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Agricultural Outlook Forum
U.S. Department of Agriculture

Presented: March 1-2, 2007

RENEWABLE FUELS INDUSTRY: “PERFECT WEATHER” OR “PERFECT STORM” AHEAD??

Tom Houser

CoBank®

Renewable Fuels Industry

“Perfect Weather” or “Perfect Storm” Ahead ??

Tom Houser

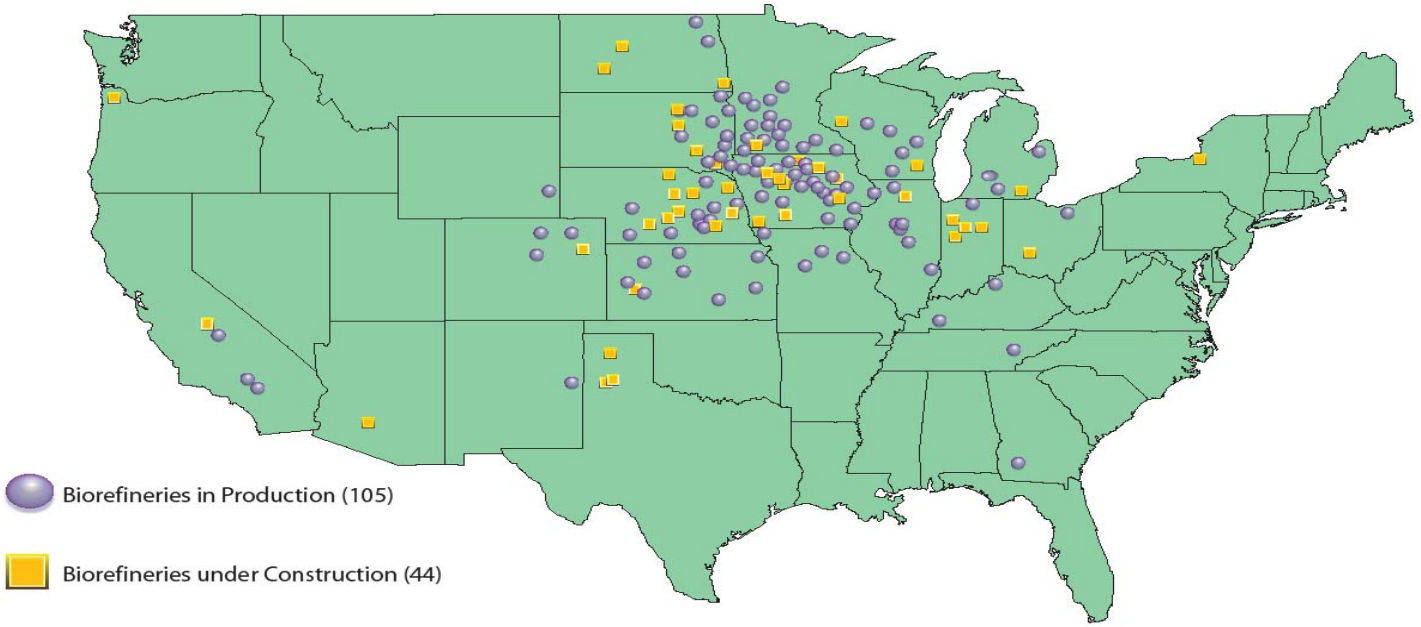
CoBank

- $40+ billion, customer owned and controlled, cooperative bank
- Part of the $160+ billion Farm Credit System
- Presently involved in financing approximately 45 ethanol plants (and several bio-diesel projects), representing approximately 25% of current and forecast industry capacity
- Gross loan commitments near $1.4 billion
- Net commitments held by CoBank near $900 million

Ethanol Industry Stats (January 2007):

- 113 plants in presently in production with total capacity of 5.5+ billion gallons
- 78? (per RFA), 79? (per Energy Policy Institute) 84? (per Cambridge Energy Research Associates) under construction
- 7? 11? undergoing expansion
- Total capacity to increase to 11+ billion gallons within approximate next 2-3 years
- Additional 200 (?) in planning stage

U.S. Ethanol Biorefinery Locations



Source: Renewable Fuels Association

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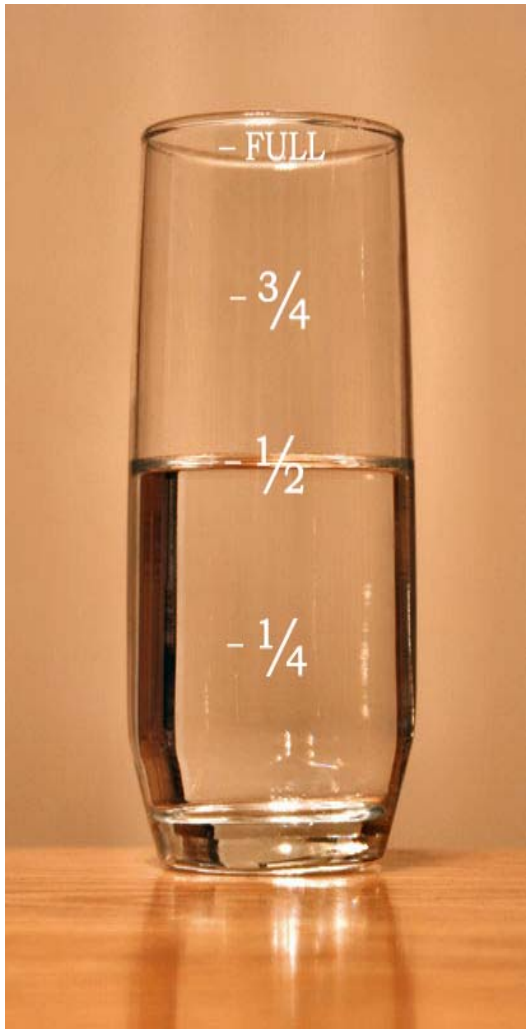
Future Ethanol Production

Year	RFS	Last Yr. Est. Capacity	Updated Est. Cap.
2006	4.0	5.1	5.3
2007	4.7	6.6	8.4
2008	5.4	7.9	10.6
2009	6.1	8.6	11.5
2010	6.8	9.3	?
2011	7.4	9.9	?
2012	7.5	10.3	?



ETHANOL

Is the Glass
Half Empty
or
Half Full?

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Risk Assessment / Issues:

- Primary Risk – Crude Oil Price Scenario !!!
- Crude at $60+/barrel, “the glass is half full”
- Crude settles back to $40 +/- a barrel, economics dramatically different
- Present RFS does, though, provide “floor”

Historic U.S. Ethanol Marketplace by Segment

Growth Driven by Need for Oxygenate AND Economics

- State MTBE bans drove a dramatic rate of growth for ethanol consumption in Reformulated Gasoline (RFG) .
- Nonetheless, prior to 2006 close to half of current U.S. ethanol usage remained outside the federal oxygenate mandates, mostly driven by economics.

US Consumption of Ethanol by Gasoline Type (million gal)							
Gas Type	Conventional		Oxyfuels		RFG		Totals
	Use	% of Total	Use	% of Total	Use	% of Total	Use
2001	800	52%	240	15%	510	33%	1,550
2002	1,120	53%	250	12%	730	35%	2,100
2003	1,450	53%	260	9%	1,040	38%	2,750
2004	1,600	46%	270	7%	1,650	47%	3,520
2005 (projected)	2,020	48%	280	7%	1,850	45%	4,150
Rate of Growth	26%		4%		38%		28%

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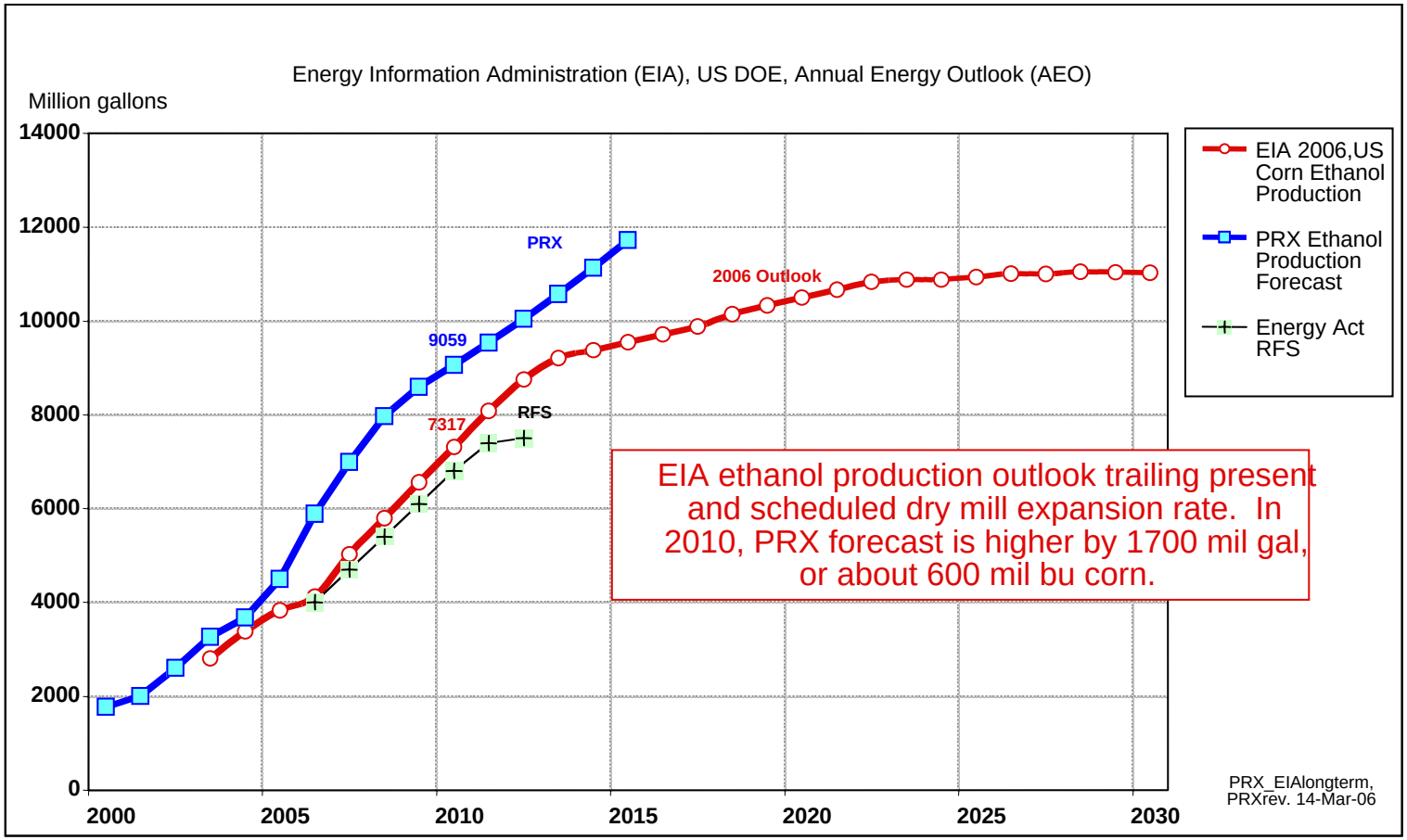
U.S. Corn Ethanol Production, With PRX Estimate



According to the EIA:

"The AEO2006 reference case includes only those sections of EPACT2005 (the recent Energy Bill) that establish specific tax credits, incentives, or standards—about 30 of the roughly 500 sections in the legislation."

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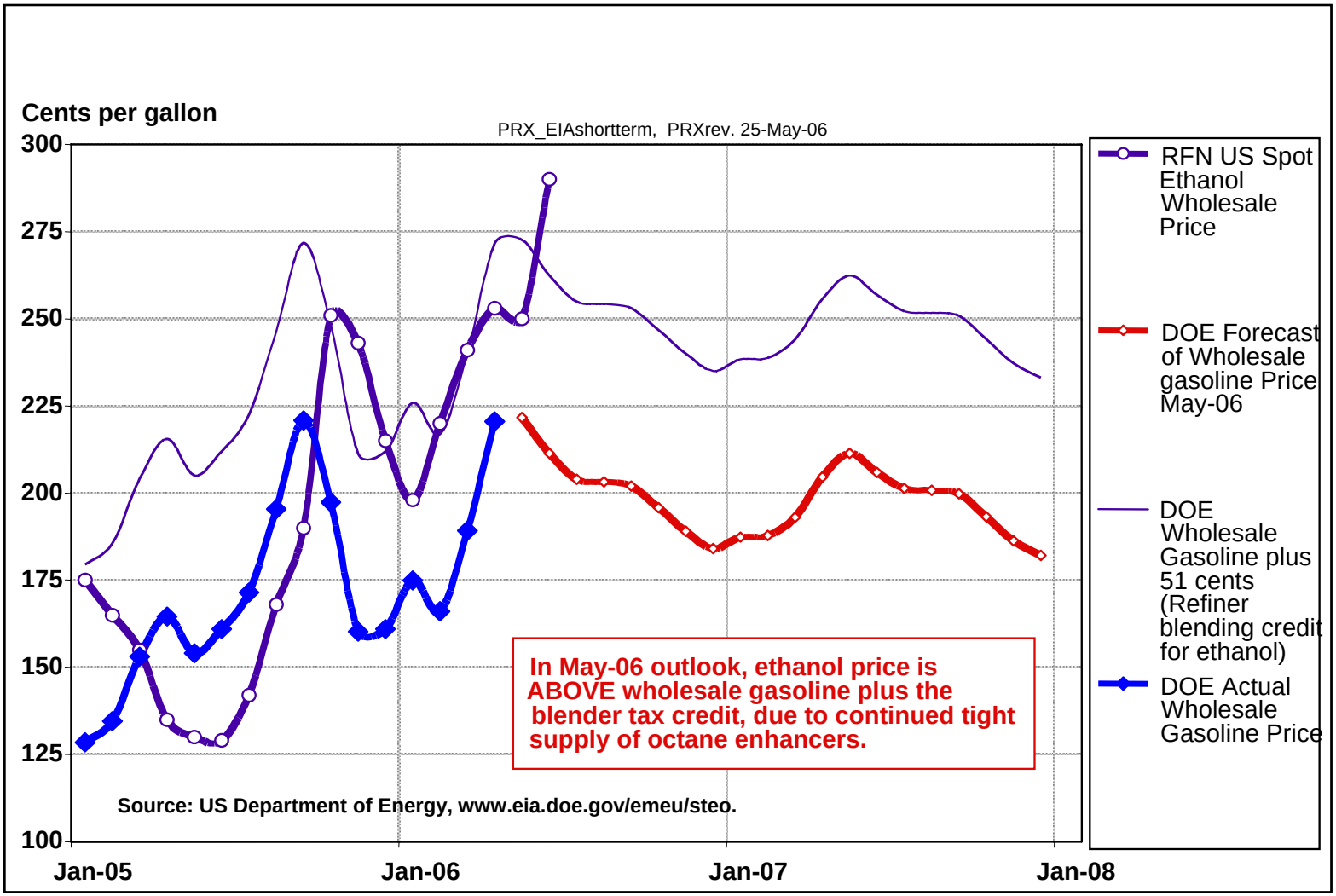
U.S. Motor Gasoline vs. Ethanol, Wholesale Price



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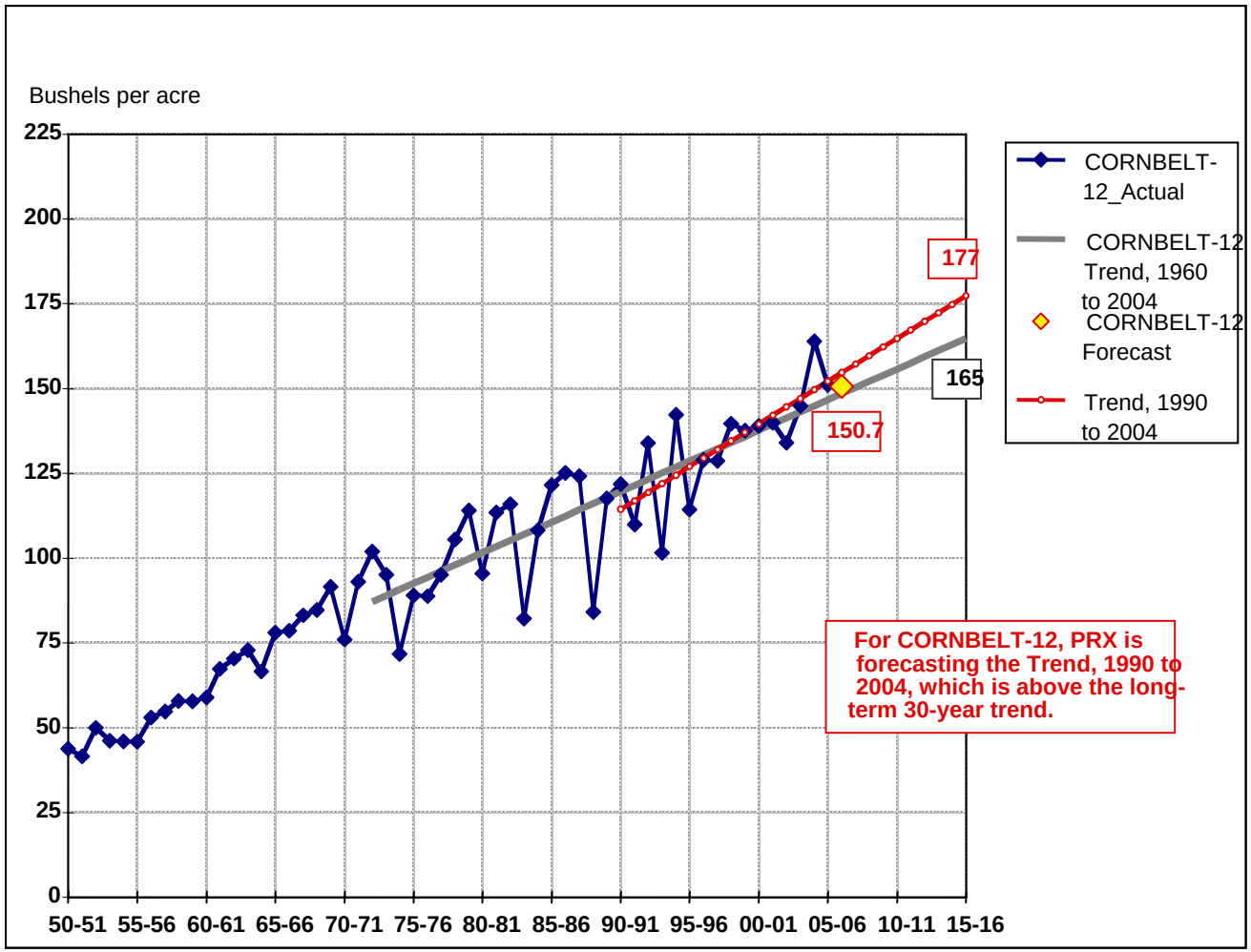
Risk Assessment / Issues: (cont'd)

- **Corn Production/Cost**

- PRX – "… it is the coming job of corn price to reduce the ROI of the ethanol dry mill industry to zero or below, halting the expansion before all the corn is gone."
- USDA/Keith Collins "2007 corn crop… quite likely….corn used in ethanol production will rise by more than 1 B bushels from the 2.15 B of the 2006 crop"
- Earth Policy Institute – "U.S. distilleries now on-line or in the works will pull an estimated 139 million tons – or 5.5 billion bushels – of corn from the 2008 harvest to produce fuel."
- NCGA – "corn yield per acre….has risen by 2%/year since 1996, translating into a 15 billion bu. crop by 2020."
  - "..corn prices will adjust to near the historic average in the long term."
- Acreage, yield curve, new hybrids, etc.
- Corn vs. Soybeans (bio-diesel)

Cornbelt-12 Yield History and Trend



PRX_B_IA_BA_BS, GTB-06-03, Mar-15-06

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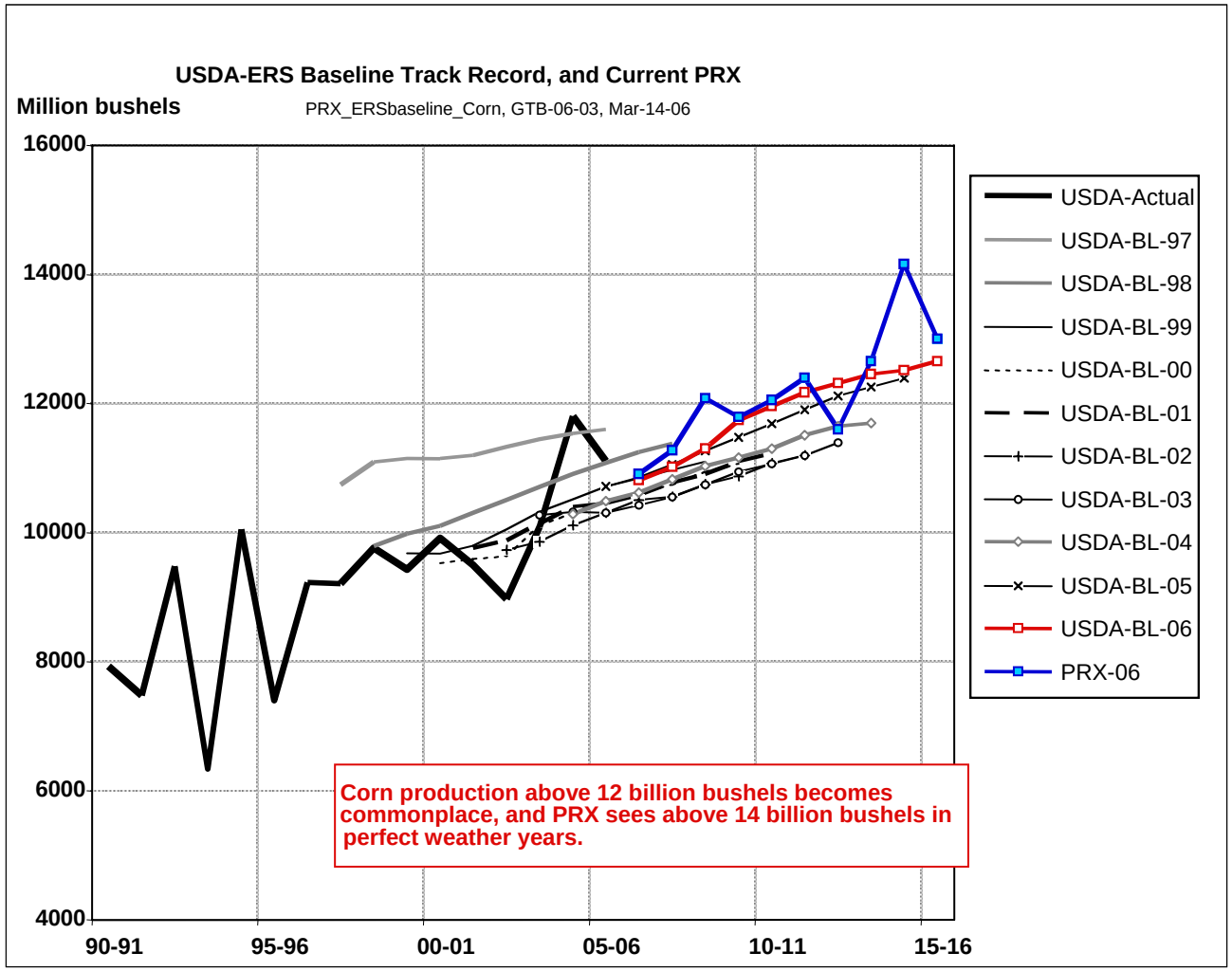
US Corn Production, Long-Term Forecasts



US
USDA-Actual

USDA-BL-97
USDA-BL-98
USDA-BL-99
USDA-BL-00
USDA-BL-01
USDA-BL-02
USDA-BL-03
USDA-BL-04
USDA-BL-05
USDA-BL-06
USDA-BL-07
USDA-BL-08
USDA-BL-09
USDA-BL-10

PRX-06

USDA-Actual

USDA-BL-97
USDA-BL-98
USDA-BL-99
USDA-BL-00
USDA-BL-01
USDA-BL-02
USDA-BL-03
USDA-BL-04
USDA-BL-05
USDA-BL-06
USDA-BL-07
USDA-BL-08
USDA-BL-09
USDA-BL-10

PRX-06

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Cornbelt Model Ethanol ROIs, Cts/Gal

PRX_BS_Regions, GTB-06-10, Oct-12-06

		Ethanol Price				
		$1.25	$1.50	$1.75	$2.00	$2.25
Corn Price	$2.00	$0.19	$0.44	$0.69	$0.94	$1.19
	$2.50	$0.07	$0.32	$0.57	$0.82	$1.07
	$3.00	($0.05)	$0.20	$0.45	$0.70	$0.95
	$3.50	($0.17)	$0.08	$0.33	$0.58	$0.83
	$4.00	($0.30)	($0.05)	$0.20	$0.45	$0.70
	$4.50	($0.42)	($0.17)	$0.08	$0.33	$0.58
	$5.00	($0.54)	($0.29)	($0.04)	$0.21	$0.46

DDG price moved in relation to corn price. Gas set at $7.00 per cu ft.

The future of corn supply-demand depends as much on the future of ethanol price as any other factor, and ethanol price has now declined from its above $3.00 levels. The job of corn price is easier, of course, the lower one's opinion of ethanol price!

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Risk Assessment / Issues: (cont'd)

- **<u>Distillers Dried Grains (DDG's)</u>**

- Ration inclusion rates increase for dairy and beef cattle, and also with swine and poultry ("glass half full").

- Market becomes saturated and value relative to corn declines.

- DDG's vs. soybean meal (what if bio-diesel takes off ?)

Risk Assessment / Issues: (cont'd)

- **Transportation Logistics**

- Pipeline shipment of ethanol not presently practical

- Rail shipments of ethanol have tripled since 2001 to 106,000 carloads last year; projected to increase to 140,000 in 2007

- Most terminals have not developed infrastructure of tracks, storage tanks, and rapid unloading for ethanol unit trains

- Distillers grain shipments also rapidly increasing

Risk Assessment / Issues: (cont'd)

- **Foreign Imports**

- Through November 2006, U.S. imports were 616 million gallons, more than 4x the 135 million in 2005

- U.S. Energy Secretary Samuel Bodman (per AP) "does not see a 51 cent/gal subsidy to U.S. farmers remaining in place beyond 2010 or an import tariff of 54 cents/gal on ethanol beyond 2008"

- Impact on supply and pricing, especially on destination/proposed coastal plants ??

Risk Assessment / Issues: (cont'd)

- **Political / Legislative Support**
- Partial excise tax exemption has been extended through 2010; 5.1 cents/blended gallon.
- RFS (already) mandates usage increasing to minimum 7.5 bgy.
- Positioning has begun to legislate higher requirement.
  - "20 in 10" ? 15 B by 2015 ? "25 x 25" (37 B) ?
  - 2007 Farm Bill
  - 37 Governors, President AND Candidates (and Cargill) !!!
  - "Mom, Apple Pie, and Ethanol"

Risk Assessment / Issues: (cont'd)

- **Technology**
- Basic production process evolving, esp. regarding energy use.
- Fractionization, starch hydrolysis, oil extraction, gasification
- Cellulosic technology improving, but not yet commercial.
  - Capital costs are almost 4 times dry mill ethanol
  - Operating costs are 50% above dry mill costs
- "Logistics" also an open issue(s) regarding transportation, quantity, timing, and consistency.
- "DOE has a goal to reduce the production cost of cellulosic ethanol from today's price of $2.25/gal to $1.07/gal in 2012"
- Government support (grants + guarantees) will be important

“Wall Street” $$$$ [What was “then”]

- Raw Material (Corn) / Finished Product (ethanol) relationship (lack thereof) used to “scare off” Wall Street.

- Tremendous interest developed, both for debt and equity investments (concerned about being “left out”).
- Project finance (leveraged) structures.
- Was a ready market to sell deals into.
- Significant fees; not much “skin”.

“Wall Street” $$$$ [This is “now”]

- Traditional lender’s portfolios “full” or near full
- Corn can go up ??
- Oil can (really?) come down ??
- Rocketing project costs
  - “Leverage” coming down
  - Some deals not getting done

Summary

- Confidence is high that the bio-fuels industry is here to stay, and will continue to grow
- Industry risks are, though, significant, with substantial economic volatility anticipated
- Absent a return to increasing crude oil prices, government support will be essential in the foreseeable future, especially with regards to commercialization of new technologies
- Well located, well capitalized, low-cost producers will survive, whereas projects lacking such attributes represent significant risk to capital providers.