The U.S. and Global Carbon Markets

Michael Walsh
Executive Vice President
Chicago Climate Exchange
“Business Increases pressure on G8 to set up global emissions trading system”

“Steve Lennon, chair of the environment and energy commission of the International Chamber of Commerce, which represents hundreds of thousands of companies in 130 countries, said:

“We see a global system of emissions trading as inevitable”

Financial Times, June 10, 2005, page 1
CCX: A Global Exchange Platform

• **Chicago Climate Exchange™ (CCX)**
  - Launched 2003 with 14 members, now 350+ members (US, CA, MX, BR, NZ, AU, CH)

• **European Climate Exchange™ (ECX)**
  - FSA-regulated futures market for European CO₂ Allowances
  - Launched April, 2005 – accounts for 80-90% of total exchange traded volume in the EU ETS

• **Chicago Climate Futures Exchange™ (CCFE)**
  - CFTC-regulated futures exchange for U.S. SO₂ allowances and U.S. NOx Ozone Season allowances
  - Launched in December 2004, world’s first and leading environmental derivatives exchange

• **Montreal Climate Exchange™ (MCEX)**
  - Joint venture with the Montreal Bourse
  - To host Canadian GHG trading, other environmental markets

• **New York Climate Exchange™ and Northeast Climate Exchange™**
  - Developing financial instruments for northeast Regional Greenhouse Gas Initiative (RGGI)

• **California Climate Exchange™**
  - Developing financial instruments relevant to the California Global Warming Solutions Act, AB32

• **India Climate Exchange™**
  - (In development)
Global Status of Legislated Global Carbon Market Activity

- US Canada: 40%
- Australia: 40%
- Russia: 40%
- Ukraine: 40%
- Japan: 40%
- Rest of World: 43%
- European Union: 17%

Green = live market   Yellow = signs of progress   Red = limited or no market activity
What is Chicago Climate Exchange?
An unique financial institution designed to advance business, environmental and social goals.

Chicago Climate Exchange (CCX ®) is the world’s first and North America’s only active voluntary, legally binding integrated trading system to reduce emissions of all six greenhouse gases, with offset projects in North America and worldwide.
CCX Membership Growth

Cumulative Growth in CCX Membership

03Q3 04Q1 04Q2 04Q3 04Q4 05Q1 05Q2 05Q3 05Q4 06Q1 06Q2 06Q3 06Q4 07Q1 07Q2 07Q3

12 19 37 51 56 60 77 95 113 128 158 200 210 220 265 331 361
Why Have So Many Entities Become a CCX® Members?

Practical and strategic drivers:

- obtain practical expertise through “hands-on” participation
- build institutions: first-mover; global linkages
- get ahead of disparate regulations, prepare for policy
- reduce long-term mitigation costs
- build carbon price into minds of operators and planners
- trading profits, possible early action crediting
- serve your stakeholders
- meet fiduciary commitments
Size of Live, Emerging, Possible GHG Markets
September 2007

CCX includes more industrial emissions under its legally binding cap than any country in the world.

Included emissions

- Live Market
- Market in development
- Under discussion

CCX includes more industrial emissions under its legally binding cap than any country in the world.

2003 Start
2009 Start
2012 Start
CCX Members

(Have significant direct emissions, make legally binding commitment to meet annual greenhouse gas (GHG) emission reduction targets for direct GHG emissions subject to audit by NASD.)

Aerospace & Equipment
Rolls-Royce
United Technologies

Automotive
Ford Motor Company

Beverage Manufacturing
New Belgium Brewing Company

Chemicals
Dow Corning
DuPont
Rhodia Energy Brasil Ltda

Coal Mining
Jim Walter Resources, Inc.
PinnOak Resources LLC

Commercial Interiors
Knoll, Inc.
Steelcase Inc.

Counties
King County, Washington
Miami-Dade County, Florida
Sacramento County, California

Diversified Manufacturing
Eastman Kodak Company

Electric Power Generation
AGL Hydro Partnership
Allegheny Energy Inc.
American Electric Power
American Municipal Power-Ohio
Associated Electric Cooperative, Inc.

Central Vermont Public Service
DTE Energy Inc
Duquesne Light Company
Green Mountain Power
Manitoba Hydro
NRG Power Marketing Inc.
Puget Sound Energy, Inc.
Reliant Energy Services Inc.
TECO Energy, Inc.

Electronics
Motorola, Inc.
Sony Electronics Inc.
Square D/Schneider Electric N.A.

Environmental Services
Atlantic County Utilities Authority
Lancaster County Solid Waste Management Authority
Veolia Environmental Services North America Corp.
Wasatch Integrated Waste Management Authority
Waste Management, Inc.

Ethanol Production
Corn Plus LLP

Financial Institutions
Bank of America Corporation

Food and Agricultural Products & Services
Agrumi U.S. Inc.
Cargill, Incorporated

Food Processing
Meister Cheese Co. LLC
Premium Standard Farms
Smithfield Foods, Inc.

Forest Products
Abitibi-Consolidated
Araucruz Celulose S.A.
Cenibra Nipo Brasiliera S.A.
International Paper
Klabin S.A.
Masisa S.A.
MeadWestvaco Corp.
Neenah Paper Incorporated
Stora Enso North America
Suzano Papel E Celulose SA
Tembec Industries Inc.
Temple-Inland Inc.

Manufacturing
Bayer Corporation
Interface, Inc.
Ozinga Bros., Inc.
Smurfit-Stone

Municipalities
City of Aspen
City of Berkeley
City of Boulder
City of Chicago
City of Oakland
City of Melbourne, Australia
City of Portland

Petrochemicals
Petroflex Industria e Comercio SA

Pharmaceuticals
Baxter International, Inc.

Recreation
Aspen Skiing Company

Retail
Safeway, Inc.

States
State of Illinois
State of New Mexico

Steam Heat
Concord Steam Corporation

Steel
Roanoke Electric Steel Corp.

Technology
Freescale Semiconductor
IBM
Intel Corporation
STMicroelectronics

Transportation
Amtrak
San Joaquin Regional Rail Commission

University
Hadlow College
Michigan State University
University of Idaho
University of Iowa
University of Minnesota
University of Oklahoma
Tufts University
CCX Market Architecture (2003-2010)

- Reduction Schedule for Members of Phase I and II
- Reduction Schedule for Members of Phase II only

Emissions (% of Baseline):
- 2003: 99%
- 2004: 98%
- 2005: 97%
- 2006: 96%
- 2007: 94%
- 2008: 92%
- 2009: 91%
- 2010: 89%

CCX Program Commitment Period:
- Phase I: 2003-2007
- Phase II: 2008-2010

All Members 6% below Baseline by 2010
GHG Reduction Targets: CCX, Proposed Legislation

Trend = +1%/yr

- CCX "B" (extrapolated @-0.75%/y)
- CCX "A" (-1%/y)
- proposed McCain
- Lieberman Obama Clinton
- proposed Kerry
- Snowe
- proposed Boxer
- Sanders
- proposed Feinstein
- Carper
- proposed California

CCX ongoing and extended paths

Federal/Cal Proposals “catch-up” to CCX path around 2023-25

Year
CCX Associate Members:

- Negligible direct emissions: generate indirect emissions through electricity use and business travel.
- Purchase/retire CCX CFIs equal to 100% of annual indirect emissions, subject to NASD through 2010.
- Office-based organizations such as professional firms, research & science centers and NGOs
CCX Membership
( Participant Members)

- **Offset Provider**: Owner of an Offset Project that registers and sells Offsets on its own behalf.
- **Offset Aggregator**: Entity that serves as the administrative representative, on behalf of Offset Project owners, of multiple Offset-generating projects.
- **Liquidity Provider**: Entity or individual who trades on the Exchange for purposes other than complying with the CCX emissions reduction schedule, such as market makers and proprietary trading groups.

**Selected Offset Aggregators**
- 3 Phases Energy Services
- Carbon Farmers
- Cargill, Inc
- CO2 Australia Limited
- Delta Institute
- Econergy
- Ecoserurities
- Environmental Credit Carbon Pool
- Environmental Credit Corp.
- First Capitol Risk Management
- Intrepid Technologies, Inc.
- Iowa Farm Bureau
- Kentucky Corn Growers Assoc.
- National Carbon Offset Coalition
- North Dakota Farmers Union
- Rice Dairy LLC
- Standard Carbon
- Xi’an Zhongyang Electric Co.

**Selected Liquidity Providers**
- Arreon Carbon
- Amerex Energy
- Bank of America
- Black River Clean Energy
- Breakwater Trading
- Calyon Financial, Inc.
- Cargill Power Markets
- Evolution Markets
- FCT Europe Ltd.
- First New York Securities LLC.
- Goldenberg, Hehmeyer & Co.
- Haley Capital Management
- JP Morgan Ventures Energy
- Lehman Brother Commodity
- Marquette Partners
- Natsource LLC
- Peregrine Financial Group
- Rand Financial Services, Inc.
- Shatkin Arbor, Inc.
- Swiss Re Financial Products Corp.
- Tradelink

**Selected Offset Providers**
- Arreon Carbon UK Ltd.
- Beijing Shenwu Thermal Energy
- CO2 Australia
- Ecosercurities
- Energy Trading Co
- Commonwealth Resource Management Corp
- Gallo Cattle Company
- Hubei Sanhuan Development Corporation
- Lugar Stock Farm
- Precious Woods Holdings
- RCM International LLC
- Sexton Energy LLC
- Sustainable Forestry Management, Ltd.
- Vessels Coal Gas Inc.
- Weber County
CCX Comprehensive Market Infrastructure

Electronic Market Registry

- Web-accessible Electronic Trading Platform

Comprehensive Rules System

- Emitters: Standard baseline, multi-year allowance stream equal to reduction targets
- Offset Providers (project credits)
- Liquidity Providers
- Associate Members
CCX Emission Offset Types

- Verified Offset projects sequester or eliminate GHGs to earn Carbon Financial Instruments (CFI) sold on CCX electronic platform to CCX membership

Current pre-defined offset categories:
- Agricultural Methane
- Landfill Methane
- Agricultural Soil Carbon
- Forestry
- Renewable Energy
- Coal Mine Methane
- Rangeland Soil Carbon
- Others in development

Independent verification required by authorized entities: SGS, DNV, First Environment, BvQi

Minnesota dairy farmer receives first check from sales of CCX Offsets for methane destruction (Approx. $10k for 1 year)
CCX Verifiers: Leaders in their Field

- **Agricultural Methane Capture and Combustion**
  - Agri-Waste Technology, Inc.
  - SES Inc.
  - TUV SUD Industrie Service GmbH

- **Forestry**
  - BVQi
  - Forecon Inc.
  - SGS
  - TUV SUD Industrie Service GmbH
  - Winrock International

- **Agricultural Soil Carbon Sequestration**
  - Agri-Waste Technology, Inc
  - Association of Illinois Soil and Water Conservation Districts
  - North Dakota Association of Soil Conservation Districts
  - SES Inc.
  - TUV SUD Industrie Service GmbH

- **Energy Efficiency**
  - Econergy Corporation International
  - Franklin Energy Services
  - ICF Consulting Canada Inc.
  - TUV SUD Industrie Service GmbH

- **Landfill Methane**
  - ARM Group Inc.
  - Det Norske Veritas (DNV)
  - Econergy Corporation International
  - First Environment Inc.
  - Richardson Smith Gardner and Associates, Inc
  - Kleinfelder
  - TUV SUD Industrie Service GmbH

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**SGS** is a world leading inspection, verification, testing and certification company, and is recognized as a global benchmark for quality and integrity. With more than 48'000 employees, SGS operates a network of over 1’000 offices and laboratories around the world.

**DNV** is a leading independent greenhouse gas verifier operating globally. Their GHG experts are used by international organizations, governments, and industry, delivering independent, third party services for climate change activities.
## Are CCX Rules Advancing Now-viable Mitigation Options?

<table>
<thead>
<tr>
<th>Sector</th>
<th>Currently viable actions (IPCC, May 2007) that are included in CCX</th>
<th>Specifically incentivised by CCX emission cap/pricing system?</th>
<th>Incentives depend on specifically focused CCX rules?</th>
<th>Practices not yet included under CCX Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Supply</td>
<td>Improved supply/distribution efficiency fuel switching, nuclear power renewables combined heat and power;</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Transport</td>
<td>More efficient vehicles biofuels non-motorised transport (cycling, walking)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Buildings</td>
<td>More efficient lighting, appliances, heating/cooling devices insulation alternative refrigerants, recycle/destruct fluorinated gases (NB: word “destruct” not in IPCC report)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
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<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
<td>efficient end-use electrical equipment</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td></td>
<td>heat and power recovery</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
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<tr>
<td></td>
<td>material recycling and substitution</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>control of non-CO2 gas emissions; process techs</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Agriculture</strong></td>
<td>increase soil carbon improved crop/grazing land restoration of degraded lands</td>
<td>No</td>
<td>Yes</td>
<td>Restore peaty soils, improve rice cultivation, improved N management</td>
</tr>
<tr>
<td></td>
<td>Livestock/manure management to reduce CH4</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>energy crops to replace fossil fuel</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>improved energy efficiency</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Forestry</strong></td>
<td>Afforestation; reforestation, forest management reduced deforestation;</td>
<td>No</td>
<td>Yes</td>
<td>Harvested wood products</td>
</tr>
<tr>
<td></td>
<td>harvested wood product management</td>
<td>No</td>
<td>Yes</td>
<td></td>
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<tr>
<td></td>
<td>forest products/bioenergy to replace fossil fuel</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Waste</strong></td>
<td>Landfill methane recovery</td>
<td>No</td>
<td>Yes</td>
<td>compost organic waste, recycling, minimize waste</td>
</tr>
<tr>
<td></td>
<td>waste incineration with energy recovery</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>controlled waste water treatment</td>
<td>No</td>
<td>Yes</td>
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</tbody>
</table>

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CCX Price and Volume History
(Q1 2004 – Q3 2007)

Average Quarter Prices for All Vintages

Quarterly Volume

$ per metric ton

metric tons of CO2e

04Q1 04Q2 04Q3 05Q1 05Q2 05Q3 05Q4 06Q1 06Q2 06Q3 06Q4 07Q1 07Q2 07Q3 07Q4
“It's because by participating in the Chicago Climate Exchange, which really governs IBM's own business operations and our company's own carbon footprint, we are better able to understand the entire arena of creating an inventory of carbon emissions, accounting for them in an audit ready manner, presenting them to an exchange so they can be verified and considered to be tradable and how one does and doesn't make money on an exchange”

Wayne Balta
IBM
VP, Corporate Environmental Affairs
September 26, 2007
“The Chicago Climate Exchange is providing an innovative means of involving American businesses and citizens in the effort to protect the environment…I listed my farm in Indiana on the Chicago Climate Exchange to set an example for farmers and foresters in my state and throughout America…For example, the exchange mechanism could be utilized by turning unused farmland into tree farms that sequester carbon while providing farmers with extra money… In short, American farmers could become the vanguard in using market forces to the benefit of both the environment and the pocketbook…”

**Senator Richard Lugar (R-IN), Chairman of Senate Foreign Relations Committee**

“To deal directly with climate change, something we failed to do in the last energy bill, we should use a market-based strategy that gradually reduces harmful emissions in the most economical way…..Right here in Chicago, the Chicago Climate Exchange is already running a legally binding greenhouse gas trading system”

**Senator Barack Obama (D-IL), April 3, 2006**

“The CCX is leading the way toward a future in which reducing greenhouse gases could bring not only environmental rewards, but financial ones too.”

**Al Gore, from *An Inconvenient Truth*, 2006.**

“What would be wrong, at least on a theoretical basis, with taking what you have come up with by way of requirements for your (CCX) members and essentially mandating that everybody in the country comply with those?”

**Senator Jeff Bingaman (D-NM), Chairman Senate Energy & Natural Resources Committee, April 4, 2006**
CCX represents an innovative market-based approach to solving our energy issues and improving air quality.

Chicago Mayor Richard M. Daley (D), Chicago, (September 30, 2003)

It's cold in Chicago today, but I'm thrilled to see that the new Chicago Climate Exchange is warming up for the next wave in environmental protection—and economic innovation. I want to congratulate the Exchange, which is the first comprehensive voluntary pilot program for domestic trading of greenhouse gases, on the announcement of its founding members. Their progress is great news for Chicago's economy and for America's environment.

US Senator Joseph Lieberman (D-CT) (January 2003)

As CCX approaches its first anniversary of continuous trading, it is apparent that members are raising their understanding of market-based carbon emissions management through hands-on experience. Through participation in CCX members are able to develop best practices that allow the activities of emissions data gathering, auditing, and trading to become simplified and standardized.

Gov. Christie Todd Whitman (R), former Governor of New Jersey (December 2004)

We are joining the Chicago Climate Exchange for two reasons. We want to strengthen a pioneering effort to create market-based solutions to the problem of climate change, and CCX helps us maintain our own organizational commitment to keep our net carbon dioxide emissions at zero.

Jonathan Lash, President, World Resources Institute (September 2003)
Key Issues to Watch in U.S. Legislation

- Included sectors, targets, gasses, timetables (start date, true-up periods)
- Point of regulation (if any) for transport emissions (e.g. fuel vendors?)
- Availability and cost of domestic and international offsets
- Safety valves? (price, quantity, policy?)
- Parallel technology and policy development efforts (e.g. CAFE standards)
- International market and policy linkages
- Initial Allocation of tradable permits
  - grandfathering
  - auctions
  - benchmarking
  - accommodation of growth?