

Real Assets Strategic Plan Update

Investment Committee – April 18, 2016

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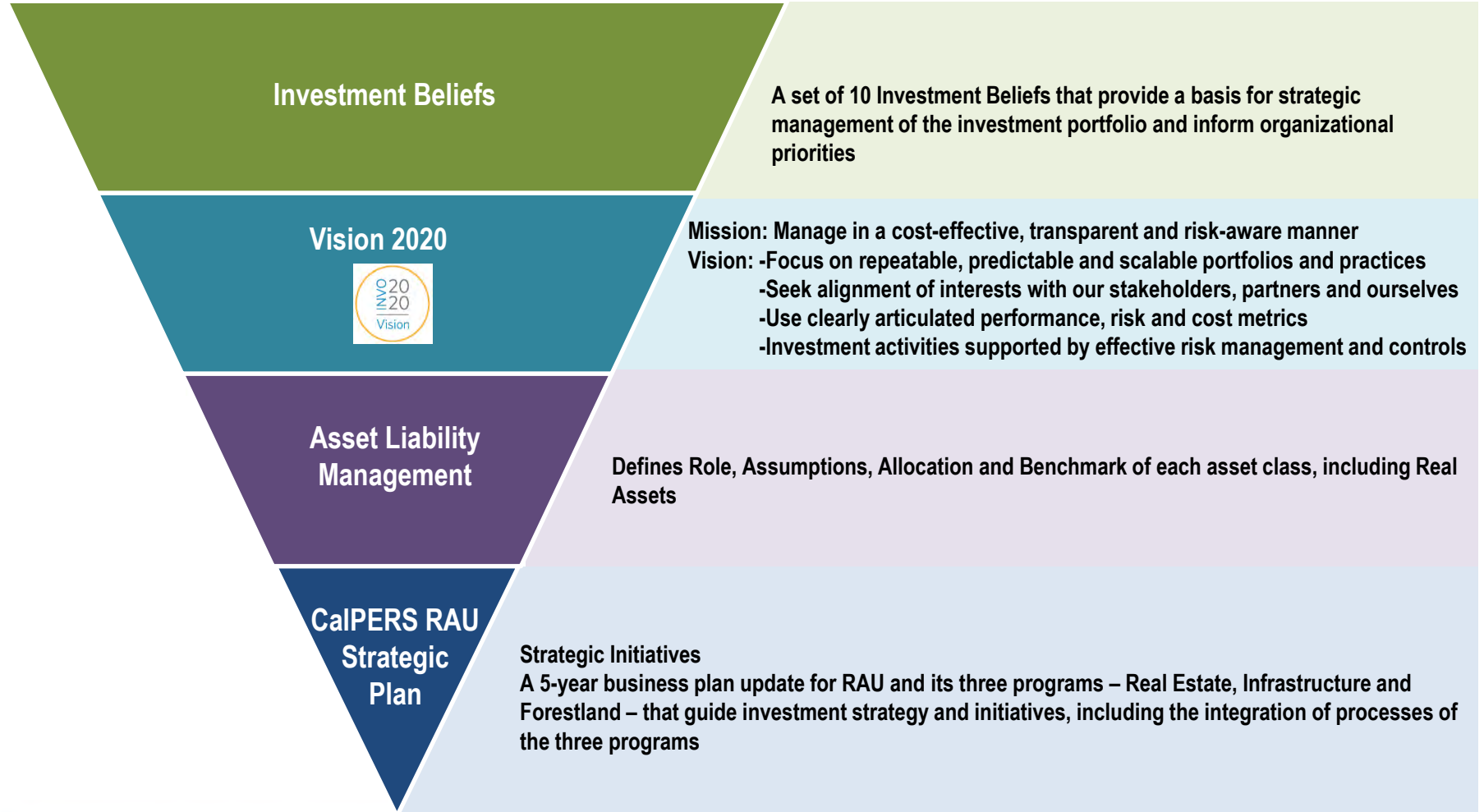
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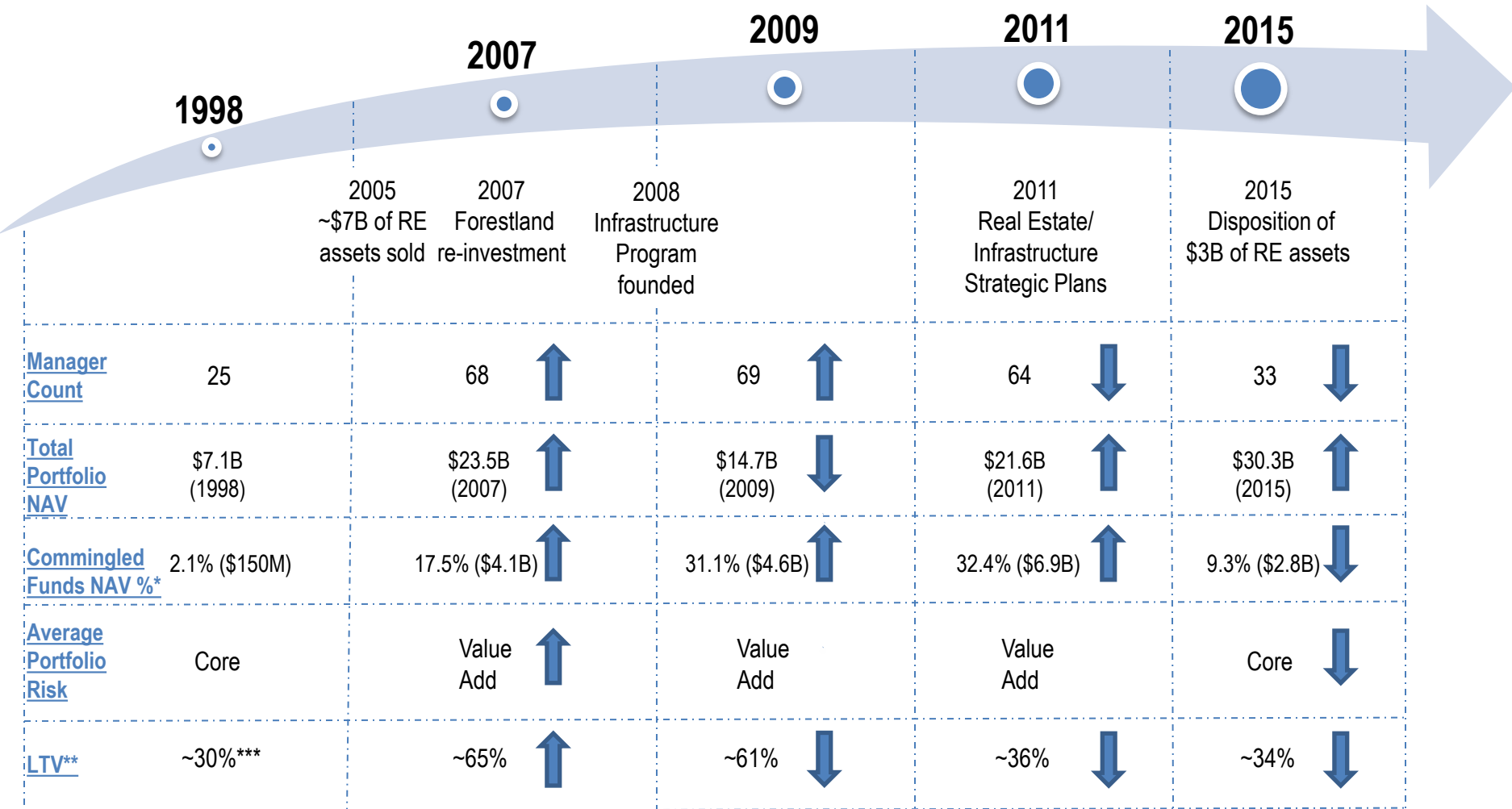
Section I: Real Assets Overview

- Real Assets INVO Alignment
- Real Assets Program History
- Real Assets Strategic Plan Process
- Real Assets Role in Total Fund
- Real Assets Key Messages – Strategy Summary
- Real Assets Key Messages – Integration / ALM 2017
- Real Assets Risks

Real Assets – INVO Alignment

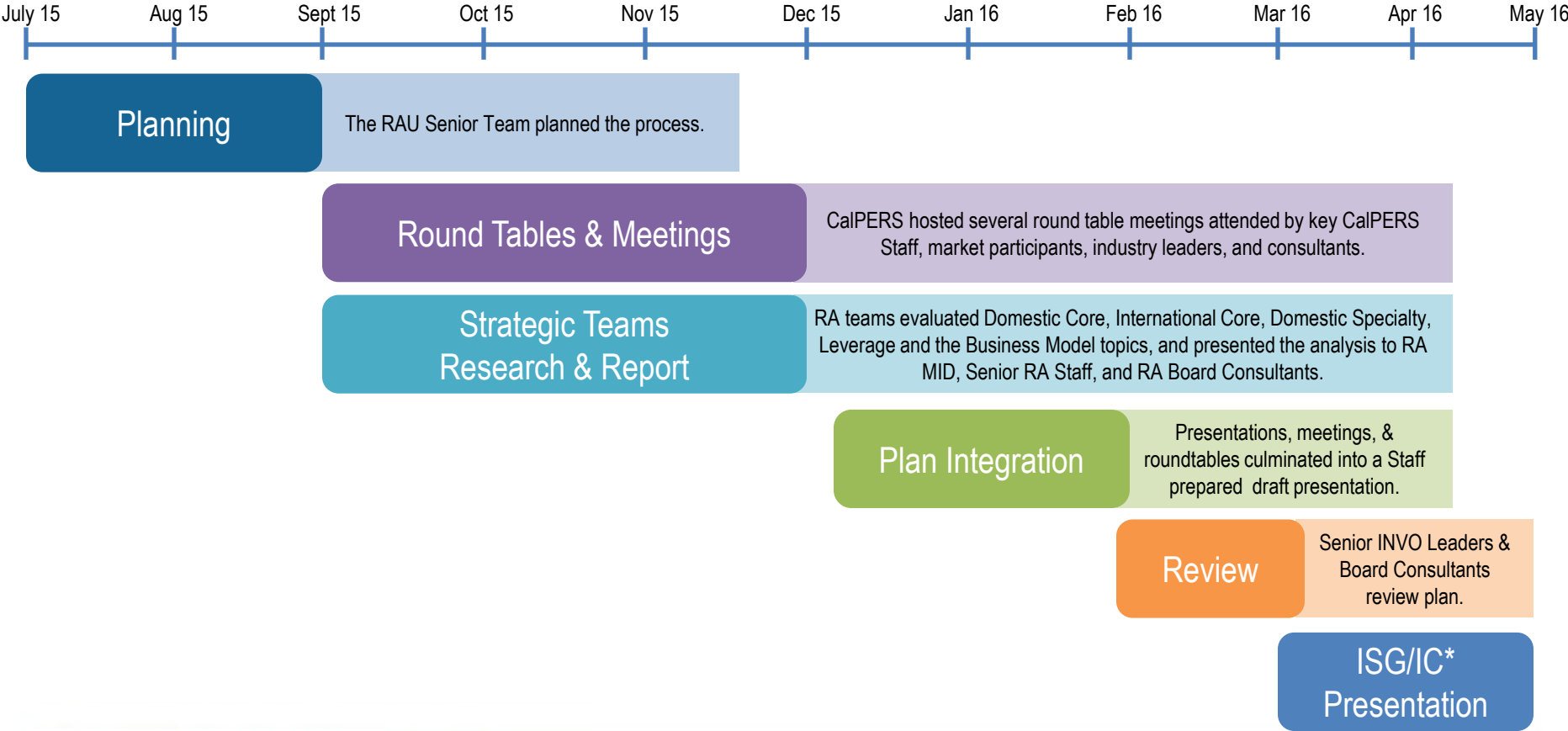


Real Assets – Program History



Real Assets – Strategic Plan Process

The Real Assets (RA) strategic planning process includes input from industry leaders, CalPERS Staff, strategic partners and consultants



Real Assets – Role in Total Fund

Harmonizing across the programs (Real Estate, Infrastructure, Forestland)

- ***Stable and predictable cash yield***
- ***Diversification of equity risk***
- ***Inflation protection***

Real Assets Key Messages – Strategy Summary (1 of 2)

Investment Strategy substantially unchanged

Refining and harmonizing portfolio structure, parameters and nomenclature

<p>Risk</p>	<ul style="list-style-type: none"> • Private Real Assets equity – providing diversification of equity risk • Mitigate Asset class risk through: <ul style="list-style-type: none"> • Majority of program (75-90%) – high quality Core assets held through business cycles • Durable cash flow – producing stable and predictable cash yield • Revenue models – supporting inflation protection
<p>Geography</p>	<ul style="list-style-type: none"> • Focus majority of portfolio in the U.S. (70-100%) • International investments aligned with role in developed and emerging markets • Acquire and maintain exposures to well located assets
<p>Leverage</p>	<ul style="list-style-type: none"> • Utilize moderate leverage across the portfolio and monitor leverage levels • Pilot Real Estate Program: (see slide #24) <ul style="list-style-type: none"> • Implement an unlevered RE partnership mandate(s) • Leverage could potentially be added and managed internally by Staff at Total Fund or Real Assets level • Security for leverage could potentially be at the Real Estate (Individual asset, Sub-Portfolio, Total Portfolio) or Total Fund level. • Leverage Pilot Program plan to be approved by Investment Strategy Group (ISG) prior to implementation. • Evaluate reducing costs and complexity, and increasing alignment and transparency

Real Assets Key Messages – Strategy Summary (2 of 2)

Strong governance focused on economic alignment, transparency and cost efficiency

<p>Business Model</p>	<ul style="list-style-type: none"> • Primary focus on Separate Accounts with highly reputable, market-leading managers • Secondary focus on Operating Companies and Direct Investments • Manager Limit Target: Movement toward fewer and larger external manager relationships, consistent with Vision 2020
<p>Specialized Programs</p>	<ul style="list-style-type: none"> • Continued implementation of Environmental, Social, Governance (ESG) goals set for the next 5 years • Continued implementation of Real Estate Emerging Manager and Transition Manager Programs
<p>Portfolio Hierarchy</p>	<ul style="list-style-type: none"> • Focus on Core assets within target Segments and Sectors to align with role • Integrate existing Strategic and Legacy sub portfolios to align with the new Real Assets Strategic Plan structure • Develop Sector implementation plans • Integrate Portfolio Hierarchy into Organizational Structure

Real Assets Key Messages – Integration / ALM 2017

Integrating Real Estate, Infrastructure and Forestland parameters

Harmonizing nomenclature; Reducing risks, costs, and complexity; Increasing transparency

- Portfolio: Hierarchy
- Risk classification: Core, Value Add, Opportunistic
 - Add Development limit of 0-10% (Build-to-Core)
- Geography: U.S., International Developed, Emerging, and Frontier
- Leverage: Loan-to-Value (LTV), Debt Service Coverage Ratio (DSCR)
- Segments – Essential, Commercial, Consumer, Residential, Specialized, and International

Items to be evaluated in Asset Liability Management (ALM) 2017 process:

ALM 2017

- Real Assets Benchmarks
 - Current Real Assets Benchmark: 83% Real Estate (NCREIF- ODCE); 8.5% Infrastructure (CPI +4%); 8.5% Forestland (NCREIF Timberland Index)
- Role of Forestland program
- Real Assets allocation

Real Assets – Risks

Select Risks and Risk management

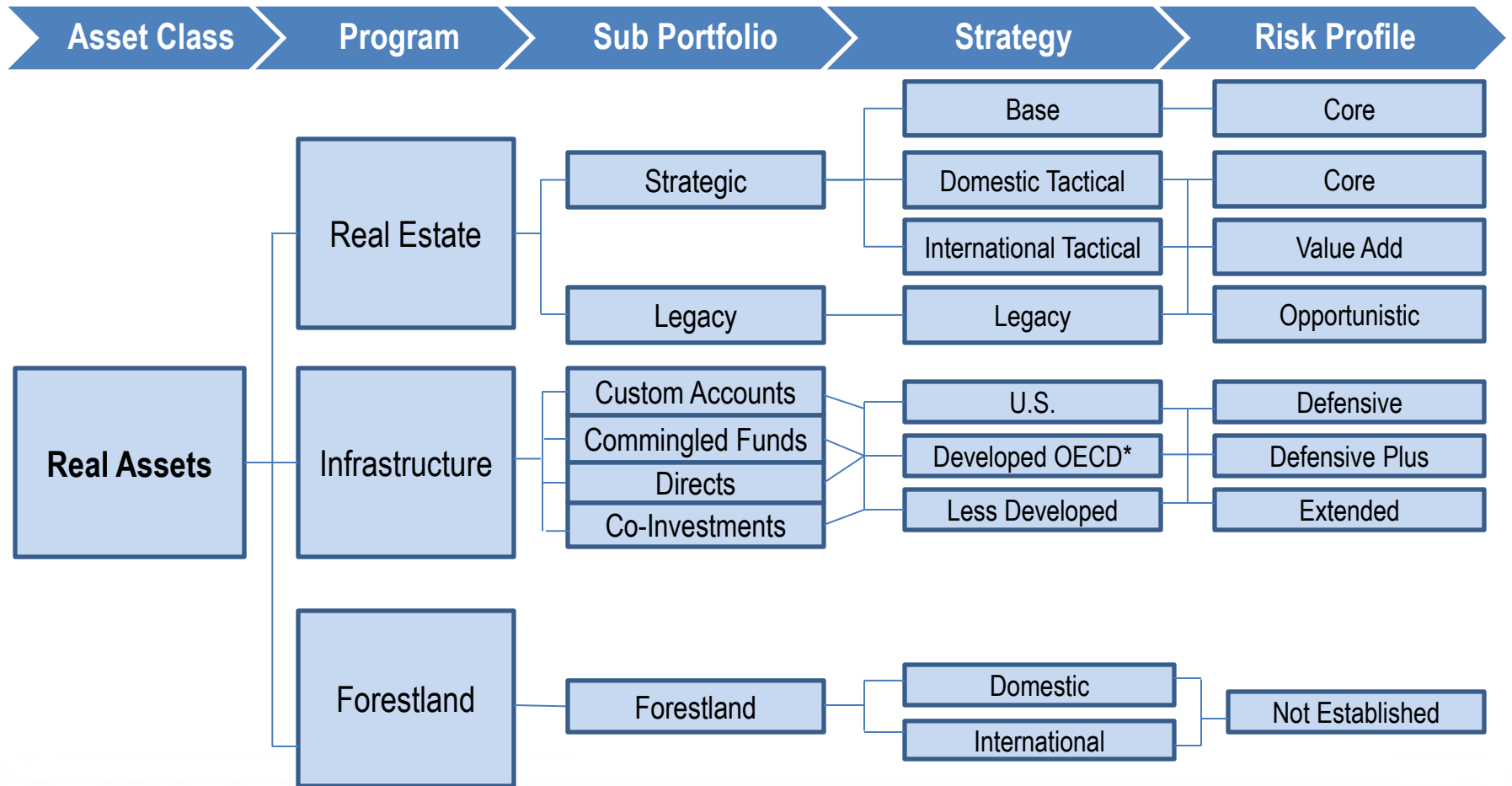
	Select Risks	Risk Management
Operational	<ul style="list-style-type: none"> • Vacancy • Maintenance of assets • Operational expenses and capital expenditures • Resource management 	<ul style="list-style-type: none"> • Due diligence (asset and manager) • Monitoring
Revenue Model	<ul style="list-style-type: none"> • Contract / lease features • Merchant / renewal risks • Counterparty risks 	<ul style="list-style-type: none"> • Contract / lease negotiation • Due diligence • Monitoring
Agency / Governance	<ul style="list-style-type: none"> • External manager practices • Ownership under Joint Ventures (JVs) 	<ul style="list-style-type: none"> • Partner selection / Due diligence • Monitoring • Negotiation of governance/rights
Environmental	<ul style="list-style-type: none"> • Climate change impact • Resource use and management 	<ul style="list-style-type: none"> • Due diligence (asset and manager) • Monitoring
Reputational	<ul style="list-style-type: none"> • Management of sensitive matters • Relationship with regulatory bodies 	<ul style="list-style-type: none"> • Due diligence (asset and manager) • Monitoring • Stakeholder engagement
Valuation	<ul style="list-style-type: none"> • Value of cash flows post-contract • Cap rate reversion (impact on values) 	<ul style="list-style-type: none"> • Due diligence • Contract / lease negotiation

Section II: Real Assets Hierarchy and Structure

- Real Assets Current Portfolio Hierarchy
- Real Assets Proposed Portfolio Hierarchy
- Real Assets Current Organization Structure

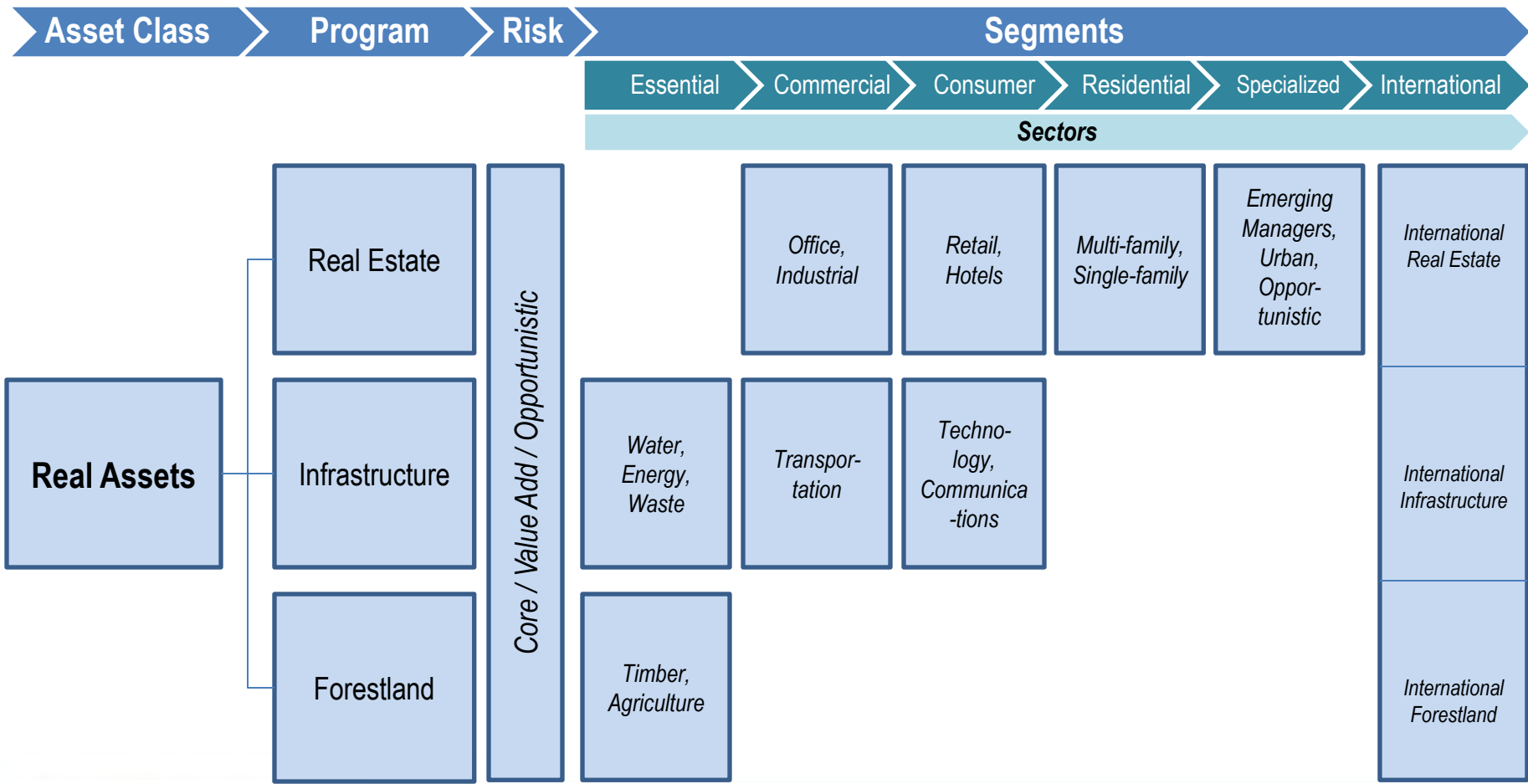
Real Assets – Current Portfolio Hierarchy

Real Assets currently consists of three programs, seven sub-portfolios, nine strategies, and seven risk profiles

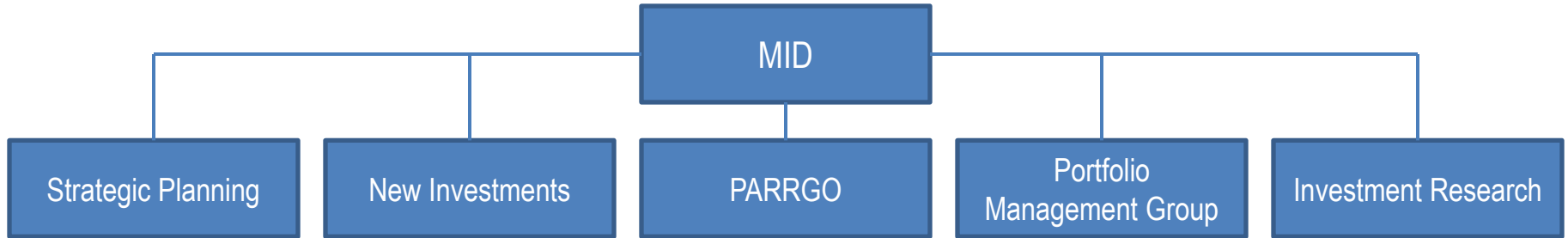


Real Assets – Proposed Portfolio Hierarchy

Real Assets would consist of three programs, three risk classes and six segments



Real Assets – Current Organization Structure





Current Status	Proposed
<ul style="list-style-type: none"> Organization Integration complete Process integration ongoing 	<ul style="list-style-type: none"> Portfolio hierarchy to be integrated into organizational structure

Section III: Changes

- Real Assets Proposed Changes and Rationale
- Real Assets Changes
- Real Estate Changes
- Infrastructure Changes
- Forestland Changes
- Real Assets Current Portfolio Structure
- Real Assets Proposed Program Parameters
- Real Estate Proposed Leverage Pilot Program
- Real Estate Emerging Manager and Transition Manager Programs
- Real Assets ESG Integration

Real Assets – Proposed Changes and Rationale

Establishing Real Assets parameters
Harmonizing nomenclature

Type of Change	Change		Rationale
Additions	<ul style="list-style-type: none"> • Harmonize risk classification • Cap on development • Leverage measurement (LTV, DSCR) • Geography • Manager Limit target 		<ul style="list-style-type: none"> • Reduces complexity • Reduces risk • Reduces cost • Increases transparency
Modifications	<ul style="list-style-type: none"> • Six new segments 		<ul style="list-style-type: none"> • Reduces complexity • Increases transparency • Align with Total Fund

Real Assets – Changes

Establishing Real Assets parameters

Harmonizing nomenclature

Reducing risk, costs and complexity; Increasing transparency

Parameter	Current	Proposed
Risk	Not established	Core: 75-100% Value Add: 0-25% Opportunistic: 0-25% Development: 0-10% (Build-to-Core)
Geography	Not established	-US: 70-100% -International Developed: 0-30% -International Emerging Markets: 0-15% -International Frontier Markets: 0-5%
Leverage	LTV: Not established DSCR: Not established	LTV: 55% DSCR: 1.40
Manager Limit Target	Not established	25
Segments	Not established	Essential, Commercial, Consumer, Residential, Specialized, and International

Real Estate – Changes

Structure substantially unchanged
Reducing risk, costs and complexity; Increasing transparency

Parameter	Current	Proposed
Risk	Core: 75-100% Value Add: 0-25% Opportunistic: 0-25% Development: Not established	Core: 75-100% Value Add: 0-25% Opportunistic: 0-25% Development: 0-10% (Build-to-Core)
Geography	US: 63.75-100% Developed: Ex-US: 0-25% Emerging Markets: 0-15% Frontier Markets: 0-5%	US: 75-100% International Developed: 0-25% International Emerging Markets: 0-15% International Frontier Markets: 0-5%
Leverage	LTV: 50% DSCR (Total): 1.5 DSCR (Core): 2.0	No changes proposed
Manager Limit Target	Not established	15
Sub Portfolios	Strategic and Legacy	Eliminate Sub Portfolios
Classification	Domestic Base, Domestic Tactical, International Tactical, Legacy	Eliminate these classifications
Segments	Not established	Essential, Commercial, Consumer, Residential, Specialized, and International

Infrastructure – Changes

Modifying parameters

Harmonizing nomenclature; Reducing risks, costs and complexity; Increasing transparency

Parameter	Current	Proposed
Risk	Infrastructure Defensive: 25-75% Infrastructure Defensive Plus: 25-65% Infrastructure Extended: 0-10% Development: Not established	Core: 60-100% Value Add: 0-25% Opportunistic: 0-25% Development: 0-10% (Build-to-Core)
Geography	US: 40-80% Developed OECD ex-US: 20-50% Less Developed: 0-15%	US: 50-100% International Developed: 0-50% International Emerging Markets: 0-15% International Frontier Markets: 0-5%
Leverage	LTV: 65% DSCR: Not established	LTV: 65% DSCR: 1.25
Manager Limit Target	Not established	10 (Infrastructure & Forestland combined)
Segments	Not established	Essential, Commercial, Consumer, Residential, Specialized, and International
Key Parameters Applicability Minimum (NAV)*	\$3B	\$5B

Forestland – Changes

Establishing parameters

Harmonizing nomenclature; Reducing risk, costs and complexity; Increasing transparency

Parameter	Current	Proposed
Risk	Not established	Core: 75-100% Value Add: 0-25% Opportunistic: 0-25% Development: 0-10% (Build-to-Core)
Geography	Not established	US: 50-100% International Developed: 0-50% International Emerging Markets: 0-15% International Frontier Markets: 0-5%
Leverage	LTV: 40% DSCR: Not established	LTV: 40% DSCR: 1.25
Manager Limit Target	Not established	10 (Infrastructure & Forestland combined)
Segments	Not established	Essential, Commercial, Consumer, Residential, Specialized, and International

Real Assets – Current Portfolio Structure

Program	Real Assets	Real Estate	Infrastructure	Forestland
Risk Classification	N/A	Core: 71% Value Add: 12% Opportunistic: 17%	Defensive: 31% Defensive Plus: 49% Extended: 20%	N/A
Geography	US: 90% (CA: 25%) International: 10%	US: 94% (CA: 29%) Developed ex-US: 0% Emerging: 6%	US: 60% (CA: 5%) Developed OECD ex-US: 38% LDC: 2%	US: 82% (CA: 0%) Latin America: 12% Asia Pacific: 6%
Leverage	LTV: 34% DSCR: N/A	LTV: 33% DSCR: 3.0**	LTV: 47% DSCR: N/A	LTV: 21% DSCR: N/A
Business Model	N/A	Separate Accounts: 80% Commingled: 6% Operating Companies: 14%	Commingled: 52% Directs: 26% Separate Accounts: 22%	Separate Accounts: 100%
Manager Count	33*	24	8	2
Emerging Managers	5	5	N/A	N/A
NAV / Unfunded	NAV: \$30.3B Unfunded: \$11.8B	NAV: \$25.7B Unfunded: \$9.5B	NAV: \$2.3B Unfunded: \$2.2B	NAV: \$2.2B Unfunded: \$0.0

* Real Assets Total Manager Count is less than sum of Program Manager Count. One manager is counted in both Real Estate and Infrastructure Programs.

**Actual DSCR for Real Estate is for Core funds

Real Assets – Proposed Program Parameters

Integrating Real Estate, Infrastructure, and Forestland into Real Assets

Program	Real Assets	Real Estate	Infrastructure	Forestland
Risk Classification	Core 75-100% Value Add 0-25% Opportunistic 0-25% Development : 0-10% (Build-to-Core)	Core 75-100% Value Add 0-25% Opportunistic 0-25% Development : 0-10% (Build-to-Core)	Core 60-100% Value Add 0-25% Opportunistic 0-25% Development : 0-10% (Build-to-Core)	Core 75-100% Value Add 0-25% Opportunistic 0-25% Development : 0-10% (Build-to-Core)
Geography	US: 70-100% International Developed: 0-30% International Emerging Markets: 0-15% International Frontier Markets: 0-5%	US: 75-100% International Developed: 0-25% International Emerging Markets: 0-15% International Frontier Markets: 0-5%	US: 50-100% International Developed: 0-50% International Emerging Markets: 0-15% International Frontier Markets: 0-5%	US: 50-100% International Developed: 0-50% International Emerging Markets: 0-15% International Frontier Markets: 0-5%
Leverage	55% LTV Limit 1.40 Total DSCR (Min)	50% LTV Limit 1.5 Total DSCR (Min) 2.0 Core DSCR (Min)	65% LTV Limit 1.25 Total DSCR (Min)	40% LTV Limit 1.25 Total DSCR (Min)
Business Model	Separate Accounts / JVs, Directs, Commingled	Primarily Separate Accounts, Commingled	Primarily Separate Accounts / JVs, Commingled, Directs	Primarily Separate Accounts, Commingled
Manager Count	25	15	10 (Infrastructure and Forestland combined)	10 (Infrastructure and Forestland combined)
Emerging & Transition Managers	up to 11	up to 11	N/A	N/A
ESG Integration	Manager Expectations: Sustainable Investment Practices for Selection, Contracting, Monitoring & Management for Assets & Managers			

Real Estate – Proposed Leverage Pilot Program

Implement an unlevered Real Estate partnership mandate(s)

Leverage could potentially be added and managed internally by Staff at Total Fund or Real Assets level

Security for leverage could potentially be at the Real Estate (Individual asset, Sub-Portfolio, Total Portfolio) or Total Fund level

Leverage Pilot Program plan to be approved by ISG prior to implementation

Evaluate reducing costs & complexity, and increasing alignment & transparency

Potential Advantages

- Increase scale of borrowings
- Reduce cost
- Reduce complexity
- Increase alignment
- Increase transparency

Challenges

- Implementation timing
- Staff resources
- Processes
- Controls
- Data Technology

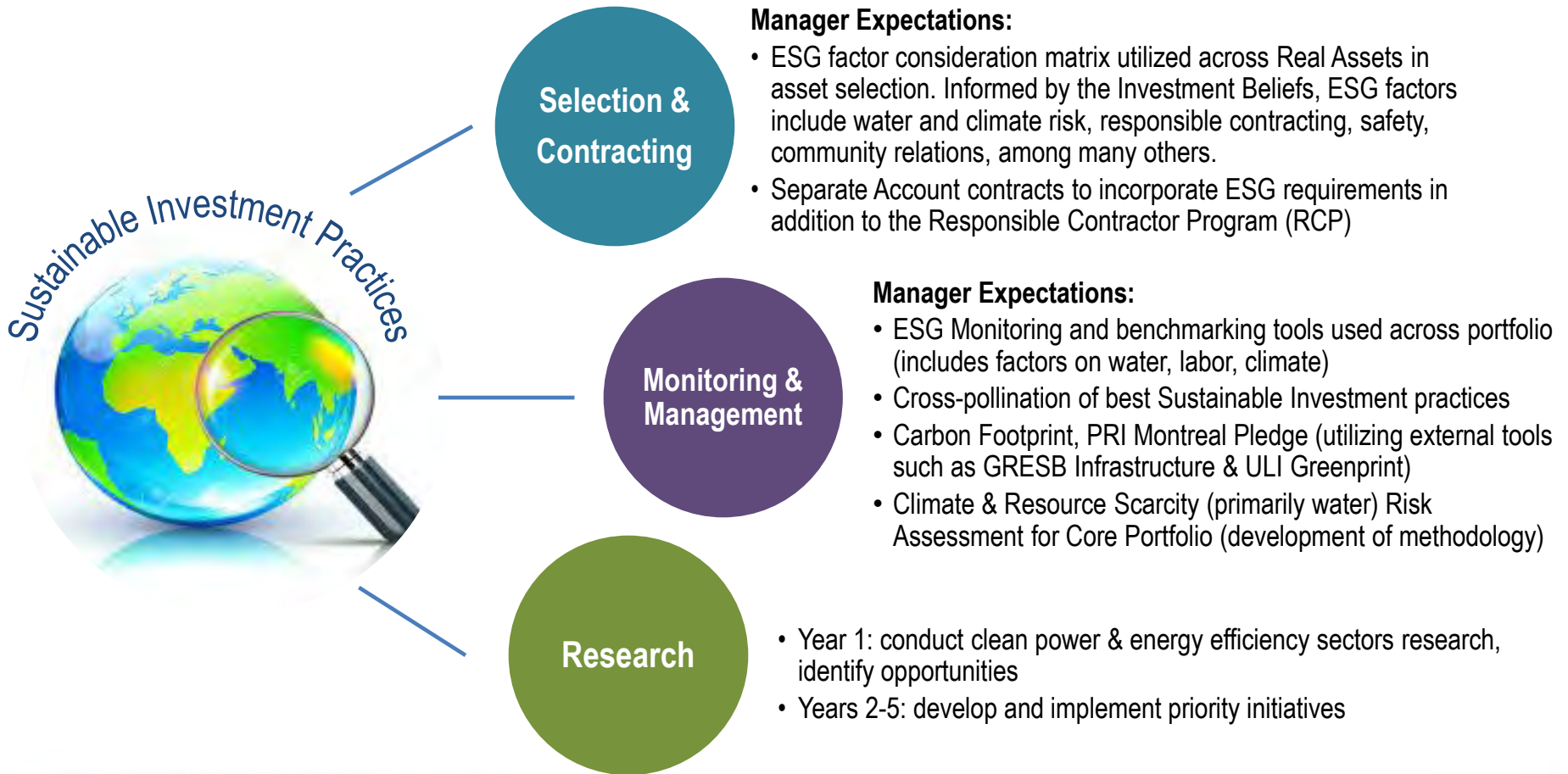
Real Estate – Emerging Manager and Transition Manager Programs

These Programs provide an opportunity to invest with successful early and mid-stage managers

Parameter	Emerging Manager	Transition Manager
Estimated Future Commitments Over a Five Year Period	Up to \$500M	Up to \$2B
Number of Managers at Program Maturity	Up to 6	Up to 5
Geographic Focus	California	TBD
Risk	Opportunistic	TBD
Manager Oversight	External Advisor/Mentoring Manager	Staff
Business Model	Primarily Separate Accounts	Separate Accounts & Commingled Funds
Firm Assets Under Management	Less than \$1B	TBD
Length of Track Record	First, Second or Third Separate Account or Institutional Fund	Fourth, Fifth and Sixth Separate Account or Institutional Fund
Estimated Time Frame for Manager to Complete Program	5 – 10 Years	5 – 15 Years

Real Assets – ESG Integration

Goals for Next 5 Years

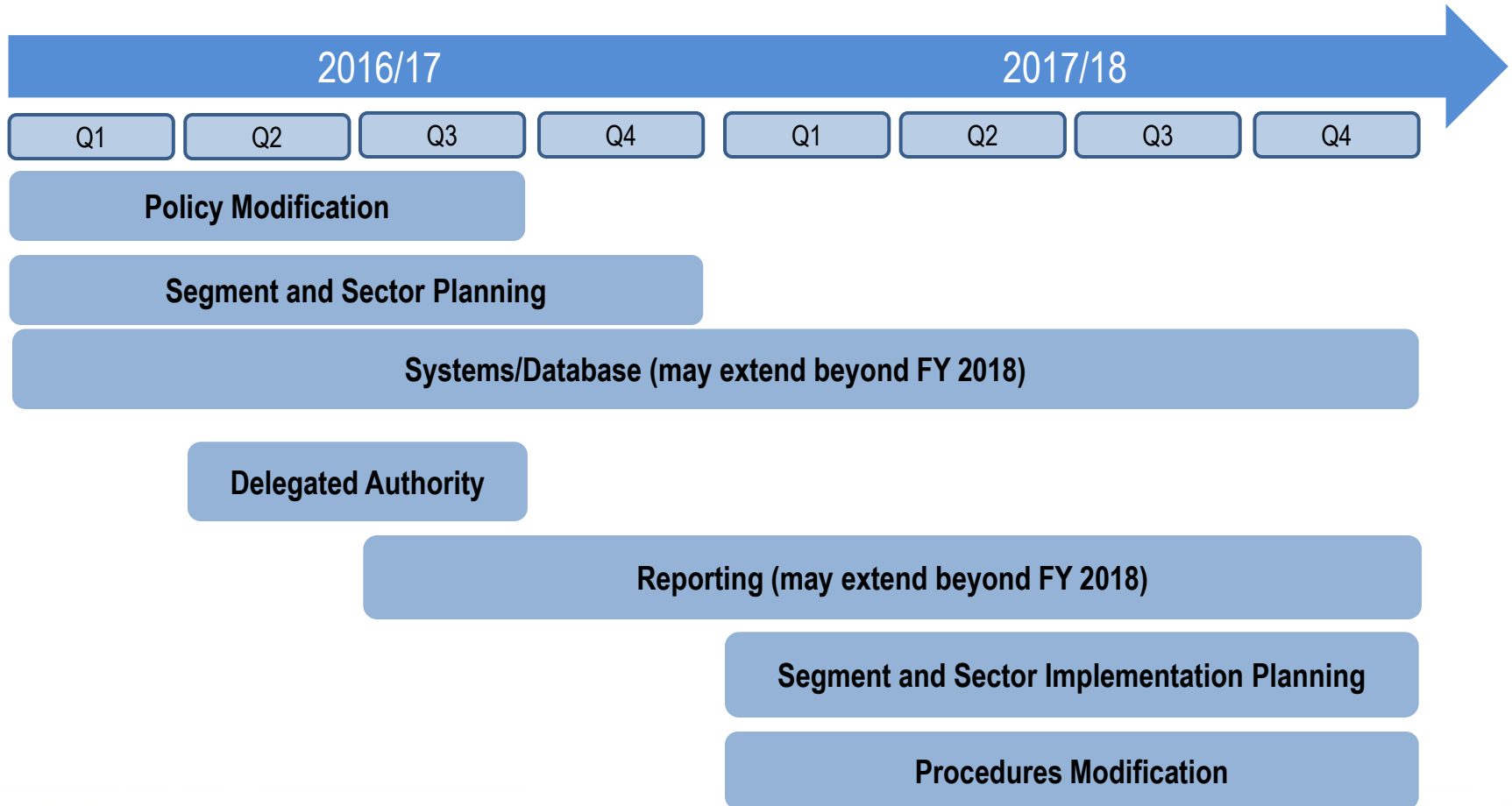


Section IV: Implementation & Conclusion

- Real Assets Proposed Strategic Plan Implementation
- Real Assets Conclusion Strategy Summary
- Real Assets Conclusion Integration / ALM 2017

Real Assets Proposed Strategic Plan Implementation

Ongoing planning in FY 2016-17 with implementation in FY 2017-18



Real Assets Conclusion – Strategy Summary (1 of 2)

Investment Strategy substantially unchanged

Refining and harmonizing portfolio structure, parameters and nomenclature

<p>Risk</p>	<ul style="list-style-type: none"> • Private Real Assets equity – providing diversification of equity risk • Mitigate Asset class risk through: <ul style="list-style-type: none"> • Majority of program (75-90%) – high quality Core assets held through business cycles • Durable cash flow – producing stable and predictable cash yield • Revenue models – supporting inflation protection
<p>Geography</p>	<ul style="list-style-type: none"> • Focus majority of portfolio in the U.S. (70-100%) • International investments aligned with role in developed and emerging markets • Acquire and maintain exposures to well located assets
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Real Assets Conclusion – Strategy Summary (2 of 2)

Strong governance focused on economic alignment, transparency and cost efficiency

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Real Assets Conclusion - Integration / ALM 2017

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Items to be evaluated in Asset Liability Management (ALM) 2017 process:

ALM 2017

- Real Assets Benchmarks
 - Current Real Assets Benchmark: 83% Real Estate (NCREIF- ODCE); 8.5% Infrastructure (CPI +4%); 8.5% Forestland (NCREIF Timberland Index)
- Role of Forestland program
- Real Assets allocation

Section V: Real Assets Information

- Real Assets INVO ALM
- Real Assets Current Market Conditions
- Real Assets Performance
- Real Assets Current Portfolio Characteristics
- Real Assets Estimated Pro-Forma Portfolio Characteristics

Real Assets - INVO ALM

Strategic Plan based on ALM 2013; Next ALM is in 2017

Asset Class	Role	Benchmark	Allocation Target/Range	Compound E(R)	Volatility (St. Dev.)
Real Assets	Stable and predictable cash yield Economic diversification of equity risk Inflation protection	83% Real Estate benchmark + 8.5% Infrastructure benchmark + 8.5% Forestland benchmark	N/A	N/A	N/A
Program	Role	Benchmark	Allocation Target/Range	Compound E(R)	Volatility (St. Dev.)
Real Estate	Stable cash yield with real property ownership Economic diversifier Partial inflation hedge	NCREIF ODCE	Interim Target/Range 10% 5% to 15% Strategic Target/Range 11% 6% to 16%	7.00	14.00
Infrastructure	Predictable returns with essential infrastructure assets ownership Economic diversifier, moderate long-term inflation protection	Consumer Price Index + 4% lagged one quarter	Interim Target/Range 2% 0% to 4% Strategic Target/Range 3% 1% to 5%	7.00	11.00
Forestland	Forestland properties ownership Long-term inflation protection	NCREIF Timberland Index			

Real Assets – Current Market Conditions

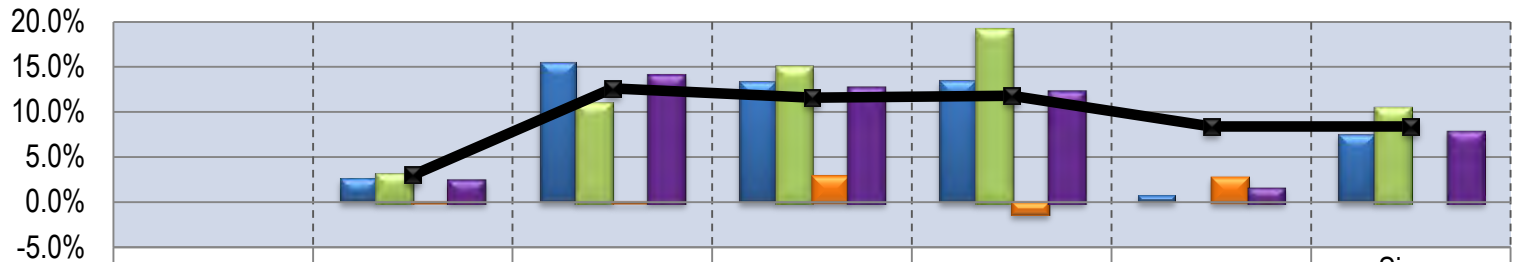
Continued competitive environment for asset buyers

Program	Market Conditions
Real Estate	<ul style="list-style-type: none"> • Continued robust pricing for core assets • Volatility in public markets, slowing global growth, and uncertain Fed policy • Increasing supply in apartments, industrial, and office sectors although more restrained in latter two sectors • Net Operating Income (NOI) growth across property sectors is positive but moderating
Infrastructure	<ul style="list-style-type: none"> • Core assets continue to be in high demand with institutional and strategic investors leading bids • Valuation levels have exceeded pre-Global Financial Crisis (GFC) levels • Energy continues to be the most abundant investment opportunity in the U.S. • Transportation and water opportunities more abundant in the U.K. and Australia
Forestland	<ul style="list-style-type: none"> • Recent timberland transaction activity has been slightly below average • Low housing demand and increasing inventory levels in the U.S. South have led to low / slow pricing recovery

Real Assets - Performance

Total Program outperforms in the 1, 3, and 5 Year Periods

Net Returns by Risk Classification

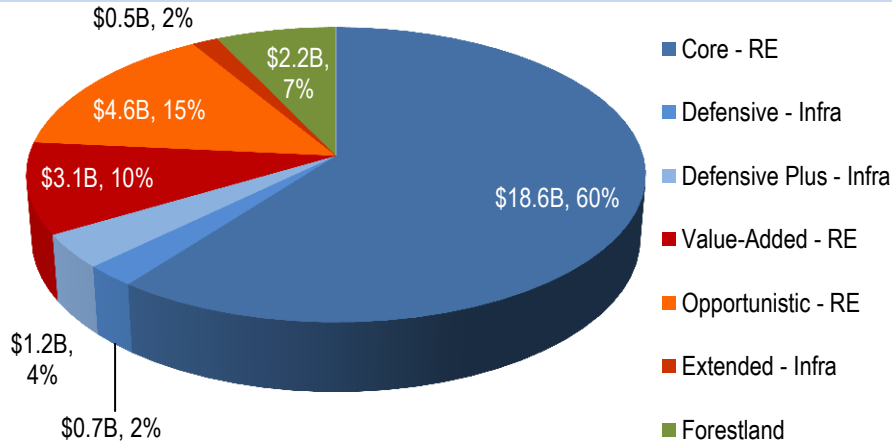


	NAV as a % of Total Program	Quarter Ending 09/30/2015	1-Year	3-Year	5-Year	10-Year	Since Inception of Investment
Real Estate	85.6%	2.6%	15.5%	13.4%	13.5%	0.8%	7.6%
Infrastructure	7.4%	3.2%	11.0%	15.0%	19.1%	N/A	10.5%
Forestland	7.0%	0.0%	0.0%	2.8%	-1.3%	2.7%	N/A*
Total Program	100.0%	2.5%	14.0%	12.7%	12.2%	1.6%	7.8%
Real Assets Benchmark (CPERRABX)	N/A	3.0%	12.6%	11.6%	11.8%	8.4%	8.4%
Difference between Total Program and Benchmark	N/A	-0.5%	1.4%	1.1%	0.4%	-6.8%	-0.6%

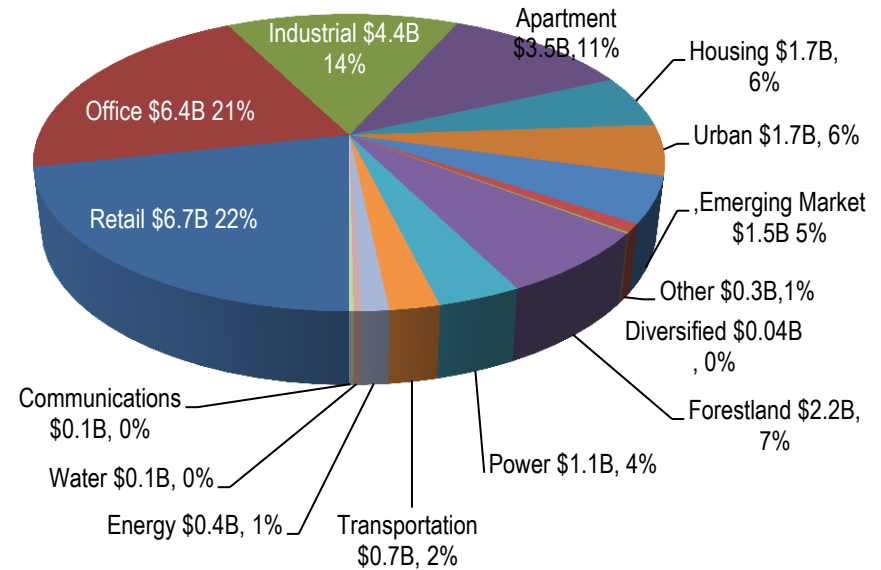
Real Assets – Current Portfolio Characteristics

Numerous classifications across three programs

Risk Classification



Sector



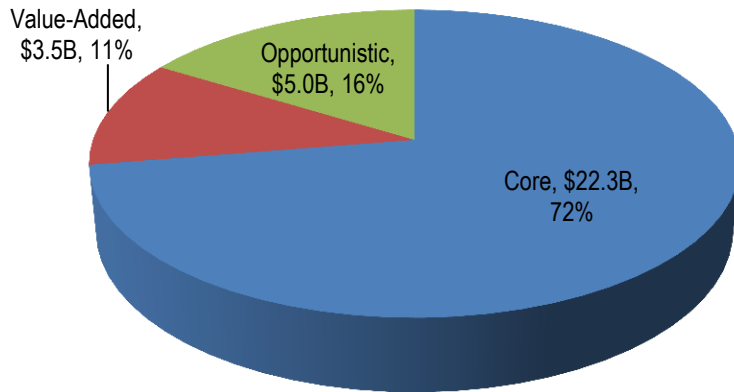
Current portfolio nomenclature and classifications:

- Numerous risk classifications across programs
- Numerous sectors classifications across programs

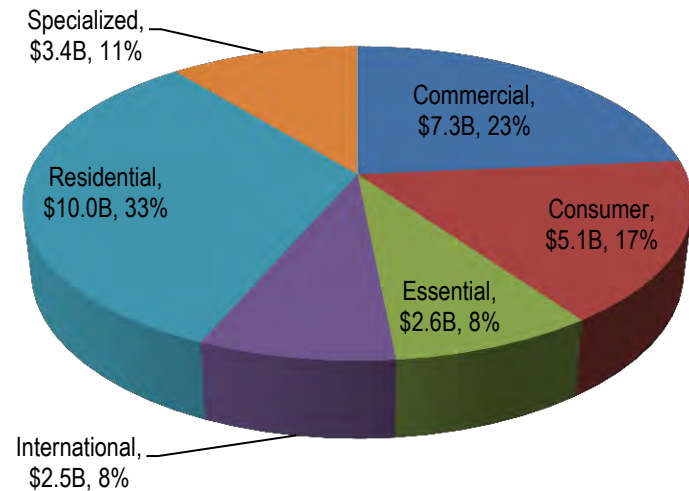
Real Assets – Estimated Pro-Forma Portfolio Characteristics

Proposed risk and segment classifications
Harmonizing nomenclatures

Risk Classification



Segments



Proposed structure:

- Above graphs illustrate proposed risk classification and segments using estimated pro-forma figures as of 9/30/2015
- Sectors (e.g. Office, Energy) would reside one level below Segments in the proposed hierarchy

Real Estate Appendix




- Real Estate Messages
- Real Estate Proposed Changes and Impact
- Real Estate Current Portfolio Parameters
- Real Estate Performance
- Real Estate Characteristics

Real Estate - Messages

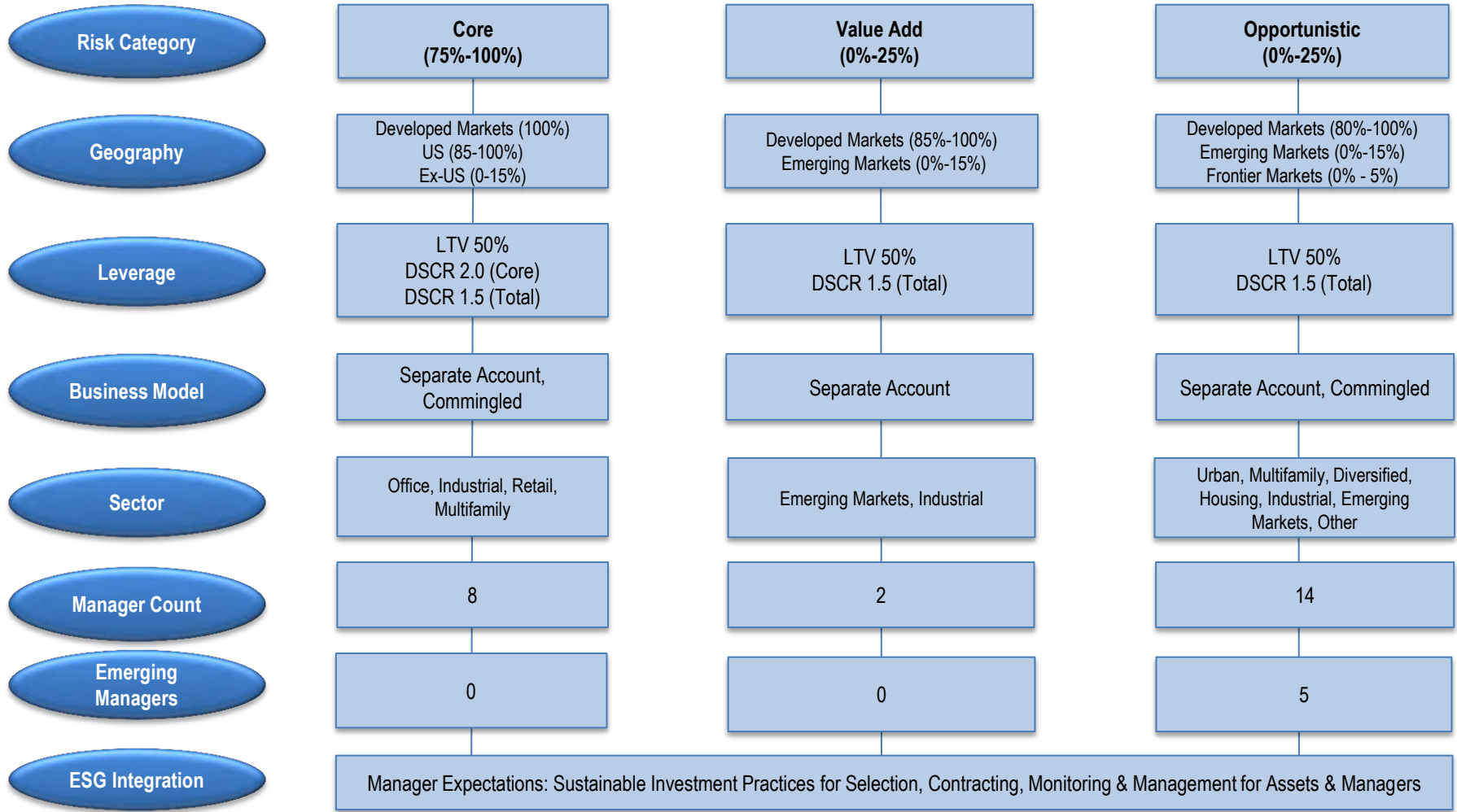
Topic	Message
Risk	Continuing focus on Core – reduces risk
Geography	Continuing focus on U.S. – reduces risk International investments aligning with role in developed and emerging markets
Leverage	Continuing moderate leverage levels – reduces risk Pilot Real Estate Leverage Program: <ul style="list-style-type: none"> • Implement an unlevered RE partnership mandate(s) • Leverage could potentially be added and managed internally by Staff at Total Fund or Real Assets level • Security for leverage could potentially be at the RE (Individual asset, Sub-Portfolio, Total Portfolio) or Total Fund level • Leverage Pilot Program plan to be approved by ISG prior to implementation • Evaluate reducing costs and complexity, and increasing alignment and transparency
Business Model	Continue primary focus on Separate Accounts Continue secondarily focus on Operating Companies
Specialized Programs	Continuing implementation of ESG goals set for the next 5 years Continuing implementation of Real Estate Emerging Manager and Transition Manager Programs
External Managers	Manager Limit Target: Movement toward fewer and larger external manager relationships, consistent with Vision 2020
Portfolio Hierarchy	Harmonizing Portfolio Hierarchy – reduces complexity

Real Estate - Proposed Changes and Impact

Structural changes simplify portfolio and promote integration of Real Estate Program with the Infrastructure and Forestland Programs

Category	Changes		Impact
Additions	<ul style="list-style-type: none"> • Risk: Development limit of 0-10% (Build-to-Core) • Manager Limit Target: 15 		<ul style="list-style-type: none"> • Reduces risk • Reduces complexity • Reduces cost
Deletions	<ul style="list-style-type: none"> • Portfolio Hierarchy: <ul style="list-style-type: none"> • Base Core / Domestic Tactical / International Tactical strategies eliminated • Strategic and Legacy sub-portfolios eliminated 		<ul style="list-style-type: none"> • Reduces complexity
Modifications	<ul style="list-style-type: none"> • Portfolio Hierarchy: Sectors to be classified within Segments (Essential, Consumer, Residential, Commercial, Specialized and International) 		<ul style="list-style-type: none"> • Reduces complexity

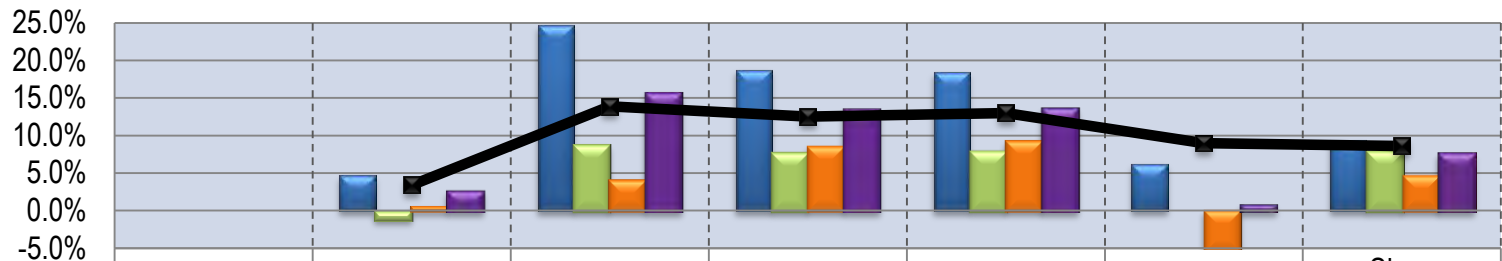
Real Estate - Current Portfolio Parameters



Real Estate - Performance

Total program outperforms in 1, 3, and 5 year periods
Core outperforms in all periods except 10 year period

Net Returns by Risk Classification



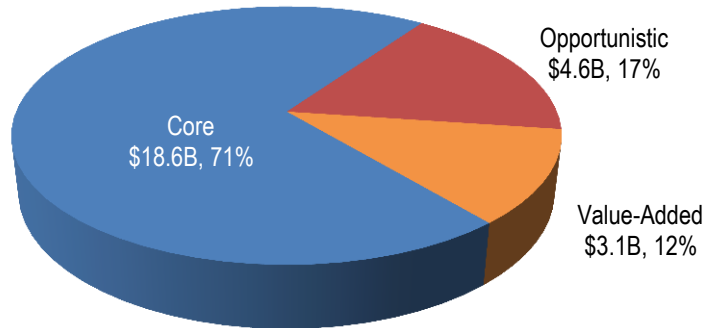
	NAV as a % of Total Program	Quarter Ending 09/30/2015	1-Year	3-Year	5-Year	10-Year	Since Inception of Investment
Core	58.3%	4.7%	24.7%	18.7%	18.4%	6.2%	9.3%
Value-Add	18.3%	-1.1%	8.6%	7.6%	7.8%	N/A	7.8%
Opportunistic	23.4%	0.5%	4.0%	8.5%	9.2%	-5.4%	4.6%
Total Program	100.0%	2.6%	15.5%	13.4%	13.5%	0.8%	7.6%
RE Program Benchmark (CPERSREX)	N/A	3.4%	13.9%	12.5%	13.0%	9.0%	8.6%
Difference between Total Program and Benchmark	N/A	-0.8%	1.6%	0.9%	0.5%	-8.2%	-1.0%

Real Estate – Characteristics

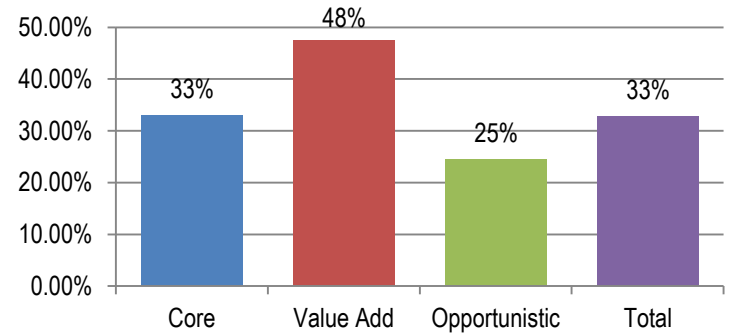
Real Estate Portfolio is primarily U.S. Core with modest leverage

As of 9/30/15, Adjusted NAV of \$25.7 Billion (8.9% of Total Fund) – \$9.5 Billion Unfunded

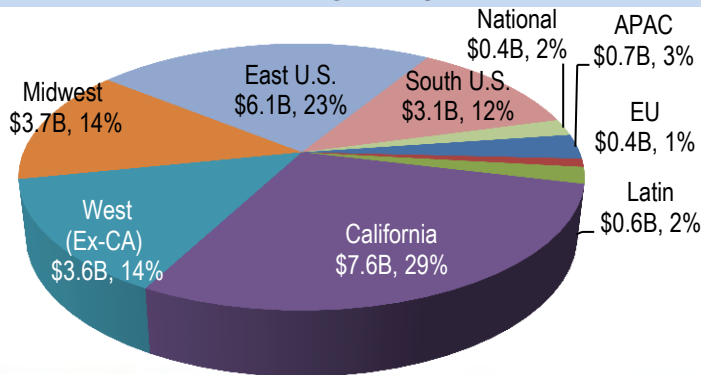
Risk



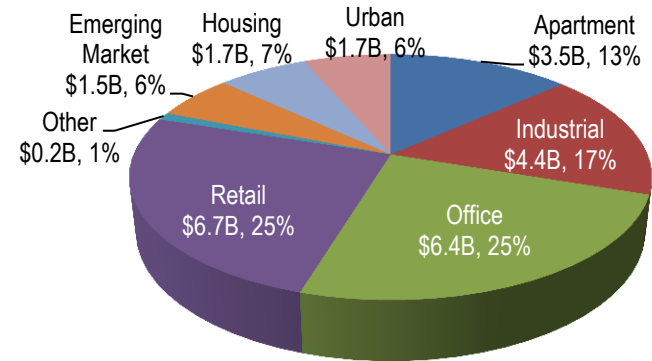
Leverage – LTV (%)



Geography



Sector



Infrastructure Appendix

- Infrastructure Messages
- Infrastructure Proposed Changes and Impact
- Infrastructure Current Portfolio Parameters
- Infrastructure Performance
- Infrastructure Characteristics

Infrastructure - Messages

Topic	Message
Risk	Continuing focus on Core assets – reduces risks Adding 10% Development limit (Build-to-Core)
Geography	Continuing focus on U.S. and International developed markets – reduces risks
Leverage	Maintain current LTV limit of 65% Adding DSCR 1.25 minimum – reduces risks
Business Model	Primarily focusing on Separate Accounts Secondarily focusing on Directs
External Managers	Manager Limit Target: Movement toward fewer and larger external manager relationships, consistent with Vision 2020
Key Parameters Applicability Minimum (NAV)	Increasing from \$3B to \$5B
Portfolio Hierarchy	Harmonizing Portfolio Hierarchy – reduces complexity

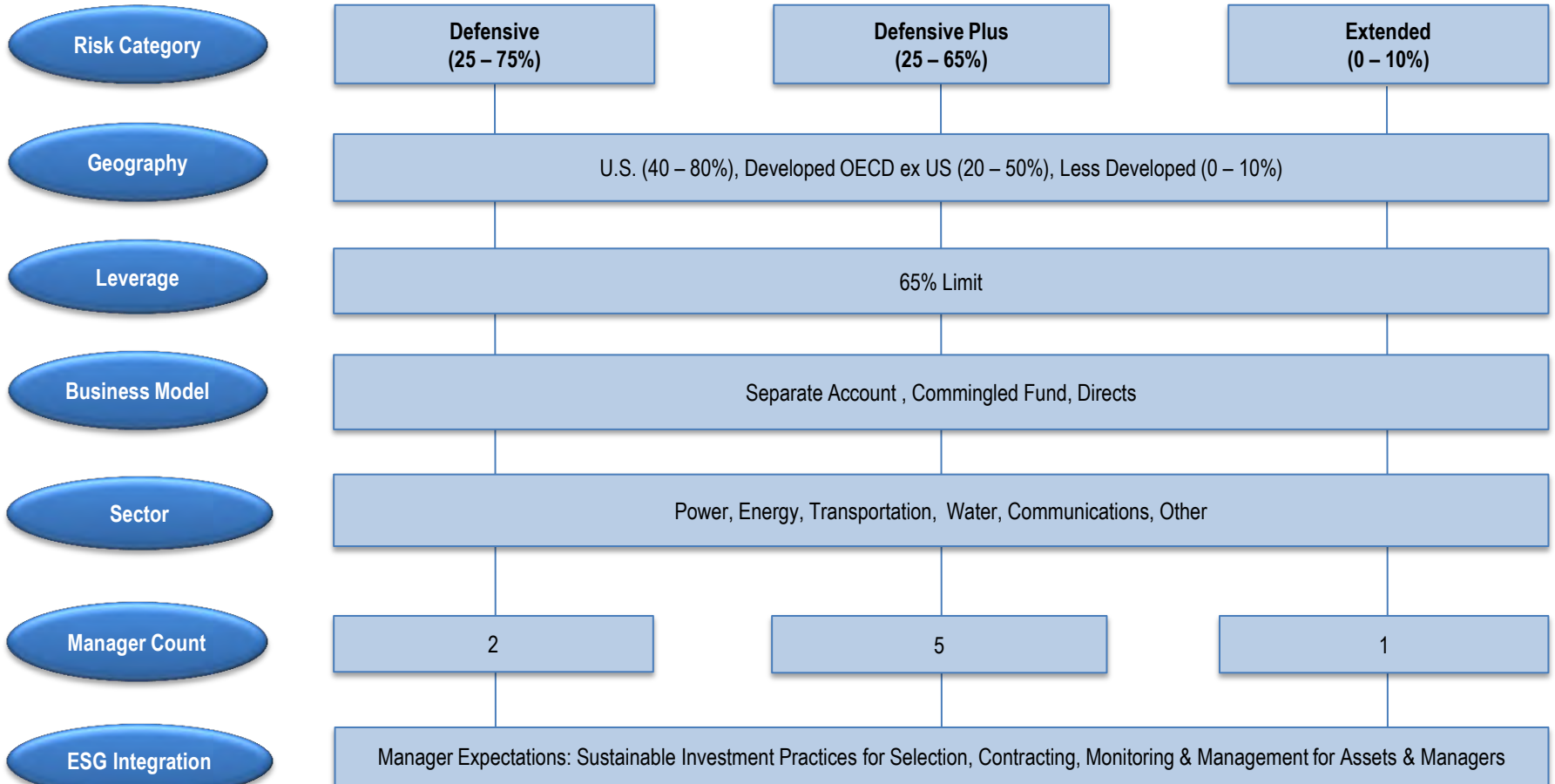
Infrastructure - Proposed Changes and Impact

Infrastructure will be further integrated into RAU and better diversified, with access to a broader opportunity set

Category	Change	Impact
Addition(s)	<ul style="list-style-type: none"> Risk: Development limit 0-10% (Build-to-Core) Leverage: DSCR target of 1.25x Manager Limit Target: 10 	<ul style="list-style-type: none"> Reduces risk Increases transparency Reduces costs
Deletion(s)	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Modification(s)	<ul style="list-style-type: none"> Risks: <ul style="list-style-type: none"> -New: Core (60-100%); Value Add: (0-25%); Opportunistic: (0-25%) -Eliminate: Defensive (25-75%); Defensive Plus (25-65%); Extended (0-10%) Geography: <ul style="list-style-type: none"> -Eliminate: US (40-80%) / Developed ex-US (20-50%) / Less Developed (0-15%) -New: US (50-100%); International Developed (0-50%) / International Emerging Markets (0-15%) / International Frontier Markets (0-5%) Portfolio Hierarchy: <ul style="list-style-type: none"> -Segments: <ul style="list-style-type: none"> o Essential: Power and Energy, Water, Waste o Consumer: Communications o Commercial: Transportation Key Parameters Applicability Minimum: Increased from \$3B to \$5B 	<ul style="list-style-type: none"> Reduces risk Reduces complexity Increases transparency Increases flexibility



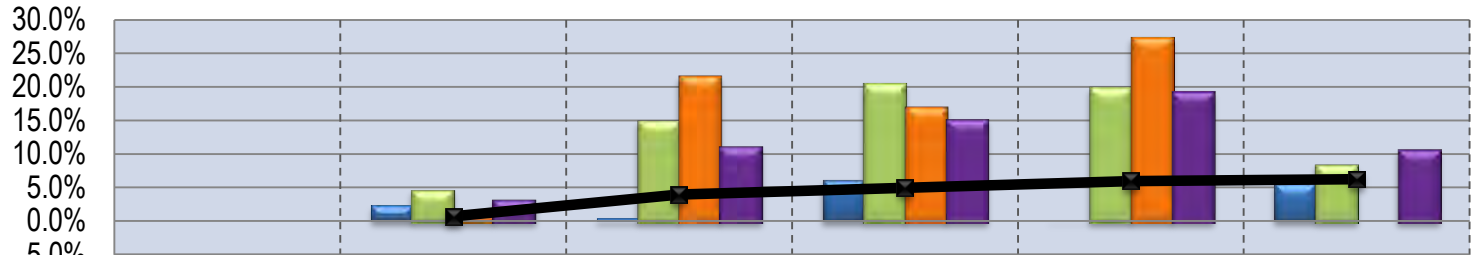
Infrastructure - Current Portfolio Parameters



Infrastructure - Performance

The Infrastructure Program outperformed the benchmark in all periods

Net Returns by Risk Classification



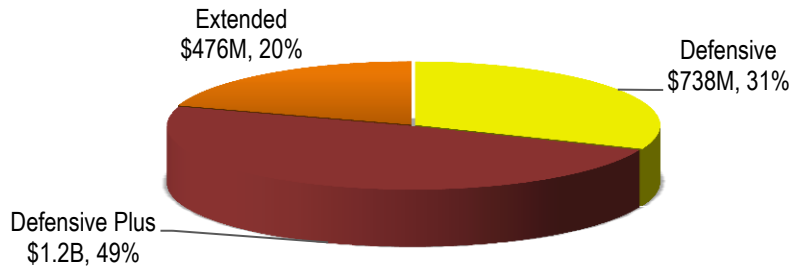
	NAV as a % of Total Program	Quarter Ending 09/30/2015	1-Year	3-Year	5-Year	Since Inception (04/01/2007)
Defensive	32.1%	2.3%	0.4%	6.1%	N/A	5.6%
Defensive Plus	49.2%	4.5%	14.8%	20.3%	19.7%	8.3%
Extended	18.8%	1.3%	21.5%	16.9%	27.2%	N/M
Total Program	100.0%	3.2%	11.0%	15.0%	19.1%	10.5%
CPI + 400 BPS	N/A	0.7%	4.0%	5.0%	5.9%	6.3%
Difference between Total Program and CPI + 400 BPS	N/A	2.5%	7.0%	10.0%	13.2%	4.2%

Infrastructure - Characteristics

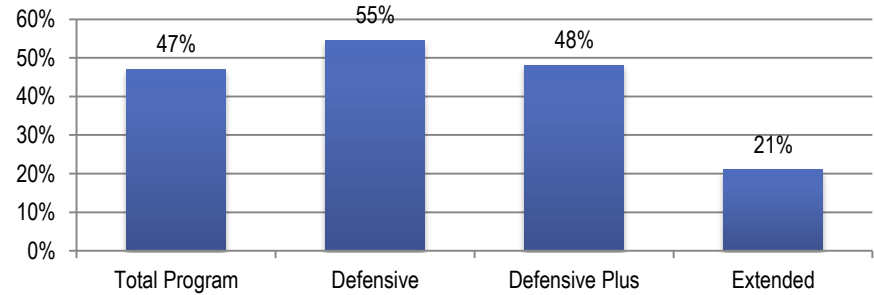
The Program is in ramp up mode

As of 9/30/2015, Total Adjusted NAV of \$2.37 Billion (0.9% of Total Fund) – \$2.22 Billion Unfunded

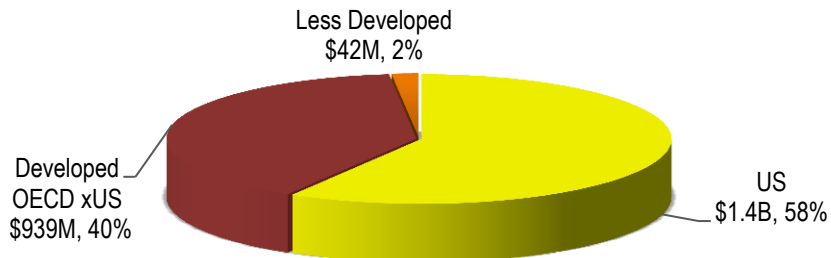
Risk



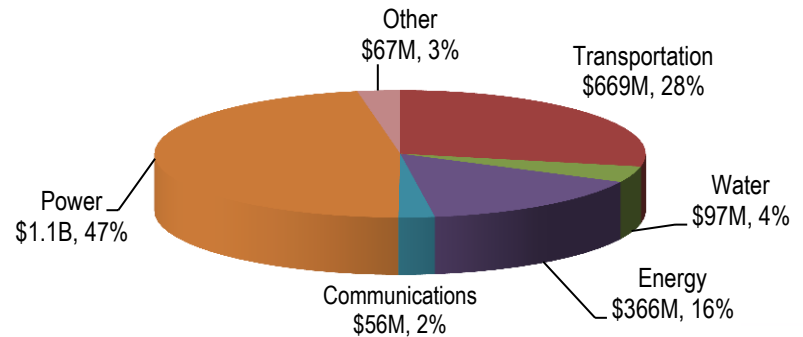
Leverage – LTV (%)



Geography



Sector



Forestland Appendix

- Forestland Messages
- Forestland Scalability Analysis
- Forestland Proposed Changes and Impact
- Forestland Current Portfolio Structure and Proposed Parameters
- Forestland Performance
- Forestland Characteristics

Forestland - Messages

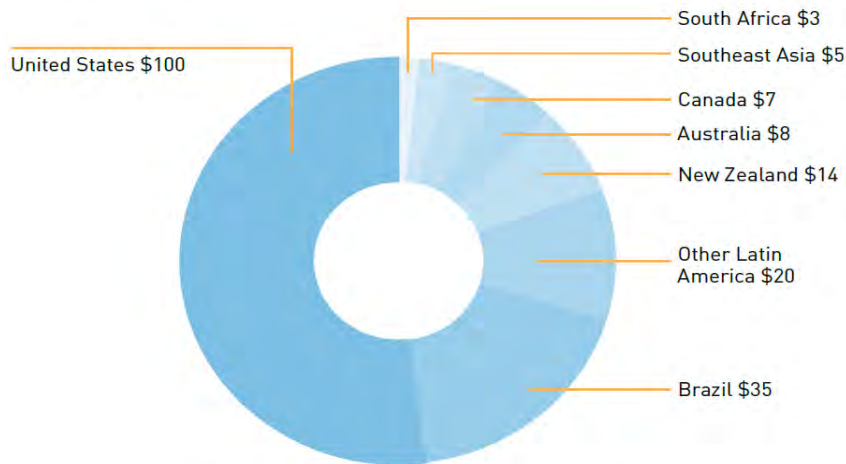
Topic	Message
Current Status	<ul style="list-style-type: none"> • International portfolio outperformed the benchmark since (10/1/07) • Domestic portfolio is under restructuring
Implementation Challenges	<ul style="list-style-type: none"> • Challenging to scale at a meaningful level for CalPERS • It may take Program 5+ years to get to a 1% allocation and 11+ years to get to a 2% allocation • At 2% of allocation (\$6B), CalPERS would comprise 6.7% of the global timberland market*
ALM 2017	<ul style="list-style-type: none"> • Forestland's role to be evaluated as part of 2017 ALM Process

Forestland – Scalability Analysis

Forestland is challenging to scale at a meaningful level for CalPERS

- **Transactions:** Annual average transaction volume of approximately 32 transactions or \$3B
- **Managers:** The top ten Timber managers' assets under management total \$44B

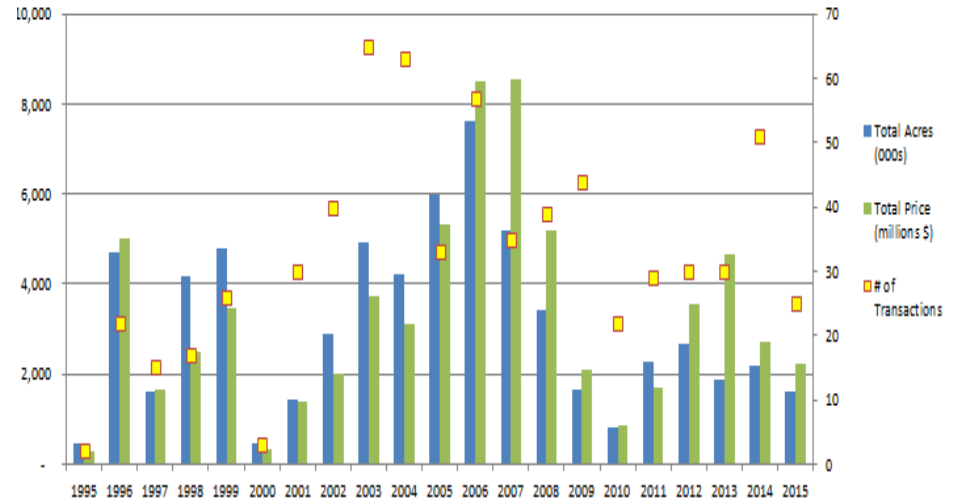
Timberland Investment Universe by Region (USD Billion)



Source: New Forests data, June 2015. NB: Does not include Europe.

Major U.S. Timberland Transactions 1995-2015⁽¹⁾

(Total Acres and Total Price - left scale; # of Transactions - right scale)




Sources: RISI; Equity Research Associates

⁽¹⁾Excludes transactions of less than \$1M

Forestland - Proposed Changes and Impact

Forestland will be further integrated into Real Assets

Category	Change	Impact
Addition(s)	<ul style="list-style-type: none"> • Risk: <ul style="list-style-type: none"> • Core (75-100%) • Value Add (0 – 25%) • Opportunistic (0-25%) • Development limit 0-10% (Build-to-Core) • Geography: <ul style="list-style-type: none"> • U.S. (50-100%) • International Developed (0-50%) • Emerging Markets (0-15%) • Frontier Markets (0-5%) • Leverage: DSCR target of 1.25x • Manager Limit Target: 10 (Infrastructure and Forestland combined) 	 <ul style="list-style-type: none"> • Reduces risk • Increases transparency • Reduces costs
Deletion(s)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Modification(s)	<ul style="list-style-type: none"> • Portfolio Hierarchy: <ul style="list-style-type: none"> -Segments: <ul style="list-style-type: none"> ○ Essential: Timber, Agriculture 	<ul style="list-style-type: none"> • Reduces complexity • Increases transparency

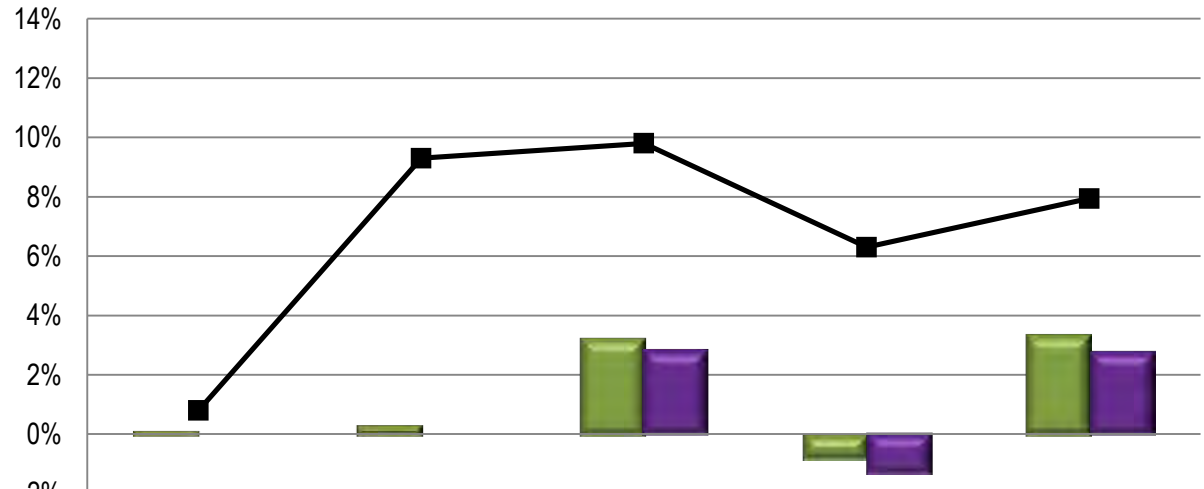
Forestland – Current Portfolio Structure and Proposed Parameters

	Current	Proposed
Risk Category	Not Established	Core: 75-100% Value Add: 0-25% Opportunistic: 0-25% Development: 0-10%
Geography	Not Established	US: 50-100% International Developed: 0-50% International Emerging Markets: 0-15% International Frontier Markets: 0-5%
Leverage	40% LTV Program Limit Actual 21.2%	40% LTV Program Limit DSCR: 1.25
Business Model	Separate Account (2 accounts, 100%; \$2.2 B)	Primarily Separate Account
Manager Count	Not Established	10 (Infrastructure and Forestland combined)
ESG Integration	Manager Expectations: Sustainable Investment Practices: Selection, Contracting, Monitoring & Management	Manager Expectations: Sustainable Investment Practices: Selection, Contracting, Monitoring & Management
Sector	Forestland	Forestland/Agriculture
Asset Type	Sawtimber, Pulpwood	Sawtimber, Pulpwood, Agricultural Products

Forestland - Performance

Forestland has underperformed across all periods

Gross Returns versus Net Returns



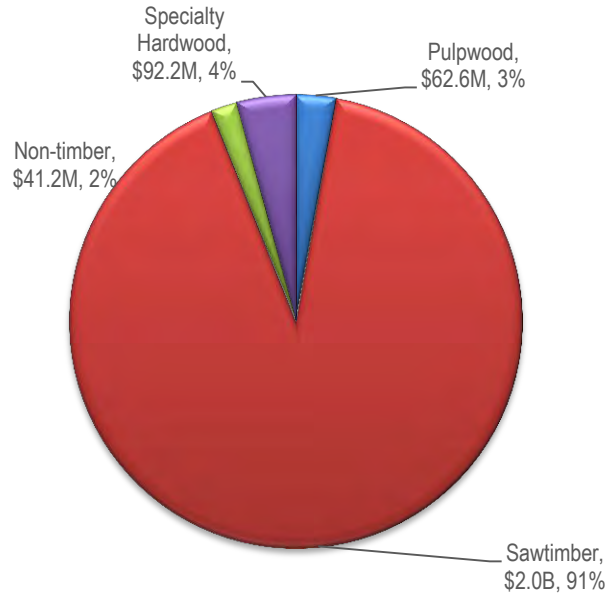
	Quarter Ending 09/30/2015	1-Year	3-Year	5-Year	10-Year
Total Forestland - Gross	0.1%	0.3%	3.2%	-0.8%	3.3%
Total Forestland - Net	0.0%	0.0%	2.8%	-1.3%	2.7%
NCREIF Timberland Index	0.8%	9.3%	9.8%	6.3%	7.9%
Difference Between Forestland Returns and NCREIF Timberland Index (Both Gross of Fees)	-0.7%	-8.9%	-6.6%	-7.1%	-4.6%

Forestland - Characteristics

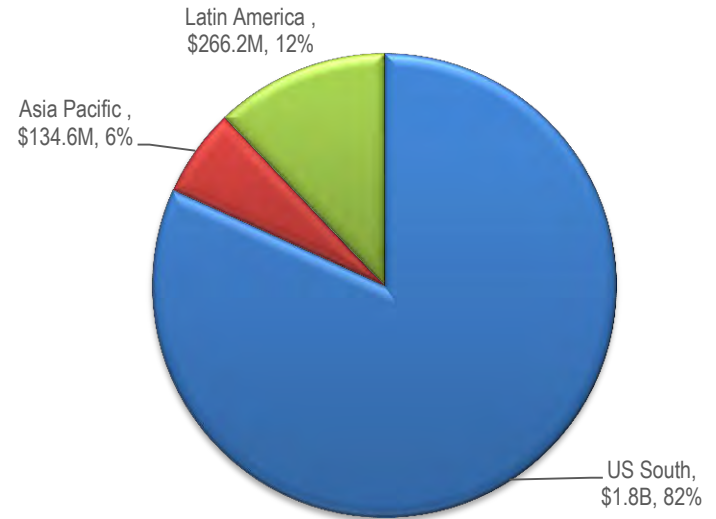
Forestland investments are concentrated in Sawtimber in the Southern United States.

As of 9/30/15, Total NAV of \$2.2 Billion (0.8% of Total Fund) – \$0 Billion Unfunded

Product Type (%)



Geography Exposure (%)



Source: CalPERS

Glossary Appendix

Glossary

Below is a list of terms that appear in the 2016 RAU Strategic Plan. A definition and slide number where it first appears are provided below.

Cap Rate Reversion: Cap rates adjusting to historical mean levels. (Slide #11)

Capital Expenditures (capex): Investment expenditures that are capitalized onto the balance sheet (vs expensed in the current period). (Slide #11)

Cash Yield (%): Net cash flow divided by Net Asset Value (NAV) paid to owner. (Slide #7)

Climate & Resource Scarcity Risk Assessment: The assessment of value at risk due to short, medium and long term risks from resource scarcity (primarily water) and climate change (physical risk to asset from sea level rise, storms). (Slide #26)

Debt Service Coverage Ratio (DSCR): Net operating income divided by total debt service. (Slide #10)

Development (Build-to-Core): Development intended for inclusion in the Core portfolio upon stabilization. (Slide #10)

Direct Investments (Directs): Investments that are purchased and owned directly by an investor without a dedicated manager. (Slide #9)

Frontier Markets (Frontier): Frontier Markets are those that are less economically established than Emerging markets but have investable stock markets. Examples include Vietnam, Nigeria, and Argentina. (Slide #10)

Loan-to-Value ratio (LTV): (Debt divided by asset value). (Slide #5)

Merchant (renewal risk) / Value of cash flows post-contract : Contract renewal risks. / The value of the cash flows that occur after contract expiration. (Slide #11)

Net Asset Value (NAV): The value of an investment's assets less the value of its liabilities. (Slide #5)

Glossary

Operating Companies: An investment vehicle structure responsible for day to day management of the investments of the vehicle. (Slide #9)

Operational expenses (opex): Expenses incurred during normal course of operations reflected in the income statement (vs. capitalized on the balance sheet). (Slide #11)

Separate Account: An investment vehicle structure with a manager solely dedicated to the investor. (Slide #9)