Investment Objective

The role of Real Estate is to have ownership risk in real property with stable cash yield and act as an economic diversifier to equity risk. Capital appreciation is an added, but lower source of return.

The role of Forestland is to have ownership risk in forestland properties, enhance long-term inflation protection and provide moderate cash yield.

The role of Infrastructure is to have ownership risk in essential infrastructure assets and provide predictable returns with moderate long-term inflation protection. Infrastructure also acts as an economic diversifier to equity risk.

- CalPERS ALM Workshop (2013)

Real Assets Programs

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Estate</td>
<td>Benchmark: NCREIF ODCE</td>
</tr>
<tr>
<td>Forestland</td>
<td>Benchmark: NCREIF Timberland</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Benchmark: CPI +4%, lagged one quarter</td>
</tr>
</tbody>
</table>

- *Partners - 38
- *Partnerships - 87

*Partner and partnership count includes active and inactive trailing partnerships

Asset Class Characteristics

Managing Investment Director: Paul Mouchakkaa

Assets: $36.3 Billion

Benchmark: 84.6% Real Estate benchmark + 7.7% Infrastructure benchmark + 7.7% Forestland benchmark

- Real Estate Program
  - Benchmark: NCREIF ODCE
    - Stable cash yield with real property ownership
    - Acts as a partial inflation hedge

- Forestland Program
  - Benchmark: NCREIF Timberland
    - Forestland properties ownership
    - Inflation protection, illiquid

- Infrastructure Program
  - Benchmark: CPI +4%, lagged one quarter
    - Predictable returns with essential infrastructure assets ownership
    - Economic diversifier

<table>
<thead>
<tr>
<th>Class Allocation</th>
<th>Real Estate</th>
<th>Forestland</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Target Range %</td>
<td>6-16%</td>
<td>0-2%</td>
<td>0-2%</td>
</tr>
<tr>
<td>Interim Strategic Target %</td>
<td>11%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Actual Investment %</td>
<td>9%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Variance</td>
<td>-2%</td>
<td>-0.4%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Interim Strategic Target $</td>
<td>$ 35.6 Billion</td>
<td>$ 3.2 Billion</td>
<td>$ 3.2 Billion</td>
</tr>
<tr>
<td>Actual Investment $</td>
<td>$ 30.5 Billion</td>
<td>$ 2.0 Billion</td>
<td>$ 3.8 Billion</td>
</tr>
<tr>
<td>Variance $</td>
<td>$(5.1 Billion)</td>
<td>$(1.3 Billion)</td>
<td>$ 0.5 Billion</td>
</tr>
</tbody>
</table>

Note: Interim Strategic Target effective October 1, 2016
### Real Assets Performance

**Month Ending June 30, 2017**

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Ending Market Value</th>
<th>FYTD Net Return</th>
<th>Excess BPS</th>
<th>3-YR Net Return</th>
<th>Excess BPS</th>
<th>5-YR Net Return</th>
<th>Excess BPS</th>
<th>10-YR Net Return</th>
<th>Excess BPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>REAL ASSETS</td>
<td>$36.3 Billion</td>
<td>7.4%</td>
<td>43</td>
<td>8.6%</td>
<td>(130)</td>
<td>10.0%</td>
<td>(19)</td>
<td>(0.9%)</td>
<td>(784)</td>
</tr>
<tr>
<td>REAL ESTATE</td>
<td>$30.5 Billion</td>
<td>7.6%</td>
<td>24</td>
<td>9.4%</td>
<td>(141)</td>
<td>10.8%</td>
<td>(29)</td>
<td>(1.3%)</td>
<td>(907)</td>
</tr>
<tr>
<td>FORESTLAND</td>
<td>$2.0 Billion</td>
<td>1.0%</td>
<td>(268)</td>
<td>(3.1%)</td>
<td>(875)</td>
<td>(0.1%)</td>
<td>(726)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>INFRASTRUCTURE</td>
<td>$3.8 Billion</td>
<td>9.9%</td>
<td>345</td>
<td>10.7%</td>
<td>561</td>
<td>12.0%</td>
<td>671</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Performance for the total asset class and top 3 strategies based on ending market value.

---

**Real Assets Policy Benchmark Returns & Real Assets Cumulative Returns**

- REAL ASSETS RETURNS
- REAL ASSETS POLICY RETURNS
- REAL ASSETS CUMULATIVE RETURNS
- REAL ASSETS POLICY CUMULATIVE RETURNS

---

**Real Assets 3-Year Rolling Excess Returns**

- 1-YEAR EXCESS RETURNS
- ROLLING 3-YEAR EXCESS RETURNS
### EXPENSES

<table>
<thead>
<tr>
<th>Real Assets Expenses</th>
<th>FY 2015-2016 ($millions)</th>
<th>FY 2016-2017 ($millions)</th>
<th>Fiscal YOY Change ($millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Management</td>
<td>$10</td>
<td>$9</td>
<td>$(1)</td>
</tr>
<tr>
<td>Asset Management Fees</td>
<td>$179</td>
<td>$187</td>
<td>$8</td>
</tr>
<tr>
<td>Consultants Expense</td>
<td>$2</td>
<td>$1</td>
<td>$(1)</td>
</tr>
<tr>
<td>Technology &amp; Operating Expense</td>
<td>$13</td>
<td>$12</td>
<td>$(1)</td>
</tr>
<tr>
<td>Profit Sharing</td>
<td>$279</td>
<td>$57</td>
<td>$(223)</td>
</tr>
</tbody>
</table>

### STAFFING (as of 6/30/2017)

- **Senior Management Team**: Years with CalPERS - Years Experience
  - Paul Mouchakkaa - MID: 2 - 17
  - Ed Yrure - ID: 10 - 26
  - Jane Delfendahl - ID: 13 - 25

- **Investment Team**: Number of Members
  - Investment Managers: 11
  - Associate Investment Managers: 2
  - Investment Officers: 20

- **Additional Resources**: Number of Members
  - Administrative Support Staff: 12

- **Real Assets Staffing Updates**
  - Appointed 1 Investment Director
  - Appointed 3 Investment Managers
  - Appointed 2 Associate Investment Managers
  - Appointed 5 Investment Officers
  - Appointed 3 Associate Governmental Program Analysts
  - Appointed 1 Office Technician (Typing)
  - Appointed 2 Seasonal Clerks
  - Transferred to other INVO program areas:
    - 1 Investment Manager
    - 2 Investment Officers
  - Current Vacancies:
    - 1 Seasonal Clerk
    - 1 Staff Services Analyst
    - 1 Associate Governmental Program Analyst
    - 2 Investment Officer II's
    - 1 Investment Officer III
    - 1 Investment Manager
    - 1 Investment Director
CalPERS INVESTMENT BELIEFS

CalPERS Investment Beliefs

#1 Liabilities must influence the asset structure
Real Assets role, according to the ALM, is to provide long term stable income, cash yield, and a partial hedge to inflation to match liabilities.

#2 A long time investment horizon is a responsibility and an advantage
Real Assets strategy is to invest in long term income producing properties.

#3 CalPERS investment decisions may reflect wider stakeholder views, provided they are consistent with its fiduciary duty to members and beneficiaries
Engagement with Global Governance

#4 Long-term value creation requires effective management of three forms of capital: financial, physical and human
Sustainability monitoring tools and portfolio policy compliance ensure portfolios are managed according to expectations. Have established leadership with regard to alignment of financial interests and responsible contracting.

#5 CalPERS must articulate its investment goals and performance measures and ensure clear accountability for their execution
Real Assets has clearly stated benchmarks and internal staff compensation is aligned using 5 year Real Assets returns.

#6 Strategic asset allocation is the dominant determinant of portfolio risk and return
The role of real assets, the strategic plan, and the benchmark are all consistent with the Strategic Asset Allocation.

#7 CalPERS will take risk only where we have a strong belief we will be rewarded for it
A majority of the program (75%) to be invested in high quality well located assets held long term with limits and governance on debt financing. Further, Staff actively measures risk in determining and underwriting its risk/reward profile.

#8 Costs matter and need to be effectively managed
Management of portfolio consistent with costs of the benchmark as well as external management fee reductions is a Real Assets priority.

#9 Risk to CalPERS is multi-faceted and not fully captured through measures such as volatility or tracking error
Staff has implemented detailed risk measurements for portfolio components.

#10 Strong processes and teamwork and deep resources are needed to achieve CalPERS goals and objectives
Enhanced training has taken team on path to be a world class investment management group. Existing need for enhancement of IT systems.