

# LCFS and Corn Ethanol: Status of Issues

May 9, 2008

Renewable Fuels Association

# RFA Energy Efficiency Survey

- 22 facilities participating
- 1.8 bgy (37% of 2006 production)
- Majority were investor owned dry mills and wet mills
- 66% of these facilities (all dry mills) were built after 2001
- Dry mills: 79% NG, 13% coal, 8% grid electricity
- Wet mills: 72% coal, 27% NG, 1% other
- No wet mills built since the early 1990s (some have closed)

# RFA 2007 Survey

(more results in report)

	RFA 2007 Survey		USDA 2001 Survey		Percent Change from 2001	
	Dry	Wet	Dry	Wet	Dry	Wet
Production (mmgal/yr)	52.7	145.9				
Yield (ethanol/bushel)	2.81	2.74	2.64	2.68	6.40%	2.40%
Co-products production (dry lb/gal)	5.9	6.5				
Percent wet feed	37%	41%				
Total energy (Btu/gal)	31070	47409	39719	51060	-21.80%	-7.20%
Water (gal/gal)	3.45	3.92	4.7	NA	-26.60%	
Steam (lb/gal)	14.5	29.5				

2001-2007 Change: Higher yield per bushel of corn (+2 to 6%) with less energy (-7 to -22%) and less water (-26%)

## Comparison to ARB Corn Ethanol Report - Dry Mills (April 21, 2008)

	RFA Survey	ARB Report
Primary Energy Input (Btu/gal)	31,070	34,889
DDG Yield (lb/gal)	5.9	6.4

# Indirect Land Use

- AIR compared Searchinger to preliminary EPA analysis in a number of areas:
  - Starting and ending ethanol volumes
  - One-time land use conversion emission estimates
  - Type of ecosystem converted
  - Acres converted/1 bgy
  - Domestic credits considered (EPA)
  - Projected yield increases
  - 30-year factor for growing grassland or forest (Searchinger)

## Land-Use Impact Differences

Item	Searchinger, et al	Preliminary EPA
Volumes	15 to 30 bgy	12 to 18 bgy
Future grain productivity improvements (domestic and international)	Not included in modeling to predict acres converted - used to “balance” conversion of lower productivity lands	Included in modeling
One time land conversion estimates	Based on 1990s mix of land types converted, wtd ave of 143 Mt CO <sub>2</sub> /acre	Based on contemporary mix of land, ave around 30-40 Mt CO <sub>2</sub> /acre
Credits considered	None?	Domestic rice methane reductions, domestic livestock reductions, domestic soil carbon reductions
30 years carbon sequestration by converted “growing” forest/grasses	Yes	No

# Collective Concerns of Academics

- Corn ethanol volumes too high
- Not a true lifecycle analysis - all modeling and little data
- Presents primary results as if they are “fact”, even though there are many uncertainties
- Yield trends too low
- GREET ethanol production values (energy, DDG credits) used are outdated
- Land carbon conversion worse case values
- Does not include newer, lower GHG ag practices becoming more widely used (no till, cover crops)
- Much of the increased demand can be gotten with intensification rather than conversion

# Other Developments - Land Use

- GTAP Paper No 52 (Keeney and Hertel)
  - Critical of Searchinger (and FAPRI model) assumptions of no change in yield response to price
  - Also critical of assumption that decreased exports from the US must be made up with increased domestic production (and not imports from another country other than US)
  - Evaluates land changes for 1 bgy increase from 5 bgy to 6 bgy using GTAP model modified for the above two factors
    - Is ARB using the modified model or the unmodified model in its work with GTAP?
- New (but preliminary) analysis comparing global crop yields
  - Yields in US and western Europe are similar
  - Yields in rest of world far lower
  - Much opportunity to expand yields rather than converting lands

# Ethanol Indirect Land Use Effects

## Conclusions to Date

- ARB has not yet defined the elements of a good land use impacts study.
- Estimates of the effects vary widely among current academic studies. To date, it appears that Searchinger, et al is not a model of a good land use study.
- With the current degree of disagreement in the academic community, it may not be possible to accurately quantify indirect land use impacts in time to support the LCFS regulation.
- RFA suggests that ARB consider postponing the incorporation of indirect land use impacts until more consistent and reliable research becomes available. This might include updating the LCFS regulation at an appropriate time in the future.