

***Experience Leasing Greenhouse
Gas Emission Offsets from
Sustainable Farming Practices***

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Corporate Highlights

- Entergy is an integrated energy company engaged in electric power production, retail distribution, energy marketing and trading, and gas transportation
- Headquarters in New Orleans; operations in Gulf Coast (LA, MS, AR & TX) and Northeast (NY, CT, VT)
- \$26.9 billion in assets; \$8+ billion in revenues
- 2.6 million retail customers; 15,352 employees
- 30,000 MW of generation worldwide; 14,500 miles of transmission; an expanding U.S. plant portfolio
- 5th largest U.S. electricity generator

Agenda

- Entergy's Voluntary Greenhouse Gas Commitment
- Why is an Energy Company talking to the Ag Community?
- Buyer's Perspective on Carbon Credits
- PNDSA Experience
- Elements of a "good deal"

Entergy's Values

"The future cannot be predicted. It must be created based upon our conscience, our own set of values, our own sense of right and wrong and the legacy we want to leave for future generations. The responsibility starts and ends with each of us as individuals."

— Wayne Leonard, CEO, Entergy
2000 Business Climate Change Symposium

Sustainability Value Proposition

- “Entergy will be recognized as an environmental leader and will demonstrate the advantage of environmental excellence in achieving financial results;
- “We must be profitable, competitive and do what’s right for future generations”

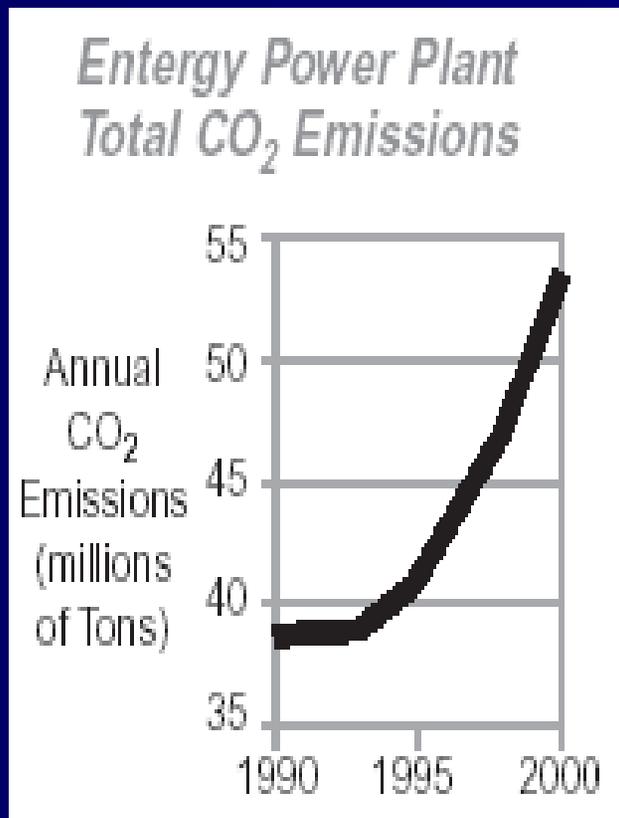
Entergy's Greenhouse Gas Reduction Commitment

- May 2001, Entergy became the 1st US electric power company to establish a voluntary stabilization target for CO₂ emissions

CONTEXT FOR ENTERGY'S CLIMATE CHANGE PROGRAM: THE GOOD NEWS

- Entergy's major source of greenhouse gas emissions is carbon dioxide (CO₂) from fossil-fueled power plants
- Entergy's CO₂ emission rate is among the lowest of any US electric generating company
- It is good and getting better (since '98 reduced CO₂/kwh by 50%)
- Entergy has been taking actions since 1991 to reduce total company greenhouse gas emissions
- The company reduced emissions by over 30 million tons CO₂E during the 90's as part of DOE's "Climate Challenge" Program

CONTEXT FOR ENTERGY'S CLIMATE CHANGE PROGRAM: THE BAD NEWS



- ✓ In spite of reducing CO₂ emissions per unit of electricity, overall CO₂ emissions increased during the 1990's due to increased demand for electricity
- ✓ Entergy decided further action was needed to stabilize the growth of CO₂ emissions as we entered the new century

OVERVIEW OF ENTERGY CO₂ TARGET

- Stabilize CO₂ emissions from U.S. power plants at 2000 levels through 2005
- Target treated as 5 year emissions “budget”
- Includes internal reductions and external offsets (multiple gases)
- Independent, third party verification
- Further, post-2005 target (TBD)

RELATED SUPPORTING ACTIONS

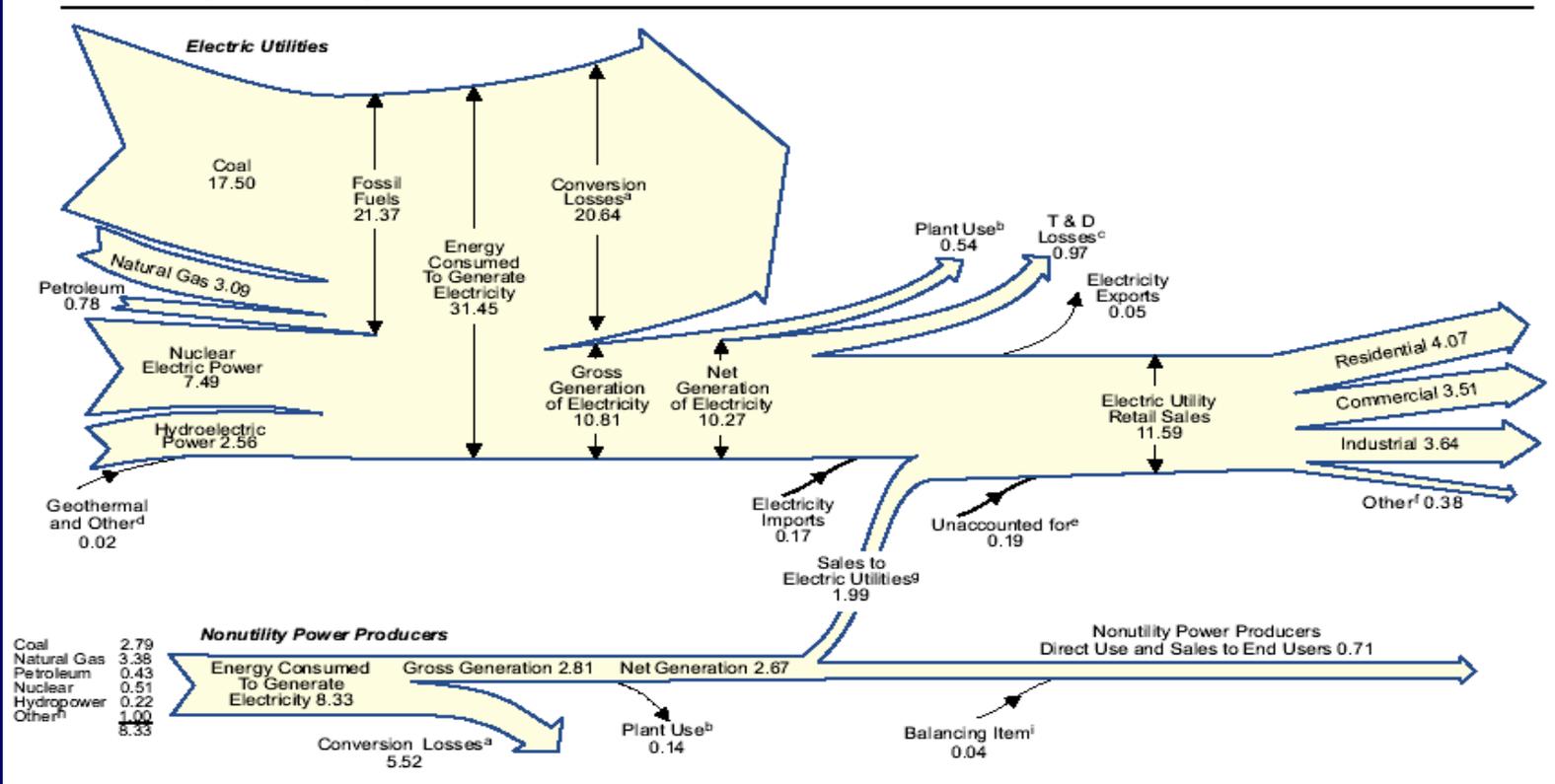
- \$25 million corporate fund (Environmental Initiatives Fund) to support CO₂ reduction projects
- Cooperative agreement with Environmental Defense (Advice and Oversight)
- Membership in the "Pew Center on Climate Change" & "Partnership for Climate Action"

Reasons Why Entergy Established a GHG Target

- Entergy management philosophy
 - Science on climate change sufficient to indicate meaningful risks
 - Responsible thing to do
- Exposure of service territory, e.g.,
 - Increased flooding from sea level rise/hurricanes
 - Increased spread of mosquito-borne tropical diseases due to warmer climate
 - Impending emission limitations on other pollutants; need for integrated approach
- Early action could mean lower cost
- CO₂ reduction actions create other co-benefits

EFFICIENCY OPPORTUNITIES

Diagram 5. Electricity Flow, 2000
(Quadrillion Btu)



POTENTIAL COST REDUCTIONS

- Reduced Operating Costs Benefits Everyone
 - Revenue – Expenses = Profit
 - Lower “cost of product” > Fossil Competitiveness
 - Lower price > Demand

	Fossil GWH	Fuel Heat Content MMBtu @ 10,000 btu/kwh	Fuel Cost @ \$3 / MMBtu	Potential Fuel Cost Savings	Efficiency Improvement
Delivered Energy	42,000	420,000,000	\$1,260,000,000		
Conversion Losses		275,637,520	\$826,912,560	\$ 12,260,000	← 1%
Plant Use	721	7,211,447	\$21,634,340	\$2,163,434	← 10%

Potential Environmental Performance Improvements

- Improved efficiency
 - Reduces fuel consumption
 - Reduces emissions
 - Avoids externalities

	2001 Fossil GWH	CO2 Savings Tons / Yr	SO2 Savings Tons / Yr	NOx Savings Tons / Yr	Efficiency Improvement
Delivered Energy	42,000				
Conversion Losses		275,100	716	704	← 1%
Plant Use	721	3,029	12	12	← 10%

Internal GHG Reduction Projects

- 44 internal projects with \$14 million to achieve 1.2 million tons CO2 reduction through 2005
 - Power plant efficiency improvements;
 - SF6 circuit breaker replacement
 - Carbon sequestration at company property

Portfolio of External Offsets Financed with EIF (Based on \$5 Million and 1.1 Million Tons CO₂)

<u>Category</u>	<u>Investment Level</u>	<u>% of Total</u>	<u>2001-2005 CO₂ Reductions</u>
Sequestration (SQ)	\$ 1,500,000	30%	200,000 tons
Methane (CH ₄)	\$ 750,000	15%	450,000 tons
Renewable Energy (RE)	\$ 1,250,000	25%	200,000 tons
Fuel Switch /Energy Efficiency(FS/EE)	\$ 1,000,000	20%	225,000 tons
Special Projects (SP)	<u>\$ 500,000</u>	<u>10%</u>	<u>25,000 tons</u>
TOTAL	\$ 5,000,000	100%	1,100,000 tons

External Project Examples



Landfill Gas to Energy Project

- 50,000 metric tons of CO₂-equivalent greenhouse gas reductions created through the capture and beneficial use of landfill gas (methane).
- Municipal landfill methane that would otherwise be released to the atmosphere is collected as a fuel to generate electricity.
- Methane is over 20 times more potent in creating the greenhouse effect as CO₂.

External Project Examples



Red River Wildlife Refuge Reforestation & Carbon Sequestration Project

- With The Conservation Fund and Environmental Synergy, Inc., Entergy restored 600+ acres of hardwood in NW Louisiana.
- Property transferred to U.S. Fish and Wildlife Service; became the first landholding in the country's newest national wildlife refuge.
- Trees will remove an estimated 275,000 tons of CO₂ from the atmosphere as they mature; provide federally-protected fish and wildlife habitat and recreation-driven economic benefits to the region.

External Project Examples



Entergy- DuPont N₂O Emissions Trade

- DuPont achieved “surplus” greenhouse gas reductions of N₂O at chemical plant near Orange, Texas
- Verified Emission Reductions equivalent to 125,000 tons of CO₂ obtained by Entergy from DuPont
- Inter-company trade is helping Entergy meet its corporate greenhouse gas commitment.

External Project Examples

Direct Seed Agriculture

*30,000 tons of
CO₂*



Entergy entered into a first-of-its-kind agreement to lease 30,000 tons of CO₂ offset credits from the Pacific Northwest Direct Seed Association (PNDSA). The offset credits will be generated by growers who have agreed to use direct seed agriculture methods for at least 10 years. Direct seed cultivation avoids soil carbon losses from oxidation associated with using traditional farming techniques, and also reduces the growers' fuel use and soil erosion.

Forest Sequestration

*300,000 tons of
CO₂*



Entergy is funding two large forest sequestration projects in the Mississippi Delta. The funding will be used to acquire land and easements to convert over 1,000 acres of marginal cropland to bottomland hardwood forest over the next two years. Within 80 years, the planted trees are projected to sequester over 300,000 tons of CO₂. The projects will also provide wetland and wildlife habitat benefits.

CO₂ Emission Offset Credits from Direct Seed Operations

- Environmental Defense brought PNDSA and Entergy together
- Entergy leases CO₂ offset credits from PNDSA
 - Emission reduction credits (fuel savings)
 - Carbon Sequestration in soil
- PNDSA aggregates “grower contracts”
- Growers agree to use direct seed methods for 10 year lease period

Buyer & Seller Concerns

- Yield
- Verification
- Enforcement – Failure to Perform
- Ownership of Offset Credits
- Qualification Criteria
 - Permanence
 - Leakage
 - Additionality
- Willing Buyer and Seller
 - Market Price
 - Transaction Costs
 - Future Value ?

Aggregator (PNDSA) Responsibilities

- Obtain contracts with willing “direct seed” growers equal to 30,000 tons of CO₂ offset credits over 10 yr lease.
- Provide additional acreage in the event of a default
- Provide Leaseholder an Annual Report
 - Detailing amount of annual offset credits,
 - Transferring offset credits to Entergy,
 - Certifying Growers have complied with contract conditions
- Maintain a registry with legal descriptions of acreage under contract
- Pay Growers

Growers Responsibility

- Use direct seed methods on acreage under contract for 10 years
- Transfer Offset Credits to the Aggregator
- Allow independent 3rd party verifiers access
- No burning to reduce crop residue
- Prepare annual reports certifying compliance with contract conditions

Leaseholder (Entergy) Responsibilities

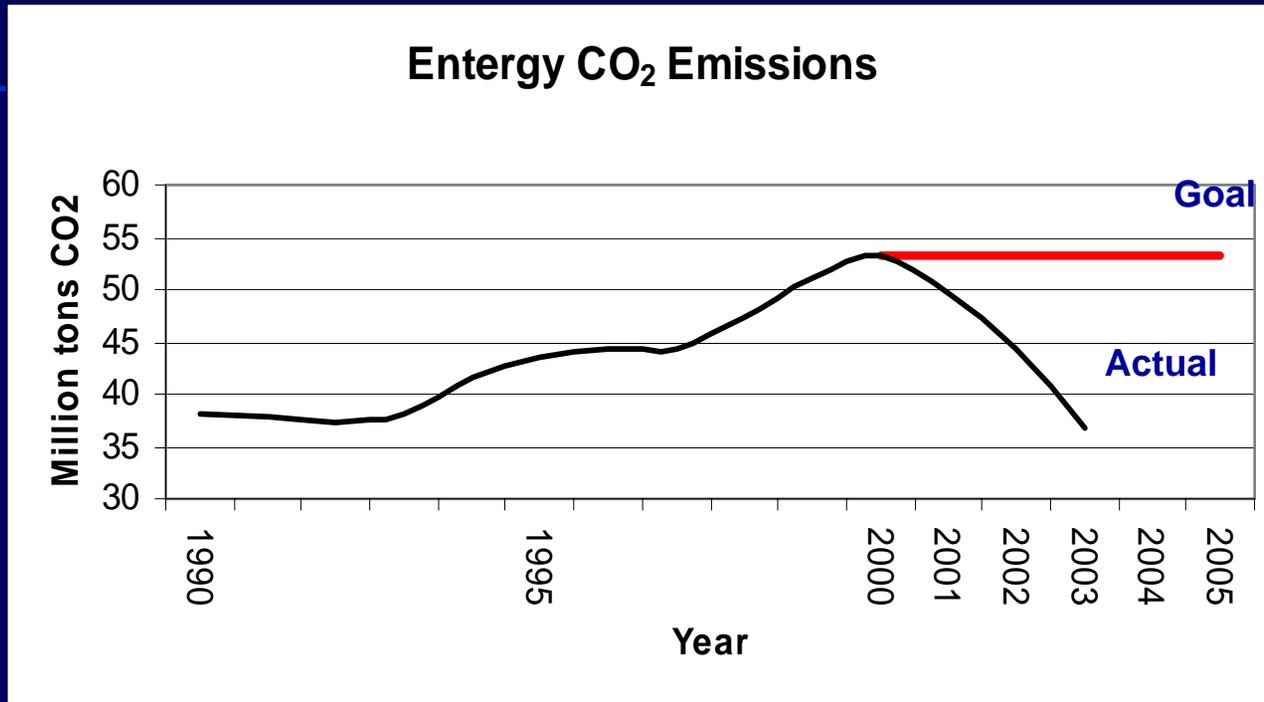
- Make Lease payments to Aggregator
- Monitor Aggregator's compliance with contract terms
- At end of lease either:
 - Replace with permanent CO₂ Offset Credits,
 - Extend lease for new CO₂ Offset Credits,
 - incur a debit.

Learning Experiences

- Lease was key to finding willing sellers
- Having a “trustworthy” Aggregator vital to buyer
- Research on yield, verifying use of “good practices” and 3rd party verification an adequate proxy for measurement
- Tradeoffs were needed to keep transaction costs viable
- Use of external offsets is critical to help meet GHG reduction targets (Entergy would not have set its target without access to an external GHG market)
- Variety of credible offsets are available at reasonable costs (Entergy portfolio average < \$5/metric ton)
- Investments in external offsets, and corresponding GHG reductions, will likely remain limited absent a government program to control emissions, register GHG credits, or at least formally grant credit for early action

Entergy GHG Commitment Progress

2001 - 2003



- **Entergy's commitment: Stabilize CO₂ emissions at 2000 level through 2005**
- **Through 2003, exceeded goal by 18%**
- **EIF supported 44 internal emissions reduction projects and 12 external projects**

Questions?

