

A Carbon Cap: Financial Impact to the U.S. Ethanol Industry

June 28, 2007

Facts

- Greenhouse Gases (GHG) was agenda item at recent Group of 8 Summit
- Regional Greenhouse Gas Initiative (RGGI) – (DE, ME, NH, NJ, NY, VT, MD)
- Western States Regional Carbon Initiative (CA, AZ, OR, WA, ID, British Columbia, Manitoba)
- S. Bill 280 (Lieberman) S. Bill 309 (Sanders) S. Bill 317 (Feinstein) H.R. Bill 620 (Olver)
- Kyoto Protocol carbon trading extends to 2012

Facts

- U.S. ethanol refineries are permitted to operate under a ‘minor source’ status as long as key pollutants are below 250 tons total per year
- CO2 is not defined as a key pollutant
- CO2 Market Risk Exposure to Ethanol Industry Today = \$0

Carbon Cap and Trade

■ The CAP

- An overall cap on CO₂ emission levels is set
- The government establishes a certain number of allowances (i.e., rights to emit)
- Allowances are distributed or auctioned to the sources of such emissions, covered entities
- The sources subject to the cap are required to surrender an allowance for every unit (e.g., ton) of CO₂ they emit
- Annual caps on emissions are phased down

■ The TRADE

- If covered entity needs more emission allowances to cover its emissions in a year, it can buy (i.e., “trade”) additional allowances from entities (sell) that have more allowances than they need.

Carbon Finance Process

Kyoto Protocol

1. Inventory CO₂ emission footprint over the project lifecycle.
For a New Project: Feasibility and Modeling.

Example:

$$9,460,000 \text{ MMBtu} \times 93.51 \text{ kg CO}_2/\text{MMBtu} = 84,604.6 \text{ metric tons CO}_2$$

Global Warming Potential = Tons GHG X GWP

GWP Factor of CO₂ = 1

GWP Factor of N₂O = 296

Carbon Finance

2. Registration, Validation. Asset is created.

1. Documentation
2. Public Consultation
3. Validation by Operational Entity
4. Approval by National Authority
5. Registration by CDM Board
6. Implementation
7. Verification by Operational Entity
8. Issuance of Carbon Credits

Carbon Finance

3. Sell, securitize or “monetize” the asset or if environmental liability then:
4. Mitigate Liability via investment in technology
5. or Mitigate via Investment in Carbon Offsets

Carbon Offsets

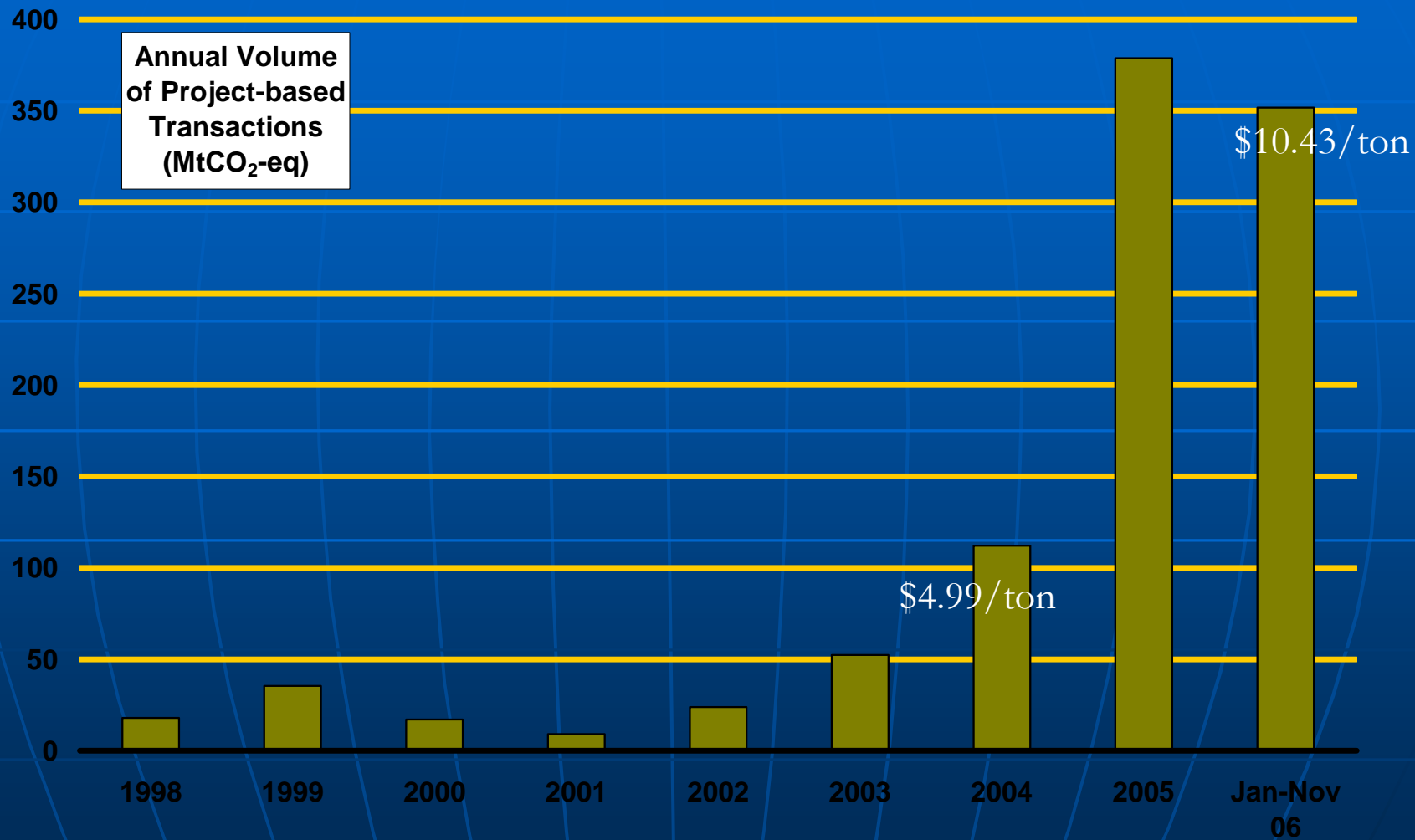


Carbon Offset Projects

■ Characteristics

- Defined as verified reductions in emissions by non-covered entities
 - Real or additional
 - Quantifiable
 - Enforceable
 - Permanent
- Potential offsets:
 - Carbon sequestration (underground storage)
 - Repowering existing electric generation facilities
 - New clean energy sources

CDM Carbon Market



Carbon Finance

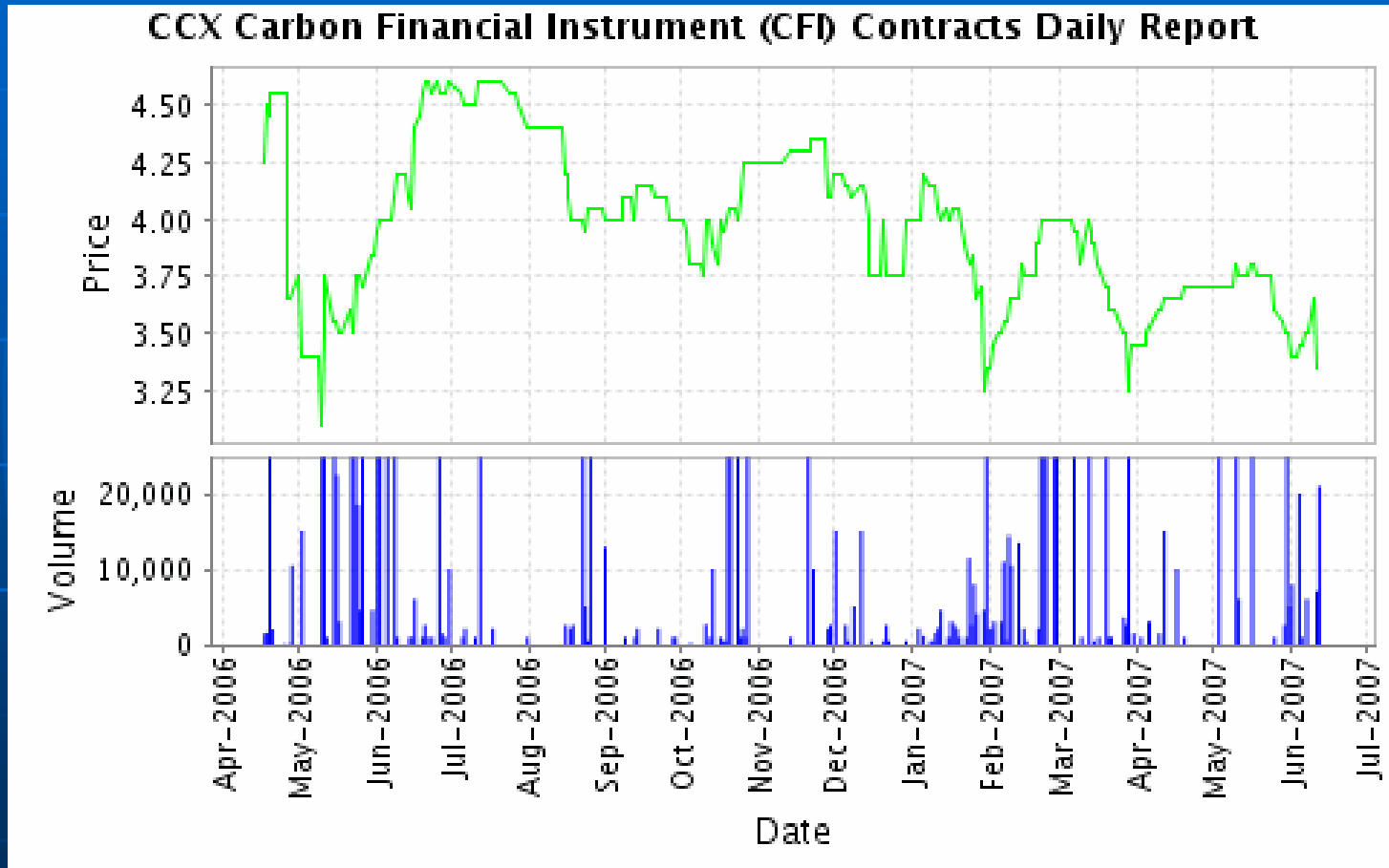
U.S. vs. Brazil Ethanol

- Sugar to Ethanol - Bagasse
 - Carbon Footprint (+)
 - CDM – Kyoto Protocol
 - Carbon Credit Revenue
- Corn to Ethanol - Nat Gas
 - Carbon Footprint (-)
 - Voluntary Market
 - Carbon Cost

KEY MARKET RISK FACTORS

- Value (Supply & Demand)
- Liquidity
- Quality

Value and Liquidity



Chicago Climate Exchange Voluntary Market

CCX 2010 Vintage ~ \$3.50/ton

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Carbon Quality

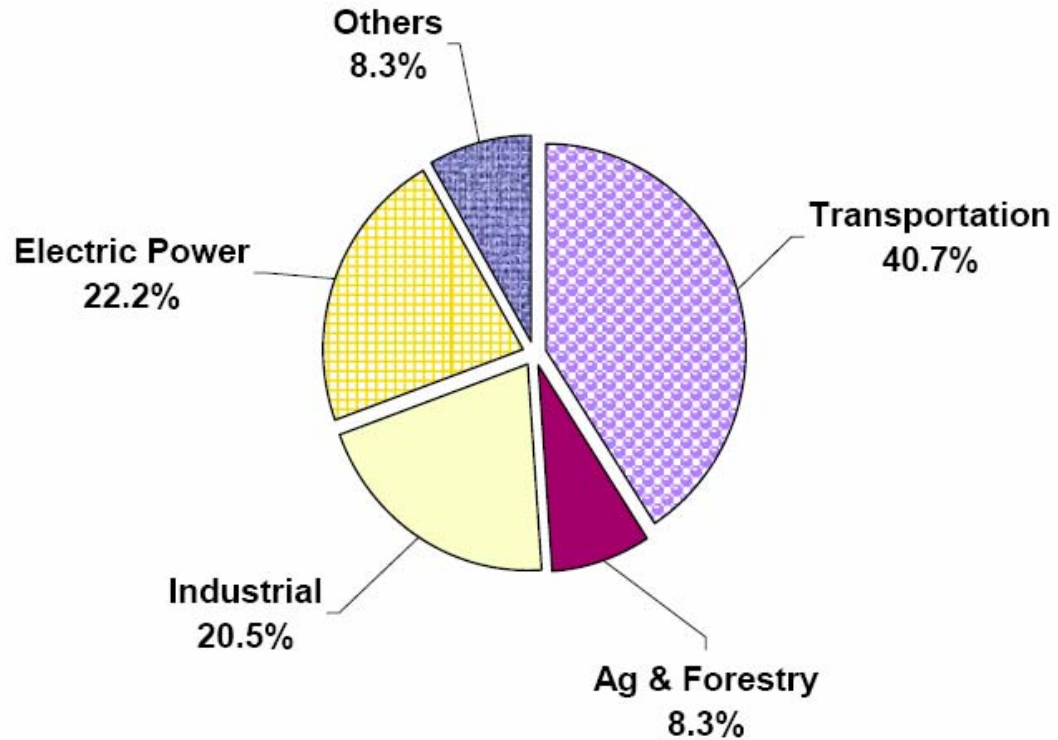
- Voluntary Carbon Standard
- National Climate Registry
- Voluntary Market Exchanges
 - Asia Carbon Exchange (ACX)
 - European Climate Exchange (ECX)
 - Chicago Climate Futures Exchange (CCFE)
 - Chicago Climate Exchange (CCX)

Comments

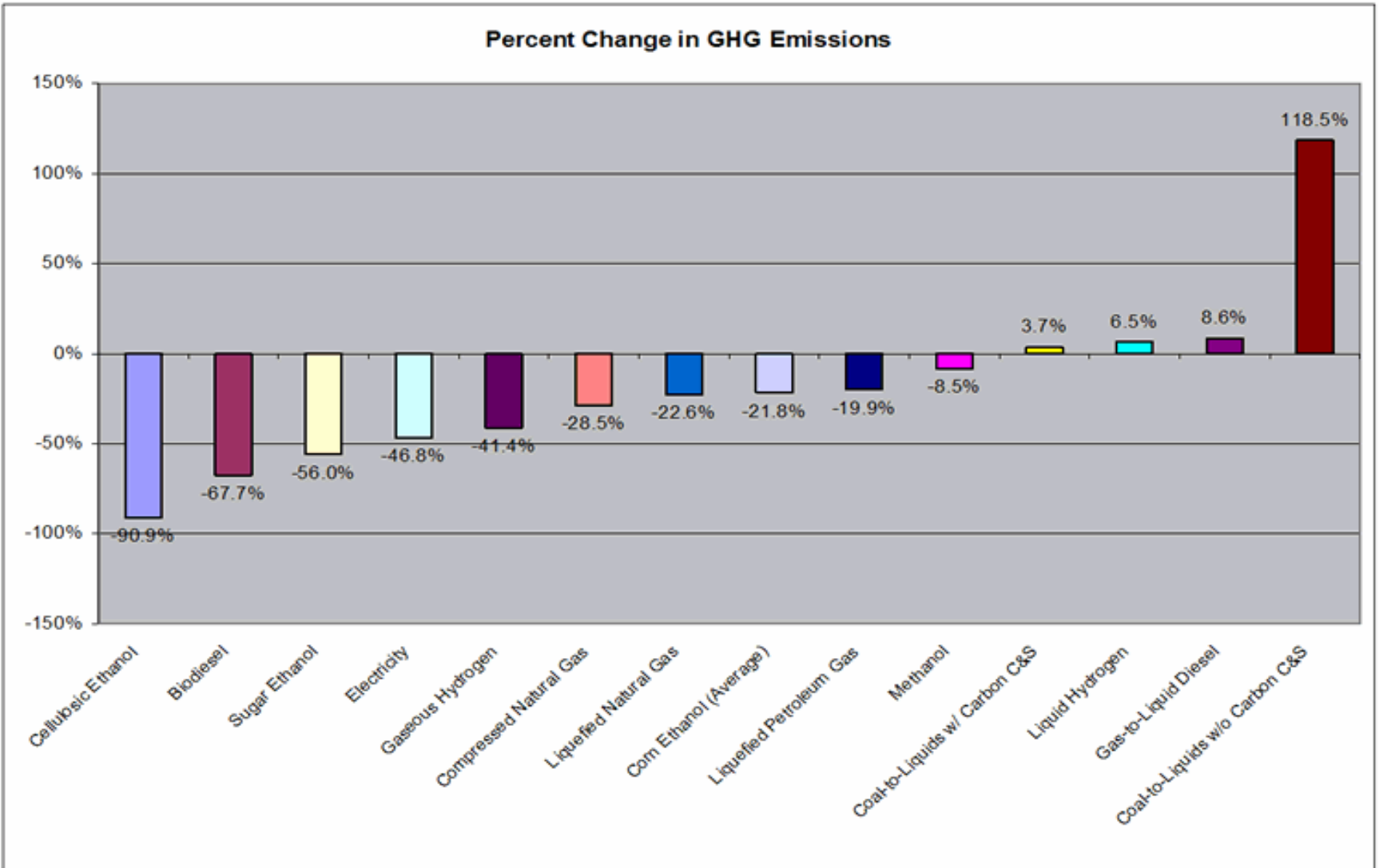
- GHG Allowances Should be Auctioned, not Allocated
- Ethanol Industry Needs a Voice in D.C.
 - Will ethanol refiners or blenders be considered for allocation of baseline allowances?
 - What will be the baseline year for granting allowances?
 - Is blending of ethanol as a fuel a direct reduction in CO₂?

Direct Reduction?

CO2 by Emissions Source - California



Source: California Energy Commission



*Source: Argonne National Laboratory's GREET model

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