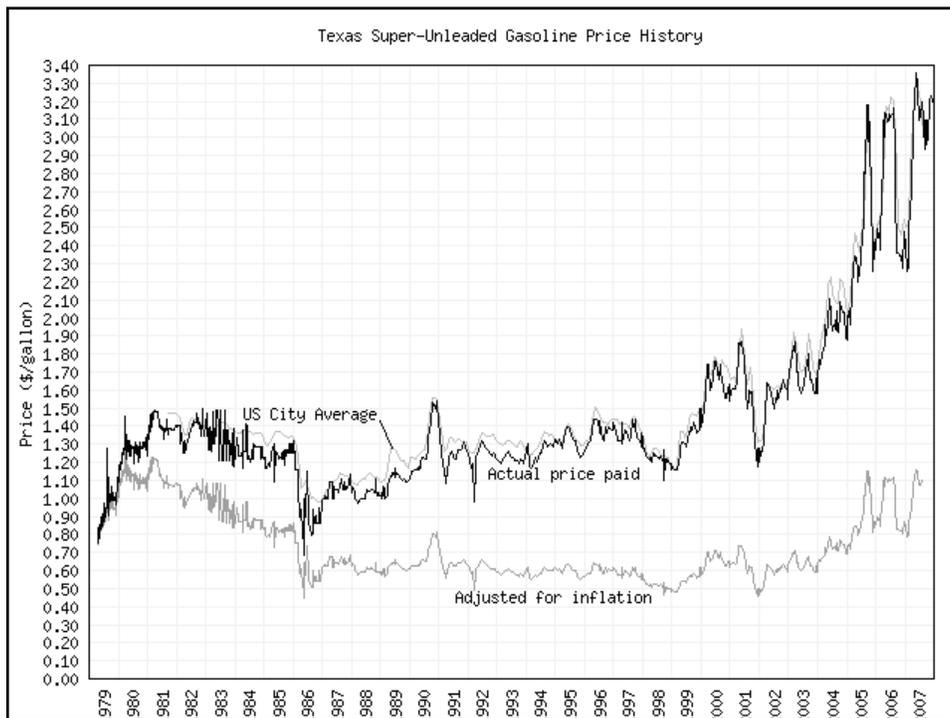


# Biofuel Energy Trends and Opportunities

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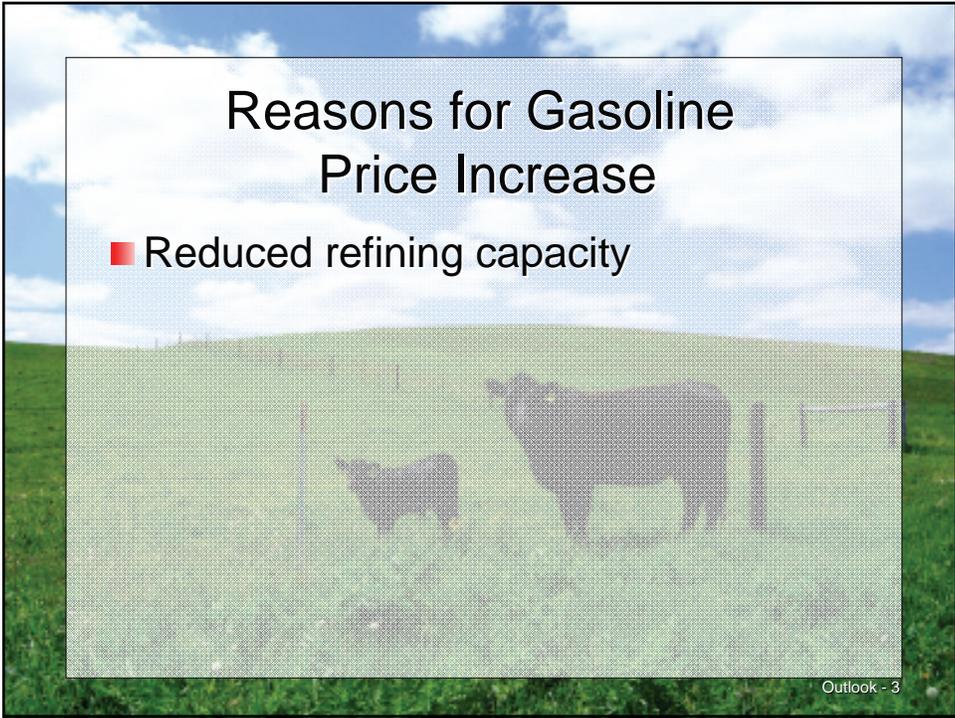
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Outlook - 1



## COST CONTROL: RISK MANAGEMENT PLANNING STRATEGIES

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## U.S. Oil Supplied by 34" Enbridge Pipeline?

- 3%
- 5%
- 10%
- 15%

Outlook - 5

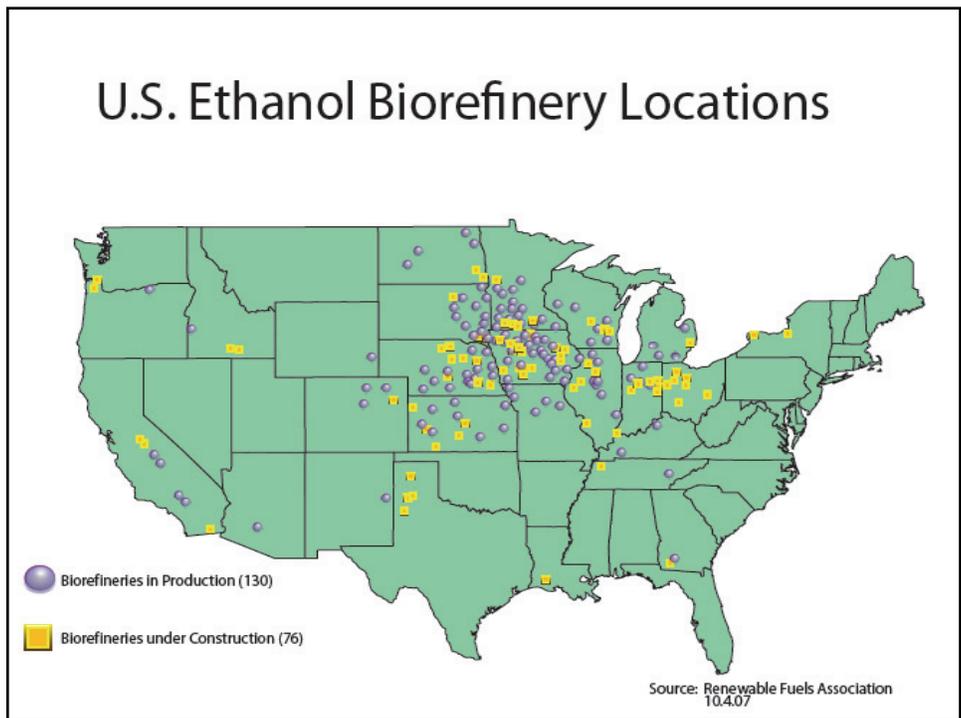
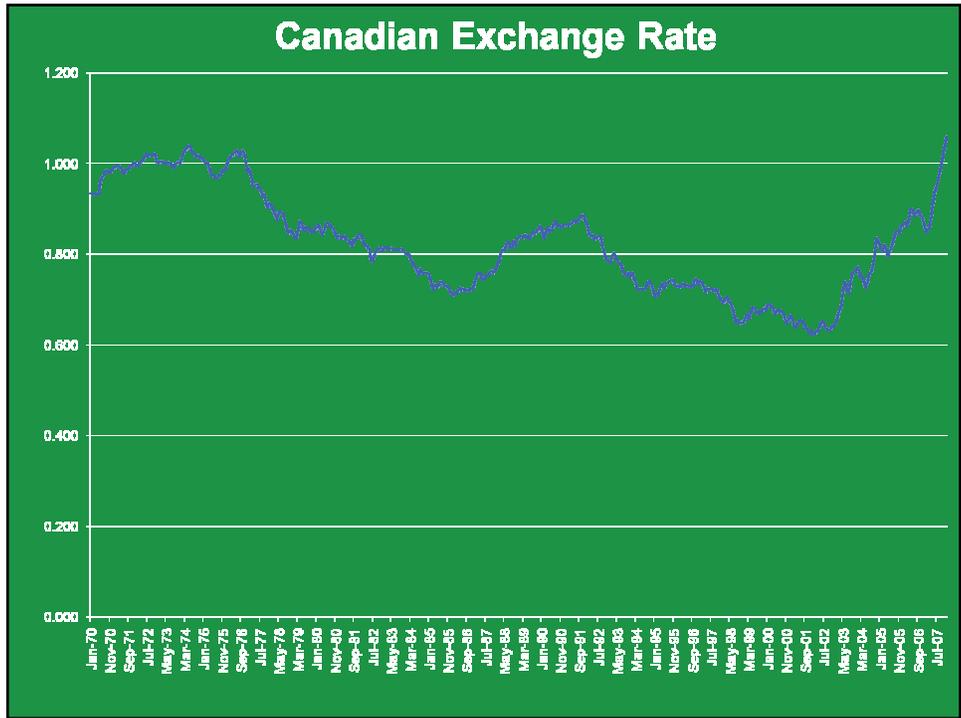
## Reasons for Gasoline Price Increase

- Reduced refining capacity
- Rising prices have not curbed demand
- Boutique fuel blends
- Exchange Rates

Outlook - 6

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## Rapid Historical Investment

- Renewable Fuel Standard motivated industry expansion (Tax credits, import tariffs, blend mandate)
- Favorable gasoline/corn price ratio provided high returns on investment
  - High investment returns enabled plants to pay high prices for corn
  - \$3 billion of investment capital flowed into agriculture sector
  - External investment has rural development implications

Outlook - 9

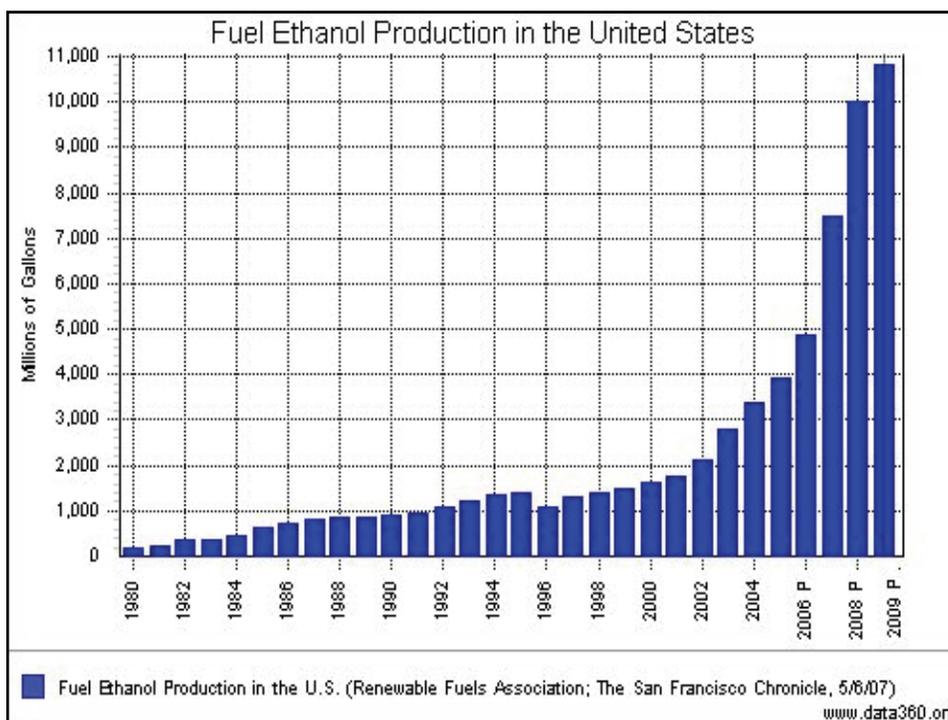
## Energy Independence and Security Act of 2007

- 36 billion gals. ethanol by 2022
- Of this, 21 billion from cellulosic

Outlook - 10

Year	Conventional Biofuel	Advanced Biofuel	Cellulosic Biofuel	Biomass-based Diesel
2008	9.0			
2009	10.5	0.60		0.5
2010	12.0	0.95	0.10	0.7
2011	12.6	1.35	0.25	0.8
2012	13.2	2.00	0.50	1.0
2013	13.8	2.75	1.00	*
2014	14.4	3.75	1.75	*
2015-2022	15.0	5.50-21.0	3.00-16.0	*

Outlook - 11

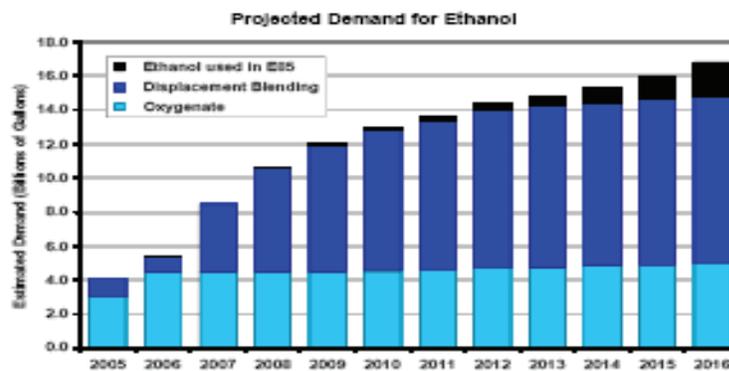


## COST CONTROL: RISK MANAGEMENT PLANNING STRATEGIES

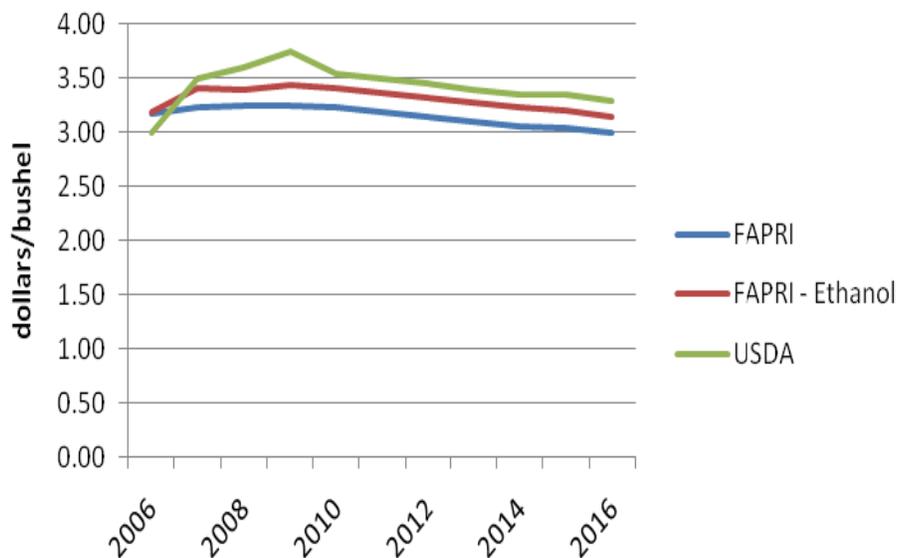
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## U.S. Ethanol Industry Growth

- Support for ethanol is at an all time high as lawmakers embrace environment, economic and security benefits of renewable fuels
- BBI expects U.S. ethanol production to increase at a compound annual growth rate of 12.5% through 2016



## U.S. Corn Price Forecast

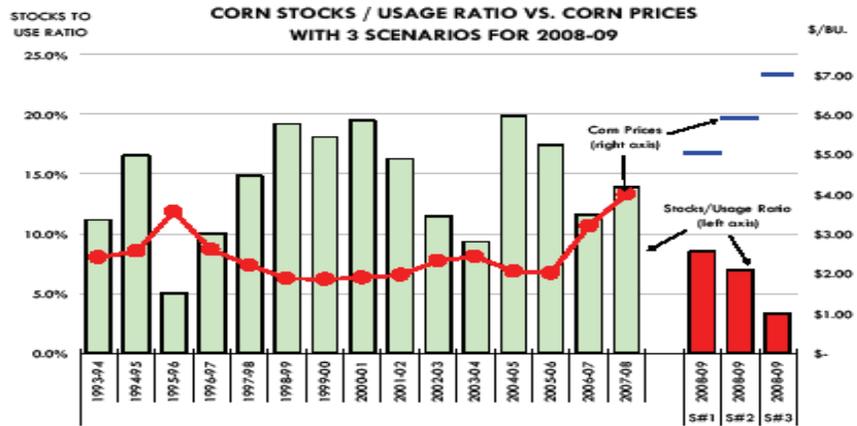


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## Daily Livestock Report

Livestock market information provided by Steve Meyer and Len Steiner.



## Ethanol Plant Ownership

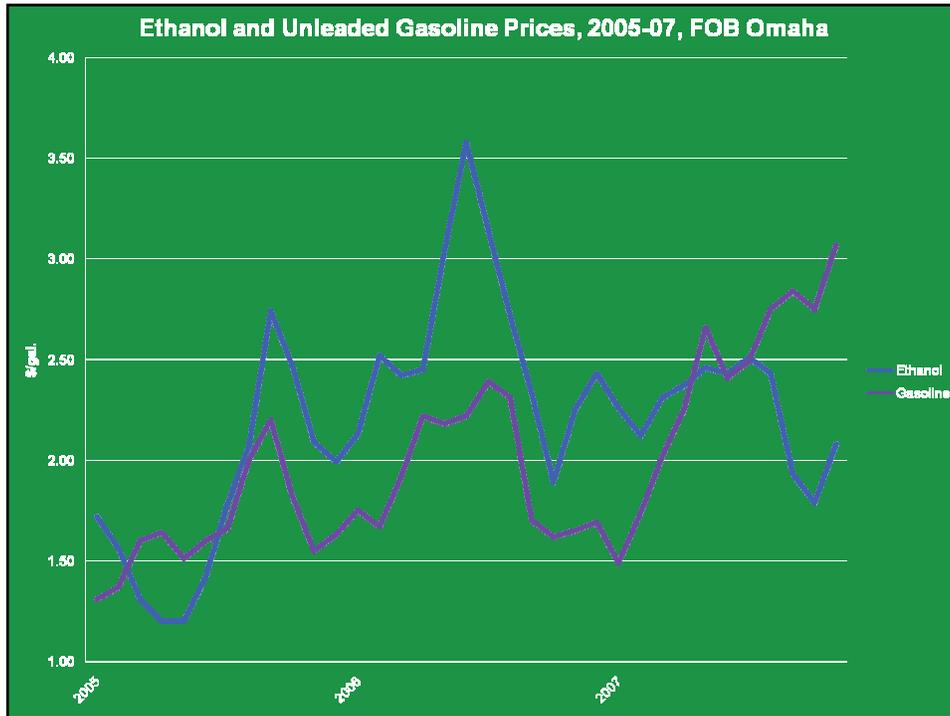
### ■ Current Plants

- 47 percent of plants are farmer owned
- 39 percent of production from farmer owned

### ■ Plants under Construction

- 12 percent of plants are farmer owned
- 11 percent of production farmer owned
- (1 percent loss of ownership => 1 less local job)

Outlook - 16



**Estimated Ethanol Production Costs for New Construction**

Corn Price \$/bu.	0% Return on Equity		12% Return on Equity	
	60 Million Gal./Year \$/gal.	120 Million Gal./Year \$/gal.	60 Million Gal./Year \$/gal.	120 Million Gal./Year \$/gal.
2.00	1.19	1.14	1.32	1.24
3.00	1.44	1.40	1.57	1.49
4.00	1.70	1.66	1.83	1.75
5.00	1.96	1.91	2.08	2.00
6.00	2.21	2.16	2.34	2.25

Vern Eidman, 2007  
Outlook - 18

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## What an Average Ethanol Plant Can Pay for Corn...

Ethanol Price	And cover variable costs	And cover variable costs <i>plus int., dep., &amp; taxes</i>
\$1.85/gal. <i>DDG prices stable</i>	\$4.50	\$3.55
\$1.85/gal <i>DDG prices rise</i>	\$5.50	\$4.15
\$2.35/gal <i>DDG prices rise</i>	\$7.50	\$6.10

Source: Keith Collins, USDA

## Investment Climate Has Cooled

- Rising price of corn and supply uncertainty
- Construction costs have risen
- Tax credits are not certain
- New concerns about environmental impact, resource demands (water), and product quality
- Investment portfolios of lenders becoming saturated
- Federal loan programs do not align with scale of new plants
- New biomass technology may render existing corn plant technologies less profitable

Outlook - 20

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## New Biomass Plants

Spain, Commercial Plant  
Denmark, Commercial Plant  
California, Rice Straw Plant  
Minnesota, Straw test run

Abengoa Energy, Chesterfield, MO - \$76m - corn, wheat, milo  
ALICO, LaBelle, FL - \$33m - yard, wood, energycane  
BlueFire Ethanol, Irvine, CA - \$40m - green/wood waste  
Broin, Sioux Falls, SD - \$80m - corn fiber  
Iogen, Shelley, ID - \$80m - wheat, barley straw  
Range Fuels, Soperton, CA - \$76m - wood

Outlook - 21



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## New Ethanol Technology

- Fractionation
  - Endosperm, 82% of kernel, 86% starch
  - Germ, 10% of kernel, 80% oil
  - Pericarp, 8% of kernel, gasify
- Gasification of distillers grains
- Fluid Bed Technology

Outlook - 23

## Energy Balance and Greenhouse Gas Impacts of Ethanol and Biodiesel

	Energy Out/ Fossil Energy Input	%GHG Reduction vs. Gasoline/Diesel
Gasoline	0.81	
Ethanol (corn grain)	1.25-1.35	12-26
Ethanol (cellulose)	10.0	82-85
Diesel	0.83	
Biodiesel (soybean oil)	1.93-3.21	41-78

Outlook - 24

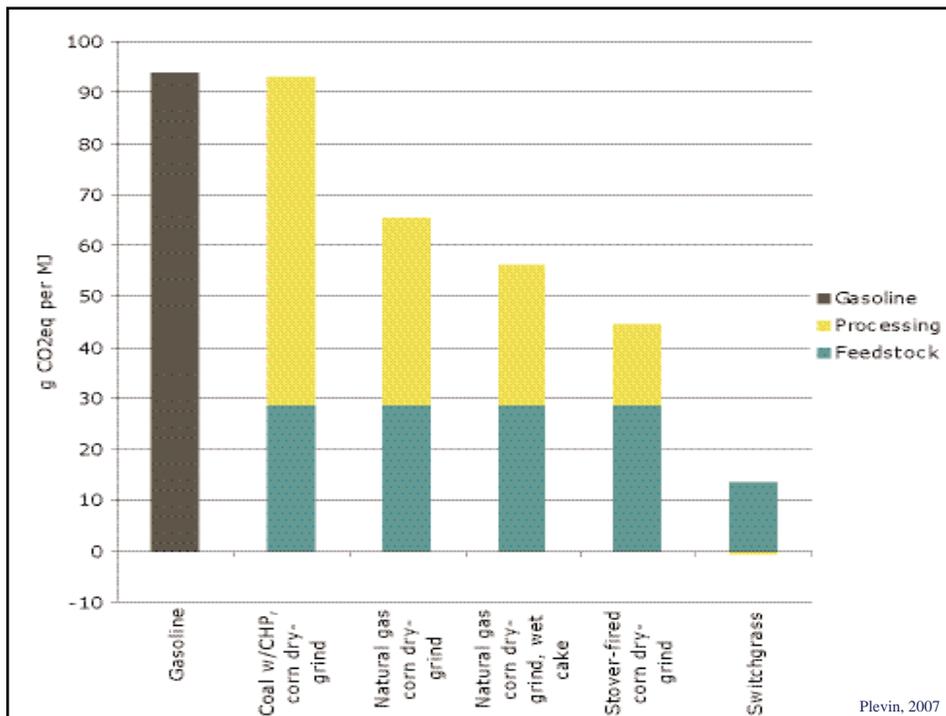
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## Ethanol's Impact on Greenhouse Gases

- Gov. Schwarzenegger (1/9/07) signed "low-carbon fuel standard" to reduce the carbon intensity of transportation fuels by at least 10 percent by 2020.

Outlook - 25



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## **Notes**

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