Wilshire

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Mr. Henry Jones
Chairman of the Investment Committee
California Public Employees' Retirement System
400 P Street
Sacramento, CA 95814

Re: Consultant Review of Global Equity Program

Dear Mr. Jones:

Wilshire has conducted its annual review of the CalPERS Global Equity (GE) Program. In addition to implementing and managing the PERF's global equity allocation, the GE Program encompasses management of the Affiliate Investment Programs. Our review included a combination of onsite meetings and phone discussions with key members of the global equity investment team. The comprehensive due diligence agenda covered a variety of critical functional areas and processes including:

- GE structure and governance model
- GE investment decision framework (strategy review, approval and funding process)
- Research (idea generation and agenda governance)
- Portfolio construction
- Execution Services & Strategy (ESS) Coverage and support model
- Strategy analysis/monitoring (strategy rationalization)
- Corporate Governance

- Affiliate Investment Programs

Overview

Despite disappointing relative performance during the latest fiscal year, particularly during Q2 2018, Wilshire believes that the Global Equity Program continues to meet its objectives of providing low cost global equity beta and plays the role of providing strategic exposure to global growth and the equity risk premium. The Program's recent underperformance appears to be largely the result of its intentional tilt towards defensive positioning rather than from any deterioration in investment approach or process. Nonetheless, the recent levels of relative risk, further discussed below, should be monitored to assess whether they merely reflect anomalistic events within the current market environment or are instead symptomatic of future relative risk levels.

Affiliate Investment Programs

While the remaining sections of this letter focus on the GE Program's role within the PERF, our review included coverage of the Affiliate Investment Programs (AIP), which collectively represent aggregate assets of approximately $16.5 billion. As noted above, the AIP functionally operates within Global Equity even though the investment programs include global equities, fixed income, and real assets. The largest asset pools include the California Employees' Retiree Benefit Trust ($8.3 billion), the Public Employees' Long-Term Care Fund ($4.5 billion) and the Judges' Retirement System II Fund ($1.5 billion). AIP responsibilities also include the supervision of two Supplemental Income Plans (SIP) within a defined contribution platform with $1.6 billion in participant assets.

A major project during the 2017-2018 fiscal year was the AIP's comprehensive strategic asset allocation review. This year's review was coordinated within the PERF's ALM cycle and, therefore, was able to benefit and efficiently scale from the concurrent research and efforts of the TLPM team.

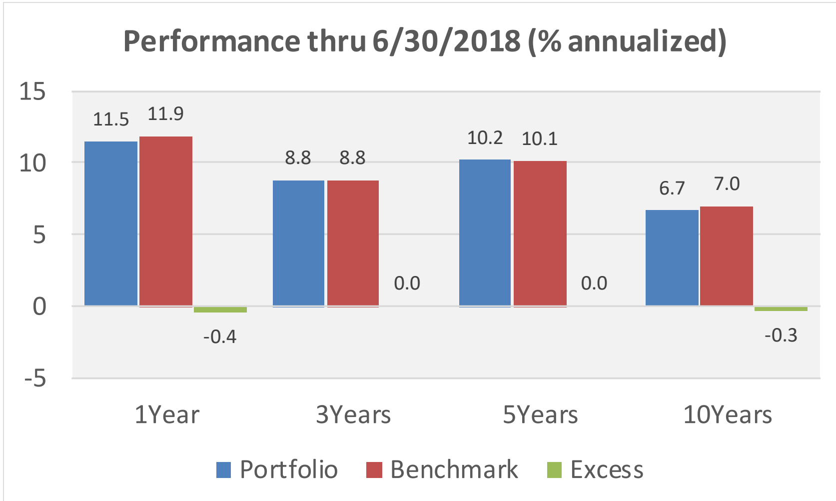
AIP has several key business initiatives planned for the 2018-2019 fiscal year including full implementation of the recent asset allocation structure, transition manager search/launch, technology integration/upgrade (i.e. Artemis 3.1) and SIP support for joining/leaving municipalities.

Global Equity Portfolio Objectives and Performance

The GE team's mandate is to deliver the global equity market beta (as represented by CalPERS' custom benchmark), plus a targeted excess return of 15 basis points (bps) with a risk budget of up to 50 bps of tracking error annually. Despite providing another strong year of absolute performance (+11.5%), the GE portfolio trailed its benchmark by 0.4% in the 2017-2018 fiscal year, with all of the underperformance being realized in Q2 2018. As shown in the chart below, despite its negative excess returns in the past two fiscal years, the GE Program has delivered benchmark-like excess returns over the past three and five fiscal-year periods. However, due to its poor relative performance during the Global Financial

Crisis, the GE portfolio has not kept pace with its benchmark over the trailing ten-year period.

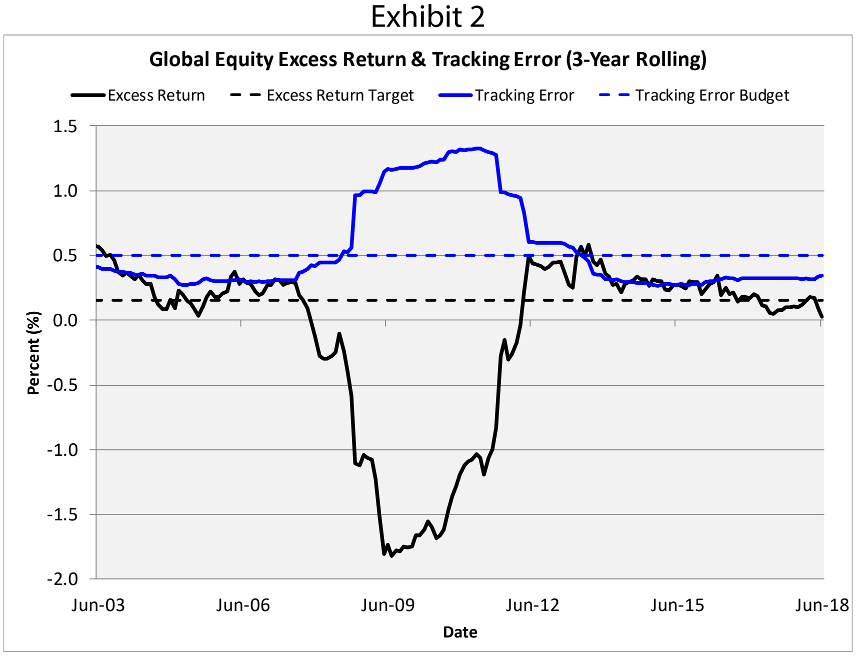
Exhibit 1



Note that, due to rounding, "Net" figures are not uniformly consistent with the differences in displayed "Portfolio" and "Benchmark" returns.

The three-year rolling realized excess return and tracking error figures provided in Exhibit 2 demonstrate that, following several years of very strong relative performance, realized returns have recently dipped below the 15 bps excess return target (solid black line vs. dotted black line). However, it is worth noting that, since turning positive in April 2012, the GE Program has outperformed its benchmark in all three-year rolling periods (a span of over six years). Despite a recent increase in monthly variances – trailing the benchmark by -9, -19 and -14 bps in April, May and June, respectively, the Program continues to stay well within the allocated risk budget over reasonable rolling periods (solid blue line vs. dotted blue line).

Exhibit 2



Strategy Allocation and Portfolio Structuring

Consistent with the GE Program's tracking error mandate of 0 to 50 bps, just over 62% of assets under management (AUM) are managed within low tracking error (i.e. typically less than 50 basis points of TE) index-oriented strategies (top table in Exhibit 3). The remaining ~38% of the GE portfolio is allocated to traditional active (~20%), alternative beta (~16%), emerging manager (~2%) and activist strategies (<1%), with varying levels of tracking error. Approximately 80% of the portfolio is managed internally. The bottom table within Exhibit 3 shows the changes in strategy allocations over the most recent fiscal year. ***Here we note the 2.6% shift from index-oriented strategies into traditional active (1.5%) and alternative beta (1.1%) strategies. These shifts from lower tracking error strategies, in conjunction with the recent increase in realized risk, will be important for Staff to monitor going forward as they reconcile realized results versus risk system estimates.***

Exhibit 3: Strategy Allocation

As or June 2018

Managed	Index Oriented	Active: Traditional	Active: Alt Beta	Active: Activist	Active: Emerging Managers	Total
Internally	62.2%	2.7%	15.4%	0.0%	0.0%	80.3%
Externally	0.0%	17.3%	0.0%	0.3%	2.1%	19.7%
Total	62.2%	20.0%	15.4%	0.3%	2.1%	100.0%

June 2018 vs. June 2017

Managed	Index Oriented	Active: Traditional	Active: Alt Beta	Active: Activist	Active: Emerging Managers	Total
Internally	-2.6%	1.9%	1.8%	0.0%	0.0%	1.1%
Externally	0.0%	-0.4%	-0.7%	0.0%	0.0%	-1.1%
Total	-2.6%	1.5%	1.1%	0.0%	0.0%	0.0%

The remainder of this report provides Wilshire perspectives, "scoring," and rationale on the Global Equity Program.

Evaluation Scoring

Wilshire continues to rate the GE Program highly, ranking the overall Program in the third tier (i.e. decile) among other similar asset management operations. Significant positives include quality of investment team, commitment to improvement and strong risk budgeting controls within the portfolio construction process, while the lack of equity ownership is a detractor versus peers in the asset management industry.

CalPERS Global Equity	**Tier**	**Letter**
Total Qualitative Score	**3rd**	**B**

	Weight	**Tier**	**Letter**
Organization	**20%**	**5th**	**C**
FIRM	***50%***	**7th**	**D**
Quality and Stability of Senior Management			
Quality of Organization			
Ownership/Incentives			
TEAM	***50%***	**3rd**	**B**
Stability of Investment Professionals			
Quality of Team			
Commitment to Improvement			
Information Gathering	**20%**	**2nd**	**A**
Information Resources			
Depth of Information			
Breadth of Information			
Forecasting	**20%**	**3rd**	**B**
Clear & Intuitive Forecasting Approach			
Repeatable Process			
Strength, Clarity, and Intuitiveness of Valuation Methodology			
Forecasting Success			
Unique Forecasting Approach			
Portfolio Construction	**20%**	**1st**	**A**
Risk Budgeting/Control			
Defined Buy/Sell Discipline			
Consistency of Portfolio Characteristics			
Implementation	**10%**	**2nd**	**A**
Resources			
Liquidity			
Compliance/Trading/Monitoring			
Attribution	**10%**	**1st**	**A**
Depth of Attribution			
Integration of Attribution			

Tiers are based on a decile distribution with 1st Tier representing the highest score and 10th Tier the lowest score.

Organization: Firm

The score reflects the level of turnover at key management positions, with the impending departure of the CIO and a new COIO. Scoring in this area can improve as continuity increases. CalPERS faces some unique organizational risks that for-profit enterprises have greater flexibility in managing. There is a lack of long-term "ownership" opportunities such as direct ownership, phantom stock and other incentive-based compensation packages. These long-term forms of incentives are common within private sector investment organizations and can serve as significant retention tools. The absence of such compensation structures can expose the organization to the increased risk of losing intellectual capital at both the Investment Office (INVO) Senior Staff level and the senior management level within Global Equity to asset managers and other financial institutions. Ensuring that CalPERS as an organization has the tools necessary to recruit and retain qualified, diverse candidates should be a strong focus in line with Investment Belief #10 - Resources and Process. CalPERS as an organization, is clearly aware of this as evidenced by the ongoing discussion over incentive packages and the willingness to consider changes to recruit and retain investment talent.

Organization: Team

Global Equity's broad team structure has been consistent and has benefited from increased team stability during the past fiscal year. Turnover is mitigated through a positive and intellectually challenging work environment, deliberate active involvement of all GE team members in the investment process and a strong sense of mission. Global Equity's team-based culture ensures that each person, including the MID, has multiple potential back-ups, which assists in mitigating key person risk.

While the Global Equity team continues to look for outstanding candidates for new and open positions, compensation bands constrain its ability to attract candidates especially with competition from both local asset management and asset owner organizations. There are currently open positions at the Investment Director (ID) Investment Officer (IO) and Associate Investment Manager (AIM) levels, which play an important role in supporting the senior team and will be crucial in maintaining the quality of personnel over the long-term. Global Equity continues to emphasize diversity as an important factor in its hiring process. The team remains focused on further enhancing its diversity profile in the medium to longer term through both external and internal career development initiatives to effectively cultivate future leaders within GE.

Global Equity utilizes a committee structure to serve as its primary deliberative body. The key objective of this committee - the Global Equity Capital Allocation Committee (GECAC) - and its various sub-committees is to provide a robust governance structure and an open setting for the critical evaluation of ideas and in making holistic investment decisions across the GE portfolio. The GECAC is expected to act on recommendations put forth by its subcommittees or project teams working at the direction of the MID of Global Equity. The GECAC's current sub-committees include the Portfolio Positioning, Portfolio Opportunities and Portfolio Structuring & Execution Subcommittees. Importantly, the GECAC's membership is functionally diverse and includes colleagues from other INVO programs, which allows it to efficiently act on decisions made at the Total Plan level (e.g., Investment Committee, CIO, ISG).

Following its structural integration into Global Equity during FY 2016-2017, Corporate Governance functions are now fully integrated and established within the Program, which allows the GE team to directly manage proxy voting, corporate engagement and shareholder campaigns. The new structure seems to be serving the organization well and may lead to cost savings, as Staff explores the potential of bringing some contracted third-party services in-house. The GE Corporate Governance team further collaborates with the Sustainable Investment (SI) program via the proxy voting, research, financial markets and correspondence working groups, which report into the Governance and Sustainability Subcommittee (GSS) that is chaired by the MID of Sustainable Investment. Corporate Governance and SI also formally collaborate during proxy season through weekly proxy season ‘heat map’ meetings, where they collectively assess sensitive votes. The groups also coordinate climate-related research and engagement through the formation of a Climate Action 100+ engagements working group.

Information & Forecasting

CalPERS’ Global Equity Program manages a variety of active and index-oriented strategies. Few of the index-oriented strategies follow pure index-replication principles, but rather are enhanced by active decisions presented by market events such as corporate actions, rebalancing/trading views and other pricing anomalies. Many of these activities are consistent with strategies employed by institutional index fund managers. Global Equity also implements traditional active strategies that focus on factor positioning and alternative beta, (i.e. momentum, value, size and quality factors), and identification of managers with unique sources of expected alpha (skill) for use in the portfolio. The licensing of intellectual capital from investment management firms and other strategic partners, and internal implementation of these approaches is a cost-effective way to employ these quantitative strategies without paying additional fees for implementation, while capitalizing on the skills of the Global Equity investment team. ***Wilshire views Global Equity’s ability to select from a variety of different alpha generating strategies and implementation approaches as an important competitive edge relative to other organizations.***

The strategy development and search functions focus on providing Global Equity with new internally and externally managed strategies to broaden the available opportunity set. The primary focus of strategy development has been on researching “smart beta,” ”alternative beta” and ESG-focused approaches. GE’s strategy search process is very focused and provides a streamlined approach to obtain information from external managers. Existing strategies, both externally and internally managed, are continuously evaluated to determine if they individually and collectively can be expected to add value to the Program on a long-term basis. The annual review process provides a more formal assessment whereby a potentially negative outcome would lead to an in-depth evaluation to determine if a strategy termination recommendation is warranted. This strategy justification process is endemic to the culture of the Global Equity team and permeates their mission and philosophy.

GE’s committee structure, noted above, reviews existing and new Global Equity strategies and provides recommendations to the MID who has delegated authority to make investment decisions. ***The collaborative process promotes a consistent, thorough and***

objective analysis of investment decisions and provides input, independent advice and perspective to the MID to reach an informed decision considering multiple points of view.

Global Equity has access to external ESG quantitative and qualitative data from both MSCI and Sustainalytics for each portfolio and their underlying investments. Use of these platforms provides Global Equity with information on over 8,000 global companies including company profiles, thematic and sector reports and controversies. Portfolios are measured on each of the three components of E, S and G.

GE's manager selection process formally includes an ESG scoring component, which requires managers to articulate how they integrate ESG considerations into their investment process. Staff's ESG scoring model directly contributes to a strategy's final ranking in determining its portfolio selection. As a key metric demonstrating evidence of progress, 95% of the Program's external partners (internally and externally managed strategies) currently have established ESG Policies (up from 20% two years ago). During 2017-2018, GE conducted a successful search that led to investments in two positive ESG-tilted strategies. Wilshire views these efforts to further integrate ESG initiatives within the GE program to be very positive, consistent with CalPERS' Investment Beliefs and ultimately instrumental in further establishing CalPERS' leadership role among institutional investors.

Portfolio Construction

The Program's approach of internal implementation of both externally and internally developed models allows Global Equity to cost-effectively manage the portfolio relative to deploying capital exclusively with external managers. This structure is implemented in line with Investment Belief #8 – Costs Matter. In addition to internally managed portfolios, there are external managers who provide direct investment management and act as strategic partners to provide research and insight, supplementing the work performed by Staff. Both internal and external strategies are regularly reviewed to evaluate their role in the broader investment structure.

As noted earlier, the Global Equity team has a mandate to deliver the global equity market beta (as represented by CalPERS custom benchmark), plus a targeted excess return of approximately 15 basis points with a risk budget of up to 50 bps of tracking error annually. With this tracking error range in mind, ~62% of assets under management are managed within low tracking error, index-oriented strategies. The remaining ~38% of the portfolio is allocated to traditional active, alternative beta and emerging manager strategies with varying levels of tracking error or risk due to actively managing security or factor exposure versus the benchmark. ***Overall, the portfolio construction approach balances managing costs and pursuing structured risks with positive expected payoffs. These priorities are consistent with Investment Belief #7 – Risk vs. Reward.***

The process has a strong focus on portfolio construction through its allocation to strategies approved within the GE Capital Allocation Committee (GECAC) and its sub-committee structure, as well as monitoring risk factors of the overall GE portfolio and its individual underlying allocations. Global Equity has access to portfolio analysis and attribution tools, which contribute to an Executive Dashboard that facilitates the effective monitoring of portfolio risk characteristics. This analytics package highlights active tilts and contributions to risk from individual factors and can be customized to focus on key drivers of risk and return.

Staff's attention to risk is very apparent and very rigorous in all levels of decision making and is designed to prevent attachment to any single strategy or firm. This translates into a top-decile score for risk budgeting and control for Global Equity. The GECAC's access to a rich set of risk reports enables adherence to desired risk levels and position sizing. The process is designed to minimize the impact of unintended exposures. As such, strategy and overall portfolio tracking errors are reviewed at least monthly to ensure that risk is being deployed in areas with positive expected payoffs. This process aligns well with Investment Belief #5 – Accountability as the relative performance comparisons of the individual components of the broader portfolio and decisions regarding changes in that portfolio can be measured versus an appropriate benchmark.

The risk reporting process for Global Equity regularly evolves and provides a meaningful feedback loop at the factor, strategy, manager and total portfolio levels. The reports are utilized throughout the due diligence and research process, allowing Staff to leverage the reports' informational value throughout the Global Equity program. The team's continued expansion of its risk reporting package and commitment to building on these capabilities is impressive and is industry-leading versus other asset owners and even many asset management organizations.

Global Equity staff identifies ESG risks found in individual portfolios and uses the information to initiate discussions with its partners to better understand the potential risk/reward pay-off and the justification for holding highlighted securities. Global Equity's external partners are expected to evaluate and respond accordingly to the impact of ESG risks and opportunities in an identified investment or portfolio. Wilshire views this as a sound process for monitoring and managing ESG risks across individual strategies and the aggregate portfolio

Consistent with CalPERS' approved program of divestments, Global Equity excludes some markets and industries including Tobacco, EM principles, Iran/Sudan, Firearms and several thermal coal companies.

Implementation

The GE Program's trading operations are performed through the centralized Execution Services & Strategy (ESS) function. The ESS platform was designed to reduce operational risk by centralizing transactions between both Global Fixed Income and Global Equity. As a component of the Opportunistic Strategies (OS) team, Wilshire's formal review of ESS is contained within our OS Program review. ***However, as it relates to GE, it will be important to closely monitor the evolution and resourcing of the ESS platform for its ability to continue to serve the needs of the team. For example, the loss of GE management control over trading functions (i.e. with ESS's move from GE to OS at the end of fiscal 2016-2017),***

presents some Program vulnerability to manage GE priorities against those of other INVO programs.

Attribution

Senior Staff continues to work to further enhance Global Equity's attribution capabilities to generate actionable information related to the drivers of portfolio risk and return. The Executive Dashboard (noted earlier) and various risk reports provide the team with a rich set of information, including return and risk attribution at the total portfolio level as well as insights that assist the team in identifying intentional vs unintentional risk positioning at both the factor (i.e. region/country/sector/style) and security level. In addition to the overall Global Equity portfolio, monitoring sheets have been developed for external mandates that summarize key information obtained from different internal and external data management and risk management systems. Insights gleaned from these reports can be used to facilitate valuable discussions with external managers. Staff has access to more detailed reports should the summary reports highlight specific issues with a manager. Stress tests are applied to assess the potential impact from various changes in the market environment. For example, active risks and their underlying factor contributions can be evaluated to ensure that they are still in line with expectations and continue to properly reflect intended portfolio positioning. To this end, the Program's very recent increase in realized risk will lead the team to draw on these resources and tools to attribute short-term performance to ensure that it remains consistent with forward-looking estimates and portfolio positioning.

Conclusion

Wilshire's overall qualitative evaluation rating of 3rd Tier reflects the GE Program's many strengths. Global Equity is supported by a team and resources that are united in the common goal of streamlining the global investment portfolio by reducing the number of strategies and pursuing a fee philosophy that is aligned with CalPERS' Investment Beliefs. ***It is evident from interviews with Global Equity Staff that the adoption of CalPERS' Investment Beliefs is widespread and endemic in the GE Program's culture. The focus on efficiency and strategy justification reflects an awareness of the risk/reward relationship, the multi-faceted nature of risk and the impact of costs on the ultimate performance of the PERF. The strategic goals of the Global Equity program also recognize the long-term horizon of the investment portfolio and a responsibility to manage the portfolio to achieve the PERF's investment objectives and ensure sustainability.***

Please do not hesitate to contact us should you require anything further or have any questions.

Sincerely,