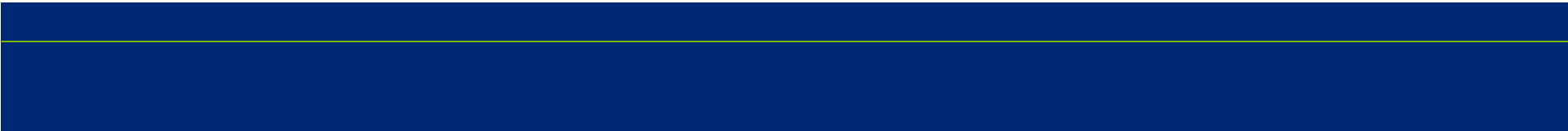




Financing Low-Carbon Development through the Capital Markets

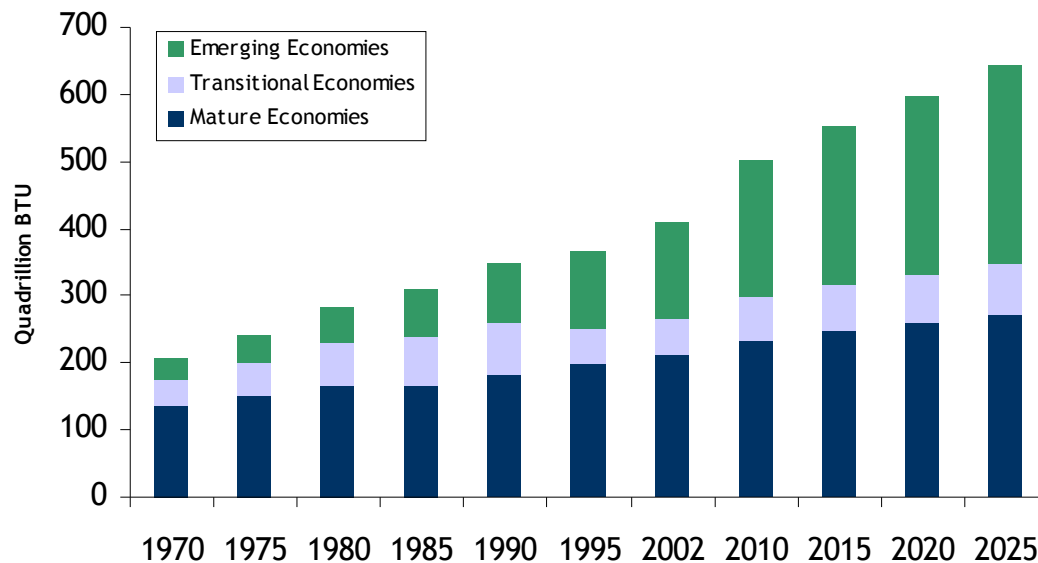
Russell Read, Ph.D., CFA
Chairman, C Change Investments
17 June 2010



Backdrop: Energy Market Outlook

Global energy demand is growing rapidly—Asia took center stage beginning around 2000

Forecasted Global Energy Use (1970 - 2025)



- Total world consumption of marketed energy is expected to expand from 412 quadrillion British thermal units (Btu) in 2002 to 645 quadrillion Btu in 2025, or a **57-percent increase** over the 2002 to 2025 time period
- The emerging economies, driven by China, India, and others in Asia will account for nearly **two-thirds** of the increase in world energy use, surpassing energy use in the mature market economies for the first time in 2020.

Approximately \$17 trillion in new investment will be needed over the next 20 years to meet future fuels demand alone

Source - Energy Information Administration

Capital and Innovation in Energy- and Materials-Related Private is the Most Promising It's Been in Decades

- All aspects of the system from the wellhead to pipelines and tankers to drilling rigs to refineries are at or near 100% capacity.
- Slack supply capacity for most energy and materials has evaporated since 1980 (e.g., petroleum: from 17 mBPD to 1-3 mBPD)
- Massive capital requirements to upgrade energy infrastructure
 - \$17 trillion for Fuels
 - \$44 trillion, all energy
 - \$100 trillion, existing but problematic infrastructure



Source - Simmons & Company International

Risk of Not Investing—Green Investing as a Super-Theme

- Opportunity: Pervasive across asset classes
- Risk of Missing Theme: Investment opportunities and returns are likely to be disproportionately represented by green investments
- Transformation in Capital Markets: Major dislocations and shifts in opportunity can be expected by geography and asset class

Clean versus Cleaner

- Clean
 - Alternative energy technologies intended to have minimal impact on the natural environment
 - Examples: wind, solar, geothermal, hydro, tidal
- Cleaner
 - Focused on transforming the inherent inefficiencies associated with traditional energy production
- Efficiencies from source to use: Coal (<20%), Solar (<15%), Petroleum (<15%)

Critical Sectors for Funds and Funds of Funds Investors

- Cleantech
 - Promoting the revolution in new technologies
 - Venture capital, growth equity, private equity
- Infrastructure
 - Lower-risk investments associated with deploying proven but more efficient technologies into the Asian energy infrastructure
- Real Estate
 - Energy efficiencies and shared savings
 - Fully one-half of energy consumption is associated with buildings

7 Principles for Successful Investment in Natural Resources and Sustainability Going Forward

1. Invest with End Points in Mind
2. Benefit from New Investor/Government/Industry Interdependency
3. Incorporate Rapid Technological Change
4. Adapt to Structural Shortage in Liquidity
5. Develop New Skills Needed for Success
6. Monetize Environmental Costs/Benefits
7. Build or Find Value-Added Capabilities

Principle I – Primacy of End Point Investing

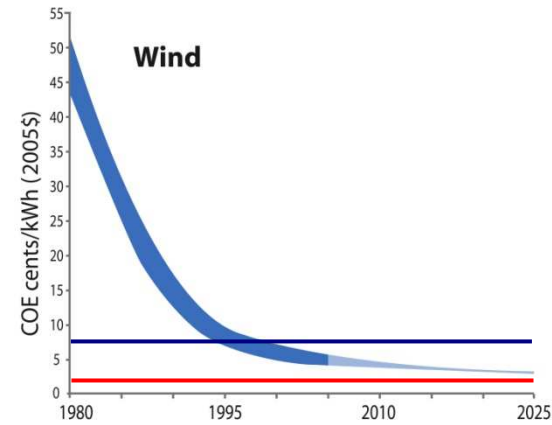
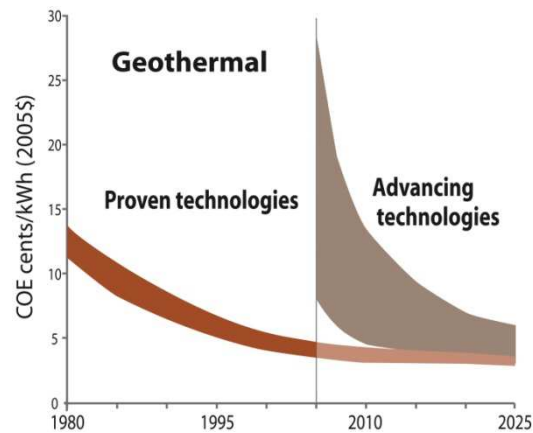
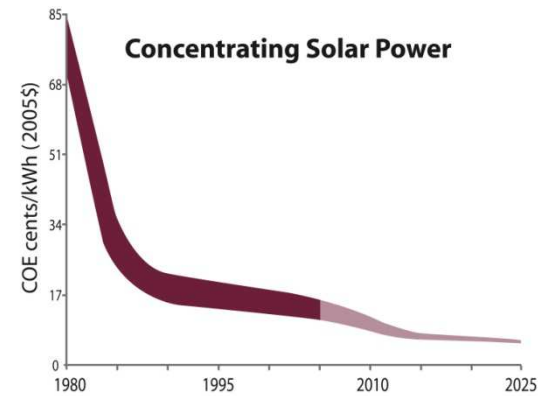
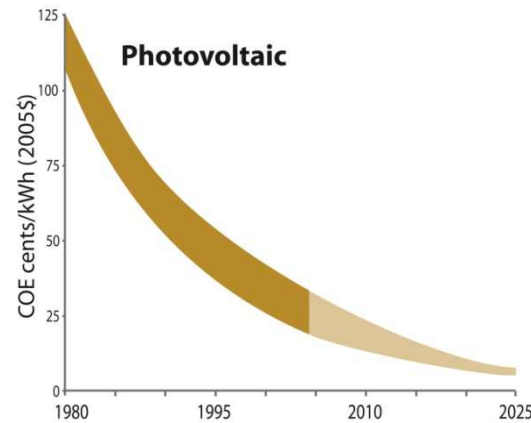
- Revolution in Clean Technologies → rapid change
- Financial, operating, and even most technological risk can be overcome by anchoring company/project cash flows:
 - Long-term Power Purchase Agreements (PPAs)
 - Industrial supply agreements
 - Government purchase agreements
- Company and project investments will generally be too risky without anchoring the cash flows—true for private market and public markets investments
 - Case: 500 competing solar technologies worldwide

Principle II—Interdependency of Investors, Governments, and Industry

- Capital cost requirements dwarf capacity of investors alone—requires significant co-investment from governments and industry
- Governments and industry provide anchor orders and purchase agreements
- Governments can provide critical incentives
- Investor/government/industry partnerships will become ubiquitous

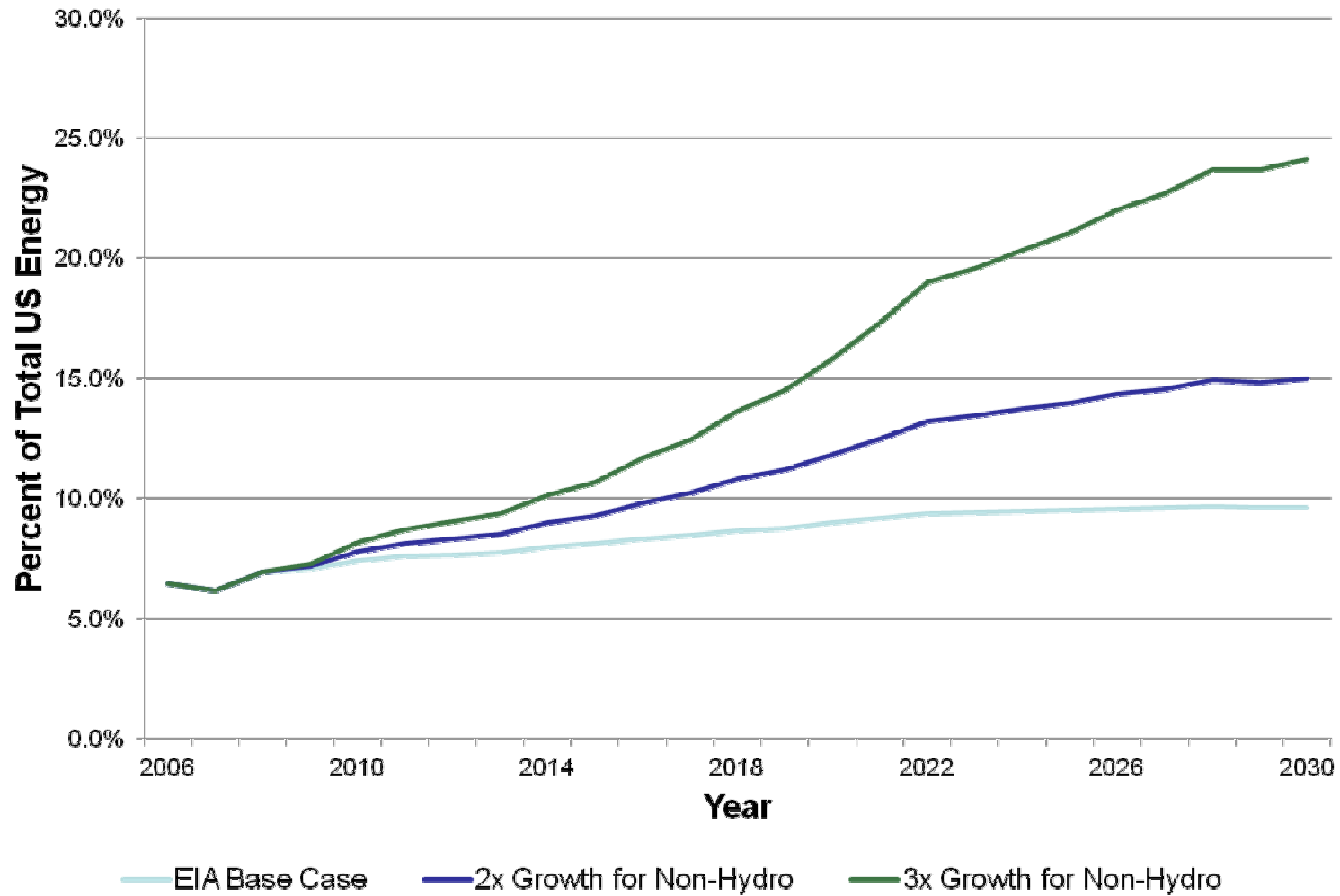
Principle III - Technological change will fundamentally change market opportunities

Forecast and Historical Real Cost Trends of Renewable Energy



Source: NREL Energy Analysis Office
Costs are based on constant 2005 dollars

Potential Share of Renewables in US



Principle IV—Adapt to a Shortage in Financial Market Liquidity Indefinitely

- Massive capital costs associated with clean technology, construction, energy and materials projects will swamp scarce capital
- Structural de-leveraging in the world's financial institutions will likely persist for decades to come
- Scarce liquidity and financing will become a major competitive advantage for investors with liquidity resources
- Prudent investors should demand a premium return in exchange for sacrificing liquidity going forward

Principle V—Fund Managers Need to Develop New Skills to Capitalize on Natural Resources Going Forward

- Nearly three decades have past since last major energy & materials infrastructure investments were made
- Centrality of emerging markets and Asia rather than the OECD in the production and deployment of new technologies and infrastructure reverses practices of 1980s-90s
- Carbon pricing and the monetization of other environmental costs are new to these managers

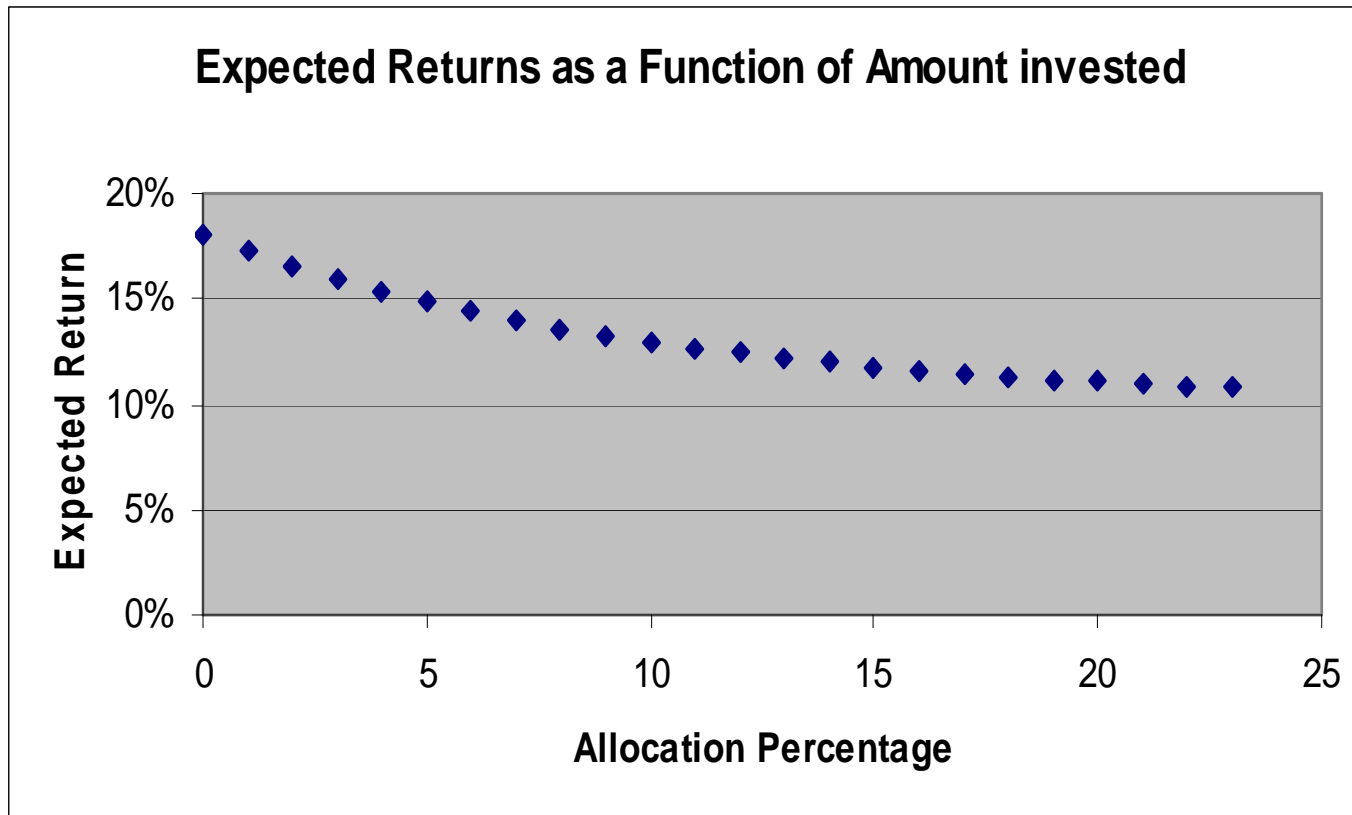
Principle VI—Global Environmental Stress will Create Major Incentives and Opportunities for Efficiency Real Estate and Infrastructure

- Carbon pricing mechanisms and the monetization of other ecological costs/benefits will become major components of returns in projects and companies
- Emerging markets private equity will play a disproportionate role in the production, consumption, and distribution of the world's natural resources including energy, materials, and water

Principle VII—Risk and Return Profiles for Investments in Most Asset Classes will Vary Based upon Investor Capability

- Traditional asset allocation model assumptions poorly account for expected returns, volatilities, correlations, and liquidity going forward
- Realized returns and volatilities will vary dramatically among investors, particularly in the private markets
- Building a capability for sourcing and assessing private market opportunities will become a major source of differentiation among investors
 - Case of Ontario Teachers: 25% allocation to infrastructure

Expected Returns for Private Markets will Vary by Amount Invested and Plan Capability (In Contrast to Stocks and Bonds) $E[R]=a+b*\exp(c*\%)$



Implications

- Opportunities are no less numerous or compelling than they were 5, 10, and 20 years ago; yet, they have shifted fundamentally in geography, sector within virtually every major asset class
- A sense of capital shortage is likely to persist for a decade or more, making liquidity considerations a permanent feature of sound allocation decisions
- New opportunities related to natural resources are likely to become increasingly important considerations for sustainable investing across every major asset class
- Green investing shouldn't mean sacrificing returns