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The Lies We've Been Told

November 18, 2008
Role of Petroleum in U.S. Energy Policy

Meeting of the Committee on Earth Resources
Board on Earth Sciences and Resources
National Research Council of the National Academies

Domestic Options for the Next Two Decades

Lucian Pugliaresi
Energy Policy Research Foundation, Inc.
Washington, DC

www.eprinc.org

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Fighting Ignorance About Oil Markets Since 1944*

**** It's taking longer than we thought.***

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Alternative Titles

- High Cost of Pandering
- “Hey, Am I the Only Person Who was Alive in the 70s?”
- What happens when you ask the wrong questions?
- Where’s the Humility?
- Everything you think you know about the oil market is wrong
- The Black Swan

THE TAKE AWAYS
or
EPRINC's UNIFIED THEORY

- Expectations Matter **(and sometimes they come true)**
- Recent Run Up in Oil Prices Was A Supply Disruption **(no one saw it because it wasn't in the briefing book)**
- Peak Oil is for Sissies
- What Things Cost are Important **(especially if there are no benefits)**
- Lower Imports Will Not Buy a Lot of Energy Security **(within the likely range)**

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Why Did Oil Prices Climb So High?

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1973-1974 Arab Oil Embargo

NOT AN EMBARGO, but instead a

- Structural Shift in Ownership and Control of the Resources of the Middle East

- Fundamental Change in Expectations on Production from Middle East Producers

As an Embargo it was a failure, market was integrated (lesson not yet learned by Chavez)

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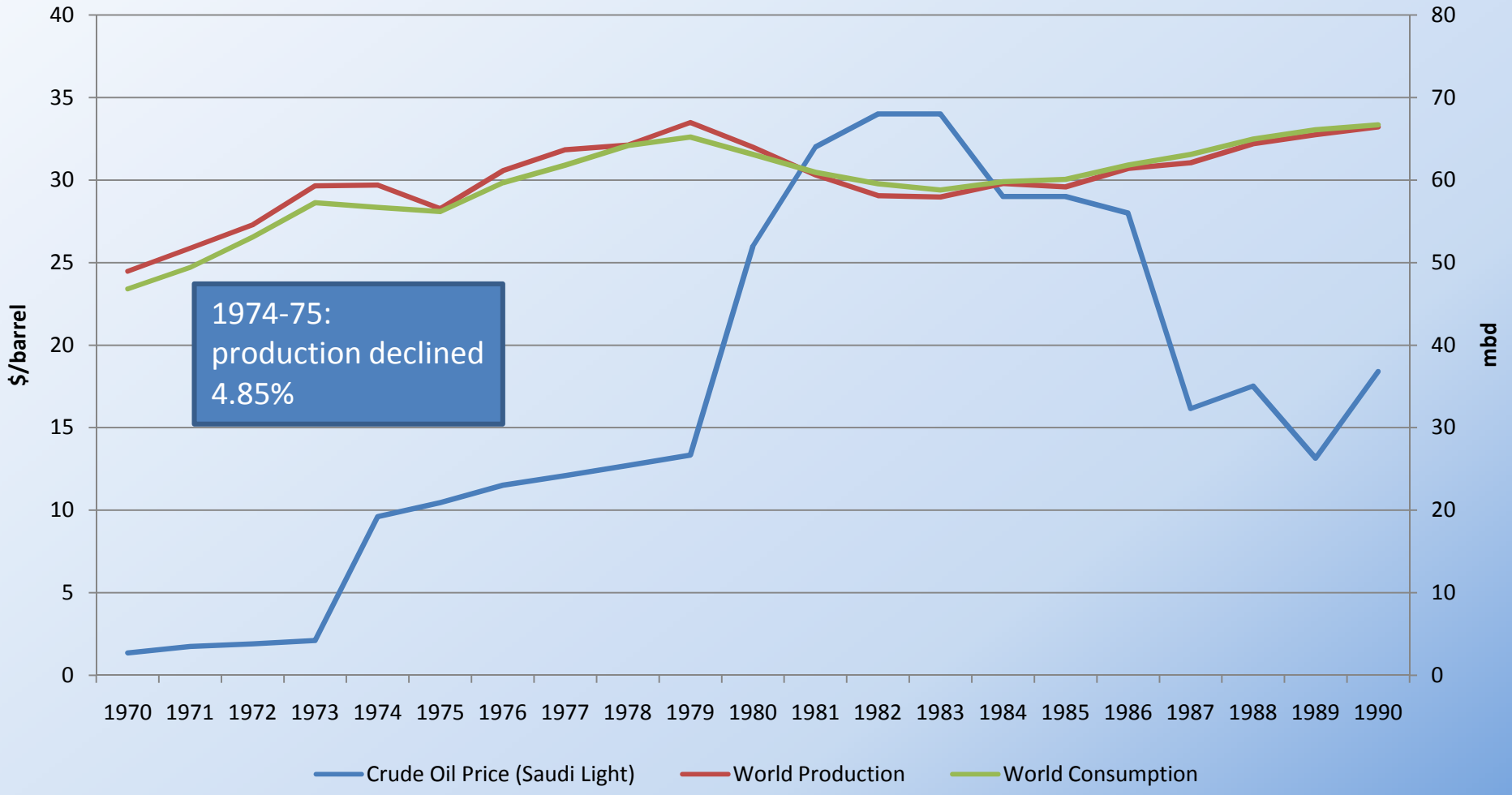
Oil Price, Production, Consumption – 1970 - 1990



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1979 Price Shock

- OIL MARKET WAS NOT FRAGILE, but instead there was a shift in:
  - expectations regarding regional risk; i.e. more risky
  - Prospects for future output from Iran and Iraq were reduced substantially, i.e., access to those reserves would now be delayed

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1986 Price Collapse

- Saudi Arabia abandons role as swing producer at low levels of net demand for SA crude
- Shift in expectations on Saudi decision making within OPEC and as regulator of world oil market
- Sustained reduction in oil use as a percentage of GNP in major Western countries

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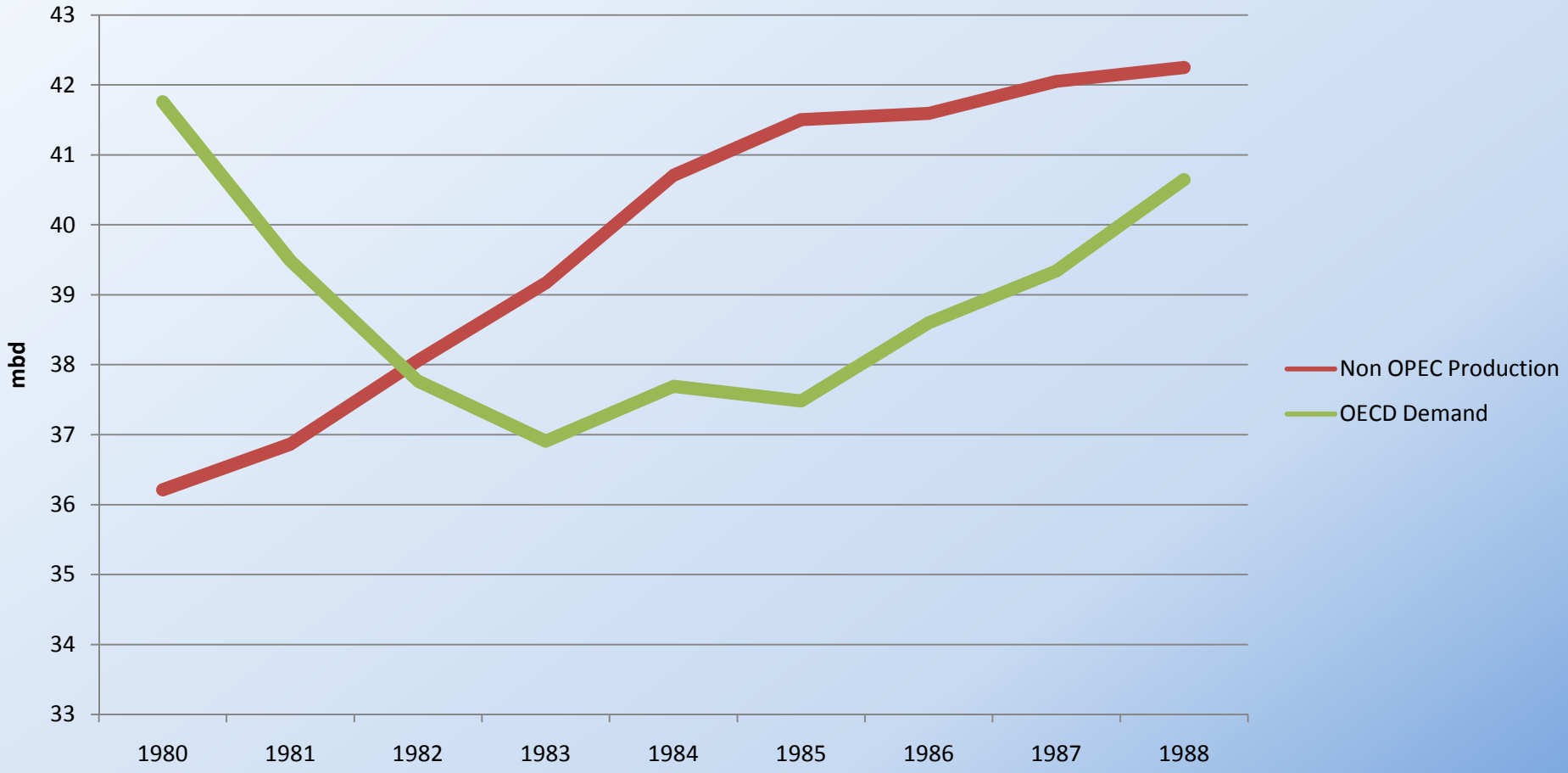
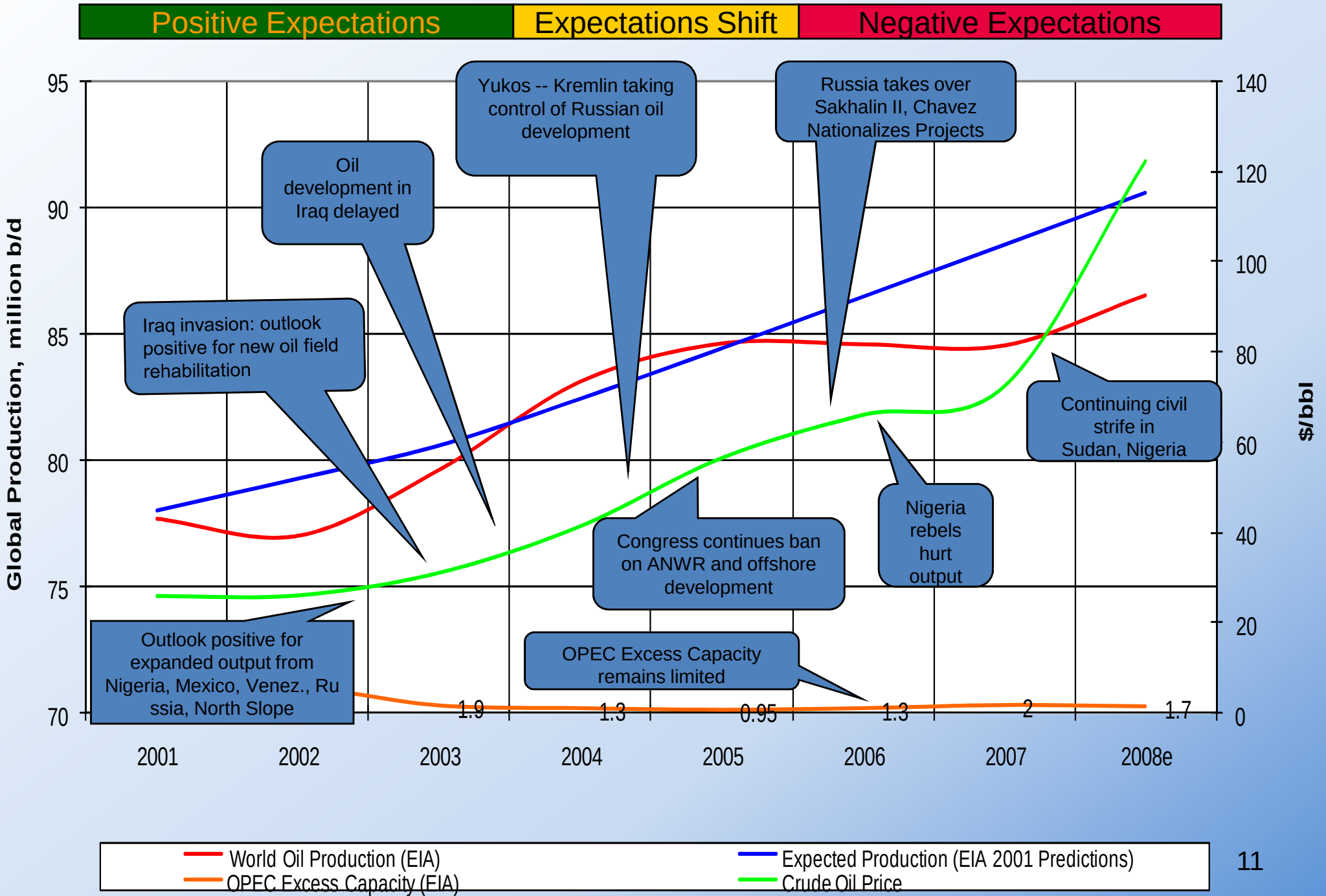
1986 Price Collapse

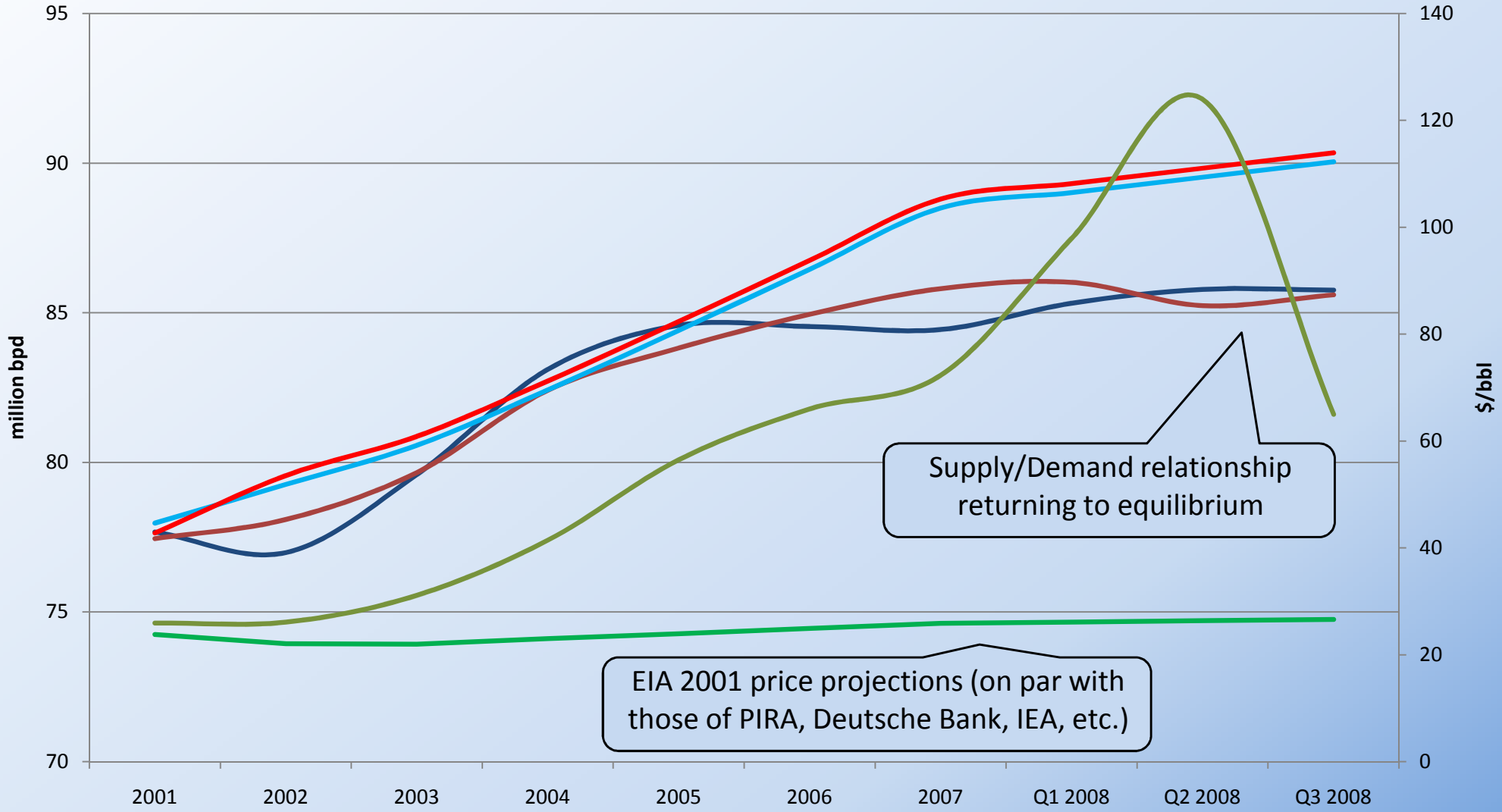


Source: EIA Data,

A Series of Unfortunate Events Leading to New Expectations



Expectations and Reality



Source: EIA Data and EPRINC Calculations

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A Series of Unfortunate Events, by country:

Country	Positive Expectations	Negative Events	Lost Production (bpd)
Iraq	Promise of investment in oil sector after war, increased production.	Sustained turmoil drops output below pre-war levels	600,000
Nigeria	4 mbd expected by 2010	Civil strive and attacks on infrastructure, 2005-2007 saw decline to 2.1 mbd	500-700,000
Venezuela	Potential for growth after stagnant production	Nationalization of oil industry, production nosedive	800,000
Russia	Projection seen at 12 mbd by 2010 after privatization of industry brought western influence, $ and new production	Re-nationalization leads to decreased production and investment	200,000
Sudan	Additional proven reserves and access to new fields	Civil strife, attacks on infrastructure, new fields remain inaccessible	200-250,000

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A Series of Unfortunate Events (cont.)

Argentina	Huge production gains from 1991-2001	Oil industry nationalized in 2004, production and investment dropped	100,000
Kazakhstan	Production from Kashagan was expected to begin in 2005	Technical difficulties with some political disagreements	TBD
US	ANWR was part of Bush's energy policy when he took office in 2000	Currently no access to ANWR or OCS	up to 1,000,000
Canada (Alberta)	Oil sands contain 95% of Canada's 179 billion barrels of reserves	In 2007 new taxes and royalty rates helped to reduce lease sale revenues by 50% compared to 2006	TBD
Mexico	Production expected to reach 4 mbd by 2005	Production in decline since 2004. Cantarell declining and PEMEX needs funding.	500,000 +
Estimated loss of supplies to the world market, 2005-2010:			2.5-4.5 mbd

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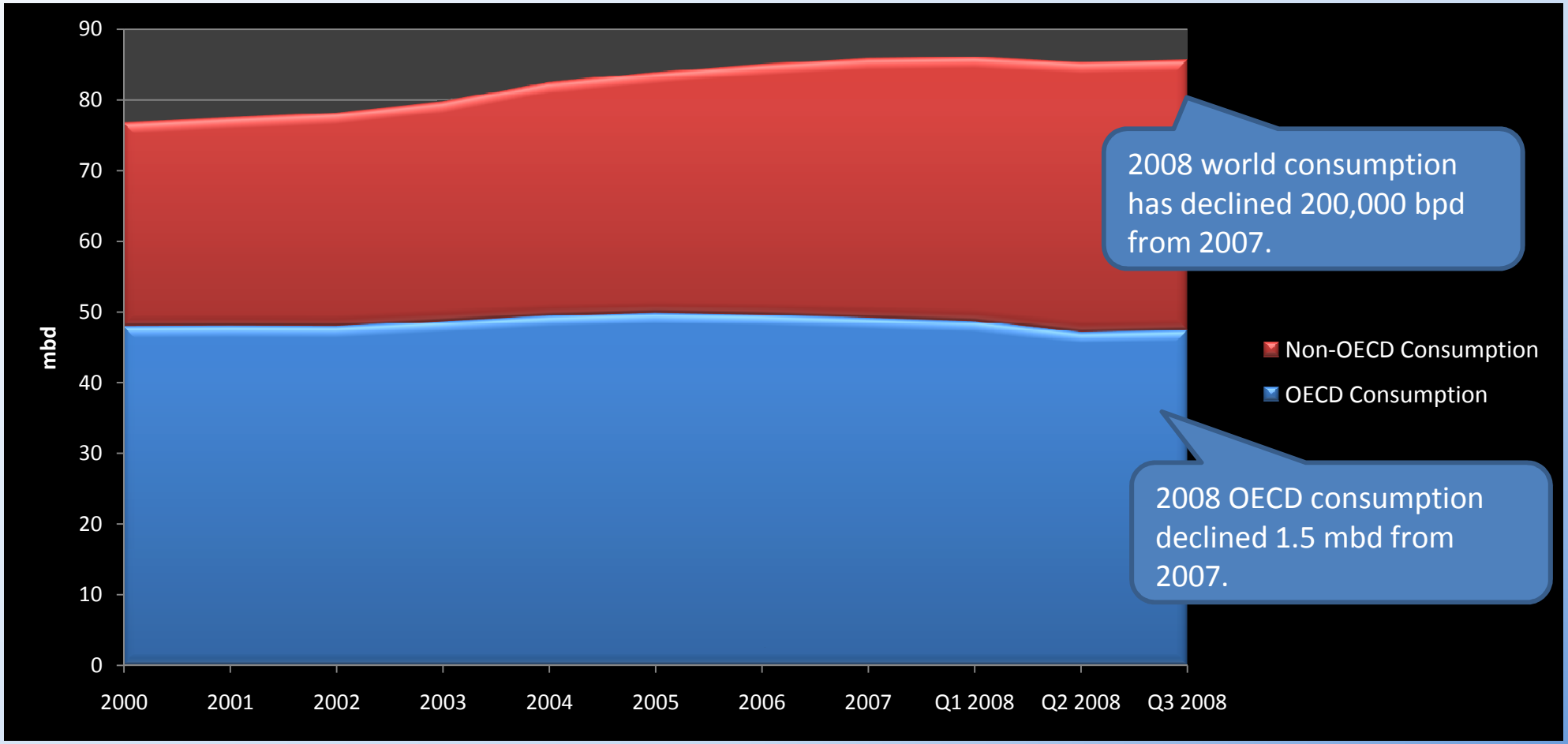
Demand Destruction Worldwide

- Global demand down slightly so far this year, OECD decline has been greater than demand growth in non-OECD countries.



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Global Crude Demand – EIA October STEO

- After summer price rally, demand is currently off, in part due to worldwide economic difficulties.
  - Worldwide economic downturn has removed some crude demand from the market
  - EIA has again revised down 2008 crude demand growth – now only +300,000 bbl/d in 2008 over 2007, which is 350,000 bpd lower than last month's forecast, which itself was a downward revision of earlier estimates.
  - OECD Consumption to decline 1.1 mmbbl/d in 2008.
- However, though some crude supply has rebounded, supply will remain tight.
  - OPEC has cut production in hopes of maintaining high prices

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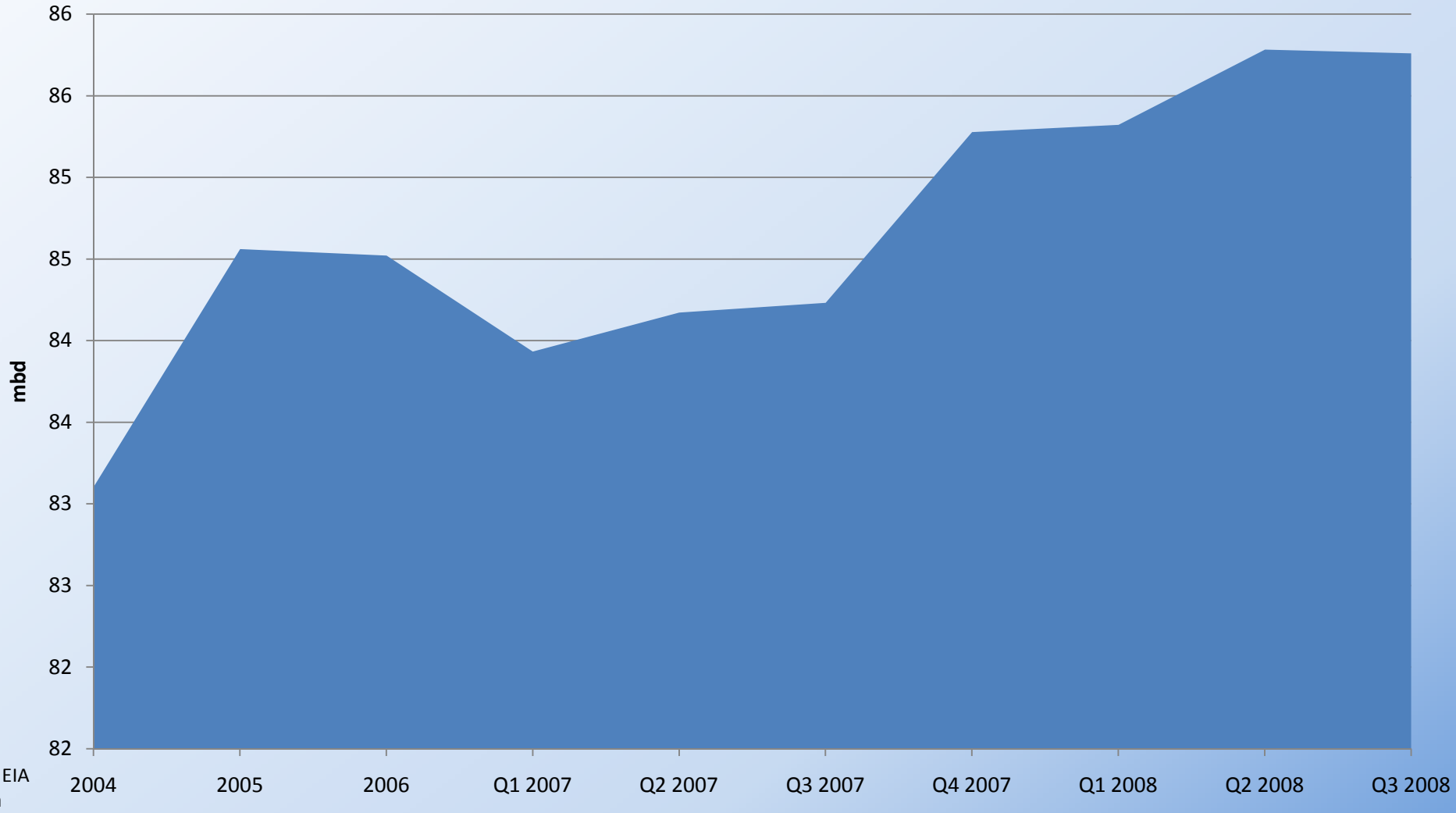
World Oil Production - Significant Post-2006 Growth



Source: EIA Data

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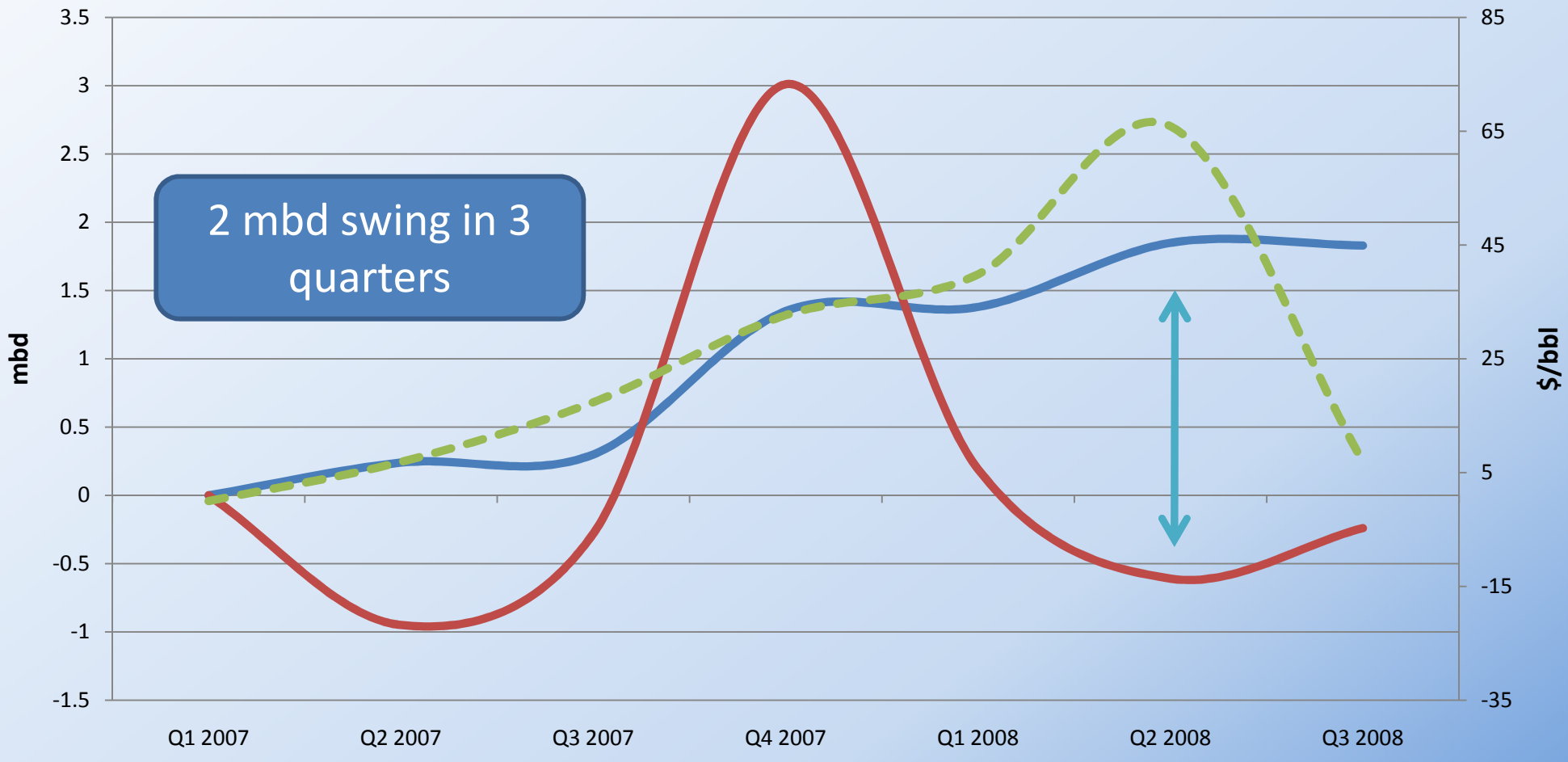
What's Happened Since 2007?



Source: EIA Data, EPRINC Calculations: All Figures Indexed to 2007

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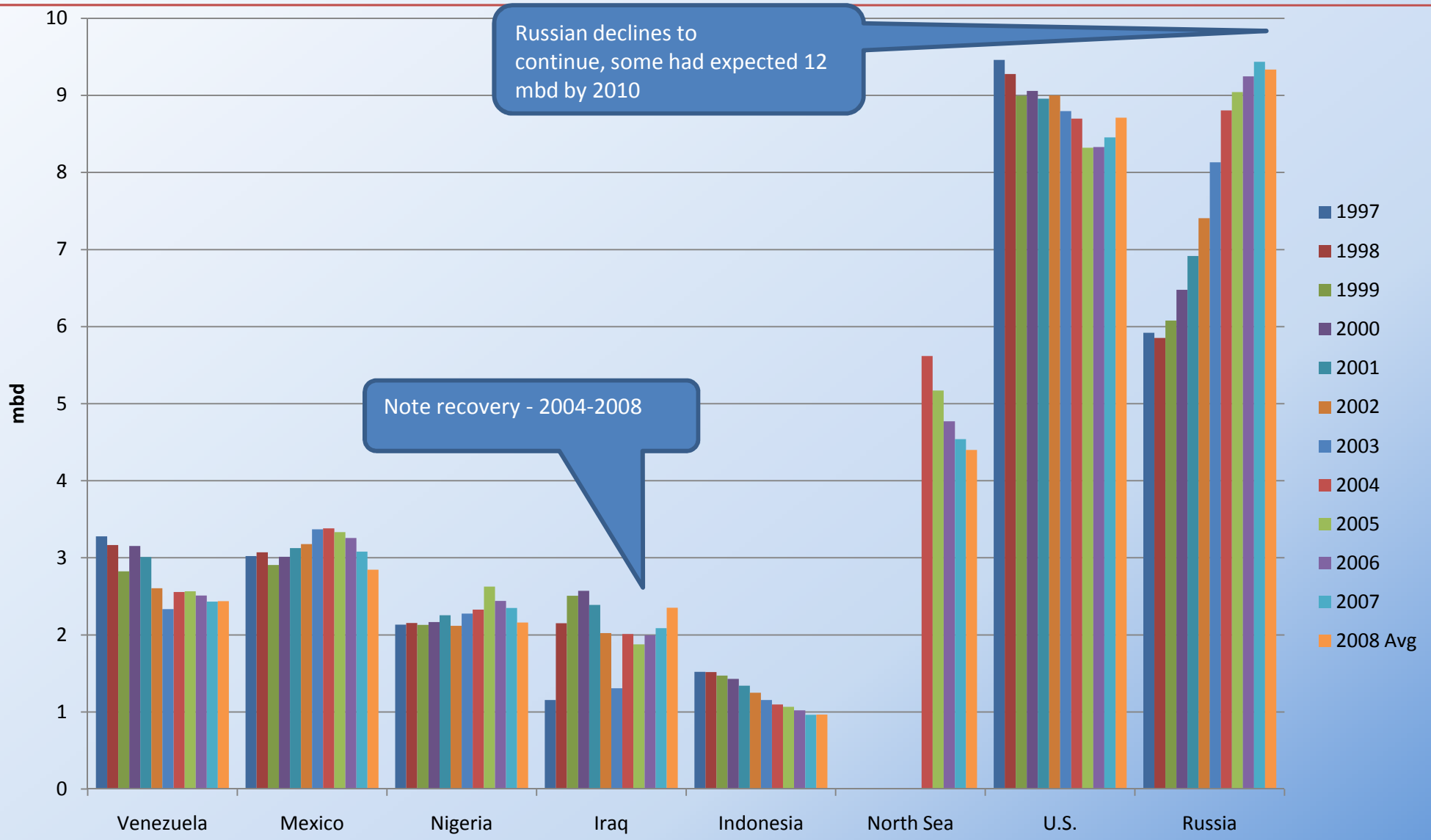
Recent Production Declines - 1997-2008



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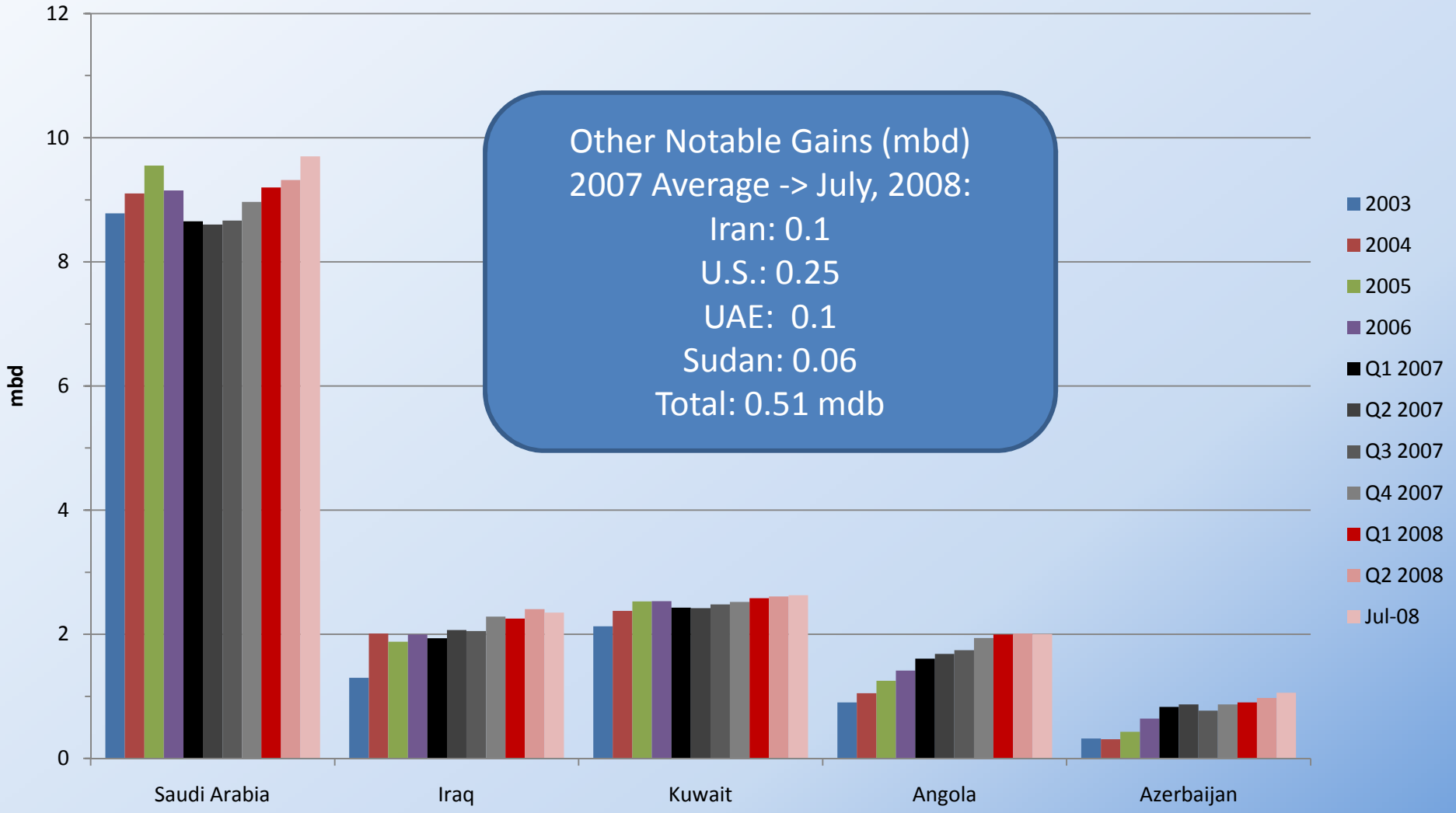
Some Production Bright Spots



Other Notable Gains (mbd)
2007 Average -> July, 2008:
Iran: 0.1
U.S.: 0.25
UAE: 0.1
Sudan: 0.06
Total: 0.51 mdb

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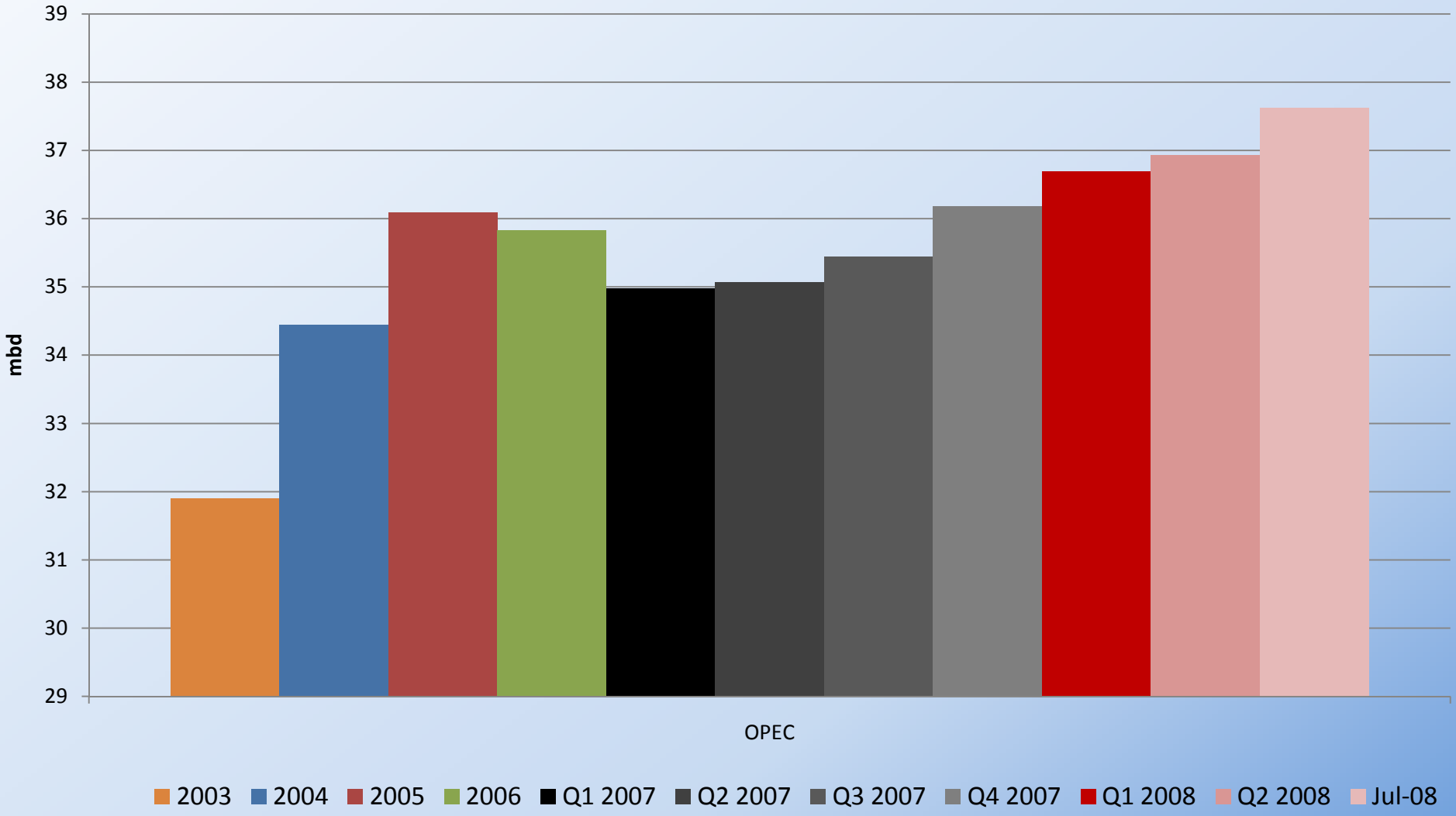
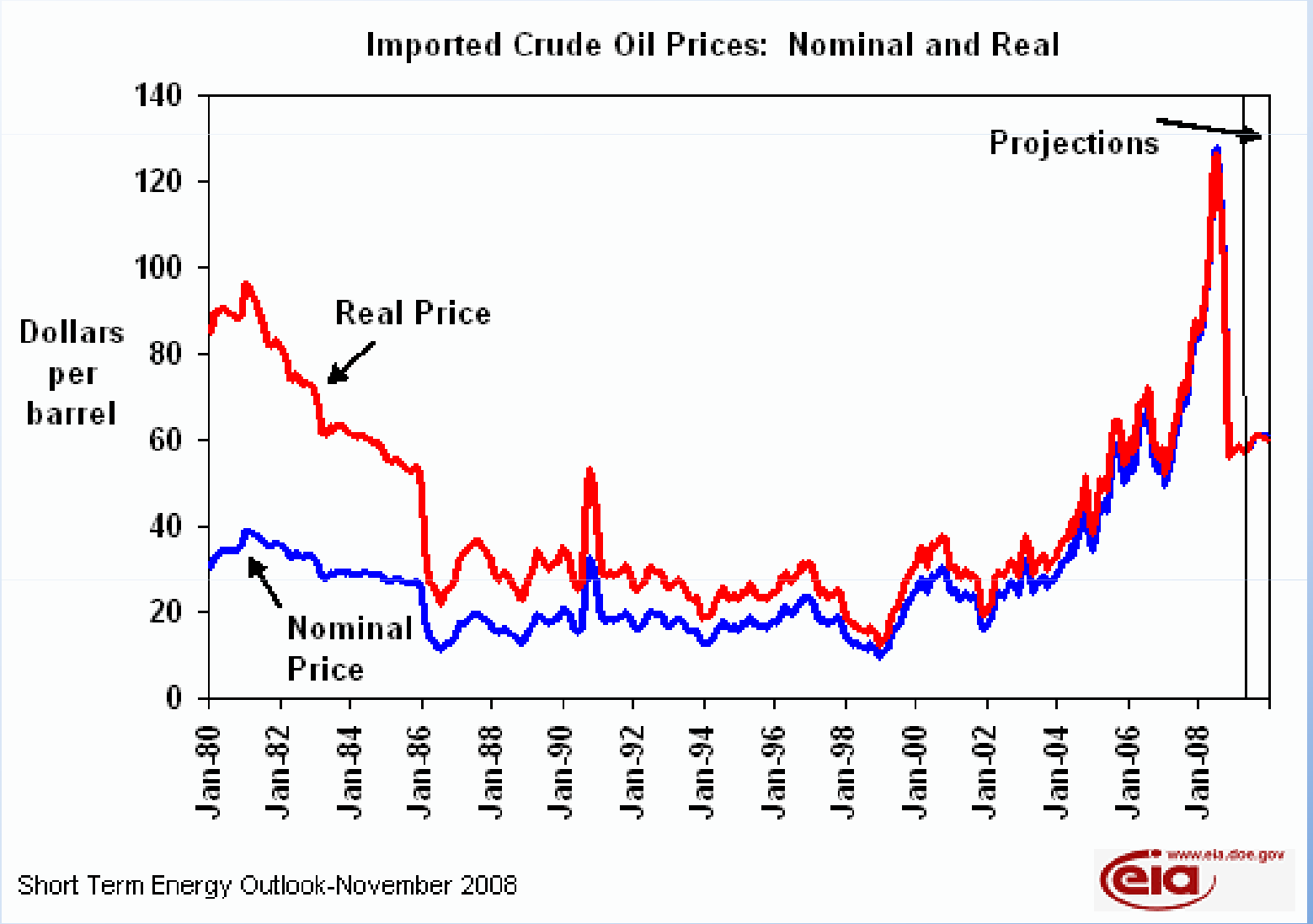
…..Led by OPEC Production



Real Imported Crude Oil Prices – 1980 - 2008



Source: EIA

What About Peak Oil

The Wrong Question!!!

The Peak Oil Problem: New Supplies Will Be More Expensive, but We Are Not Running Out of Oil

San Joaquin Valley

Testing Hubbert-Method Predictions for Reserves and Production (Billions of Barrels)

	1964	1982	2000
Cumulative Discoveries	7.7	11.8	16.1
Percent Attributable to 1915	49%	69%	76%
Cumulative production as of	8.0-9.5	11.9-12.1	16.1-16.2
Year 2000 production projected in: (mb/d)	44-112	189	597(actual)

Source: EPRINC, October 2006. *Does the Hubbert Method Provide a Reliable Means for Predicting Future Oil Production*, Richard Nehring, October 2006,

Permian Basin

Testing Hubbert-Method Predictions for Reserves and Production (Billions of Barrels)

	1964	1982	2000
Cumulative Discoveries	17.6	27.9	35.2
Percent Attributable to 1950	85%	86%	84%
Cumulative production as of	19-27.5	28.5-30.5	35.8-37.5
Year 2000 production projected in: (mb/d)	162-479	326-479	910(actual)

Source: EPRINC, October 2006. *Does the Hubbert Method Provide a Reliable Means for Predicting Future Oil Production*, Richard Nehring, October 2006,

Why You Should Stop Worrying About Peak Oil

- You'll never get the right answer
- Put your effort into something useful, such as the backstop price
- Congress has already decided that any alternative fuel, no matter how expensive, is worth supporting as an alternative to petroleum

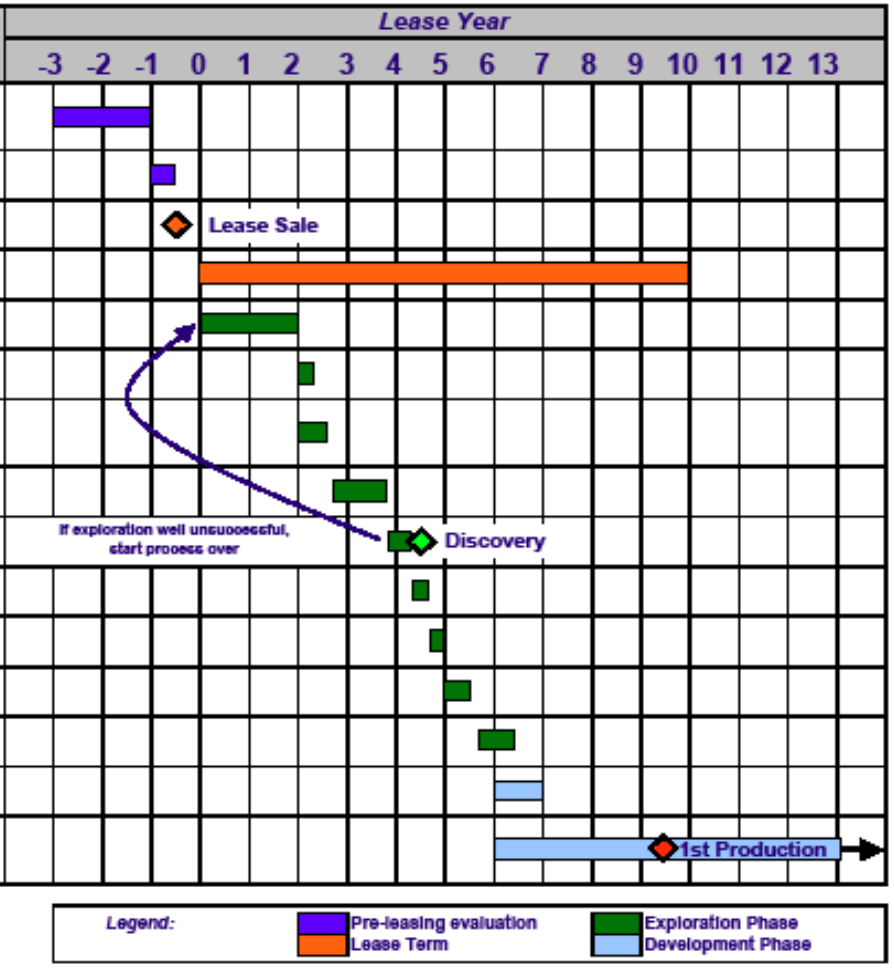
How Not to Transition to the Fuels of the Future

Big Oil, Ethanol and Offshore Leasing

Gulf of Mexico Deepwater Frontier Exploration and Production Timeline

Individual Prospect: 5,000' Water Depth, 30,000' Drilling Depth

Cost (millions)	Cumulative Cost (millions)	Activity
$1-5	$1-5	Acquire 2D and 3D seismic and evaluate geological, geophysical and engineering data to identify leads/drilling ideas.
		Prepare bids for lease sale.
$10-200	$11-205	Lease sale - sealed competitive bidding process.
$1-2	$12-207	High bid leases awarded (10 year term). Cumulative annual lease rentals.
$5-10	$17-217	Acquire and interpret 3D and other data to turn ideas into drillable prospects.
		Find partners to share costs to drill exploratory well.
		Perform shallow hazard, archeological and other regulatory permitting requirements to obtain Federal approval to drill.
		Contract a rig to drill.
$100-150	$117-367	Drill exploration well.
$40-60	$157-427	Drill sidetrack to exploration well.
		Evaluate results.
$100-300	$257-727	If encouraging, drill appraisal/delineation well(s) and sidetrack(s).
		Evaluate well results, formulate plan of development for discovery.
		Prepare and file permits for development, wait for approvals.
$1,000-5,000	$1,300-5,700	Sanction commerciality, build and install facility, drill and complete producing wells to achieve production.



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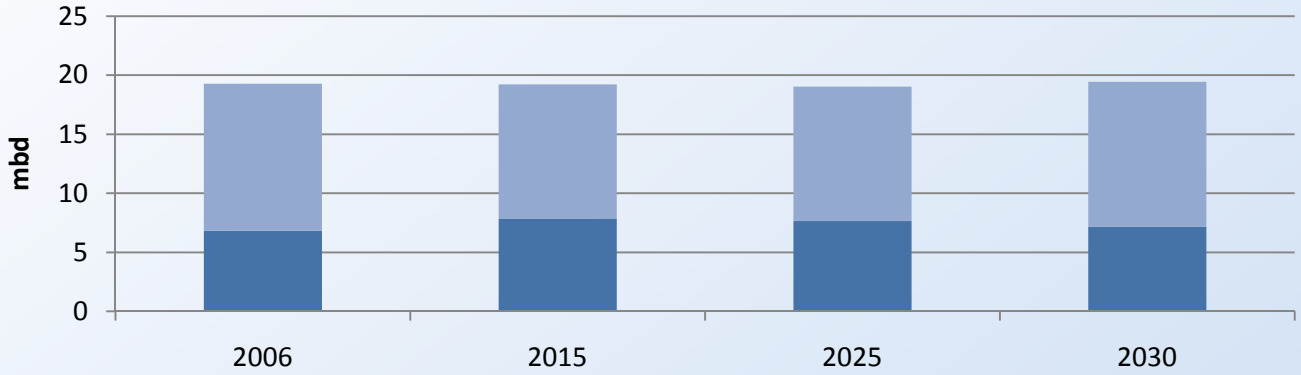
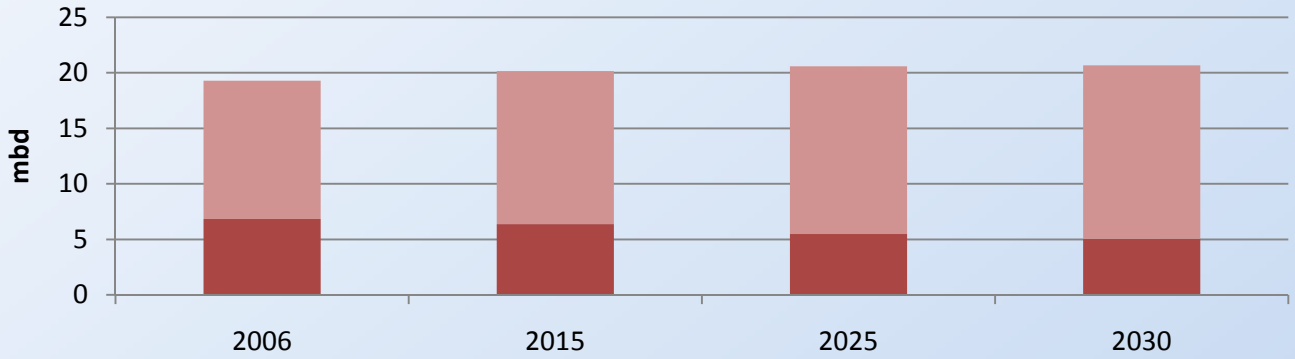


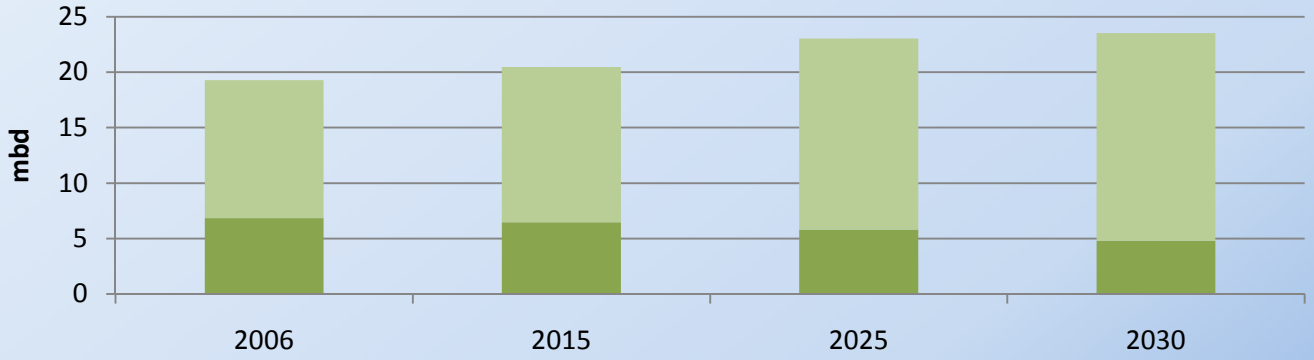
EIA Net Imports

EIA Crude/NGL Production



Global Insight, Inc. Net Imports

Global Insight, Inc. Crude/NGL Production



Deutsche Bank Net Imports

Deutsche Bank Crude/NGL Production

All estimates from the EIA's 2008 Annual Energy Outlook. EIA estimates assume EISA2007 biofuel production levels are met.

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Diesel and Gasoline Demand, 2007-2017

			Annual change in real diesel price	
		-3%/yr	0%/yr	3%/yr
Annual growth in real GDP	0%	10	0	-10
	1.5%	20	13	6
	2.5%	29	22	15
	3.5%	40	33	26

			Annual change in real gasoline price	
		-3%/yr	0%/yr	3%/yr
Annual growth in real GDP	0%	16	0	-14
	1.5%	27	10	-7
	2.5%	33	18	3
	3.5%	42	27	12

- **Assuming worst case gasoline scenario (0% economic growth, 3%/year price increase resulting in 14% demand reduction in 2017) is applied to crude oil and crude oil production remains constant, the U.S. will be importing ~9.5 mbd. If EISA 2007 is met in 2017 and 14% demand reduction scenario is applied, the U.S. will be importing ~7.9 mbd. (Elasticities can be found in http://eprinc.org/pdf/TenYearOutlookFuelsJuly.pdf)**

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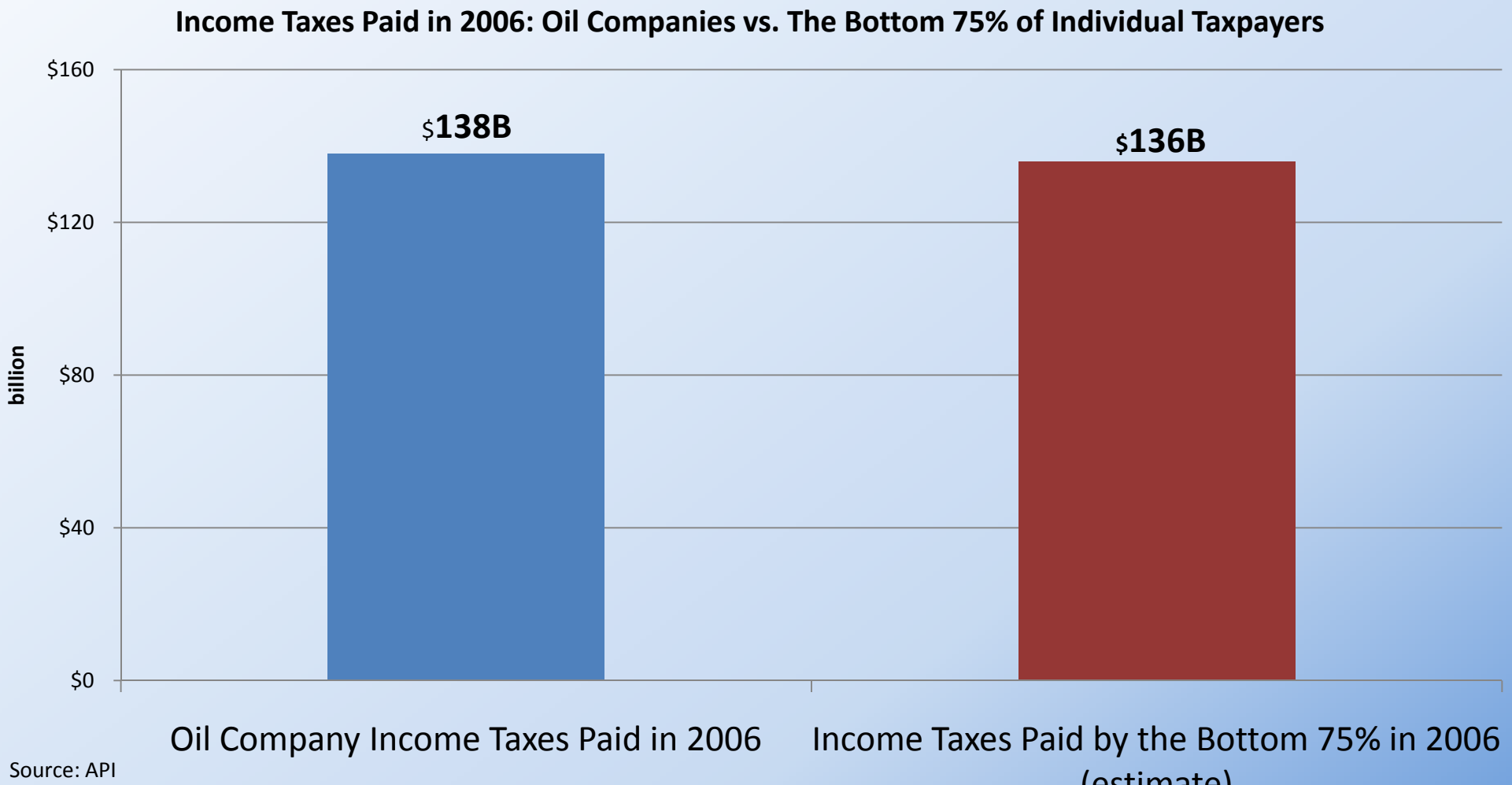
Oil's Tax Bill



Source: API

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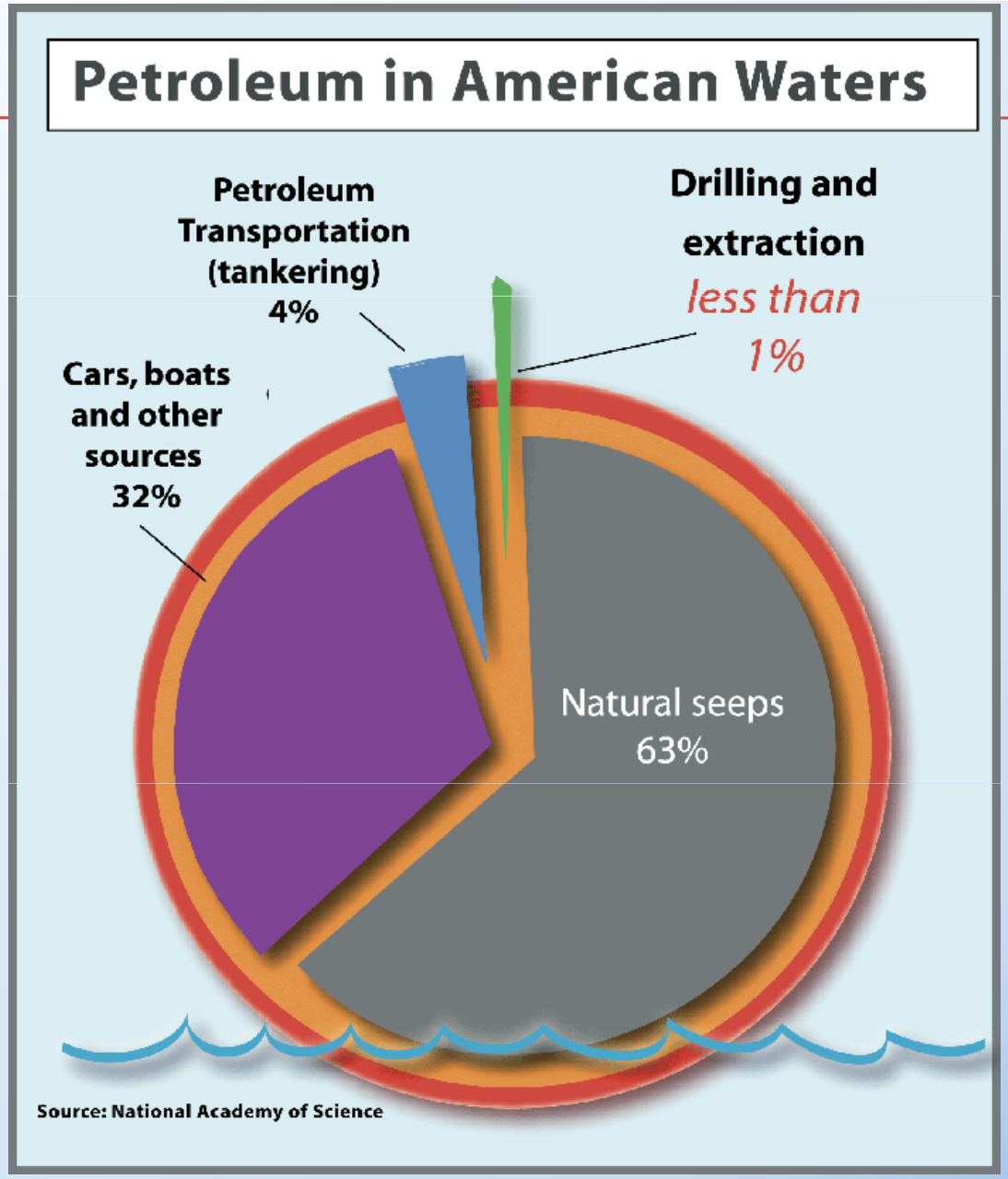
U.S. Gov't Revenues from Leases

- In 2007 the MMS received $9.4 billion from oil and gas royalties.
  - FY 2007 lease sales raised over $3 billion.
- MMS offshore lease sales thus far in 2008 have generated high bids of over $9 billion.
  - Does not include state revenues, delay rental fees, etc.
  - Royalty revenues may be higher if average FY2008 crude price is comes in higher than 2007.

Source: MMS

National Academies Study on Oil in the Sea



Highlights from ***Oil in the Sea III (2003)***

- "Operational discharges from vessels in general and tankers in particular have substantially declined over the last 25 years.
- Only 1 percent of the oil discharges in North American waters is related to the extraction of petroleum.
- Although large quantities of VOC (volatile organic compounds) are emitted from tankers and production platforms, these consist of mostly lighter compounds and only small amounts deposit to the sea surface."

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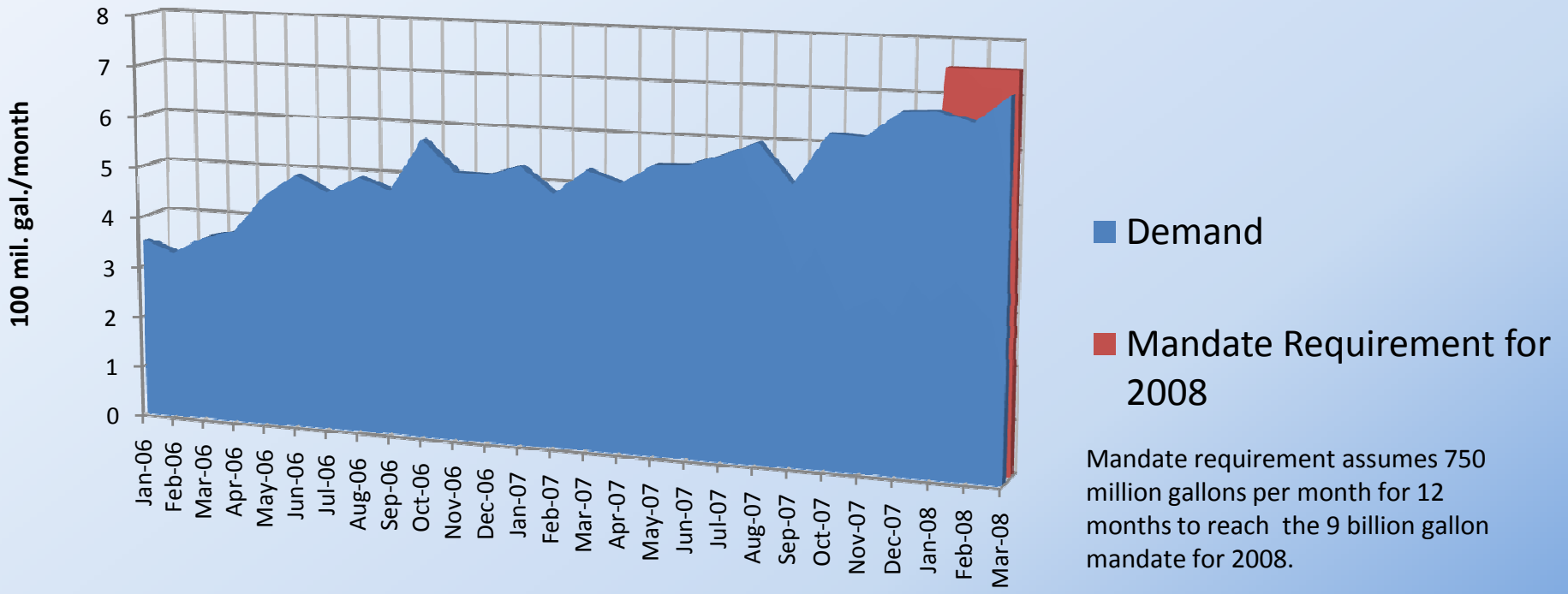
formerly PIRINC

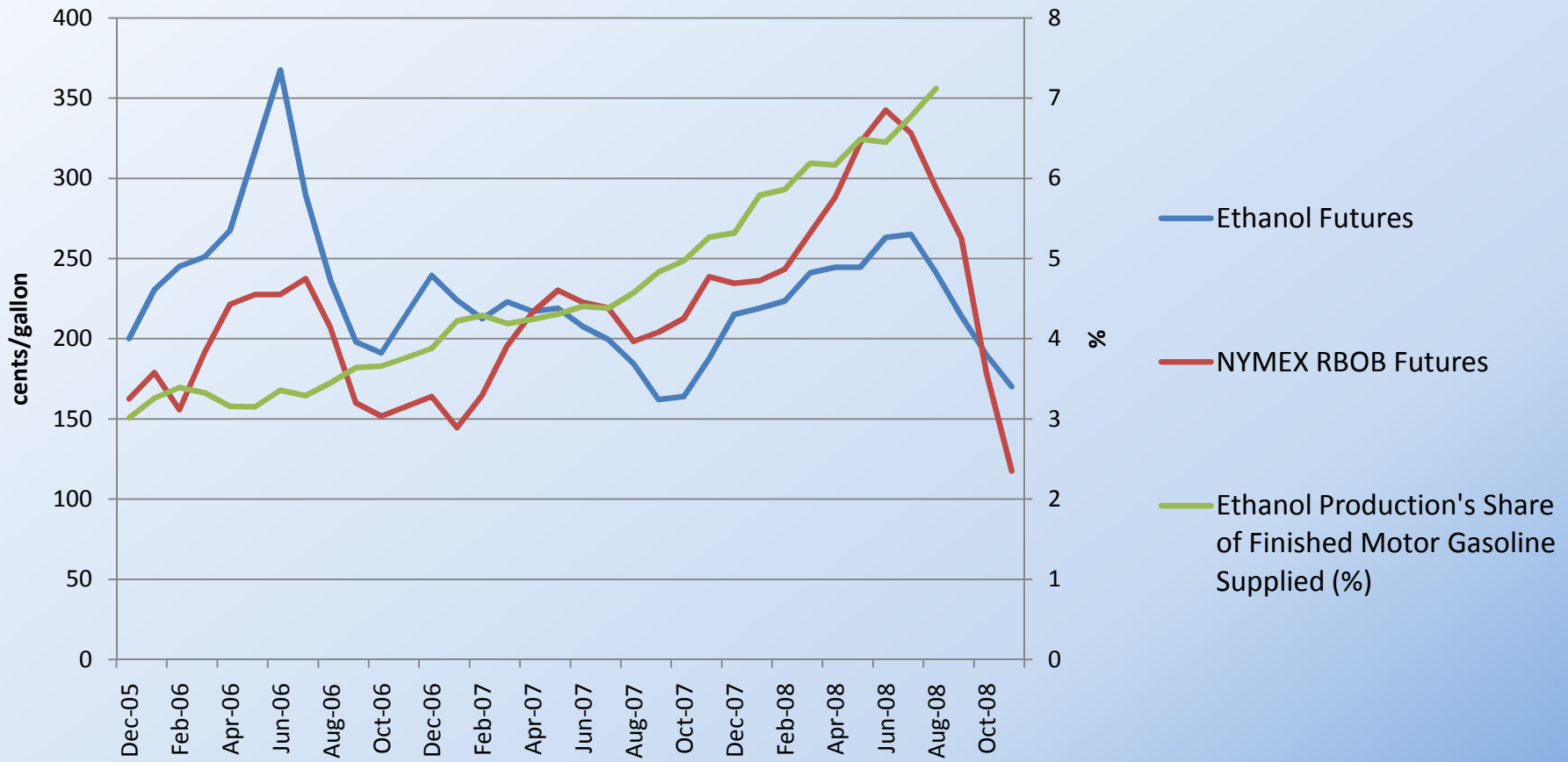
US Ethanol Consumption: 2006 - Present



Mandate requirement assumes 750 million gallons per month for 12 months to reach the 9 billion gallon mandate for 2008.

Source: Renewable Fuels Association

Ethanol and Gasoline



Source: EIA Data, Bloomberg, CME Group, EPRINC Calculations

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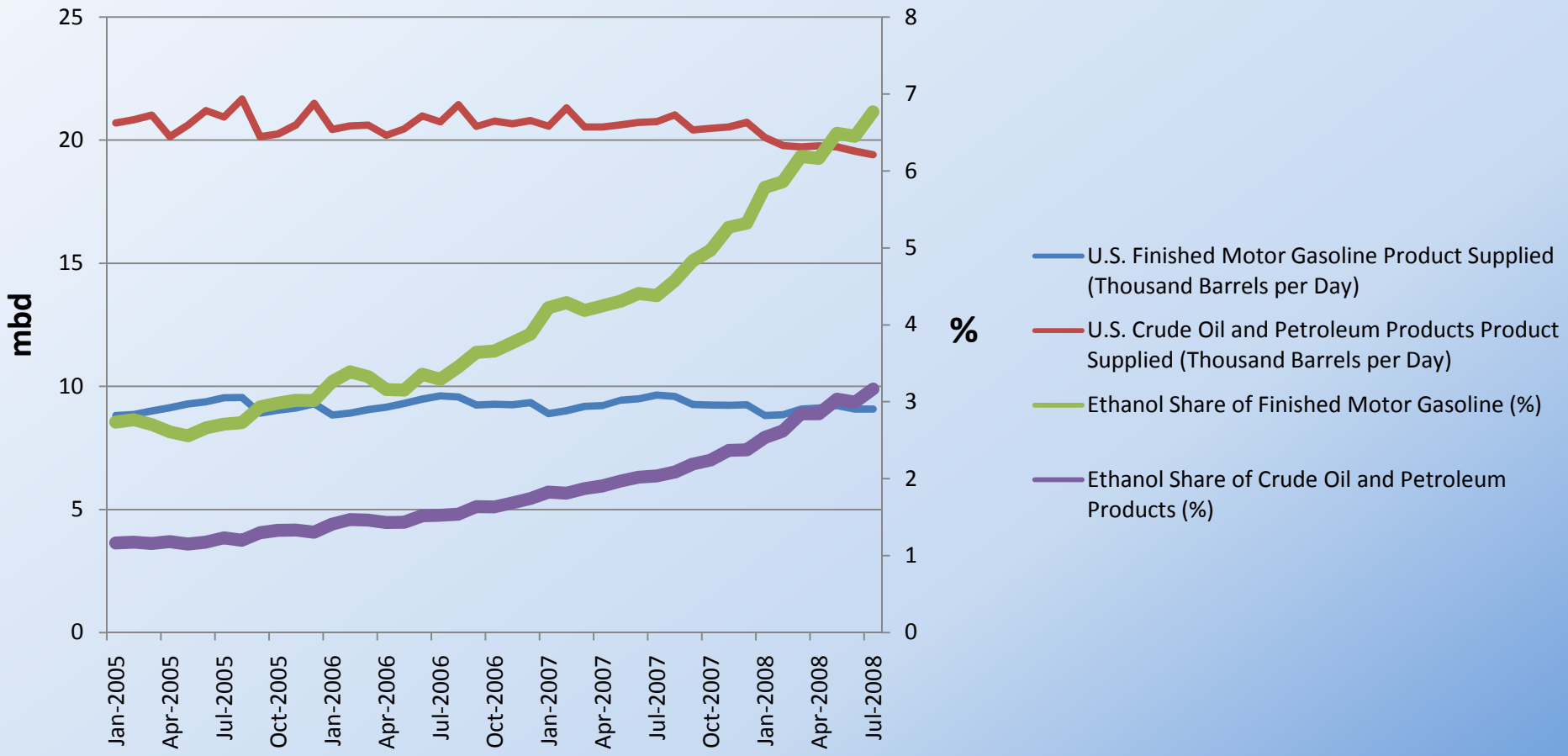
Ethanol's Share of Crude Products and Gasoline



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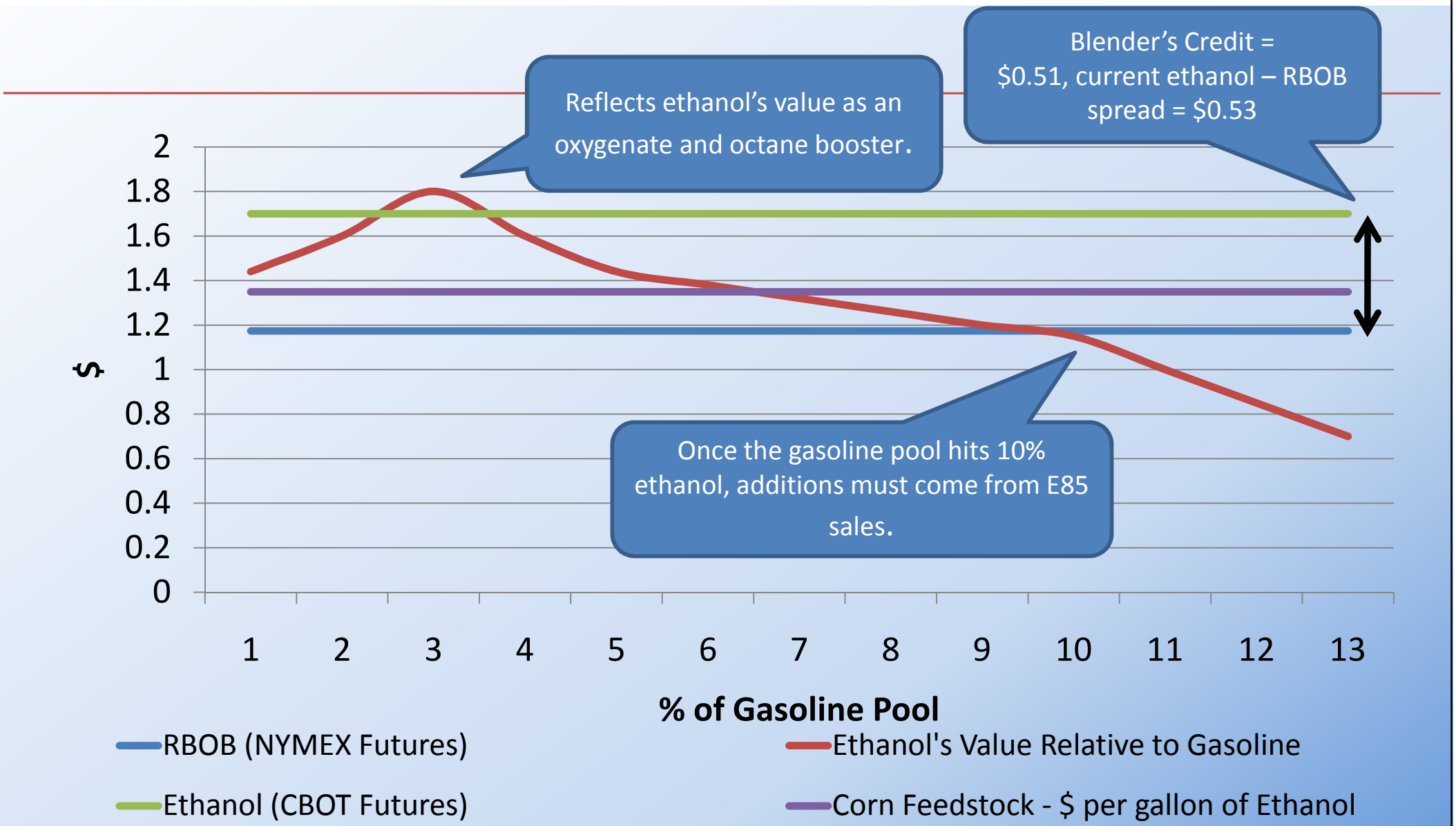
The Cost vs. Value for Ethanol



Source: Bloomberg, CBOT. Futures prices for front month contracts as of November 17, 2008.

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Cost of Ethanol Subsidies

- $7 billion per year (Economist, 2007)
  - About $1.90/gallon.
  - More than 200 types of subsidies
    - $11.2bn+ since 2005 on tax breaks for companies that blend ethanol into petrol (Financial Times)
    - Billions of dollars of subsidies for ethanol producers
  - Tariff on ethanol imports
    - Aimed at preventing imports from Brazil
    - 54 cents/gallon

Source: The Economist, Financial TImes

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Synfuels Corp

- Synthetic Fuels Corp. (SFC) - 1979
  - Use coal to produce 2 mbdoe by 1992
  - New jobs and revenues expected, "The new Office of Coal Commerce in the Illinois Department of Commerce and Community Affairs calculates that every 4 million tons' annual increase in coal output creates 4,013 new jobs, producing a $76 million annual increase in personal income in the state, $6.7 million of which ends up in state and local tax coffers."
  - Cost would be $88 billion over 10 years, partially funded by a windfall profits tax on oil companies.
  - Reagan eventually ended the project in 1986 as oil prices collapsed.

Source: *Illinois Issues,* University of Illinois, 1982.
http://www.lib.niu.edu/1982/ii820420.html

TIME Magazine

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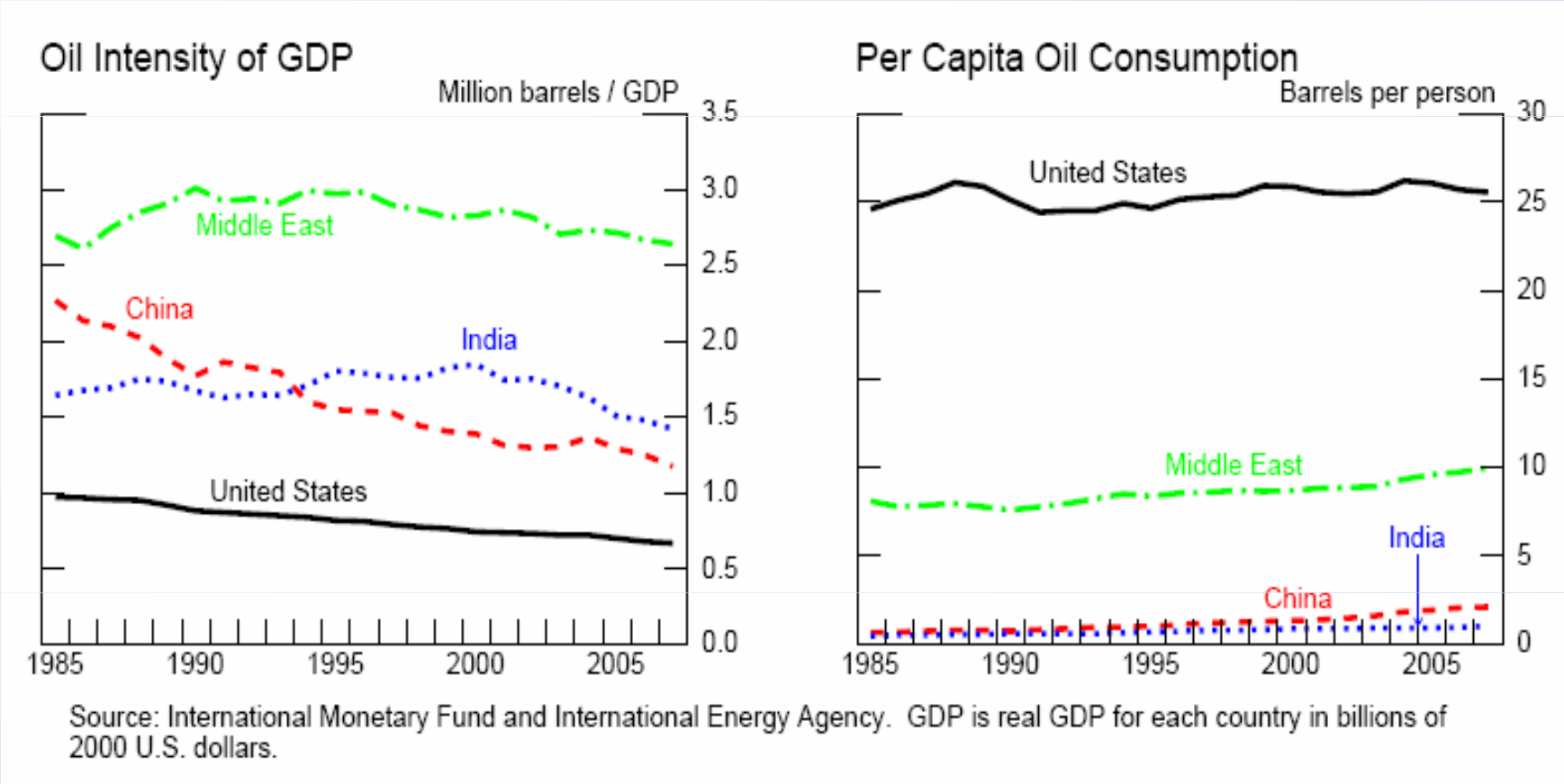
Are We Using Too Much Oil?

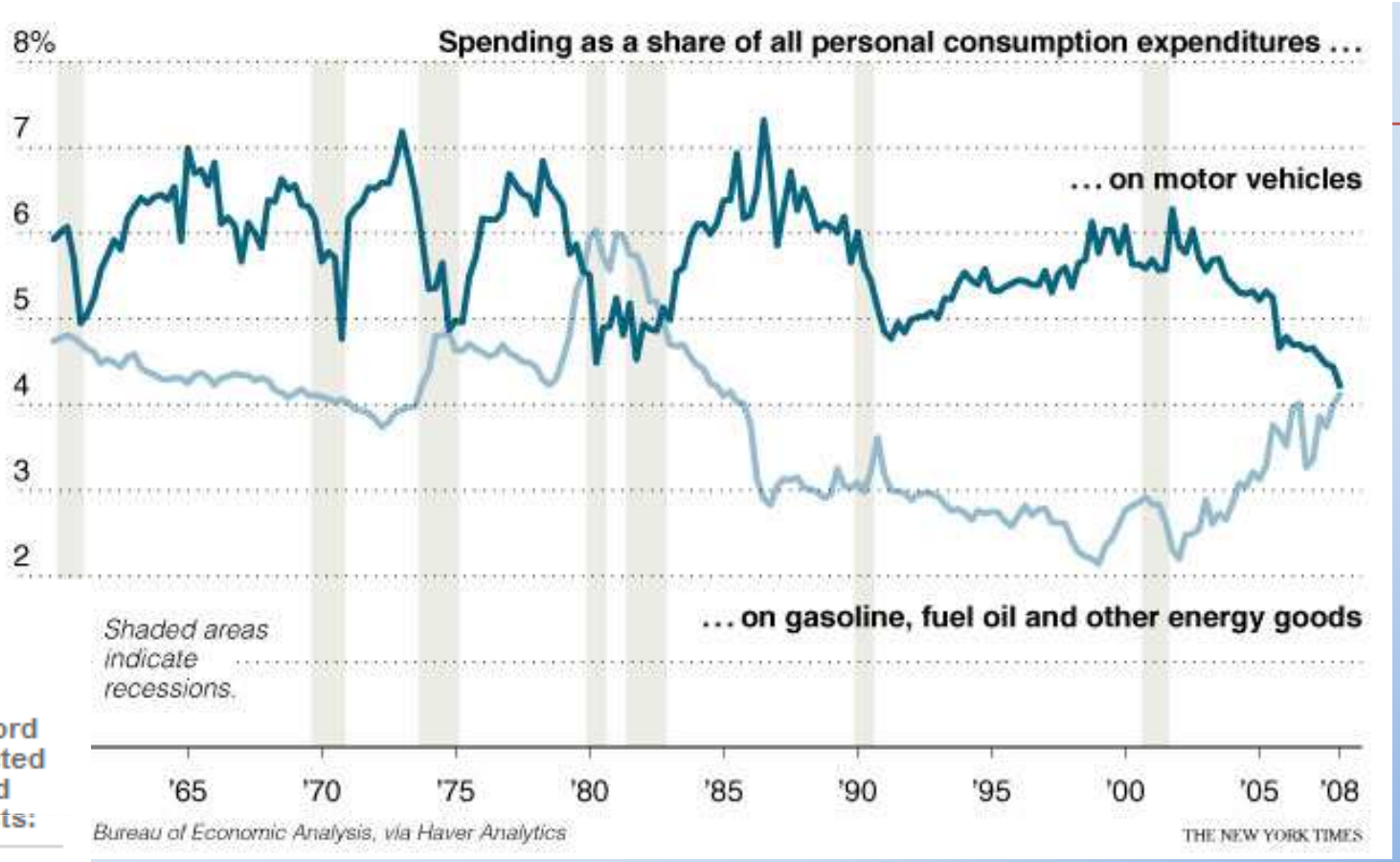
Oil Intensity of GDP



Source: International Monetary Fund and International Energy Agency. GDP is real GDP for each country in billions of 2000 U.S. dollars.

Source: CFTC Interim Report on Crude Oil, June 2008

Cost to consumers…..



PAYING MORE FOR HEAT

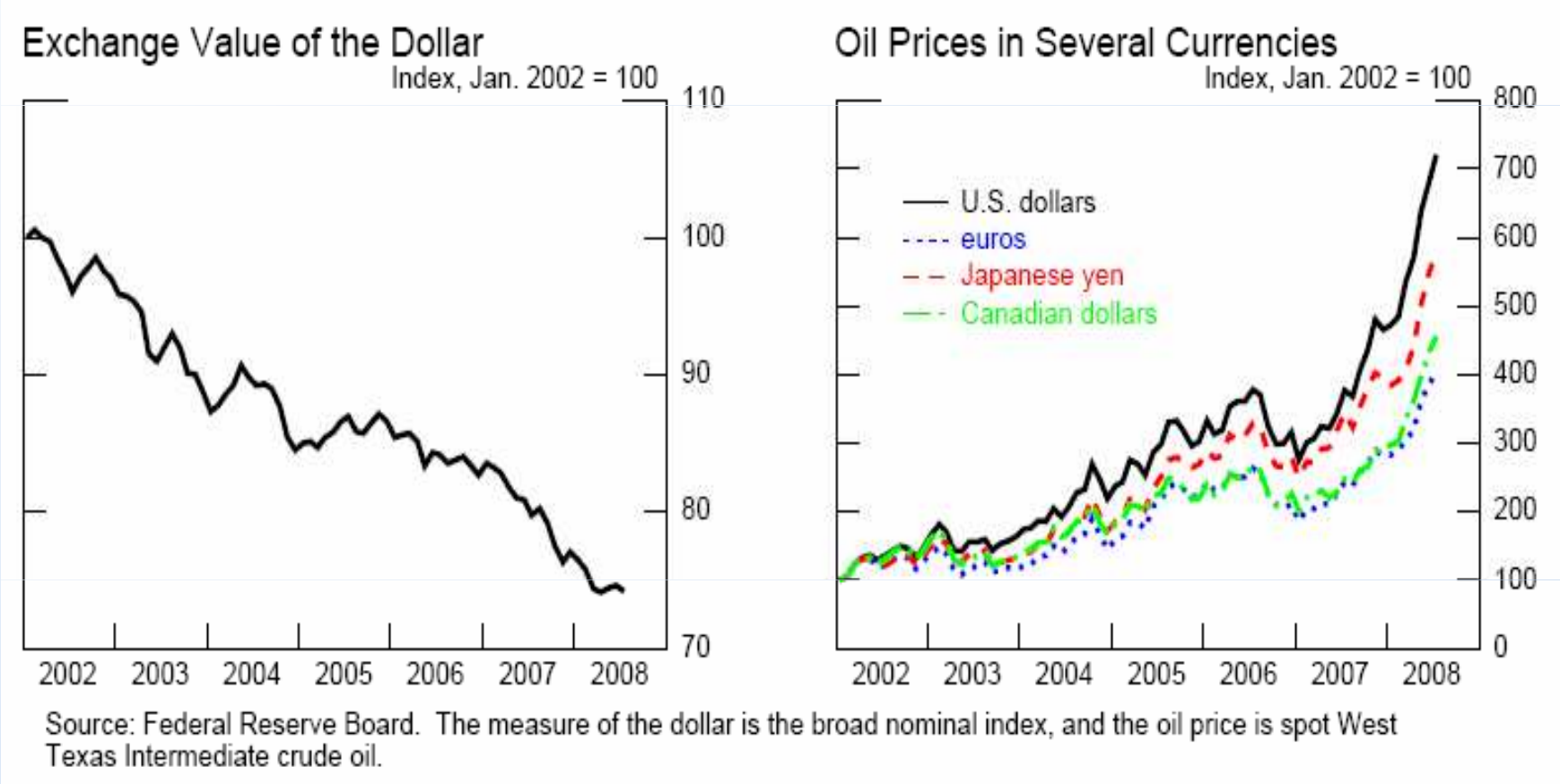
Consumers are expected to pay record prices for heating this winter. Projected average household expenditures and percentage change from 2007-08 costs:

Expenditures	Change
Heating oil $2,644	▲ 36.3%
Natural gas $1,059	▲ 23.8%
Electricity $939	▲ 9.4%

Source: Energy Information Administration

Source: New York Times, USA Today

Oil Prices by Currency



Source: Federal Reserve Board. The measure of the dollar is the broad nominal index, and the oil price is spot West Texas Intermediate crude oil.

Source: CFTC Interim Report on Crude Oil, June 2008

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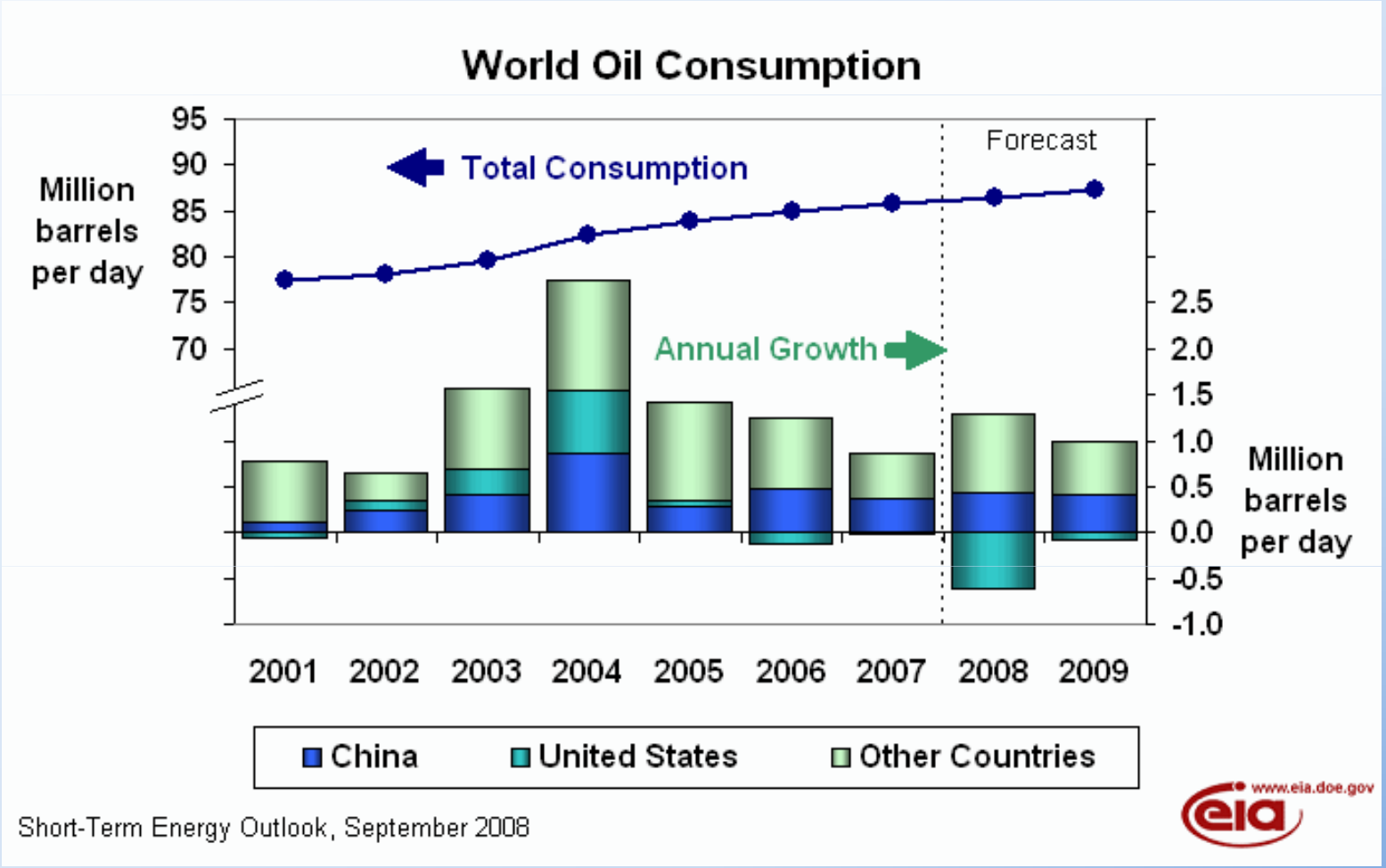
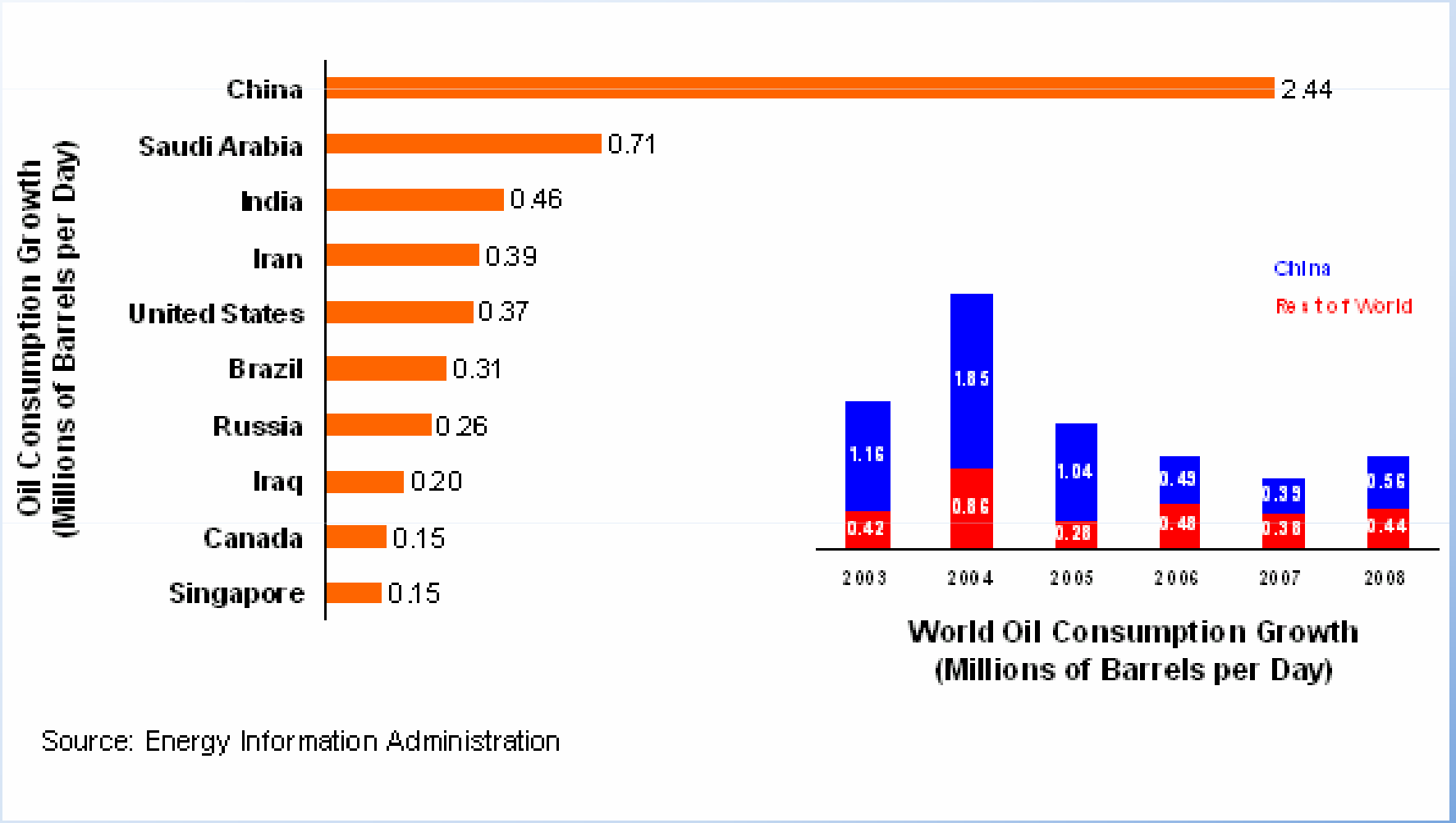
Slides for Q's and A's

World Oil Consumption



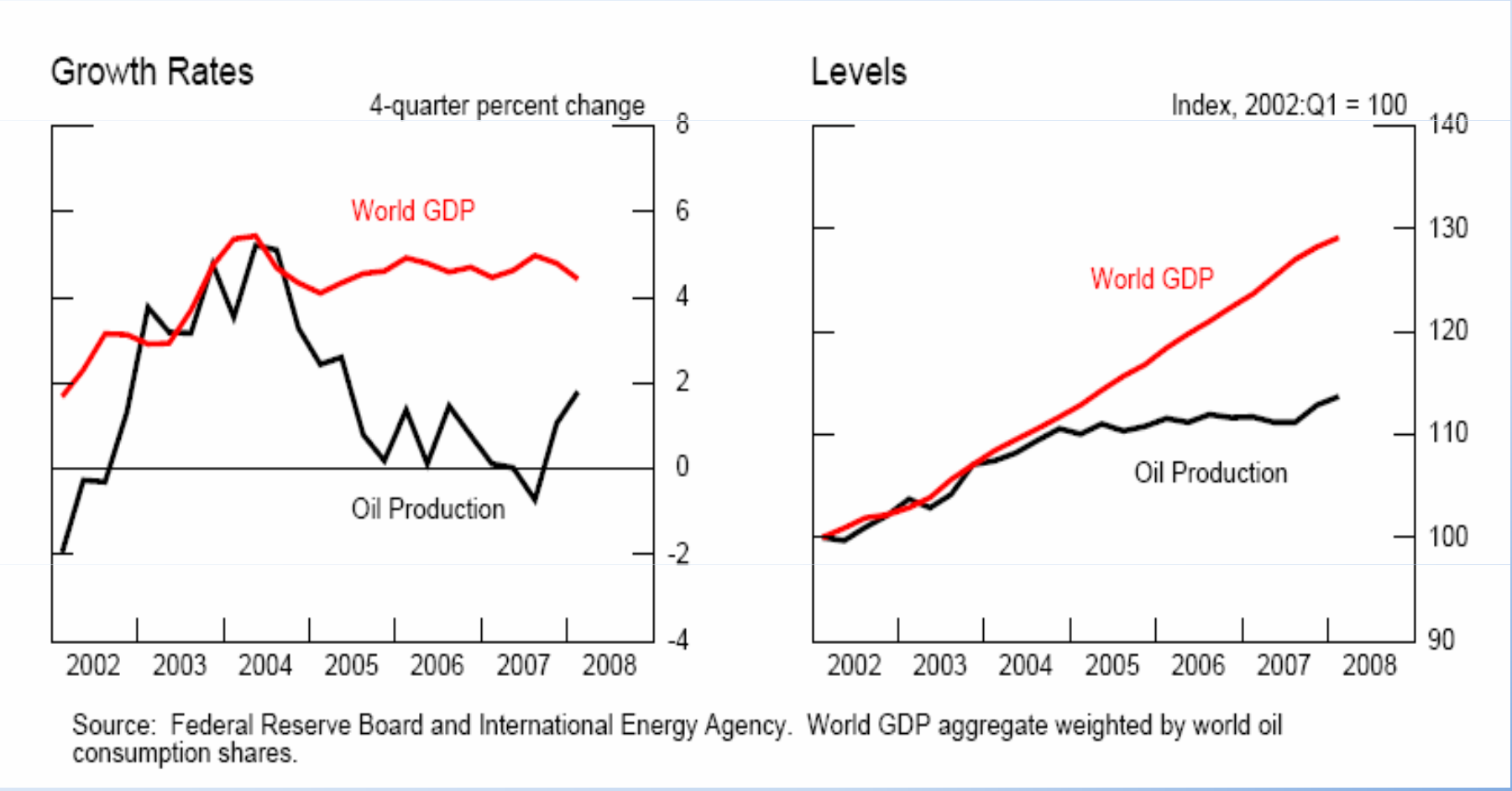
World Oil Consumption



Source: Energy Information Administration

Source: CFTC Interim Report on Crude Oil, June 2008

World GDP vs. Oil Production



Source: Federal Reserve Board and International Energy Agency. World GDP aggregate weighted by world oil consumption shares.

Source: CFTC Interim Report on Crude Oil, June 2008

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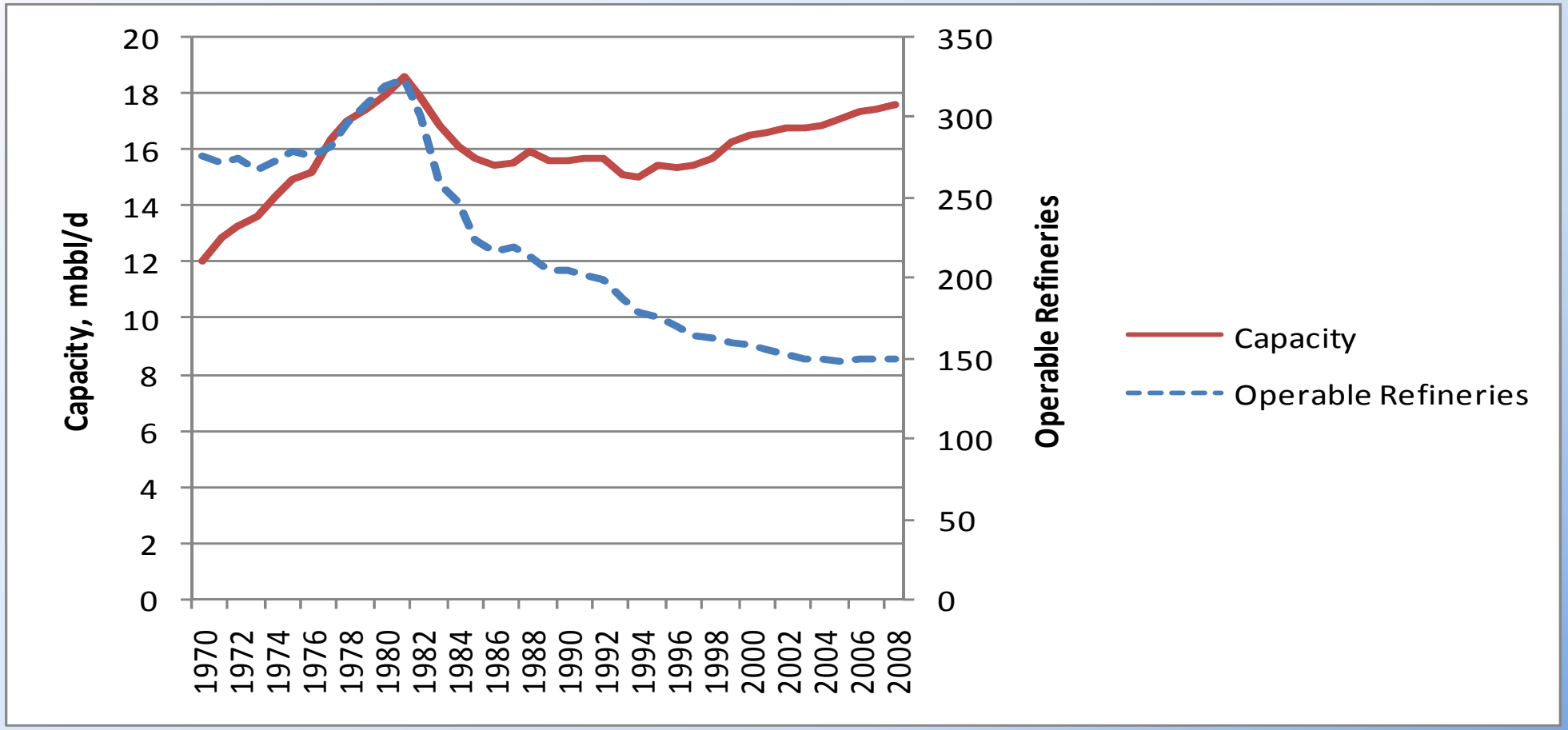
Operable Refiners and Capacity



Source: EIA Data

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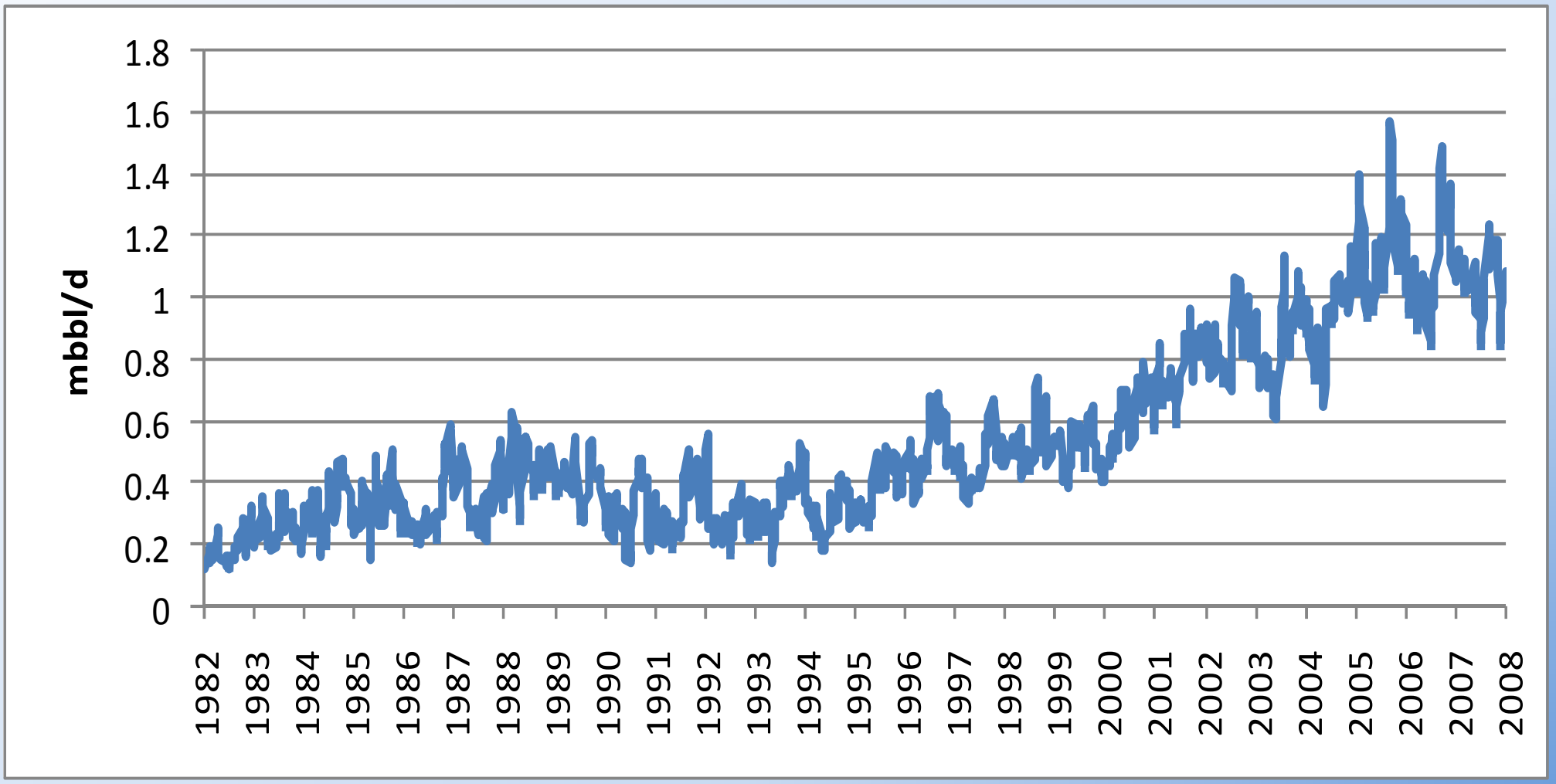
U.S. Total Gasoline Imports



Source: EIA Data

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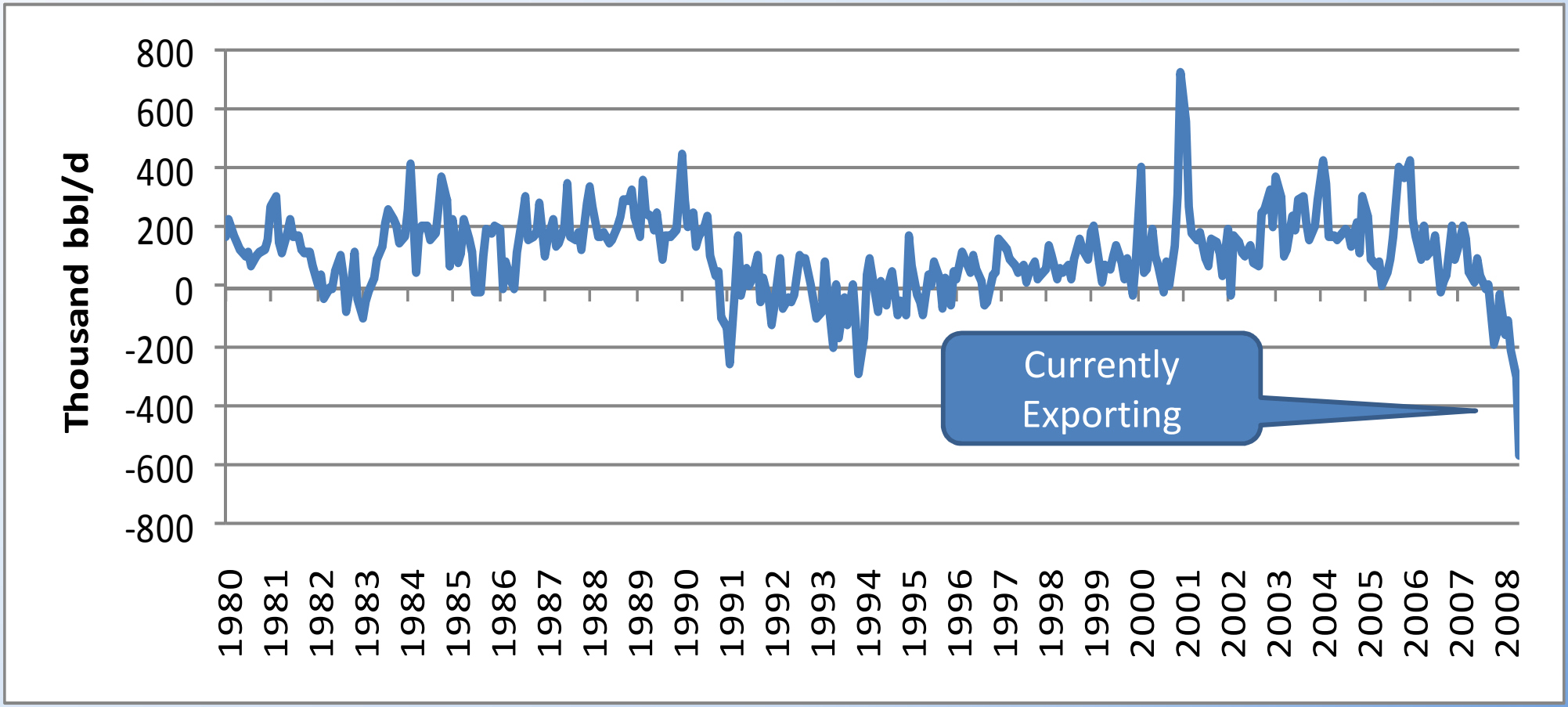
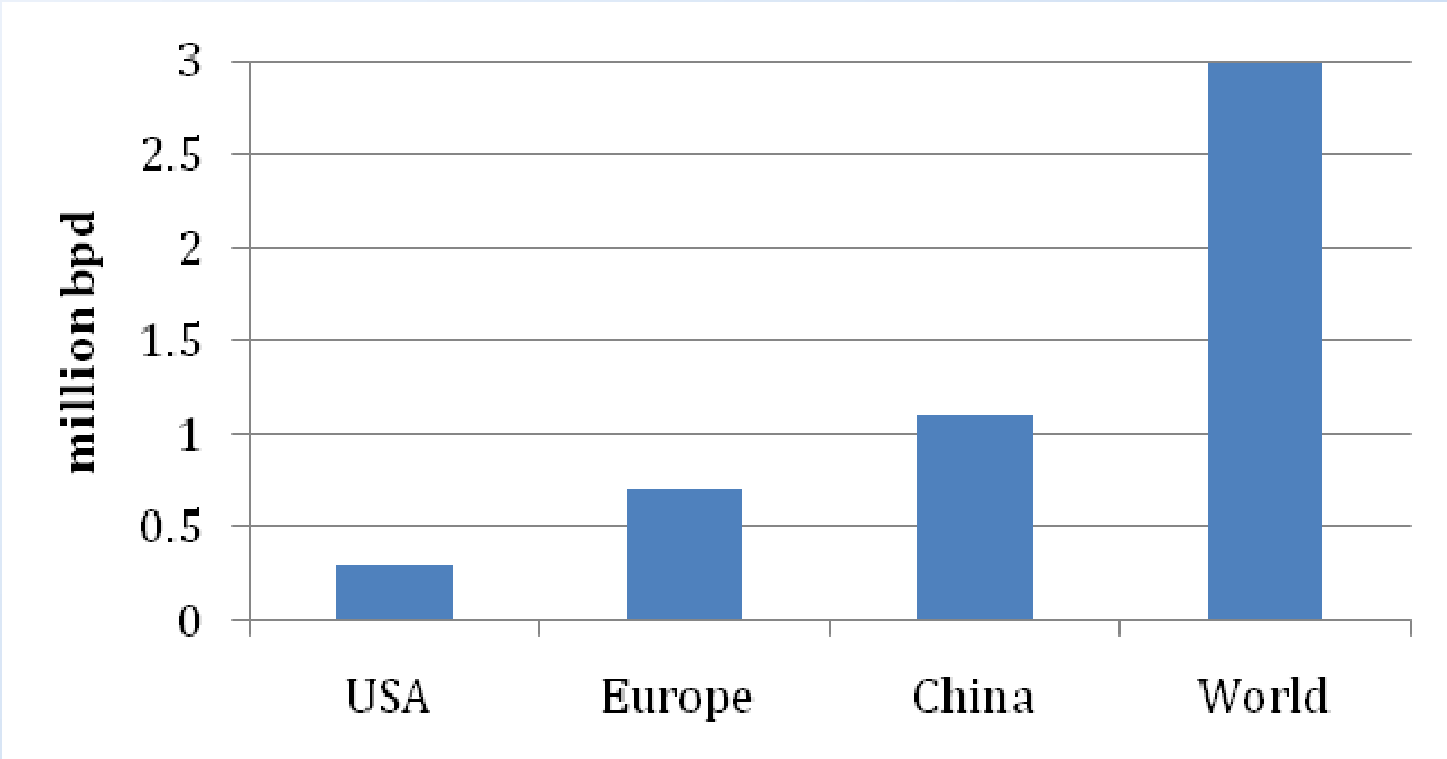
U.S. Distillate Fuel Oil Net Imports



Source: EIA Data

Distillate Consumption Growth: 2003 - 2007



Source: EIA Data

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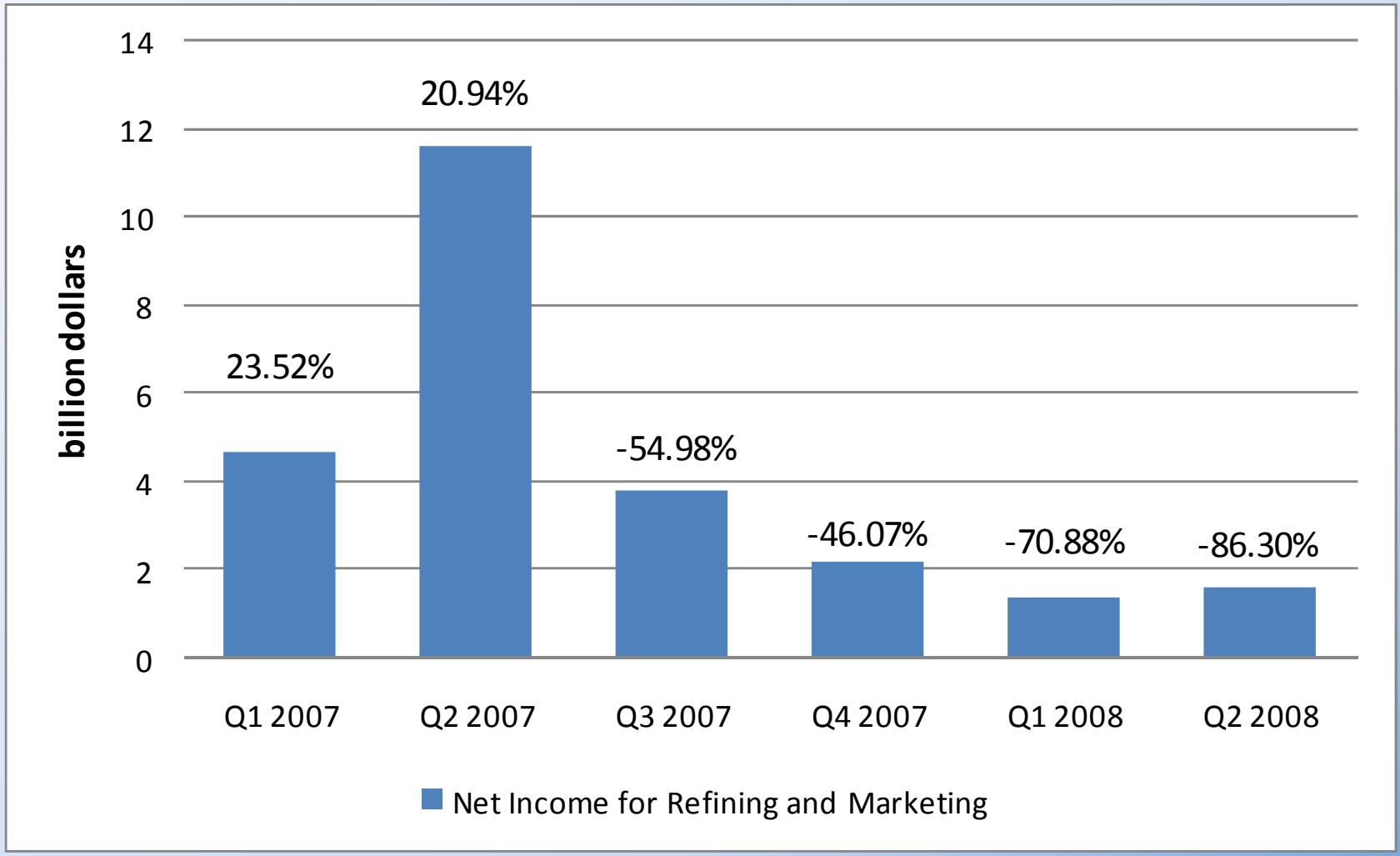
Profitability in Refining and Marketing – 2007-2008
(with year-over-year change)



Source: EIA Data and EPRINC Calculations

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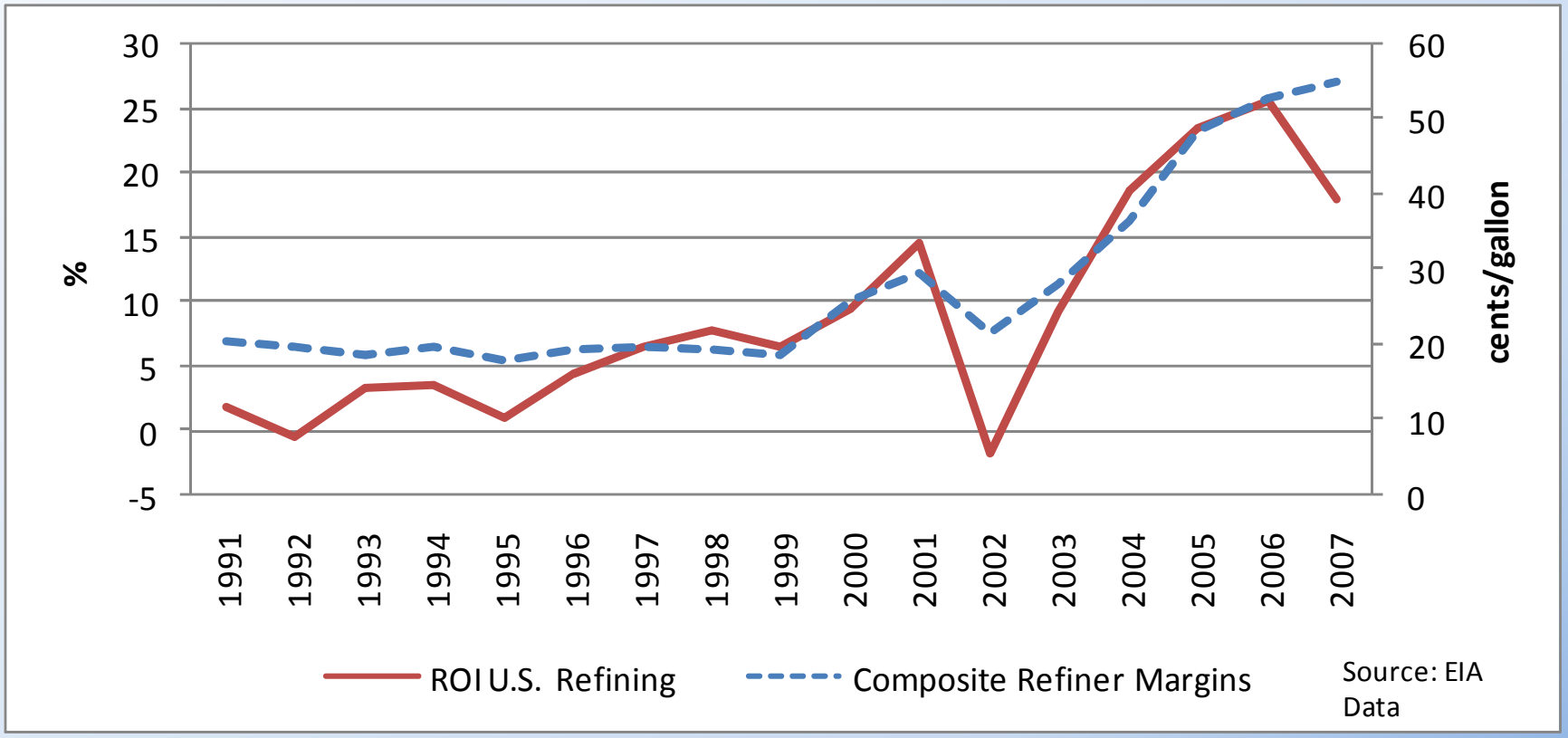
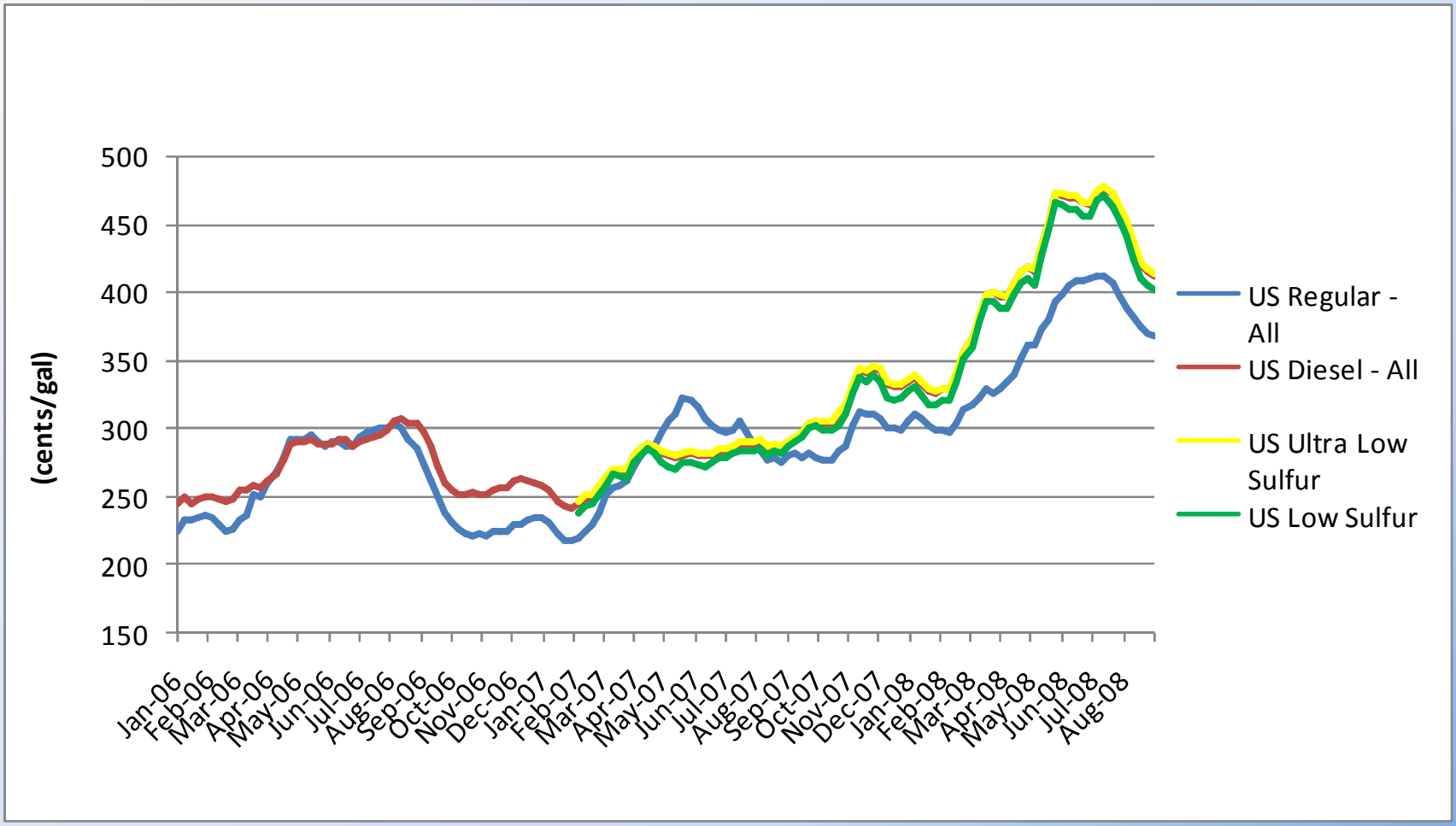
Refiner Margins vs. ROI



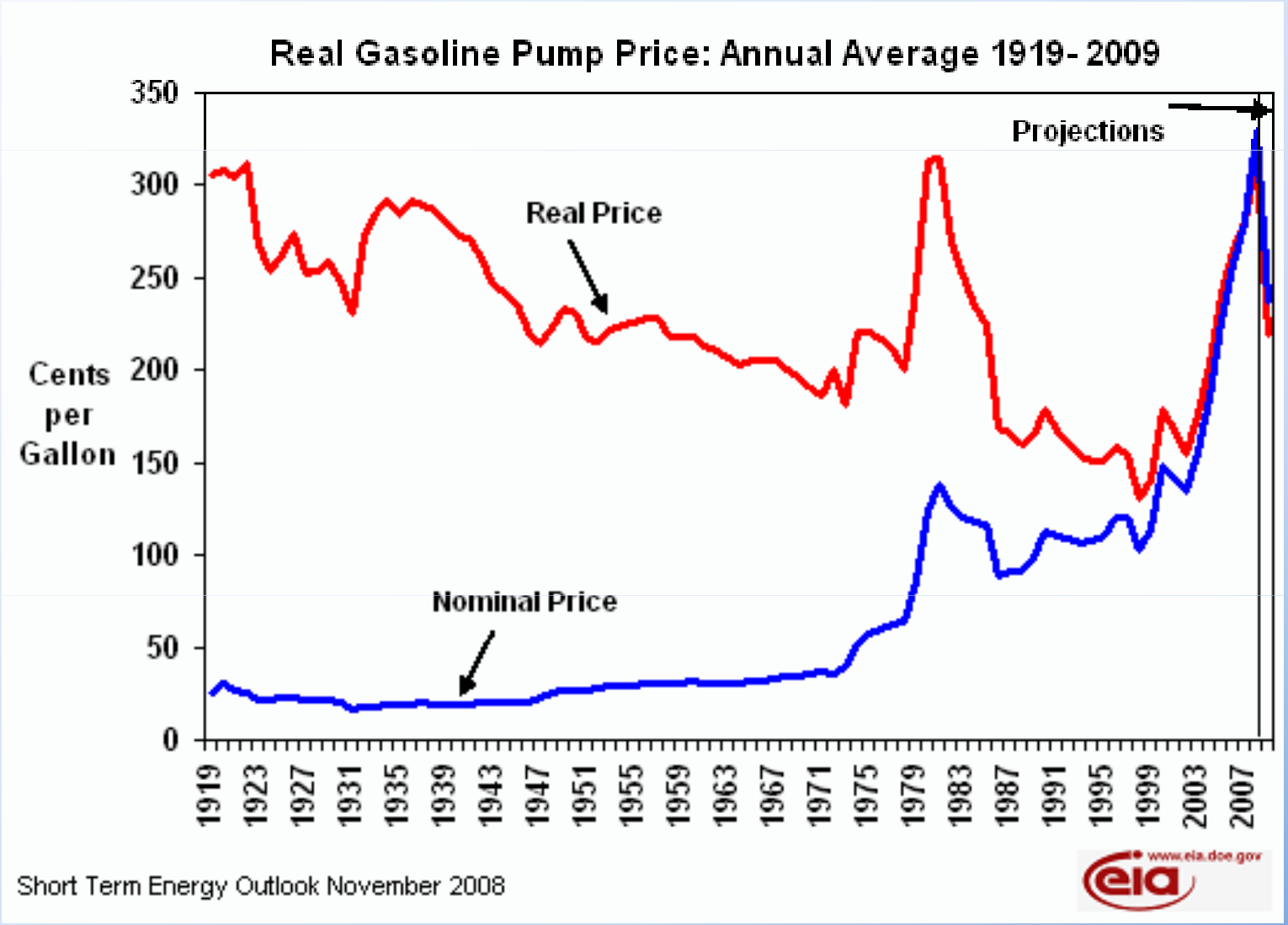
EPRINC

U.S. Retail Prices: Gasoline vs. Diesel 2006 - 2008



Source: http://tonto.eia.doe.gov/dnav/pet/pet_pri_gnd_dcus_nus_w.htm

Real Gasoline Prices – 1919 – 2009



Source: EIA