What Is Environmental Defense?

- NGO, NYC headquarters
- 400,000+ members
- 200 scientists, economists, attorneys and other professionals
- Projects in USA, Europe, Russia, China, Cuba, the Caribbean, Latin America, Africa & Antarctica
- $44.6 M 2003 budget
In the United States
PNDSA-Entergy Trade
Agricultural GHG Offset Project

• **2000 -- PNDSA-EnvDef MOA** =>
  PNDSA CO₂ sell offer sheet

• **2001 -- Entergy member of EnvDef PCA** =>
  interest in PNDSA CO₂ sell offer

• **2002 -- PNDSA-Entergy GHG offset trade** =>
  soil carbon leased; CO₂ emissions reductions sold
The Time Window for Effective Reductions is Narrow

A - Reductions begin 1990, gradual, at steepest a 2% annual decline by 2080
B - Reductions delayed until 2005, decline of 2%/year beginning not later than 2035
C - Reductions delayed until 2010, decline of 2.5%/year beginning not later than 2030
D - Reductions delayed until 2015, decline of 3.0%/year beginning not later than 2028
E - Reductions delayed until 2020, decline of nearly 5%/year beginning not later than 2025

Global CO₂ emissions (billion tons of carbon)

Stabilization target: 450 ppm by 2100
**Terrestrial GHG Offsets & U.S. Energy**

- **U.S. energy situation:**
  - High demand growth
  - Limited “non- CO₂” supply options
  - CO₂ removal at the stack expensive
  - Regional air pollution “non-attainment” constraints

- **Potential of terrestrial carbon & GHG offsets:**
  - “Bridge” to lower CO₂ emission future
  - Cost-effective compared to CO₂ stack removal
  - Ecological co-benefits -- water quality, habitat
  - GHG market => supply of GHG offsets
Terrestrial Carbon Sequestration Projects are Diverse

- Reforestation
- Avoided deforestation
- Agricultural soil carbon
- Grasslands
- Riparian zones & wetlands
Carbon Sequestration
Environmental Co-Benefits

• Water quality, wildlife habitat, soil conservation
• Markets often fail to value such services
• Valuing carbon leverages conservation resources
• Valuing carbon is positive for most ecosystems
U.S. Emissions of Greenhouse Gases
1990-2002

Based on Global Warming Potentials

[Source: USDOE, 2003]
Illustrative Ranking of Carbon as a Crop in U.S.

Carbon at $5/MT CO₂e, 50% of 1990-2002 US GHG/yr emissions growth

GHG Reductions/Offsets
Alternative Investment Options
Electric Power Sector

- Fuel Switch from Coal to Natural Gas
- Heat Rate Improvements
- Biomass Co-Firing
- T and D Efficiency Improvements
- Environmental Dispatch
- Demand Side Management

- Install Renewable Generation
- Landfill Methane
- Buy “Green Tags”
- Biological Sequestration
- EA Market
- Removal/Disposal
DOE Carbon Sequestration R&D Program

[Sources: U.S. DOE Carbon Sequestration Project Portfolio, FY2002, NETL; Carbon Sequestration Program, NETL]
## Estimated Number of U.S. Forest & Agricultural GHG Offset Projects (thru 2002)*

<table>
<thead>
<tr>
<th>Type</th>
<th>Number Projects</th>
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</thead>
<tbody>
<tr>
<td>Reforestation</td>
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<tr>
<td>Forest Conservation</td>
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<tr>
<td>Soil Conservation</td>
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<tr>
<td>Urban Forestry</td>
<td>2</td>
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<td>Forest Management</td>
<td>3</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>47</strong></td>
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* Report to Environmental Defense, Trexler & Associates, Feb 2003
Supply-Side Barriers to Ag Soil Carbon as GHG Offsets in the U.S.

- **Definitional standards** – measurement precision, baselines, additionality, leakage, permanence
- **Measurement & verification** service sectors not formulated
- **Qualified aggregators** not readily available
- **Producers not familiar** with soil carbon offsets
- **Producers adverse** to long-term offset sales contracts
Carbon Sequestration & Terrestrial GHG Offsets
Scientific Committee on “Gold Standards” for Quantification & Accounting

Field Manual Project -- 2004

• Committee of independent university scientists
• Develop & publish manual for field evaluation of prospective terrestrial GHG offset projects
• Staffed by Environmental Defense, consulting scientists, & peer reviewers
• Publication by university press in late 2004/early 2005
• Agricultural cropping, forests, range & grass lands, livestock management, wetlands
Verification & Certification of GHG Offsets

• **Verification** – *confirmation using objective data* that reported GHG offsets accurately reflects actual actual GHG offsets

• **Certification** – procedure for accredited verifier to give *written assurance* that GHG offsets *conform to specified requirements* of an accrediting agency
Agricultural GHG Offset Supplies -- Changing Practices Can Produce in 2 Ways

**Reduce Direct GHG Emissions:**

- Precision **nitrogen fertilizer use** reduces N$_2$O and CO$_2$
- **Fuel use** reductions lower CO$_2$ emissions
- Changes in **livestock management** reduce CH$_4$
- **Biofuel** reduces use of CO$_2$-intensive fossil fuels

**Sequester Carbon:**

- No or low **tillage**
- Diversified **rotations**
- Winter **cover crops**
- No summer **fallow**
- Change **soil inputs**
- Improved **grazing** practices
- Vegetation **buffers**
- **Convert** marginal agricultural land to grassland or forest
Types of Agricultural GHG Offset Transactions

- **Outright Sale**
  - Direct GHG emissions reductions -- N$_2$O, CH$_4$, CO$_2$
  - Soil/Biomass Carbon – permanent commitment

- **Term-Limited Lease**
  - Soil carbon storage
  - Biomass storage
Rates of Carbon Sequestration

0Y Base, 0.75T/Y
0Y Base, 1.00T/Y
3Y Base, 0.75T/Y
3Y Base, 1.00T/Y
Agricultural Carbon Sequestration Payment Scenarios

[Diagram showing payment scenarios for different carbon sequestration credits (0 yr base credit and 3 yr base credit) with respective annual payments.]

[0.75T/Y and 1.00T/Y]

[*Annual average payment, 3% rate]*
European Carbon Prices

€/tonne CO2e [$1.27/€, 1/13/04]

[Source: Point Carbon, 1/9/04]
GHG Trading Initiatives in U.S.

- **Private sector**
  - Bilaterals
  - Individual company programs
  - Exchanges

- **Public sector**
  - Northeast States cap-and-trade program
  - California auto GHG emissions cap
  - Oregon new power plant CO$_2$ mitigation
Elements of Agricultural CO₂/GHG MOU (2003-05)

- **GHG Offset Standards**
  - “Gold Standard” field manual
  - Pilot project applications

- **Regional GHG Offset Supply -- Demonstration Projects**
  - Diverse regional agricultural settings & partners
  - Aggregator development
  - GHG offset sell offers
  - 3rd party verifiers

- **GHG Offset Demand**
  - Energy companies
  - Portfolio development

- **GHG Offset Trades**
- **Federal & state policies**
- **Partnerships**
Mississippi Ag GHG Offset Aggregation
Project Development 2003-04

- MSWCC-EnvDef MOA
  - Investigate carbon, water quality, agricultural economic opportunities
  - Field projects
  - Communication/education
  - Signed in 7/2003

- MSWCC CO$_2$e Sell Offer
  - Estimate CO$_2$ and N$_2$O potentials
  - Identify terms -- price, contract duration, M&V, risk
  - Draft “one-pager” sell offer summary of terms
  - Facilitate bi-lateral credit acquisition dialogues
Offer Sheet – Key Elements

CO2e Offsets from ______________ Agriculture in ____, USA, ___, 2004

- Type of Project
- Location of Project
- Measures Implemented
- Organization(s)/Individuals
- Total Project Offer Price (U. S. $)
- Project Description
- Duration of and Rights to Offsets

- Price & Payments
- Estimated Total Carbon Dioxide Emission Offset (metric tons of CO2 or C equivalents)
- Verification of Amounts
- Termination of Sale or Rental Agreements
Demand-Side Barriers to Ag Soil Carbon as GHG Offsets in the U.S.

- **Weak demand & prices** – U.S. demand so far “voluntary”
- **Buyers** not familiar with agriculture
- **Permanence**
  - Permanent sale/soil C easement preferred -- makes ton of soil carbon offset equivalent to ton of reduced GHG emissions
  - Leases seen as a liability at end of lease term
  - GHG portfolio management – asset pricing methods not commonly applied by buyers
U.S. Demand for GHG Offsets -- Why U.S. Companies Buy

- Voluntary GHG commitments
- Acquire low-cost mitigation credits for long-term risk management
- Comply with contractual or regulatory requirements
- “First-mover” advantage in GHG credit market
- Competitive advantage
- Public relations
Cinergy Pledges 5% Emissions Cut
Company Is the First to Spell Out
Reduction Plan in Bush Program

By JOHN FIALKA, Staff Reporter of THE WALL STREET JOURNAL

"We'll let the economics dictate where the cheapest reductions are," said Cinergy Chairman and Chief Executive James E. Rogers, who noted that the company may also invest in "offsets," including agriculture and forestry projects that tend to reduce atmospheric levels of carbon dioxide and other gases. Environmental Defense, a nonprofit environmental group in New York, will serve as an adviser to the company. An as-yet unnamed independent company will serve as auditor of the reduction project, Mr. Rogers said. ........
PCA partners have a market capitalization of $360 billion in key industrial sectors.
Selling Ag GHG Offsets in the U.S.  

*Is Voluntary Demand Sufficient?*

- Amounts of GHG offset purchases not significant in US to date
- **Ag GHG offsets cost-effective** compared to many other GHG control options
- Technical & institutional **barriers** to supply of ag GHG offsets beginning to be addressed
- EU GHG allowance/offset market did not take off until **GHG caps** imposed on energy sectors