

## **Refinery Update**

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## Fuel Saving Tips Learn more about energy efficiency







<sup>(1)</sup> Based on Crude Capacity from 12/21/98 Oil & Gas Journal.



## EIA Crude Oil Price Forecast (Base Case and 95% Confidence Interval) – October 2006



\*The confidence intervals show +/- 2 standard errors based on the properties of the model.

Short-Term Energy Outlook, October 2006

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## EIA Natural Gas Price Forecast (Base Case and 95% Confidence Interval) – October 2006



\*The confidence intervals show +/- 2 standard errors based on the properties of the model.

CIC www.eia.doe.gov

Short-Term Energy Outlook, October 2006

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## **EIA Price Forecast October 2006**

	Year			Percent Change				
	2004	2005	2006	2007	04-05	05-06	06-07	
WTI Crude <sup>a</sup> (\$/barrel)	41.44	56.49	66.86	65.92	36.3	18.3	-1.4	
Gasoline <sup>b</sup> (\$/gal)	1.85	2.27	2.58	2.51	22.7	13.6	-2.4	
Diesel <sup>c</sup> (\$/gal)	1.81	2.41	2.73	2.66	33.0	13.2	-2.4	
Heating Oil <sup>d</sup> (\$/gal)	1.54	2.04	2.34	2.33	32.5	14.6	-0.3	
Natural Gas <sup>d</sup> (\$/mcf)	10.75	12.81	13.43	12.83	19.2	4.9	-4.5	
<sup>a</sup> West Texas Intermediate		<sup>b</sup> Avera	ane reau	lar numn	Imp price			

<sup>c</sup> On-highway retail.

West Texas Intermediate. <sup>b</sup> Average regular pump price. <sup>d</sup> Residential average.



#### U.S. average winter fuel expenditures are expected to be lower for natural gas and propane than last year, slightly higher for heating oil and electricity.

	% Change from last Winter				
Fuel	Base Case	If 10% Warmer than forecast	lf 10% Colder than forecast		
Natural Gas					
Price	-16.4	-21.7	-10.8		
Expenditures	-12.5	-25.0	1.2		
Heating Oil Price Expenditures	0.4 6.3	-0.9 -4.4	1.7 17.3		
Duran and					
Propane Price Expenditures	-5.3 -1.1	-8.6 -12.6	-1.6 11.5		
Electricity					
Price	4.6	4.3	4.9		
Expenditures	7.4	1.8	12.9		
Average Expenditures	-4.8	-15.3	6.5		

Winter = October 1 through March 31. Expenditures are based on typical per household consumption adjusted for weather. Warmer and colder cases represent 10% decrease or 10% increase in heating degree-days, respectively.













### **Fuels Timeline (Since 1990)**

- 1991 Phase II Low volatility gasoline
  - Winter Oxygenated gasoline 1992
- 1993 Low Sulfur Diesel
- 1993 **CARB** Diesel
- 1995 **RFG Phase I** 
  - 1995 CARB 2
    - 2000 **RFG Phase II**
    - 2004 CARB 3
- 2004 062006

2006

2006

- Low sulfur gasoline
- RFS
  - **Removal of RFG Oxygenate Mandate** Ultra Low Sulfur Diesel - On-Road

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## 2006: 'The Year of the Fuel Spec - EIA'

- Full Tier 2 low-sulfur gasoline requirements

- Major turnarounds due to hurricane delays and fuel changes

- Elimination of oxygenate requirement and MTBE bans

- Renewable Fuels Standard

- Northern, Southern region equalization of RFG VOC standards

- Ultra low-sulfur diesel

## Highway and Non-road Diesel Timelines

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	2006	2007	2008	2009	2010	2011	2012	2013	2014
Highway	15 ppm (80%)*			15 ppm (100%)					
Part 89 Non-road Diesel (NR) (Farm/Construction)		500 ppr	n		15 ppm				
Locomotive and Marine (L&M)		500 ppm 15 ppm							
With Credits NR (not in NE or AK)		5000 pp	m		500 ppr	n			15 ppm
Small Refiner Non-road Diesel (not in NE; with approval in AK)		5000 pp	m		500 ppr	n			15 ppm
Transmix/In-Use NR (not in NE or AK)		5000 pp	om		500 ppr	n			15 ppm
Transmix/In-use L&M (not in NE or AK)		5000 pp	m		500 ppr	n			

\* 2006: Refinery – June 1; Terminal – September 1; Retail – October 15





### **Refining Capacity - Overview**

- US demand growth has increased significantly in recent years
- US refining capacity continues to expand
- Expansions can help meet demand more quickly & costeffectively than building a new refinery
  - 10 years for new; 3 years for expansion
  - ~\$17K per daily barrel for new; ~\$9-12K for expansion
- Refineries operate in a global market; the market place is efficient and provides best means of supply/demand balance
- Refineries expand and upgrade units while spending billions to meet clean fuels and environmental regulations
- For domestic expansion:
  - Improve permitting process
  - Provide regulatory certainty
  - Ensure reasonableness in regulations



## **Refining Capacity: Global Market**

- Industry operates in global market
- There is spare global refining capacity
- Gaps filled by imports since WWII
- Most US product imports from Canada, Europe & Virgin Islands
- Response of global market to hurricanes shows that markets work
- As global economies expand, there will be increased competition for imports





## **Refining Capacity: Expansions**

- Equivalent of 12 new 200,000 BD refineries built last decade
- Expansions can help meet demand more quickly & costeffectively than building new
- Refineries expand and upgrade units, while:
  - spending billions to meet clean fuels and environmental regulations
  - \$47.5 billion from 1995-2004 (largely due to sulfur reduction in gasoline & diesel)

#### Future plans

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- Based on publicly available data, nearly <u>1.3 million barrels/day</u> of additional refinery capacity projects are either planned or under strong consideration for the years 2006-2011
- Such expansions will boost domestic refining capacity to over 18.5 million barrels per day - <u>near the all-time high</u> for U.S. operable refinery capacity

## **Considerations for Building New Refineries**

- Federal, State and local permit process
- Crude supply and product pipeline access
- Electrical, water, natural gas, etc. access
- Community acceptance

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- Cost ~ \$2.5 to \$3 billion for 150,000 B/D
- Average rate of return ~ 6.2% (1994-2003)
- Will not help meet demand in near term (3 to 10 years)
- Policies are needed to create a climate conducive to investments to expand domestic refining capacity:
  - Improve permit process
  - Complete NSR reforms
  - Align Ozone NAAQS deadlines

# World Capacity & Consumption Changes Result in Utilization Increases



Source: BP World Statistical Review 2005

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Utilization

# World Distillates Growing More than Gasoline & Fuel Oil Declining



#### **Cumulative Consumption Changes 1985-2004**

Notes: World excluding FSU; middle distillate is jet, kerosene, diesel and heating oil (No. 2) Source: BP World Statistical Review 2005





#### Note: FCC - Fluid Catalytic Cracking Source: EIA, Oil and Gas Journal

Europe's Growing Product Imbalance



Source: IEA



#### **Light-Heavy Crude Price Differential** energy & Crude Oil Price Move Together **Crude Price & Price Differential (\$/Barrel) \$20** \$70 WTI-Maya ent \$56 **\$16 WTI Crude Price Crude Price** \$12 \$42 eav \$28 **\$8** ght-H \$14 \$0 \$0

Jan-99 Jan-00

Jan-98

Jan-97

Jan-01 Jan-02

Jan-03 Jan-04

Source: Bloomberg spot price

Jan-95

Jan-96

Jan-06

Jan-05



## Current Regional Downstream Capacity Reflects Different Needs

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#### 2004 Downstream Capacity Percent of Distillation

Note: Asia-6: China, India, Indonesia, Japan, Singapore, South Korea; EU-6:France, Germany Italym, Netherlands, Spain, and U.K., Middle East: Bahrain, Kuwait, Saudi Arabia, and UAE. Source: Oil and Gas Journal

## Regional Distillation Capacity Changes 2005-2010 - EIA



Sources: Oil and Gas Journal, FACTS, Company Presentations

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## U.S. Capacity Changes 2005-2010 (KB/D) - EIA

	- 1.2A			
	CDU	Coking	FCC/RCC	HDC
AZ Clean Fuels	150	?	?	-
BP		100		
Coffeyville	15			
ConocoPhillips	230	105	-	-
Frontier	10	-	-	-
Marathon	193	70	40	60
Motiva	325	90	-	60
Sunoco	100	-	?	-
Valero	406	30	19	107
Others	70	152	31	85
Creep-Closings	250	-	-	-
TOTAL	1,749	557	90	312

Note: "?" denotes plans that mention a type of unit, but no capacity volumes. CDU: Crude distillation unit; FCC: Fluid catalytic cracking; RCC: Residual catalytic cracking; HDC: Hydrocracking. Sources: Oil & Gas Journal, company presentations, Industrial Information Resources

## Europe's Capacity Changes 2005-2010 (KB/D) - EIA

	CDU	VDU	Coking	FCC/ RCC	HDC
Croatia	-	-	-	-	42
Finland	-	-	-	-	47
France	-	-	-	2	48
Greece	-	-	50	-	37
Italy	-	-	-	-	25
Lithuania	-	-	-	-	-
Romania	-	-	-	-	25
Spain	30	-	20	-	50
TOTAL	30	-	70	2	274

Note: "?" denotes plans that mention a type of unit, but no capacity volumes. CDU: Crude distillation unit; VDU: Vacuum distillation unit; FCC: Fluid catalytic cracking; RCC: Residual catalytic cracking; HDC: Hydrocracking. Sources: Oil and Gas Journal, company presentations.

## energy Asian Capacity Changes 2005-2010 (KB/D) - EIA

	////				
	CDU	VDU	Coking	FCC/ RCC	HDC
China	1,966	680	135	142	242
India	1,015	275	50	198	228
Indonesia	250	-	-	-	-
Pakistan	150	60	-	-	50
Other	233	-	33	184	40
TOTAL	3,614	1,015	218	524	560

Note: "?" denotes plans that mention a type of unit, but no capacity volumes. CDU: Crude distillation unit; VDU: Vacuum distillation unit; FCC: Fluid catalytic cracking; RCC: Residual catalytic cracking; HDC: Hydrocracking Sources: Oil and Gas Journal, FACTS, industry media reports.

## energy Middle East Capacity Changes 2005-2010 (KB/D)-EIA

	CDU	Coking	FCC/ RCC	HDC
Bahrain	-	-	-	60
Iran	896	-	171	2
Iraq	370	-	90	35
Kuwait	410	?	?	?
Oman	131	-	75	-
Qatar	145	?	?	?
Saudi Arabia	400	80	100	200
UAE	-	-	-	-
Yemen	185	-	-	20
TOTAL	2,537	-	-	-

Note: "?" denotes plans that mention a type of unit, but no capacity volumes. CDU: Crude distillation unit; VDU: Vacuum distillation unit; FCC: Fluid catalytic cracking; RCC: Residual catalytic cracking; HDC: Hydrocracking Sources: Oil and Gas Journal, FACTS, industry media reports.

## Who Will Expand: Outlooks/Plans Vary - EIA

	Group Regions		Future Market Expectations	Refinery Investment Strategy
	Super Majors	All	Margins revert to historic	Maintain top-quartile performance , little expansion need
	Majors with Large Downstream	U.S. & Europe	Improved margins with cycles	Heavy crude projects & cautious expansion
	Independent Refiners	U.S.	"Golden Age of Refining"	Expand distillation & conversion
	Export Refiners	Middle East	Tight capacity & high light-heavy	Expand for export, add bottoms upgrading
T	State & Private	India & China	High demand growth, better margins	Rapid expansion existing & grassroots

Sources: Trade press articles, company presentations and press releases.

## energy Capacity and Consumption Changes 2005-2010 - EIA



**Sources:** Capacity see previous slides; Demand: EIA, BP World Statistical World Review 2005, FACTS, IEA















## What can government do?

- Rely on market forces to allocate products
- Do not impose new taxes that:
  - Will reduce investment in expanded oil and natural gas production and refining expansion
  - Will ultimately harm consumers and shareholders
- Reduce barriers to supply
  - Open onshore areas to responsible energy development and reduce permitting delays
  - Lift constraints on key offshore areas with high-resource potential
  - Expand access to world natural gas supplies (LNG)
- Increase refiners' flexibility to facilitate expansion
  - Provide timely response to waiver requests in emergencies
  - Streamline existing permit processes to expedite capacity expansions
  - Clarify environmental requirements to streamline operations