

The Real Cost of Green: Creating Value & Reevaluating Companies

Putting \$\$\$ on Green

Zicklin Center for Corporate Integrity
New York City
November 7, 2008

Peter C. Fusaro
Chairman, Global Change Associates
New York

peterfusaro@global-change.com or
peter@energyhedgefunds.com



ENERGY HEDGE FUND CENTER



GLOBAL
CHANGE
ASSOCIATES

Education Breeds Market Liquidity

- **3 Websites with Defined Functions & Free Content**
 - ◆ www.global-change.com (Corporate Bill Board)
 - ◆ www.energyhedgefundcenter.com (Online Community)
 - ◆ www.wsgts.com (Wall Street Green Trading Summit)
- **Books Available on Amazon.com:**
 - ◆ Free Newsletter, **Energy Hedge** (go to www.energyhedgefunds.com)
 - ◆ **Cut Carbon, Grow Profits** (Middlesex University Press, February 2007)
 - ◆ **Energy & Emissions: Collision or Convergence** (Wiley, Sept 2006)
 - ◆ **Green Trading Markets: Developing the Second Wave** (Elsevier, 2005)
 - ◆ **Energy & Environmental Hedge Funds** (Wiley, June 2006)

Why It's Different This Time

- **Higher Sustained Energy Prices**
- **More Rapid Technology Shift for Cleantech & Renewables**
- **The Environment as New Market Driver: The New “Alpha” in investments**
- **Safe Harbor in a Continuing Financial Storm**

Why Green Now?

- **Risen as Corporate Financial Issue**
- **Banks Now Have “Green Screen”**
- **Consumers Want Green Power: In US 750 utility green power programs**
- **EU ETS, Kyoto Protocol & Now US Moving Forward on GHG reductions**
- **Market-Based Solutions Work**
- **Key: Regulatory Certainty Provides Financial Certainty for Investments**

The Emissions Trading Markets

- \$64 billion CO2 market in 2007 mostly in the EU but could be \$3 trillion commodity market opportunity
- Carbon deficit is growing rising 3.1% annually since 2000 & US and China have carbon footprints of 6 billion tonnes
- Trading has been shown to be a cost effective tool to reduce pollution and accelerate technology transfer
- Directionally the first global commodity market created simultaneously (emulates oil markets ironically)
- Touches all fossil fuel contracts
- Price for carbon is the “missing link” in clean energy and cleantech investment

Ways to Reduce GHG Emissions

- **Energy efficiency across multiple sectors: buildings, transport and heavy industry**
- **Renewable energy from non-carbon sources**
- **Carbon based renewables such as wood and biofuels**
- **Carbon capture & storage**
- **More Innovations to Come as Market Matures**

GHG: Why Now?

- **Breakthroughs in the US with next president**
 - ◆ **US market Craft federal legislation over next 18 months of hearings for implementation in 2012**
- **EU ETS Phase 3 will continue European market with renewables & efficiency with less offsets**
- **Kyoto 2 is under discussion: US will reengage**
- **Need for internationalizing US carbon reductions with other countries regimes**
- **Price for carbon will ramp up opportunities for technology transfer in the US and abroad**

Beginning of a North American Market Western Climate Initiative

- 11 Western States and Canadian Provinces (Mexican states observing)
- Goal is 15% reduction of 2005 GHG levels to 2020, almost same as California goal of 25% reduction of 1990 levels
- Targeting over 350 million metric tonnes of reduction, half from CA.
- Canada's carbon footprint is 1.3 billion tonnes
- **Linkages are emerging for a regional North American markets to European and Asian markets**

Introducing The Six Greenhouse Gases

- Carbon Dioxide (CO₂)
- Methane (CH₄) –natural gas (22 times the carbon)
- Nitrous Dioxide (N₂O)- (310 times the carbon)
- Hydrofluorocarbons (HFCs): (11,700 times the carbon)
- Perfluourocarbons (PFCs)
- Sulfur Hexafluoride (SF₆)
- **The Six Greenhouses Gases are Interchangeable Because of Their Carbon Intensity**

Carbon Market Metrics

- Metric tonne of **CO₂ equivalent (CO_{2e})** is a fungible commodity
- Problem is the need for harmonious standards
- US and China are over 40% of global greenhouse gases
- Costs will not be onerous probably \$30 to \$50 per ton:
 - ◆ **Current Price \$1.20 on CCX and 18 Euros in Europe**
- New technologies waiting for deployment
- First steps are to inventory, accounting and providing certainty of credits
- **Real global market began on January 1, 2008**

Example: Carbon Pricing as the Facilitator for Renewables

- Solar raw materials are in competition with semi conductor industry
- Wind turbines are in short supply
- Shortage of geothermal parts plus high prices for drilling
- All renewables for power have transmission constraints
- Solution is need to produce modular, versatile, scalable equipment to deploy in 1 to 50 MW units
- Larger units are bank financeable and project financed

The Carbon Trading Players

- **The players:**
 - ◆ **Brokers and traders**
 - ◆ **Oil and gas companies**
 - ◆ **Electricity companies**
 - ◆ **Industrials**
 - ◆ **Agricultural producers**
 - ◆ **Insurance and reinsurance providers**
 - ◆ **Financial institutions**
 - ◆ **Governments at all levels**
 - ◆ **Aggregators for both carbon and recs**
 - ◆ **Hedge funds, private equity carbon funds & venture capital funds**

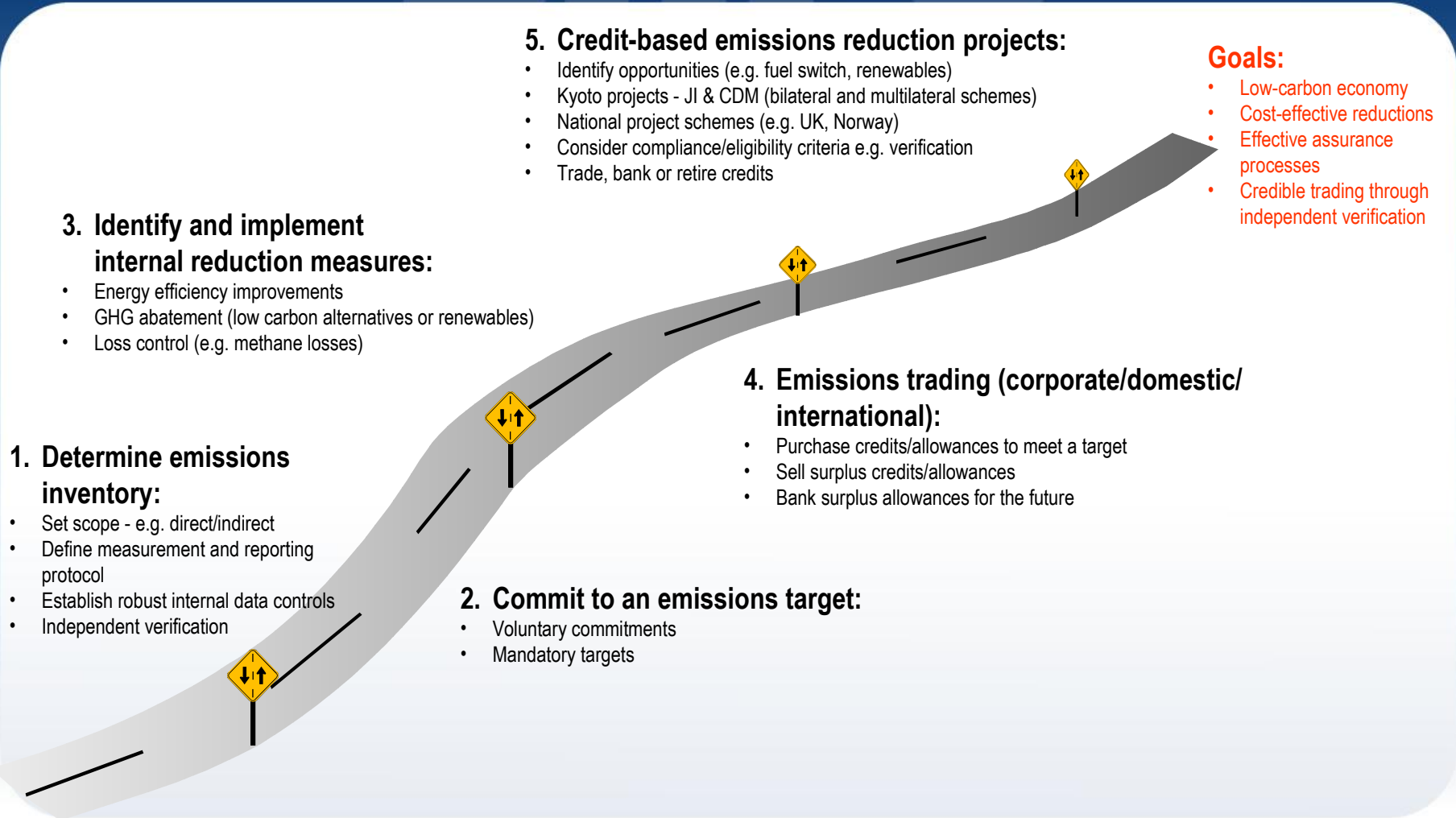
Market Opportunities for Carbon Offsets

- **Methane destruction:**
 - ◆ Initiating and operating landfill methane collection and destruction in the United States, Canada, Mexico, Brazil and other countries as applicable
 - ◆ Initiating methane collection and destruction systems at livestock operations
- **Agricultural practices:**
 - ◆ Committing land to continuous no-till, strip-till, or ridge-till cropping in the central United States and other regions or countries as applicable
 - ◆ Initiating grass cover planting in specified states, counties and parishes in the United States
- **Forestry practices:**
 - ◆ Initiating forestation and forest enrichment projects
 - ◆ Initiating combined forestation and forest conservation projects in Brazil and Mexico
- **Renewable Energy:**
 - ◆ Displacement of CO2 emissions by eligible renewable energy facilities
- **Clean Development Mechanism Eligible Projects:**
 - ◆ Acceptance of Certified Emissions Reductions (CERs) from the Clean Development Mechanism (CDM)
- **Other GHG Emission Mitigation**
 - ◆ Fuel switching
 - ◆ Renewable energy generation from solar, wind, small hydroelectric and biomass systems

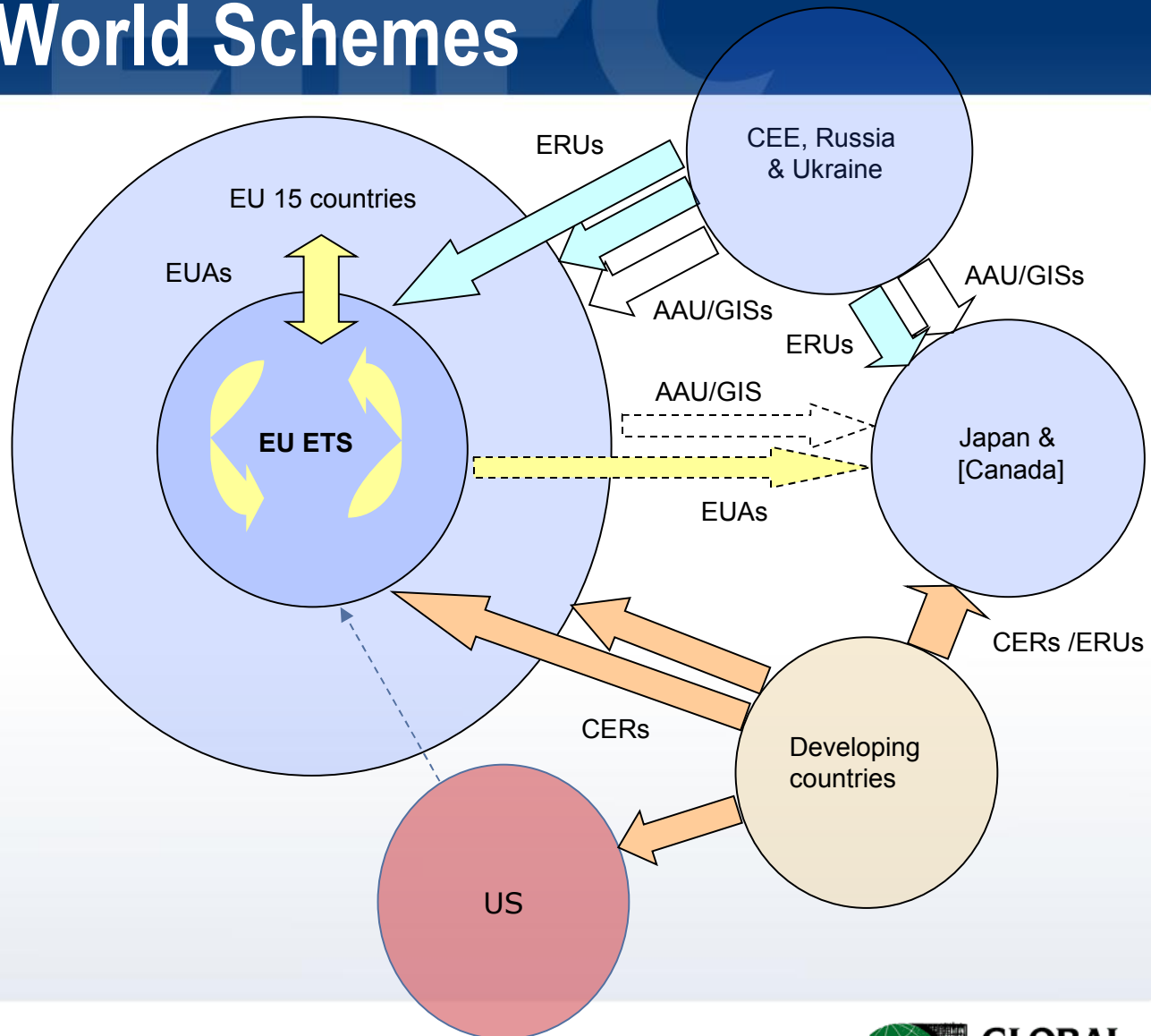
The Global Exchange: The CME Group's Green Exchange

- Green Exchange launched March 17, 2008: Trading platform partners is Evolution markets and liquidity providers Goldman Sachs, Morgan Stanley, JP Morgan, Credit Suisse, Tudor Investments, RNK Capital, Constellation Energy, and more to come (www.greenfutures.com)
- The Green Exchange links Chicago's CME Group to environmental commodity platform through Globex. Energy, Ags and financial futures on one platform.
- NYMEX has SO₂, NO_x, Ethanol and Alternative Energy Index
- Trades both voluntary & mandated carbon, renewable energy credits, NO_x, and SO_x

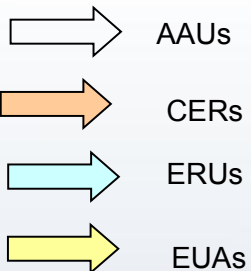
Road Map for Managing Carbon Assets from DNV Certification



Emerging Connectivity Among World Schemes



Carbon commodities



Source: New Carbon Finance



ENERGY HEDGE FUND CENTER

© Copyright 2005 Energy Hedge Funds Center.
All rights reserved. Confidential and Proprietary



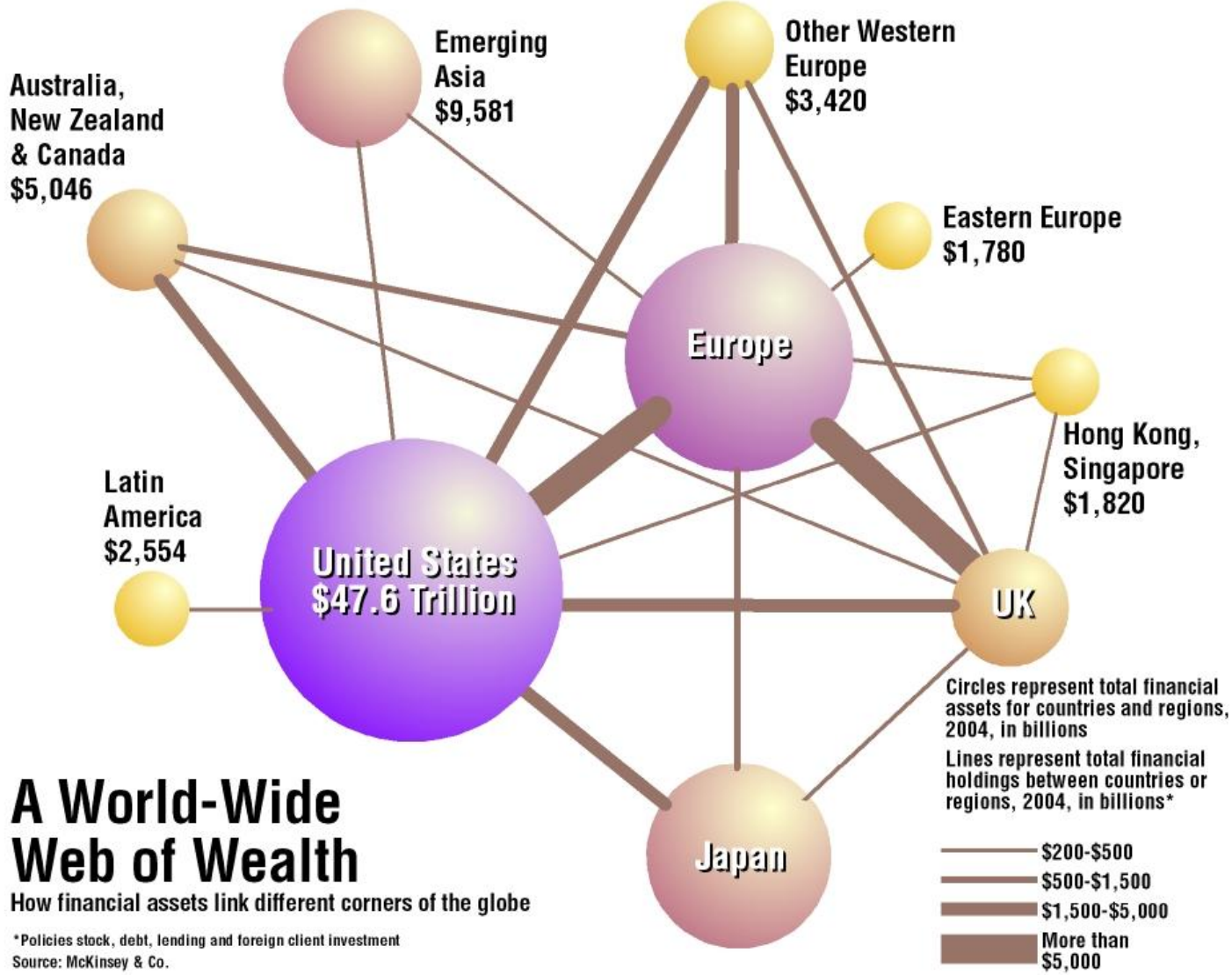
GLOBAL CHANGE ASSOCIATES

The Clean Energy Investment Opportunity is Vast

- **Alternative Energy**
 - ◆ Solar
 - ◆ Wind
 - ◆ Hydro, tidal and wave
 - ◆ Geothermal
 - ◆ Biomass
- **Bioenergy & Ethanol**
- **Distributed Energy**
 - ◆ Combined heat & power
 - ◆ Microturbines
 - ◆ Fuel cells
 - ◆ Hydrogen generation
 - ◆ Flywheels
- **Energy Efficiency**
 - ◆ Lighting
 - ◆ Buildings
 - ◆ Energy recycling
 - ◆ Battery Storage
- **Medical and Biological**
- **Environmental Technologies**
 - ◆ Water and Wastewater Treatment
 - ◆ Coal gasification
 - ◆ Emissions mitigation
- **Information Technology**
 - ◆ Net metering
 - ◆ Demand response
 - ◆ Energy management systems

The Global Opportunity

- Underinvestment in infrastructure in the US and other countries: \$2 Trillion for electricity water in the US alone and many trillions globally
- Energy is World's Largest Business: \$6 Trillion & Growing
- Cleantech Investment was only \$5.18 billion in 2007
- The game is leapfrogging better technologies in the developing world as well as OECD
- Need to deploy capital faster to scale for reductions of greenhouse gases
- **The risk capital is still available**



Investment Constraints Today

- Higher Capital Costs
- **Lack of Carbon Price Signal but**
- **The Opportunity is Great:**
 - ◆ New, more efficient and greener technologies
 - ◆ Replacing fossil fuels will take decades
 - ◆ Boost for investment due to ability to monetize credits as an “environmental kicker”
 - ◆ New Markets for both developing and developed world

Venture Capital Focus: Up to 10 Year Lock Up

- **Solar**
- **Tidal**
- **Hydrogen**
- **Clean Coal**
- **Fuel Cells**
- **Cellulosic Ethanol & Algae**

Hedge Fund Focus: Immediate Returns

- **Arbitrageurs (traders)**
- **Trading carbon and renewable energy credits (RECs)**
- **Project finance in biofuels and coal gasification**

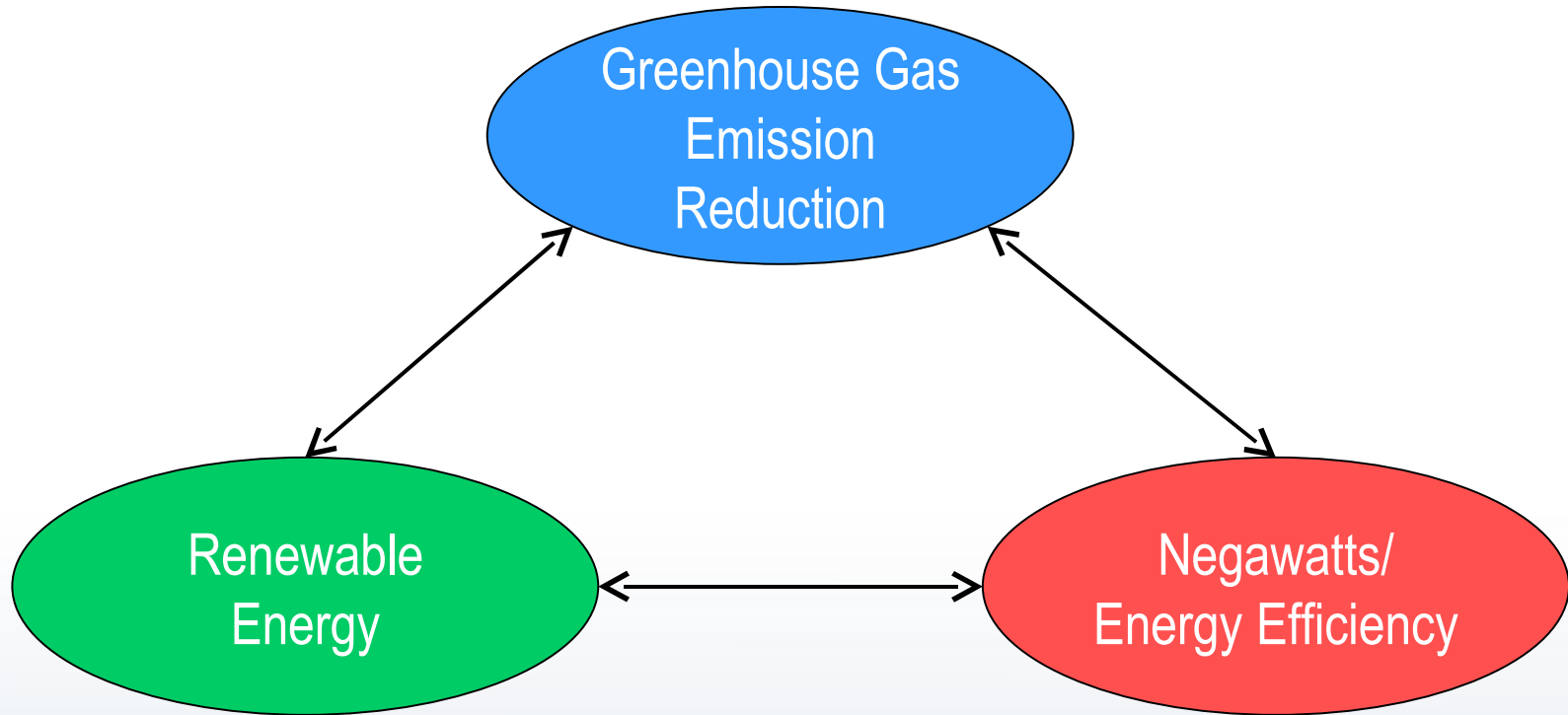
Private Equity Focus Today: Billion Dollar Investments

- **Wind**
- **Hydro**
- **Geothermal**
- **Coal to Gas and Coal to Liquids**
- **Biofuels: Ethanol and Biodiesel**

Where the Money Will Come From: New Investment Model

- **The New Hybrid Model:** Fund projects with 1 to 4 lock ups, and trade and monetize the streams of credits:
 - ◆ Sox (acid rain) and Nox (ozone)
 - ◆ Carbon credits
 - ◆ Recs (Renewable energy credits)
 - ◆ Biofuels projects and credit trading
 - ◆ Impact: Increase return on investment & reduce cost of capital
 - ◆ **Bottom Line: Add Liquidity to Markets, also price volatility**

Triple Convergence



New Green Screen for Investors

- Provide needed capital for emissions control equipment & other cleaner technology
- New metrics for SRI & emerging analytics
- Cleantech for energy and water
- Software for tracking emissions, data management on enterprise level, trading and compliance
- Renewable energy technologies needing greater efficiency and global scale
- Services in advisory, engineering and finance

Innovation Themes Across 4 Sectors

- **Energy**
 - ◆ Solar
 - ◆ Negawatts
 - ◆ RECs
 - ◆ Utility Demand Mgt
 - ◆ New Crops for Biofuels
- **Buildings**
 - ◆ Energy Mgt & Controls
 - ◆ Day Lighting & LEDs
 - ◆ Green Buildings
 - ◆ Intelligent Building Systems
- **Transportation**
 - ◆ Smart Community Design
 - ◆ Car Sharing
 - ◆ Biofuels & Electric Vehicles
 - ◆ Traffic Monitoring
 - ◆ Pollution Control
- **Water**
 - ◆ Water Purification
 - ◆ Infrastructure Repair
 - ◆ Drip Irrigation
 - ◆ Infiltration Control

This is the End of the Beginning

- The problem has been identified
- It's engineering & technology solutions
- Financial solutions are a facilitator in trading and project finance
- Need greater deployment of knowledge to this sector
- Underinvestment for decades in OECD and Global Opportunity has not been estimated!
- Try to use your imagination to solve the greatest problem facing humanity!