MEMORANDUM

Date: February 19, 2019

To: Members of the Investment Committee
California Public Employees' Retirement System ("CalPERS")

From: Meketa Investment Group ("Meketa")

Re: Semi-Annual Infrastructure Performance Review
as of December 31, 2018

In our role as the Board Infrastructure Consultant, Meketa conducted a semi-annual performance review of the Infrastructure Portfolio ("the Portfolio") based on data provided in Wilshire's CalPERS Real Assets Performance Analysis Review for the period ended December 31, 2018, and selected CalPERS reports.[1] This memorandum provides the Portfolio performance data and information on key policy parameters, along with summary market commentary.

Portfolio Performance[2]

CalPERS' Infrastructure Portfolio continues to significantly outperform its policy benchmark for the reporting period, and over all other trailing periods shown below, as it did the last semi-annual reporting period.

Net Returns %	Qtr.	6 mos.	1 year	3 year	5 year	10 year
Infrastructure Portfolio	3.2	3.9	11.3	12.6	14.3	15.2
PREA/IPD US Quarterly Property Fund NTR	1.9	3.7	6.9	6.3	5.7	6.2
Over (under) Performance	1.3	0.2	4.4	6.3	8.6	9.0

1 CalPERS Infrastructure Program Allocation, Characteristics, and Leverage Reports, Quarter Ending September 30, 2018.
2 Per Wilshire's CalPERS Real Assets Performance Analysis Review for the period ended December 31, 2018, reported with a 1-quarter lag, so effectively as of September 30, 2018.

Key Policy Parameters

The Portfolio is compliant with all key parameters related to diversification and other limits, as demonstrated in the table below.

Key Portfolio Parameter	Policy Range/Limit	NAV 9/30/18 Exposure
Risk Classification	%	%
Core	60-100	81.3
Value Add	0-25	7.9
Opportunistic-All Strategies	0-25	10.8
Opportunistic-Development	0-10	0.0
Geographic Region[3]	%	%
United States	50-100	54.7
International Developed	0-50	44.9
International Developing	0-15	0.5
International Frontier	0-5	0.0
Real Asset Segments-Sectors[4]	%	%
Commercial-Transportation	0-60	10.7
Consumer-Communications	0-40	0.0
Essential-Energy/Water/Waste	0-25	32.6
Specialized-Opportunistic	0-20	29.6
International	0-25	27.2
Manager Exposure[5]	%	%
Largest Partner Relationship	20 max	3.3
Investments with No External Manager	20 max	1.2
Leverage		
Loan to Value	65% max	44.0%
Debt Service Coverage Ratio	1.25x min	2.13x
Public Securities[6]	%	%
Directly Invested[7]	10	0.0

[3] Geographic NAV policy ranges effective for the period changed in December 2018; see Footnote 13.
[4] For informational purposes only. These parameters are measured at the Real Assets Program level.
[5] Calculated as NAV plus total unfunded commitments relative to a Real Assets Program base of $49.2 billion.
[6] Measured at the Real Assets Program level.
[7] Staff reports no direct investments in public securities via separately managed accounts; it is possible that one or more of the commingled fund managers could have de minimus positions in public securities.

Implementation

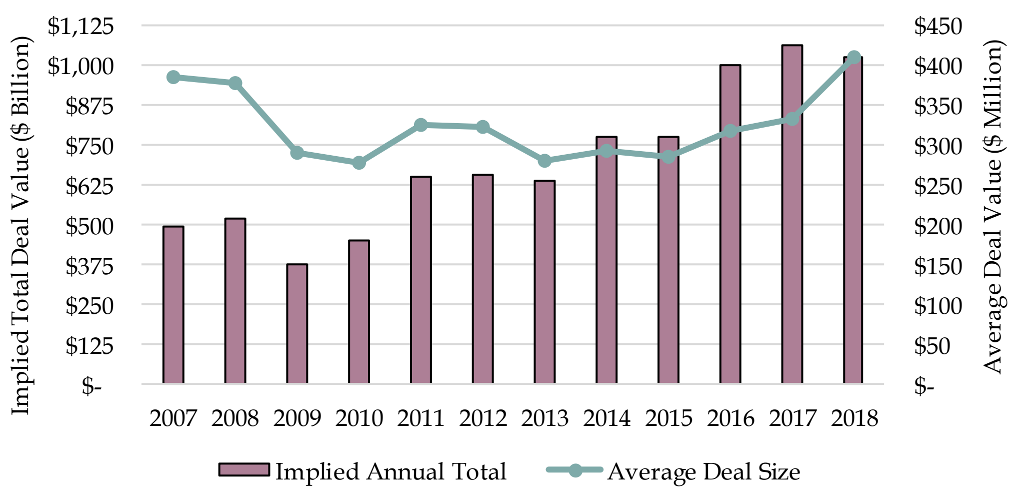
The Portfolio's NAV as of September 30, 2018, was $4.35 billion, an increase of $70 million, or 1.6%, compared to the March 31, 2018 NAV of $4.28 billion. The current NAV represents 1.3% of the Total Fund.[8] Until July 2018, a 1% Interim Target was in effect for the Portfolio, as established under the 2013 Asset Liability Management ("ALM") study.[9] As noted in Meketa's 2018 Infrastructure Portfolio Annual Program Review delivered in September 2018, the new Real Asset Program-level Policy Target is 13% (±5%) for the Real Estate, Infrastructure, and Forestland Portfolios collectively. This was generated from the 2018 ALM, effective July 2018, and intentionally eliminates prior portfolio-level targets.

Market Commentary[10]

Market Activity

Preqin reports 1,102 completed deals with a transaction date in the second half of 2018, compared to 1,402 for the first half of the year, for a total of 2,504, just making our projection last August of 2,500 to 3,000 for the year. In most prior years, the second half has beaten the first half, including a strong fourth quarter. This year represents the first drop off in year-over-year number of deals since 2012. At the same time, 2018 average deal value was $411 million, up from $334 million in 2017, and $318 million in 2016, making total deal value stable over the last three years at about $1 trillion annually, as seen in the chart below.

Historical Deal Value

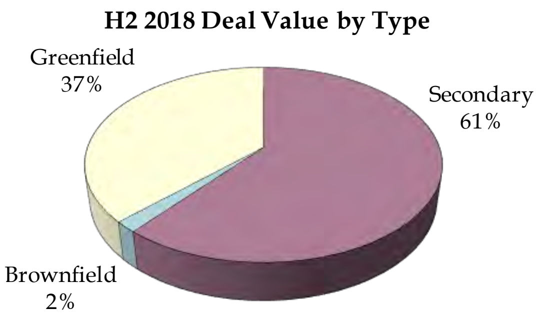


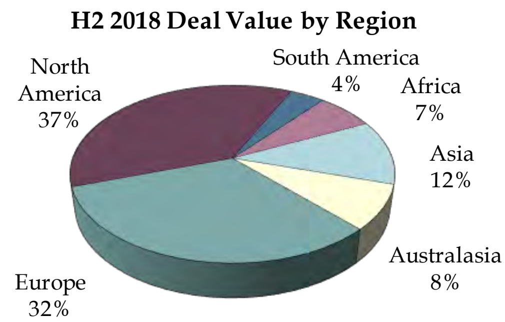
[8] The Total Fund market value was $337.3 billion as of December 31, 2018, per Staff.

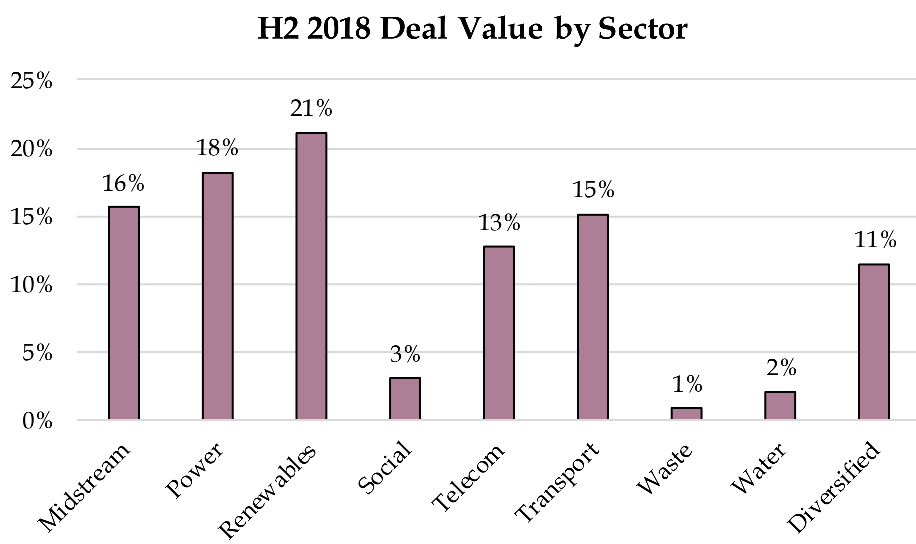
[9] Also per Staff 2017 Annual Program Review.

[10] Commentary based on analysis of aggregated and deal-level data from Preqin, and other Preqin data, unless otherwise cited.

Total deal size in H2 2018 (including equity and debt) is only available for 265 transactions, or about 24% of total number of deals, representing $139 billion in deal value. Distribution by risk category,[11] geography, and sector for the deals for which size is available is shown below.







[11] According to Preqin: Secondary stage is a fully operational asset or structure that requires no investment for development; Brownfield is an existing, typically operating asset needing improvements, repairs, or expansion; and a Greenfield asset does not currently exist. These categories can roughly be mapped to Core, Value Add, and Opportunistic, respectively, ignoring other risk attributes such as geography and sector.

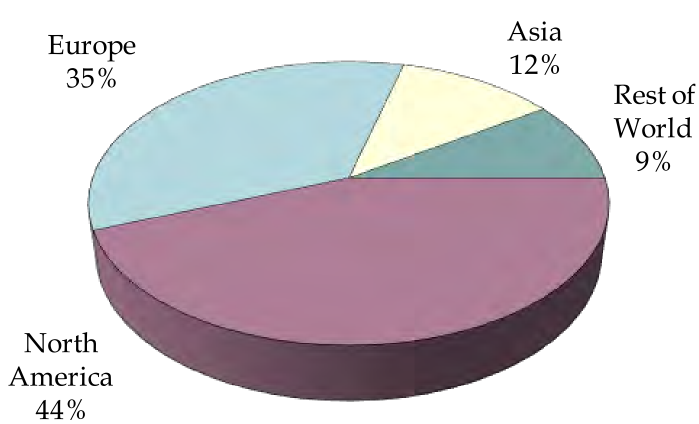
Among the North American deals closing in H2 2018, 26 were identifiable as involving California assets, including, but not limited to: 16 separate solar power transactions, some of which were sold together as portfolios; three power plants; two refineries; two refined product terminals; and one power distribution asset. Several are highlighted below.

- Multiple solar projects: Buyers included Capital Dynamics, ConEdison, D.E. Shaw Renewables, EDF Renewables, Goldman Sachs; and Sellers included Abengoa, First Solar, KKR, Recurrent Energy, Sempra Energy, and Tenaska Capital Management.
- Two gas fired and one combined cycle power plant: Avenue Capital Group purchased from AltaGas.
- Los Angeles and Martinez Refineries: Marathon Petroleum purchased from Andeavor Logistics.
- Sacramento and Stockton Refined Product Terminals: InstarAGF Asset Management purchased from Buckeye Partners.
- Trans Bay Cable: NextEra Energy Partners purchased from SteelRiver Infrastructure Partners.

Dry Powder and Fundraising

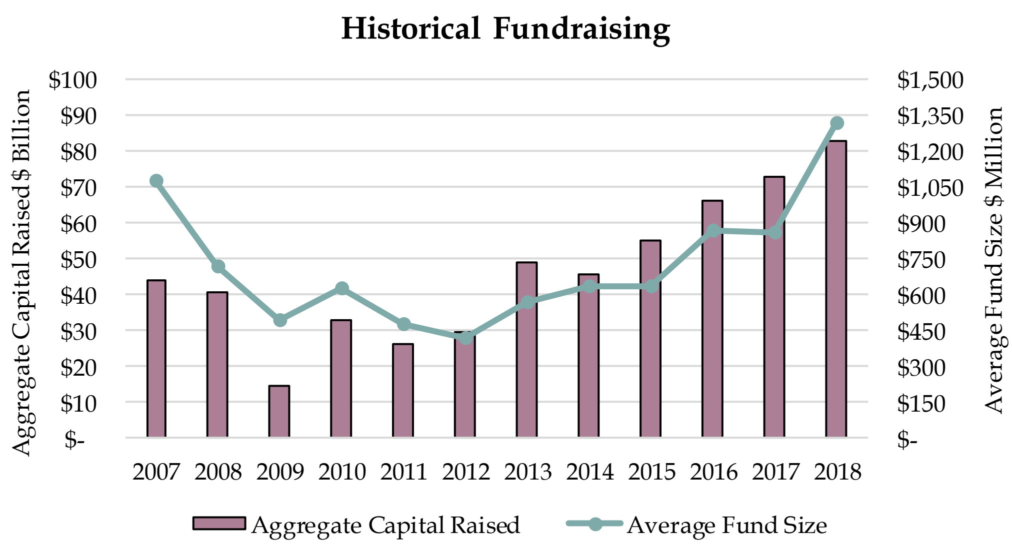
As of December 2018, unlisted infrastructure funds[12] had $172 billion in dry powder, essentially unchanged from July 2018, but still higher than 2017 and 2016 year-ends, which had $162 billion and $146 billion, respectively. Together, funds focused on North America and Europe, CalPERS' target geographies, accounted for 79% of the total, as seen in the chart below.

Dry Powder by Geography



[12] Includes funds and fund of funds.

Infrastructure managers set two fundraising records in 2018, closing on $83.3 billion at an average size of $1.3 billion, both new highs, as seen in the chart below. The second half of 2018 was stronger than the first, with managers raising $51.8 billion in the year's last six months, compared to $31.4 billion in the first six months. A number of brand names are currently fundraising, with target fund sizes segmenting naturally into three segments: less than $1 billion; over $1 billion to about $10 billion; and over $10 billion. The large segment includes both Brookfield and Global Infrastructure Partners, each raising their fourth closed-end fund with both seeking $17 billion to $20 billion.



Market Outlook

Institutional demand for infrastructure shows no signs of waning and managers continue to come to market with a wide variety of offerings with respect to strategy, sector, geography, and risk-return profile. There appears to be an increase in co-investment, club, and separate account options as investors seek lower fees and greater governance which managers trade for ready, dependable capital outside of fundraising cycles. We continue to view the core space as highly competitive, while the value-added segment offers a wider range of sourcing and transaction avenues. CalPERS' bench of existing managers and relationships under development keep the Infrastructure Portfolio well-positioned in the marketplace.

Conclusion

We believe the Portfolio's performance for the reporting period and all other trailing periods has been impressive relative to the benchmark. The Portfolio's development and its current position is appropriate and consistent with applicable policies and guidances:

- *Risk*—Exposures are roughly within the middle of the classification policy ranges, with the exception of development stage, which has no investments;
- *Geography*—Exposures are at the lower end of the categorical ranges, except for International-Developed exposure which is at the higher end of its range;[13]
- *Segment*—Investments represent multiple segments, noting that data are informational, as range targets are applicable at the Real Assets Program level;
- *Manager*—Exposures are well below the maximums allowed;
- *Leverage*—Metrics are comfortably compliant; and
- *Public Securities*—The Portfolio has no direct exposures.

The market environment continues to be challenging for core buyers on pricing, but CalPERS has an excellent vantage point on the deal flow, which remains robust. CalPERS continues to exercise its reputation, resources, and strategic relationships with select managers and other investors to participate in the market with acumen and discipline.

Please do not hesitate to contact us if you have questions or require additional information.

Sincerely,

Stephen P. McCourt, CFA
Managing Principal

Lisa Bacon, CAIA
Senior Vice President

SPM/EFB/nca

[13] Subsequent to the end of the data period, effective December 17, 2018, the geographic limit for U.S. infrastructure is 40-100% and for International Developed Markets is 0-60%, a shift of 10% toward the international category, which provides more capacity than reflected as of September 30, 2018.