisors had been selected to manage the UCRSP target date funds and would take on fiduciary responsibility for the asset allocation, operations, and communications for less than one bps in fees. That change would be implemented by early 2018.

Regent Makarechian asked why there were more participants in the UCRSP than in UCRP. Ms. Ardeshir commented that the additional participants in the UCRSP could be employees who had left UC before they were vested in the pension plan, safe harbor employees who did not qualify for participation in the pension plan, and part-time employees.

Mr. Sterman reported on the working capital pool with assets of $15.9 billion as of May 31, an important source of capital for UC campuses to achieve their objectives. TRIP had fulfilled expectations that it would earn more than STIP, to serve as a more productive use of UC resources over the long-term. TRIP's market gains and value added were offset by cash flow out from payouts to campuses and withdrawals by campuses to fund particular projects.

TRIP's asset allocation was very close to its long-term allocation, with a slight overweight to the growth component and slight underweight to the income component. Mr. Sterman did not contemplate any significant changes to the asset allocation at the present time. He would work with the Office of the CIO's consultants during the course of the year to review the asset allocation to see if any changes should be considered to improve investment outcomes. TRIP returned 7.3 percent for the fiscal year, one percent over its benchmark. Returns were driven largely by TRIP's public equity portfolio, which earned 18 percent invested 100 percent passively. All asset classes performed well. TRIP had earned 7.1 percent annually since its inception.

Committee Chair Sherman asked about TRIP's liquidity and how many days it would require to turn the portfolio into cash. Mr. Sterman said TRIP was highly liquid. The 50 percent of the portfolio in fixed income, most in public investment-grade fixed income, could be liquidated within a week. He considered the 35 percent of the TRIP portfolio invested in passive equities to be very liquid. Mr. Chan agreed that it would take two days to liquidate the global equity portfolio. Mr. Sterman said 15 percent of the TRIP portfolio was illiquid.

Regent Makarechian noted that TRIP earned 8.3 percent for the fiscal year, while the GEP earned 13.6 percent. He asked how much liquidity was needed in TRIP. Mr. Sterman said this was considered when TRIP's asset allocation was reviewed. A large difference in return was the result of TRIP's 35 percent allocation to public equities compared with 55 percent in GEP, plus the GEP's larger allocation to alternative investments. TRIP's asset allocation reflects its function as an intermediate-term product, which required more liquidity over time than the GEP. Regent Makarechian asked if some of TRIP's liquidity could be invested longer term to earn higher returns. Mr. Sterman said issues such as that would be considered with the Office of the CIO's consultants. Volatility was also considered when developing TRIP's asset allocation because of the potential for drawdowns in negative markets. Mr. Bachher added that campuses have the option to move funds to the GEP as an FFE to earn higher returns. He agreed that UC's balance sheet should be used for the best benefit of the University. Ms. Ardeshir commented that the Office of the CIO continues to work with the campuses to optimize their returns given their liquidity needs and risk tolerances.

Mr. Sterman displayed a chart showing the gradual upcoming reduction in TRIP's payout ratio, approved at the May meeting, from 4.75 percent to 4.5 percent in 2018, and to four percent by 2020.

Mr. Sterman commented that the UC Cash and Liquidity Management team had moved to the Office of the CIO. Over the past 12 to 18 months, that team of six had been fully integrated into the Office of the CIO and is responsible for all banking services of the campuses and medical centers. This team oversees $82 billion of systemwide cash flows annually, and 93 million banking transactions, including 20 million credit card transactions totaling $1 billion in sales.

Regent Makarechian suggested issuing a UC credit card, given that volume of transactions.

Mr. Sterman advised that STIP held $6.9 billion as of May 31, 2017, well in excess of the $5 billion threshold. Over the next several years the cash flow for loans to UCRP would have to be managed. STIP was a very high-quality, short-maturity portfolio, returning 1.1 percent through May 31, 50 bps above the benchmark. Mr. Sterman anticipated that returns would increase with interest rates over the upcoming few years.

Mr. Bachher commented that his office has worked hard to reduce management costs, affirming his commitment to transparency about costs. Mr. Guimaraes reported that management fees included both management fees paid to external managers and the cost of the Office of the CIO's management. Incentive fees are those paid to external managers based on performance. He displayed a graph showing annual management and incentive fees for UCRP, GEP, and TRIP from 2014 through 2016. Management fees in UCRP were 44 bps in 2014, 42 bps in 2015, and 37 bps in 2016. That change of seven bps on a $60 billion asset base equals more than $40 million of savings annually. Management fees in the GEP were reduced from 85 bps to 79 bps during that period, yielding savings of more than $5 million annually. TRIP's management fees were reduced from 42 bps in 2014, to 31 bps in 2015, and 23 bps in 2016, an annual savings of $20 million, reflecting the move in TRIP from active to passive management of its public equity portfolio. The Office of the CIO had also closely monitored its internal management costs.

Mr. Bachher added that the annual cost of the Office of the CIO was $30 million to $35 million, which equals a management fee of three bps for the assets it manages. Another way to compare management costs is assets per investment professional. The Office of the CIO has 26 investment professionals who manage an average of $4.3 billion per investment professional, compared with its California peers in pension management at $1 billion to $1.5 billion per investment professional. More broadly in the industry, the average is between $700 million and $1 billion. His goal is that the Office of the CIO becomes more efficient with fewer people. Total management fees saved thus far were $65 million annually. Mr. Bachher's goal would be to increase annual cost savings to $100 million. These cost savings represent risk-free returns.

Mr. Bachher summarized that the Office of the CIO had earned $2.4 billion in value added, 20 to 25 percent above the benchmarks over the past three years. His goals for the 2017-18 fiscal year were to continue to collaborate with stakeholders to set realistic expectations, to manage products differently based on their risk and return objectives, to implement asset and risk allocations for all products, to add value through passive and active management, to reduce costs aggressively in a low-return environment, and to leverage UC's competitive advantages.

Mr. Bachher recognized three staff members of his office for their outstanding work: Cay Hayne in the real estate group; Trevor Woods, operations manager; and Craig Huie, investment officer.

4. AMENDMENT OF REGENTS POLICY 6102: GENERAL ENDOWMENT POOL STATEMENT APPENDIX 1 (BENCHMARKS)

The Chief Investment Officer recommended that the Investments Subcommittee recommend to the Finance and Capital Strategies Committee that the Regents amend Appendix 1 of Regents Policy 6102: Investment Policy Statement for General Endowment Pool as shown in Attachment 1, effective July 1, 2017.

[Background material was provided to the Subcommittee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Chief Investment Officer (CIO) Bachher recalled that in March the Regents approved a new asset allocation for the General Endowment Pool (GEP). When the asset allocation of the UC Retirement Plan (UCRP) was last approved, the benchmarks for its public equity portfolio were simplified from four to one. When the GEP asset allocation was approved, it was discussed that the fixed income allocation would serve the purpose of holding liquidity, while generating some income. The GEP fixed income portfolio currently had four benchmarks because it had been managed like UCRP. That would be

simplified as well. The GEP absolute return benchmark would be adjusted to be the same as that for absolute return in UCRP.
Mr. Bachher said the private equity asset class had never had a benchmark for performance attribution purposes. Mr. Bachher reported that Committee Chair Sherman had favored establishing a private equity benchmark for attribution purposes. Committee Chair Sherman added that establishing this benchmark would serve the interests of full transparency.

Mr. Bachher explained that the proposed GEP public equity benchmark was the MSCI All Country World Index IMI Tobacco Free, which represents global public equity opportunities and is UCRP's single public equity benchmark. Currently the GEP public equity portfolio had four separate benchmarks, one each for U.S., non-U.S. developed, emerging market, and global public equities. This proposal would simplify the benchmark into one for global public equities, which would take effect as of July 1, 2017, the beginning of the current fiscal year. Mr. Bachher displayed a graph showing annual returns since 2005 of the GEP public equity portfolio, the current benchmark, and the proposed benchmark.

Mr. Bachher said the fixed income asset class, which would be called the Liquidity (Income) asset class, benchmark would change from four separate benchmarks, one each for U.S. core fixed income, high yield, emerging market, and Treasury Inflation Protected Securities to one benchmark, the Bloomberg Barclays U.S. Aggregate Index (Barclays Agg). Committee Chair Sherman commented that having one index would accomplish the same goal much more simply than weighting four indices. Mr. Bachher displayed a graph showing annual returns since 2005 of the GEP fixed income portfolio, the current benchmark, and the proposed benchmark. The role of fixed income in the GEP was to be approximately five percent of liquidity, which would be held in Treasuries or government bonds. The Barclays Agg would earn more than government bonds. However, opportunistic fixed income would increase returns so that the Barclays Agg would be an appropriate benchmark.

Mr. Bachher stated that the proposed GEP absolute return benchmark would be changed from the HFRX Absolute Return Index to the HFRI Fund of Funds Composite Index, the same as that for UCRP. Mr. Bachher displayed a graph showing annual returns since 2005 of the GEP absolute return portfolio, the current benchmark, and the proposed benchmark.

Committee Chair Sherman commented that the private equity asset class had not had a benchmark previously, other than the actual private equity return. The proposed benchmark would be the broad Russell 3000 Index plus a 300 basis point (bps) illiquidity premium. This benchmark would be phased in, with a 150 bps illiquidity premium for the first year beginning July 1, 2017. Mr. Bachher displayed a graph showing annual returns since 2006 of the GEP private equity portfolio and the proposed benchmark. Mr. Bachher suggested that the same change be made to the UCRP private equity asset class benchmark. Committee Chair Sherman agreed.

Regent Lemus asked how the Sharpe ratio or risk profile of the benchmarks compared with existing benchmarks. Mr. Bachher responded that more detail regarding risk characteristics was in the meeting materials. Investment Officer Ardeshir stated that UCRP private equity Sharpe ratio was 1.15 compared with 0.6 for the Russell 3000 Index, meaning that the portfolio was returning more return per unit of risk. She explained that the Sharpe ratio was the absolute return of the asset class divided by the volatility, being the dispersion of returns, and signifies how much return is being achieved per unit of risk. The public equity portfolio risk was the same as that of the benchmark index.

Upon motion duly made and seconded, the Committee approved the Chief investment Officer's recommendation and voted to present it to the Finance and Capital Strategies Committee.

5. **REGENTS POLICY 6102: GENERAL ENDOWMENT POOL STATEMENT REVIEW**

[Background material was provided to the Subcommittee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Chief Operating Officer Arthur Guimaraes introduced this discussion of the Office of the Chief Investment Officer's (CIO) strategic review of the General Endowment Pool (GEP) Investment Policy Statement (IPS) and other Regents policies relating to investments, working with Mercer Consulting, the Office of the General Counsel, and the Office of the Secretary and Chief of Staff to the Regents. The Regents' committee structure had changed with the adoption of updated Bylaws. The current IPS was 87 pages long and unwieldy. The Office of the CIO would propose reducing the IPS to a much shorter document, and developing a separate Asset and Risk Policy and a separate Implementation Manual.

Investment Officer Susie Ardeshir emphasized the importance of governance as a critical component of successful management. The purpose of this review was to align the Office of the CIO with the current governance structure of the Regents, including the committee charters, which specify authority for determining asset classes, asset allocation, and benchmarks. Her office would recommend that some authorities previously delegated to the Investments Subcommittee be changed to consent responsibilities, to be recommended by the Investments Subcommittee to the Finance and Capital Strategies Committee, in order to give members of that committee the ability to review and consider those recommendations.

Regent Zettel asked about the draft IPS and other documents. Ms. Ardeshir observed that these were for discussion. The only action proposed for the current meeting was the update to GEP benchmarks. Some changes in the IPS would be proposed to align with the new governance structure.

Ms. Ardeshir discussed a draft GEP IPS, a proposal to reduce the current 87-page IPS to a six-page document. It was proposed that many issues currently in the IPS would be moved to an Implementation Manual. This approach would then be used for the IPS for the UC Retirement Plan and other products. Every investment product would have a simplified IPS.

In connection with this review, it would be proposed that the Charter of the Finance and Capital Strategies Committee be modified to provide that the Investments Subcommittee would recommend to the Finance and Capital Strategies Committee changes in asset classes, asset and risk allocation, and benchmarks. An Implementation Manual would be developed that included materials shifted from the IPS that would involve what she said were processes and procedures of the Office of the CIO.

CIO Bachher clarified that risk allocation and selection of benchmarks would be added as consent responsibilities of the Investments Subcommittee, meaning that the Subcommittee would make recommendations to the Finance and Capital Strategies Committee. Ms. Ardeshir commented that risk allocation and benchmark selection should be at the same level of authority as setting asset classes and asset allocation, and would be part of the Asset Allocation and Risk Policy. The current Appendix One of the IPS would become the Asset Allocation and Risk Policy. Her office was proposing that all other appendices of the current IPS would become part of an Implementation Manual under the authority of the Office of the CIO, which could make changes to the Manual with no action by the Regents. Her office would propose that the Implementation Manual would include matters currently covered in IPS appendices such as risk management policies and procedures, derivatives, liquidity, and leverage policies, investment manager guidelines, watch list criteria, and valuation policies. Ms. Ardeshir said the key elements of the IPS would explicitly designate responsibilities and accountability. She expressed her office’s view that constraining policies that would limit opportunistic investments should be avoided in policy. Risk controls should provide comfort to stakeholders.

The IPS would include a statement on sustainability. Mr. Bachher commented that the current IPS included reference to prohibited investments such as tobacco products. In response to calls for divestment of fossil fuel holdings, the Office of the CIO had developed a Framework for Sustainable Investing that included environmental, social, and governance (ESG) issues. The Office of the CIO would go beyond the Framework and consider the potential impact of climate change in investment decision-making and risk assessment. Committee Chair Sherman suggested that the Sustainability Framework be called, instead, an ESG Framework. Regent Makarechian agreed. Mr. Bachher expressed his view that the Office of the CIO would be a national leader by including sustainability in its IPS.

Committee Chair Sherman suggested that governance documents when approved be shared with the campuses. He asked what level of risk would be acceptable in the GEP. Senior Managing Director Richard Bookstaber commented that any risk metric is based on past events and is predictive if the future resembles the past. Any risk management system examines past variability that occurred for the instruments that make up a given portfolio. A measure called value at risk represents how much returns could change over a period of one year, with a 90 percent degree of probability. The Office of the CIO bases its risk profile on ten to 11 percent value at risk. On a longer term, a pure U.S. S&P500 portfolio would have a volatility of 17 to 20 percent. A ten to 11 percent value-at-risk would mean a portfolio that could go up or down over the next year a little more than half as much as the S&P500. A ten percent value-at-risk meant that, with 90 percent probability, the portfolio had the potential to go down ten percent or less over the next year.

Committee Chair Sherman said it would be important to quantify the risk profile of the portfolio.

6. **REVIEW OF REGENTS POLICY 6106: TOTAL RETURN EXPENDITURE POLICY ON REGENTS' GENERAL ENDOWMENT POOL ASSETS**

[Background material was provided to the Subcommittee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Investment Officer Susie Ardeshir explained that Regents Policy 6106: Policy on Total Return Expenditure on Regents' General Endowment Pool Assets specified that the GEP spending policy was set by the Regents. Her office would propose that this policy be rescinded and that GEP spending policy be incorporated into the Investment Policy Statement that would be reviewed annually by the Regents.

7. **REVIEW OF REGENTS POLICY 6107: ENDOWMENT ADMINISTRATION COST RECOVERY ON REGENTS' ASSETS (GENERAL ENDOWMENT POOL)**

[Background material was provided to the Subcommittee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Investment Officer Susie Ardeshir stated that endowment administration cost recovery provided a mechanism to recoup costs of administration of assets in the General Endowment Pool. The current rate is 55 basis points (bps). The Office of the Chief Investment Officer would propose that this policy be rescinded and the endowment administration cost recovery rate be included in the Investment Policy Statement, which would be reviewed annually by the Investments Subcommittee and recommended for approval to the Regents.

8. **REVIEW OF REGENTS POLICY 6201: INVESTMENT POLICY FOR THE UNIVERSITY OF CALIFORNIA CAMPUS FOUNDATIONS**

[Background material was provided to the Subcommittee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Investment Officer Susie Ardeshir said that the Office of the Chief Investment Officer (CIO) proposed that this policy be modified to reflect the practice of campus foundation reporting. She suggested surveying the campus foundations about their costs of reporting. Each of the campus foundations has its own board, which sets its own investment policy. Annually, the Office of the CIO collects the campus foundations' reports for the Subcommittee and the Regents. Some required reporting was redundant, as the campus foundation reports are incorporated into the University's financial reports.

Regent Zettel asked if the campus foundations were audited. Ms. Ardeshir said all campus foundations were audited by PricewaterhouseCoopers and reported as separate components.

Regent Makarechian asked about the role of the Executive Vice President and Chief Financial Officer in the proposed governance, particularly relating to the University's cash flow and liquidity. Ms. Ardeshir commented that the University's cash flow and liquidity would be in the domain of the Finance and Capital Strategies Committee. CIO Bachher agreed.

Regent Makarechian suggested that liquidity requirements of the University be specified and added to policy at the appropriate level, likely to be considered by the Board of Regents. Committee Chair Sherman suggested raising that issue with the Finance and Capital Strategies Committee. Mr. Bachher agreed.

The meeting adjourned at 4:30 p.m.

Attest:

Secretary and Chief of Staff

Additions shown by underline; deletions shown by strikethrough.

APPENDIX 1
Effective: July 1, 2017
Replaces Version Effective: May 12, 2016

ASSET ALLOCATION, PERFORMANCE BENCHMARKS, AND REBALANCING POLICY

Based on the risk budget for the GEP, the Committee has adopted the following asset allocation policy, including asset class weights and ranges, benchmarks for each asset class, and the benchmark for the total GEP.

Criteria for including an asset class in the strategic policy include:

- Positive contribution ~~positively~~ to the investment objective of GEP
- Widely recognized and accepted among institutional investors
- ~~Has~~ Low cross correlation with other accepted asset classes
- ~~Has a~~ Meaningful performance history
- ~~Involves a unique set of investors~~

The allowable ranges for each asset class and in total have been chosen to be consistent with budgets and ranges for total and active risk.

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UNIVERSITY OF CALIFORNIA GENERAL ENDOWMENT POOL
INVESTMENT POLICY STATEMENT

A. Strategic Asset Allocation and Ranges

	Target Allocation	Allowable Ranges	
		Minimum	Maximum
Global Equity	30.0%	20.0	52.5
US Equity	15.7		
Developed Non US Equity	11.0		
Emerging Mkt Equity	3.3		
Private Equity	22.5	10.0	32.5
Absolute Return (Strategic Opportunities)	25.0	15.0	32.0
Real Assets	12.5	3.0	17.5
Liquidity (Income)	10.0	0.0	17.5
TOTAL	100%		

B. Asset Class Performance Benchmarks

The Committee has adopted the following performance benchmarks for each asset class. Criteria for selection of a benchmark include:

- Unambiguous: the names and weights of securities comprising the benchmark are clearly delineated
- Investable: it is possible to replicate the benchmark performance by investing in the benchmark holdings
- Measurable: it is possible to readily calculate the benchmark's return on a reasonably frequent basis
- Appropriate: the benchmark is consistent with The Committee's investment preferences or biases
- Specified in Advance: the benchmark is constructed prior to the start of an evaluation period
- Reflecting Current Investment Opinion: investment professionals in the asset class should have views on the assets in the benchmark and incorporate those views in their portfolio construction

Asset Class	**Benchmark**
Public Equity	MSCI All Country World Index IMI Tobacco Free
~~US Equity~~	~~Russell 3000 Tobacco Free Index~~
~~Non US Eq. Devel.~~	~~MSCI World ex-US Net Tobacco Free~~
~~Emerging Mkt Eq.~~	~~MSCI Emerging Market Free Net~~
~~Fixed Income~~	~~Barclays US Aggregate Bond Index~~
~~High Yield Fixed Income~~	~~Merrill Lynch High Yield Cash Pay Index~~
~~Emg Mkt Fixed Income~~	~~Dollar Denominated: JP Morgan Emerging Markets Bond Index Global Diversified~~
~~TIPS~~	~~Barclays US TIPS Index~~
Private Equity	~~N/A~~ Russell 3000 Index + 300 basis points (See below note 2.)
Absolute Return	~~Diversified: HFRX Absolute Return Index~~ HFRI Fund of Funds Composite
Real Assets (non-Real Estate) Real Estate (Real Assets)	~~N/A (See below note 3.)~~ Actual Real Assets Portfolio Return NCREIF Funds Index – Open End Diversified Core Equity (ODCE), lagged 3 months
~~Real Estate~~	~~NCREIF Funds Index – Open End Diversified Core Equity (ODCE), lagged 3 months~~
Liquidity (Income)	Barclays US Aggregate Index

Notes on asset class benchmarks:

1. Global Equity: The Chief Investment Officer will determine what constitutes a tobacco company based on standard industry classification of the major index providers (e.g., Russell, MSCI) and communicate this list to investment managers annually and whenever changes occur.

2. Private Equity: As we transition the benchmark into the portfolio we will use150 basis points illiquidity premium for the first year. ~~*Long term* portfolio returns will be compared to investable public equity alternatives as well as non-investable peer group indices. There is no appropriate market benchmark to use for *short term* performance evaluation or decision making.~~
~~3. Real Assets (all strategies ex-commodities): similar to Private Equity~~

C. Total GEP Performance Benchmark

This is the composition of the total GEP performance benchmark referred to in the Investment Policy Statement, Part 4(b). The percentages below add to 100%. Until GEP reaches its long term targets the performance benchmark will reflect the glide path framework and interim weightings, which will differ from the long term policy approved in the Strategic Asset Allocation and as noted below

Percentage	**Benchmark**
30.0%	× MSCI All Country World Index IMI Tobacco Free
~~21.0%~~	~~× Russell 3000 Tobacco Free Index~~
~~14.0%~~	~~× MSCI World ex-US Net Tobacco Free~~
~~7.5%~~	~~× MSCI Emerging Market Free Net~~
~~5.0%~~	~~× Barclays US Aggregate Bond Index~~
~~2.5%~~	~~× Merrill Lynch High Yield Cash Pay Index~~
~~2.5%~~	~~× JP Morgan Emerging Market Bond Index Global Diversified~~
~~2.5%~~	~~× Barclays US TIPS Index~~
~~11.5~~ 22.5%	× ~~Actual return of private equity portfolio~~ Russell 3000 Index +300 basis points
~~23.0~~ 25.0%	× ~~HFRX Absolute Return Index~~ HFRI Fund of Funds Composite
~~3.0~~ 12.5%	× ~~Aggregate Real Assets benchmark (see section B), with components weighted by their actual weights within the total real assets portfolio~~ NCREIF Funds Index – Open End Diversified Core Equity (ODCE), lagged 3 Months Actual Other Real Assets Portfolio Return
~~7.5~~ 10.0%	× Barclays US Aggregate Index

Notes on Total Fund benchmark:

~~1. The benchmark for private equity is replaced by the private equity portfolio's actual performance. This has the effect of neutralizing the active performance of this class for purposes of total fund performance evaluation.~~
1 ~~2~~. The calculation of the Total Fund benchmark will assume a monthly rebalancing methodology.
2 ~~3~~. In the event of a significant change in asset allocation, the Chief Investment Officer in consultation with the Subcommittee may specify an alternative weighting scheme to be used during a transition period.

D. Rebalancing Policy

There will be periodic deviations in actual asset weights from the long-term/current policy asset weights specified above. Causes for periodic deviations are market movements, cash flows, and varying portfolio performance. Significant movements from the asset class policy weights will alter the intended expected return and risk of the GEP. Accordingly, the Investment Committee authorizes the Chief Investment Officer to rebalance the GEP when necessary to ensure adherence to the Investment Policy.

The Chief Investment Officer will monitor the actual asset allocation at least monthly. The Committee directs the Chief Investment Officer to take all actions necessary, within the requirement to act prudently, to rebalance assets to within the policy ranges in a timely and cost effective manner when actual weights are outside the prescribed ranges. The Chief Investment Officer may utilize derivative contracts [in accordance with Appendix 4] to rebalance the portfolio such that the portfolio's net exposures are consistent with policy ranges.

The Chief Investment Officer shall assess and manage the trade-off between the cost of rebalancing and the active risk associated with the deviation from policy asset weights. With approval from the Chair of the Committee, the Chief Investment Officer may delay a rebalancing program when the Chief Investment Officer believes the delay is in the best interest of the GEP. Results of rebalancing will be reported to the Committee at quarterly meetings.