Fundamentals of Green Trading
IEEJ

February 2, 2004

Tokyo, Japan

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Global Change Associates

- New Book: **Green Trading: Commercial Opportunities for the Environment** (DNV & GE Power Systems sponsors)
- Customized consulting to both industry and government on the converging energy and environmental markets
- Business alliance with DNV for emissions and renewables certification & verification in North America & Asia
- Offices in New York, Philadelphia, Houston, Albany, NY, Tokyo & Singapore

Triple Convergence of Energy & Environmental Markets

- Emissions Trading for Greenhouse Gases (GHG), Sulfur Dioxide (SO2), and Nitrous Oxide (NOX)
- Renewable Energy Trading (Renewable Energy Credits or Recs)
- Negawatt Trading (now called Demand Response)

Rising Risks

- Oil, gas and power have higher costs and high price volatilities than before
- These risks need to be increasingly managed proactively
- Overlayed on energy volatilities and costs are **environmental liabilities**

Benefits of Trading

- Reduction of costs
- Technology transfer and acceleration
- Market-based solution to reducing pollution
- Effectiveness: SO2 allowance program was 30% under compliance for phase 1 from 1995-2000
- US created template for Kyoto emissions trading

Green Trading: The Next Financial Market

- Risk management talent for broking and trading is there
- Kyoto regime is now underway for 2005
- US trading experience is 9 years old and going strong
- Renewables poised to take off in US and many countries
- Negawatts (not a typo) has a financial value

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Why This Impacts the Energy Industry

- Historically high price volatilities for oil, gas and electricity
- More volatility coming
- Risk shifting not elimination: no silver bullet
- Futures contracts rule due to regulation
- Over-the-Counter (OTC) markets are devolving & more short-term oriented; however, emissions today are OTC
- Electronic trading & price discovery
- Particularly **project finance** impacts

Why These Tools are Emerging

- Oil, gas and power markets evolution are providing new venues for price discovery, project finance and financial engineering
- More volatility, more sophisticated structures and less traditional players/new market entrants
- **Environment overlays the energy complex (as well as agricultural industry)** i.e. the two industries most impacted by environmental liabilities and compliance

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The Next Financial Market: Environmental Trading

- Environmental markets emerge (1995)
- SO2 (volatility and options)
- NOX begins in 1999
- CO2 (100+ trades and growing)
- Chicago Climate Exchange launched in Fall 2003
- In the North America, we make markets
- Where we are now: Oil markets circa 1978

Market Evolution: Where We Are Today

- The Beginning: Today
  - Opaque prices
  - Little trading and poor liquidity
  - Chaotic and anarchic
  - Few participants
  - Wide arbitrage opportunities and fat margins
  - Tremendous inefficiency
  - How all financial markets evolve

Paper Market Evolution

- Usually:
  - Cash/spot market
  - Futures contracts
  - OTC Developments
- This time:
  - Government mandated and voluntary
  - Bilateral trading (OTC)
  - Exchange-traded

US Market Developments

- This time:
  - Misunderstanding of US position: US will never sign Kyoto (25% GHG)
  - Kyoto is ill conceived, weak and too short-term 2012 oriented
  - But, there will **not** be dual environmental standards for multinational US companies
  - Government mandated markets begin
  - State level GHG and renewable standards underway
  - Negawatts become important due to NIMBY and electric load growth

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State Level Initiatives Underway

- Federal level efforts muted & not moving forward
- States have opportunity to lead and are beginning to with California registry, New York's GHG Task Force and Renewable Portfolio Standards
- What are the economic opportunities?
  - Answer: **Environment overlays the energy complex (as well as agricultural industry) and therefore leadership is now essential**

The Market Drivers

- Human survival i.e. climate change and infectious disease
- New technologies abound
- The energy value chain is now overlaid with an environmental value chain
- Financial products for the environment are a natural market evolutionary development
- The effort is now global: it’s different this time

The Market Drivers

- Environmental risk management becomes fiduciary responsibility of energy and agricultural companies
  - Shareholder pressure
  - Financial risk & liability to companies
- GHG is the first market besides oil that will have a large cross border dimension i.e. carbon is carbon and is fungible
- Shift to new disruptive technologies and away from fossil fuels (read coal and oil) will create more market opportunities

Benefits of Price Indexing

- Competitive market forces reflected in indexes:
  - Need for market information that is transparent
  - Flexible pricing
  - Need for tradable benchmarks (Exchanges)
- Standardization increases liquidity & reduces
- Reduces the cost of risk management
- Development of environmental indexes now underway i.e. McGraw-Hill for SO2 and NOX

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The GHG Market: Why Now?

- No argument on science anymore
- Environment impacts economic activity, health care costs, property insurance and agricultural production
- Increased atmospheric concentrations of carbon
- Market awareness growing with more GHG trading initiative underway globally

The GHG Market: Why

- Some companies now acknowledging possible climate consequences in their financial statements (Dupont)
- Some companies have externalized their trading schemes (BP & Shell)
- Liabilities of potential shareholder lawsuits over global warming problems are creating a whole new category of insurance
- Public pressure and perception are key
- Great business opportunity for new technology transfer

Present State of US GHG Market

- Bush will not penalize voluntary trades
- California first to move forward with a registry
- Other states including Massachusetts, and New Hampshire have passed bills, New York and other big states drafting bills
- GHG registries are wave of the future to document baseline
- CO2 reductions in both power stations and vehicles
- Chicago Climate Exchange launched

Present State of US GHG Market

- Large number of states initiating multipollutant air pollutants under single integrated bill and strategy
- Mandates for green trading included in state bills
- Northeast governors and Canadian provincial governments have formed coalition on integrated plan to reduce CO2 region wide: implementation schedule being developed

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Present State of US GHG Market

- Need for Common Currency
- Efforts of California, Nescaum and others need to have standardization to facilitate trading
- Need for internationalizing US carbon reductions with other countries
- Renewables as well

Why Renewable Energy Now?

- Rapid technology shift underway
- Wind power growing globally at 40% per year plus US tax credits are an added kicker (will be reinstated this year)
  - Texas second largest market in the world
- Solar is growing globally at 30% per year
- Consumers are paying more for green power
- Growth industry creating jobs
- Why not attach a financial value to these environmental attributes

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Why Renewable Energy Now?

- Texas began trading renewables on January 1, 2002
- California, New York and 14 other states moving for 2003/2004
- Bush's initiative is ethanol-related because of farm lobby but mandate is broader
- US Dept of Agriculture developing both GHG and renewables trading programs

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Bush Administration Position

- Preoccupied with national security & terrorism
- Reactive rather than proactive
- Market-focused and loves trading
- More stringent reductions for SO2 and NOX
- Mercury trading (first in world) will come about this year
- Bush proposal is too slow (2017) but directionally right
- Many states moving forward on their own due to lack of federal leadership

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Negawatts: A Idea Whose Time Has Come

- August 14th blackout has heightened awareness
- Current glut in US power will disappear in two years in some areas of the country
- Transmission bottlenecks and siting problems increase delivery problems i.e. more brownouts and black outs coming
- Electricity markets will not be fully deregulated and electricity will become “strategic commodity” like oil
- Combined cycle gas turbines are not dual fuel capable
- Fannie Mae aggregation trade on energy efficiency closed

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Negawatts: A Idea Whose Time Has Come

- Opportunities are being created i.e. The Demand Exchange and ISO programs to shed load are examples
- The present technology is reliable
- The next generation technology specifically for fuel cell, microturbines, HVAC etc will bring us many factors forward in terms of efficiency gains
- Creating financial products for energy efficiency has begun i.e. there is a financial value for this commodity

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Triple Convergence Now Underway

- Triple Convergence underway in GHG, Renewables and Negawatts
- Application of the best financial engineering talent
- Evaluation services underway to deconstruct optionality for both project finance and structured finance for the environment
- Capture the value of carbon reductions

The Green Trading Markets

- Cross commodity plays are apparent:
  - Touches all New York Mercantile Exchange (NYMEX)
  - Weather and emissions
  - Coal and emissions
  - Renewables and GHG to reduce carbon
  - GHG and negawatts (double dipping)
  - More innovation to come as markets mature

The Green Trading Markets

- Today only $6 billion for SO2 and NOX
- Could be $3 trillion commodity market opportunity over next 20 years
- Cost effective tool to reduce pollution and accelerate technology transfer
- Directionally the first global market created simultaneously (emulates oil markets ironically)

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The Green Trading Markets

- The players:
  - Brokers and traders
  - Oil and gas companies
  - Electricity companies
  - Industrials
  - Agricultural producers
  - Insurance and reinsurance providers
  - Governments

The Green Trading Markets: The Next Steps

- More experimentation in trading
- Need for more liquidity (probably through project finance mechanism)
- Standardization and index construction underway
- Cross border trading i.e. first renewable trade from Europe to New Zealand last month
- Market making by the big players (utilities, oil & gas companies & banks)
- Both bilateral and exchange traded deals
- Internet applications

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The Green Trading Markets

- Growing markets are coal, oil gas & environment
- More volatilities coming and more cross commodity arbitrage:
    - **emissions and coal**
    - **emissions and weather**
    - **coal and other fuels**
    - **emissions and efficiency**

The Green Trading Markets

- Environmental technology companies in wind, solar, waste to energy and biomass
- Hedge funds: starting to invest in this sector particularly energy efficiency plays—they need analysts
- Investment banks: evaluation for M & A such as Morgan Stanley, Goldman Sachs, Rabobank, and Deutsche Bank
- Structured finance for energy projects using sophisticated financial techniques to reduce the cost of capital

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The Green Trading Markets

- Government mandates will assure market performance for green trading: over time can not be voluntary because a financial sanction is needed
- Green markets are making breakthroughs this year and next as we enter market building phase
- Remember that this is an emerging financial market