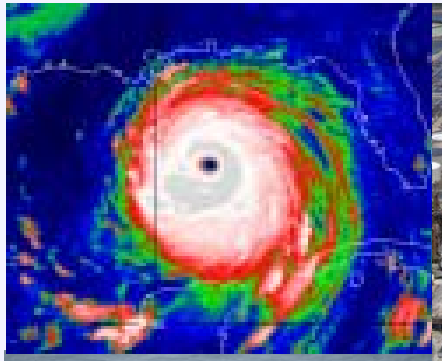


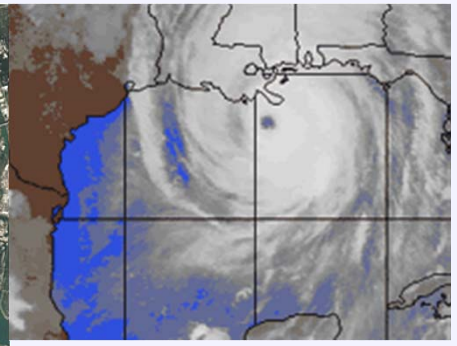


The Impacts of Hurricane Katrina and Rita on Louisiana's Energy Industry

Presentation to the Louisiana Economic Development Council

March 8, 2006

David E. Dismukes
Center for Energy Studies
Louisiana State University

Summary on Impacts of Hurricanes

- **Hurricanes were incredibly destructive to energy business – effects felt for some time.**
- **Hurricanes clearly showed the interrelationship of all types of energy infrastructure in the Gulf – the "4 Ps" – production, processing, pipes, and power.**
- **Hurricanes impacts were felt nationally – drives home importance of Gulf coast.**
- **Price and supply wildcards: geopolitics, weather, and industrial activity. Recent industrial demand destruction not clear but a big potential looming problem.**
- **Energy markets are likely to not be back on their feet prior to the next hurricane season.**

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The WORST Case Scenario:

Two Hurricanes in the Heart of the Largest Energy Infrastructure Region of the U.S.

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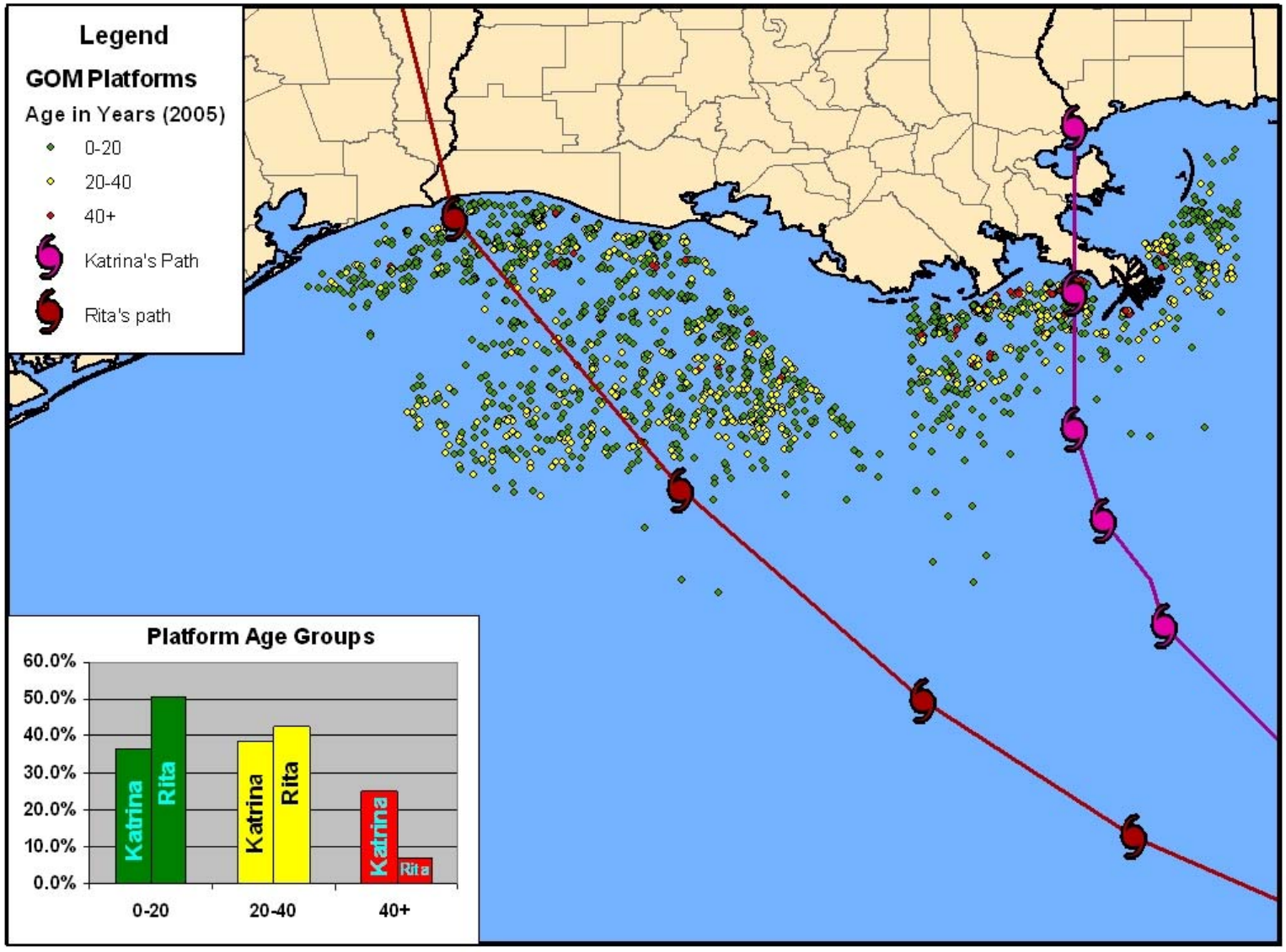
Platforms/Structures Impacted by Rita



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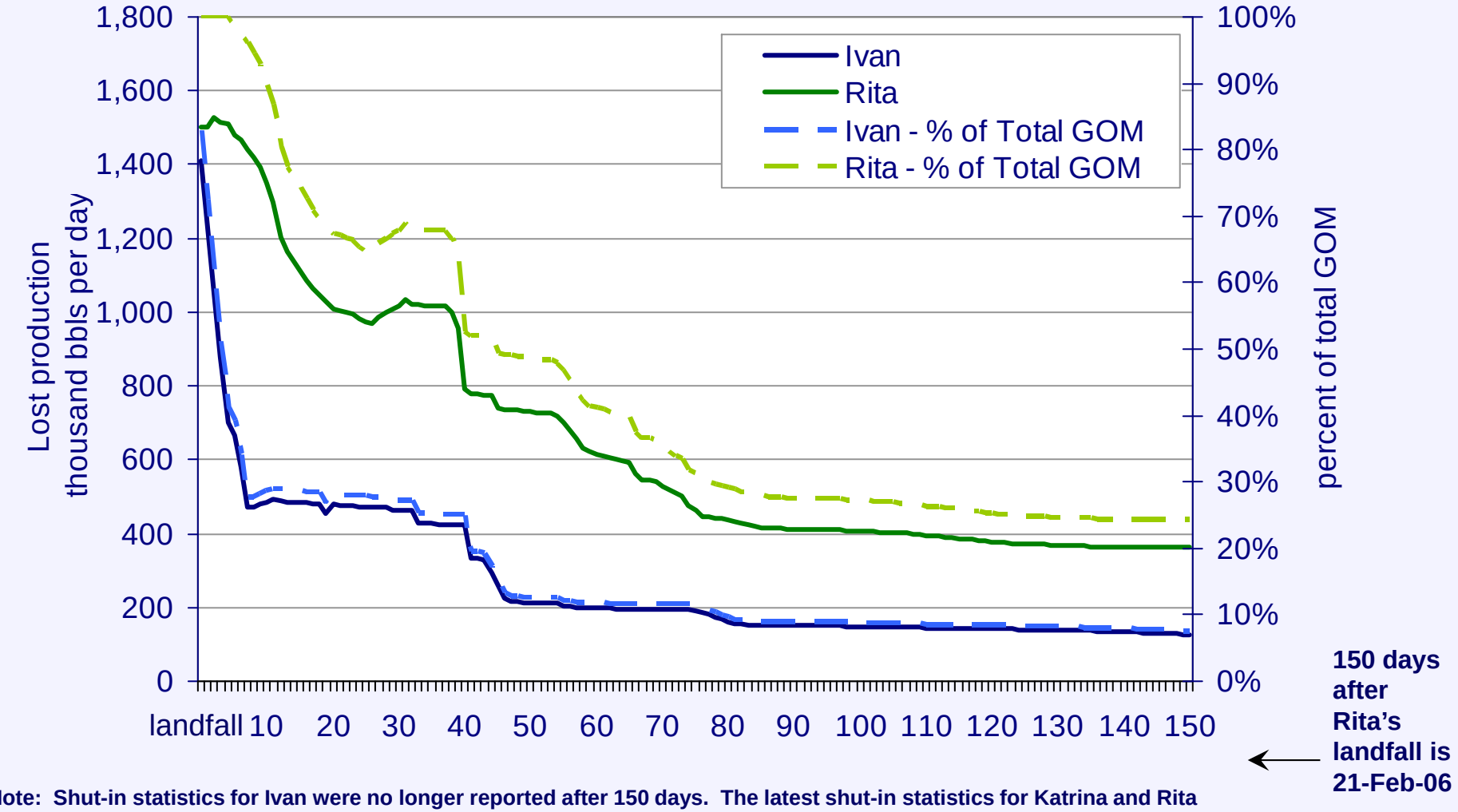
Estimated Return of Existing Crude Production

Shut-ins have reached a difficult plateau trend much like Hurricane Ivan



Note: Shut-in statistics for Ivan were no longer reported after 150 days. The latest shut-in statistics for Katrina and Rita were published on February 22, 2006.
Source: Minerals Management Service

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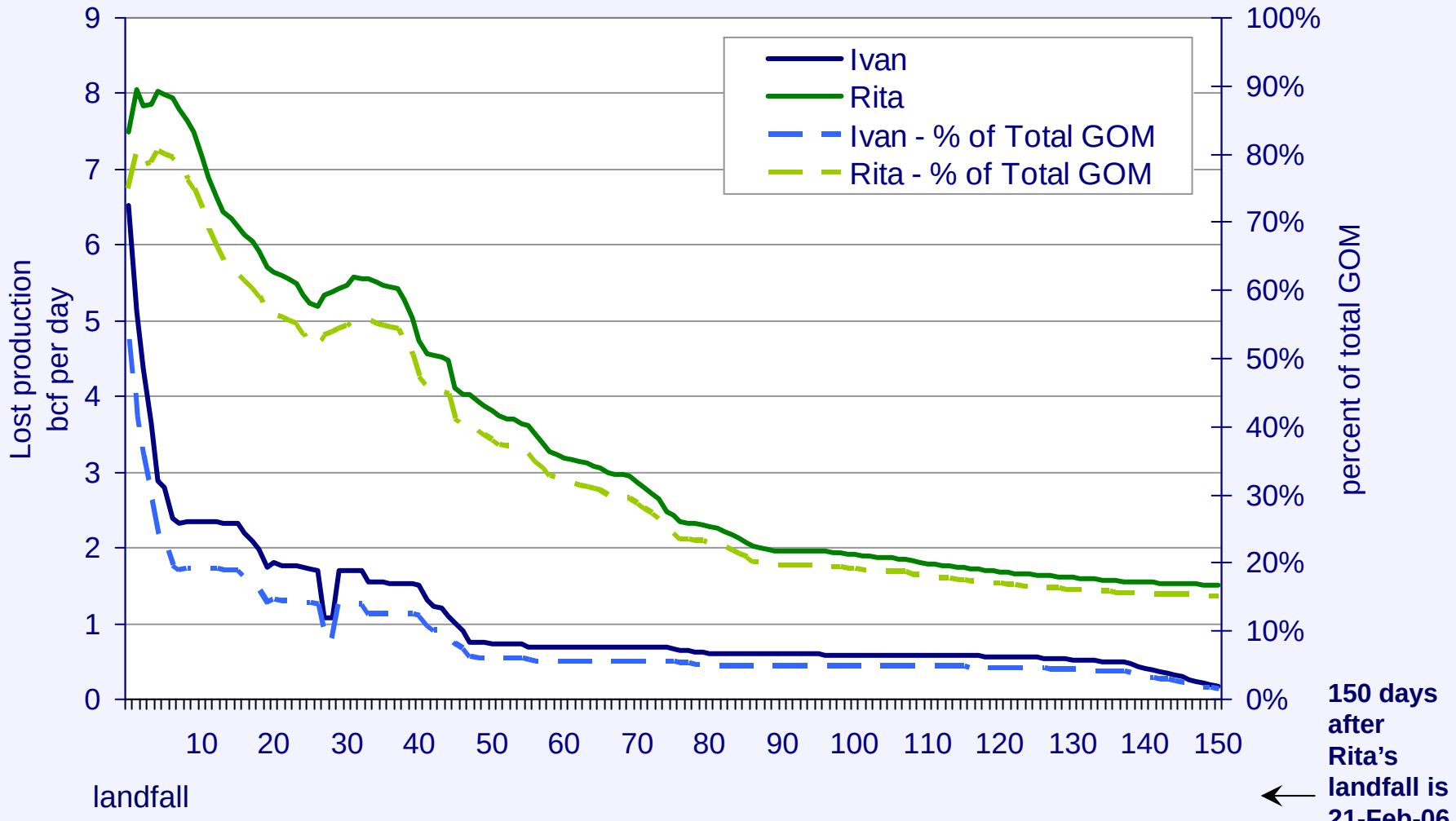
Estimated Return of Existing Natural Gas Production

Shut-ins have reached a difficult plateau trend much like Hurricane Ivan



Note: Shut-in statistics for Ivan were no longer reported after 150 days. The latest shut-in statistics for Katrina and Rita were published on February 22, 2006.
Source: Minerals Management Service

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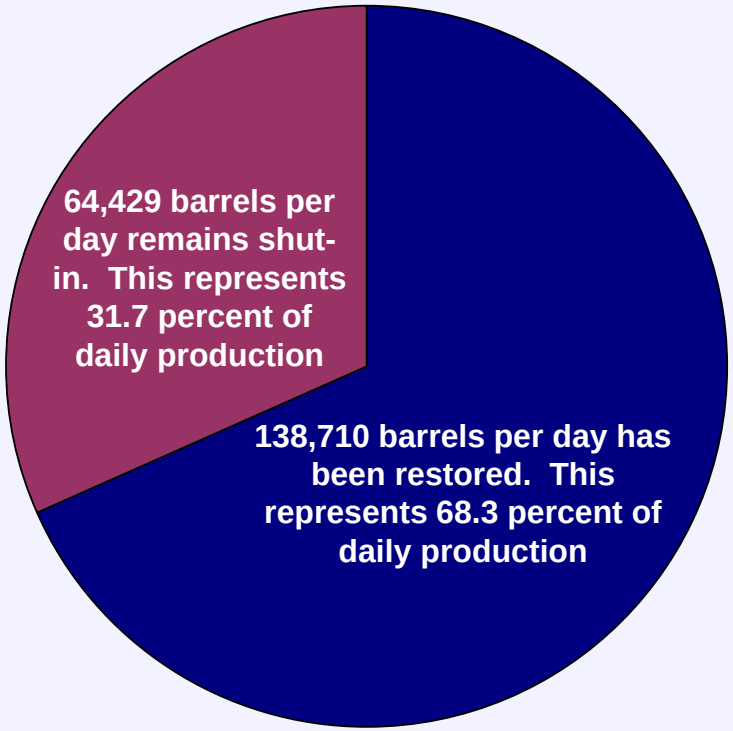
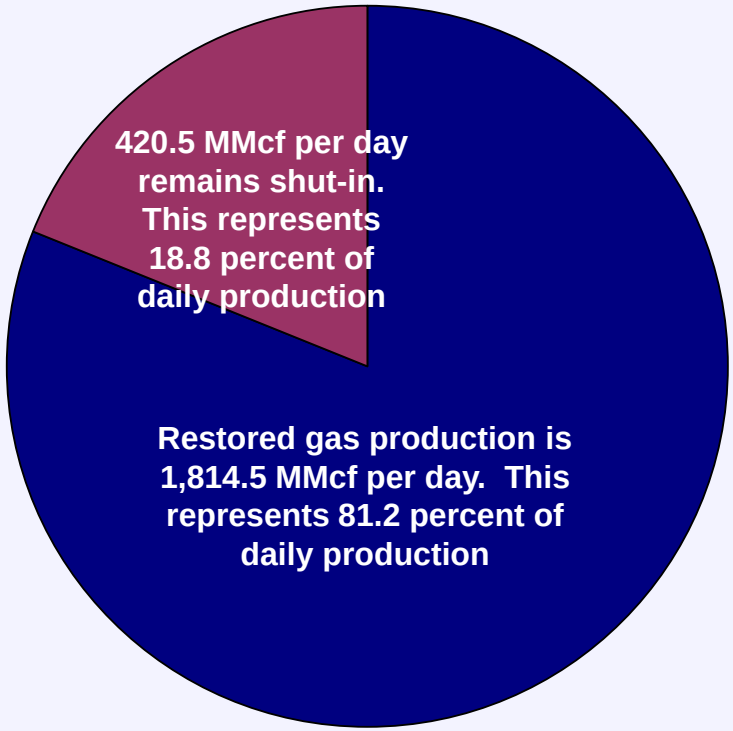
Status of Louisiana Oil and Gas Production

State Oil Production
32% Shut-in



State Natural Gas Production
19% Shut-in



Note: As of February 26,2006.
Source: Louisiana Department of Natural Resources

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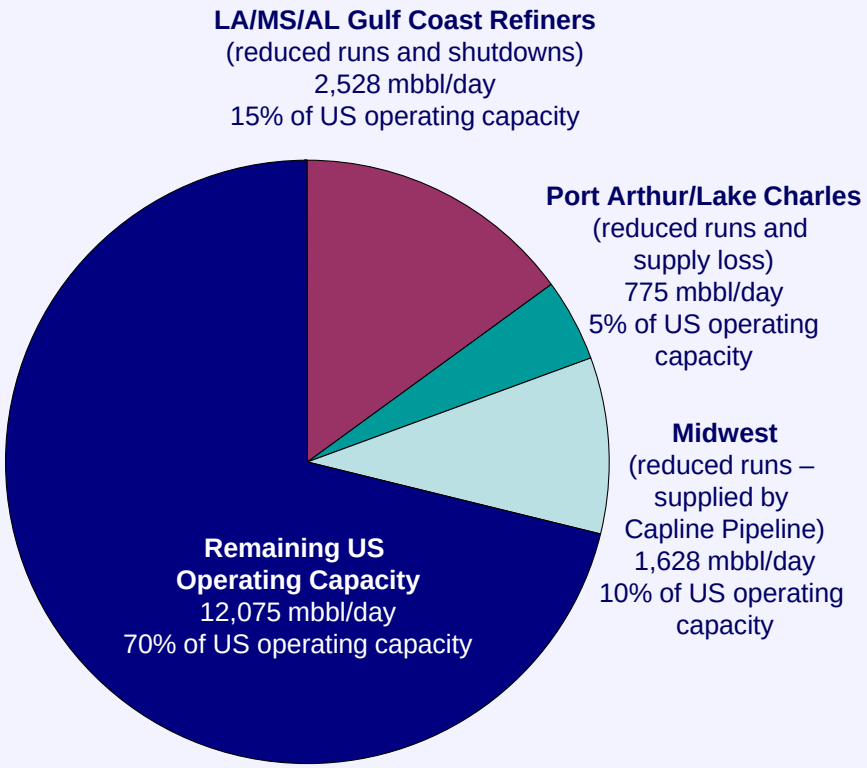
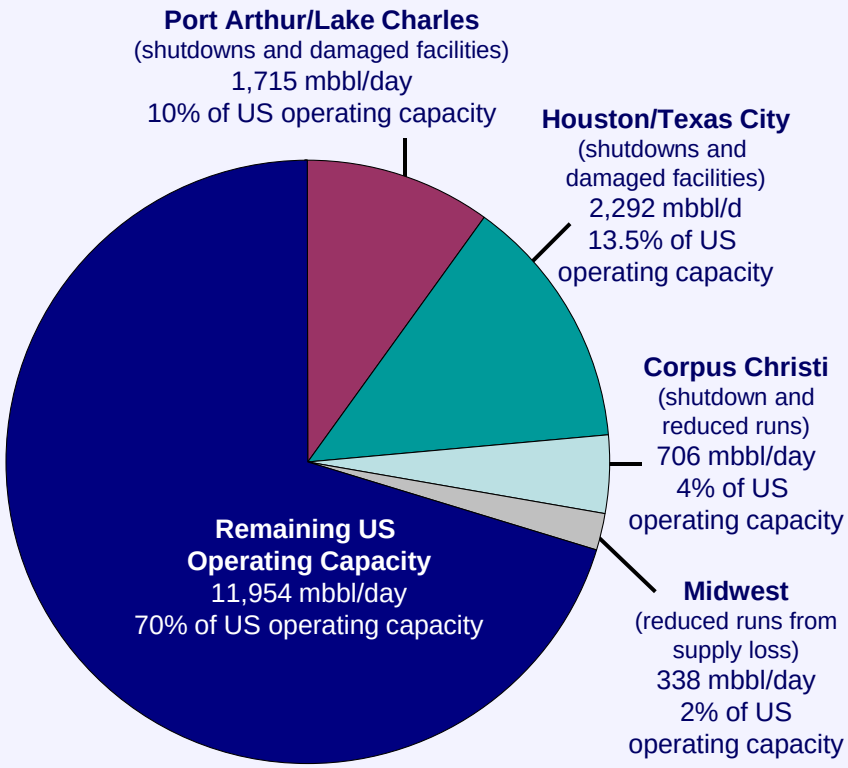
Total Immediate Refinery Impact

Hurricane Katrina



Total Refinery Impact
4,931 mbbl/day
30% of US operating capacity

Hurricane Rita



Total Refinery Impact
5,052 mbbl/day
30% of US operating capacity

Source: Energy Information Administration, Department of Energy

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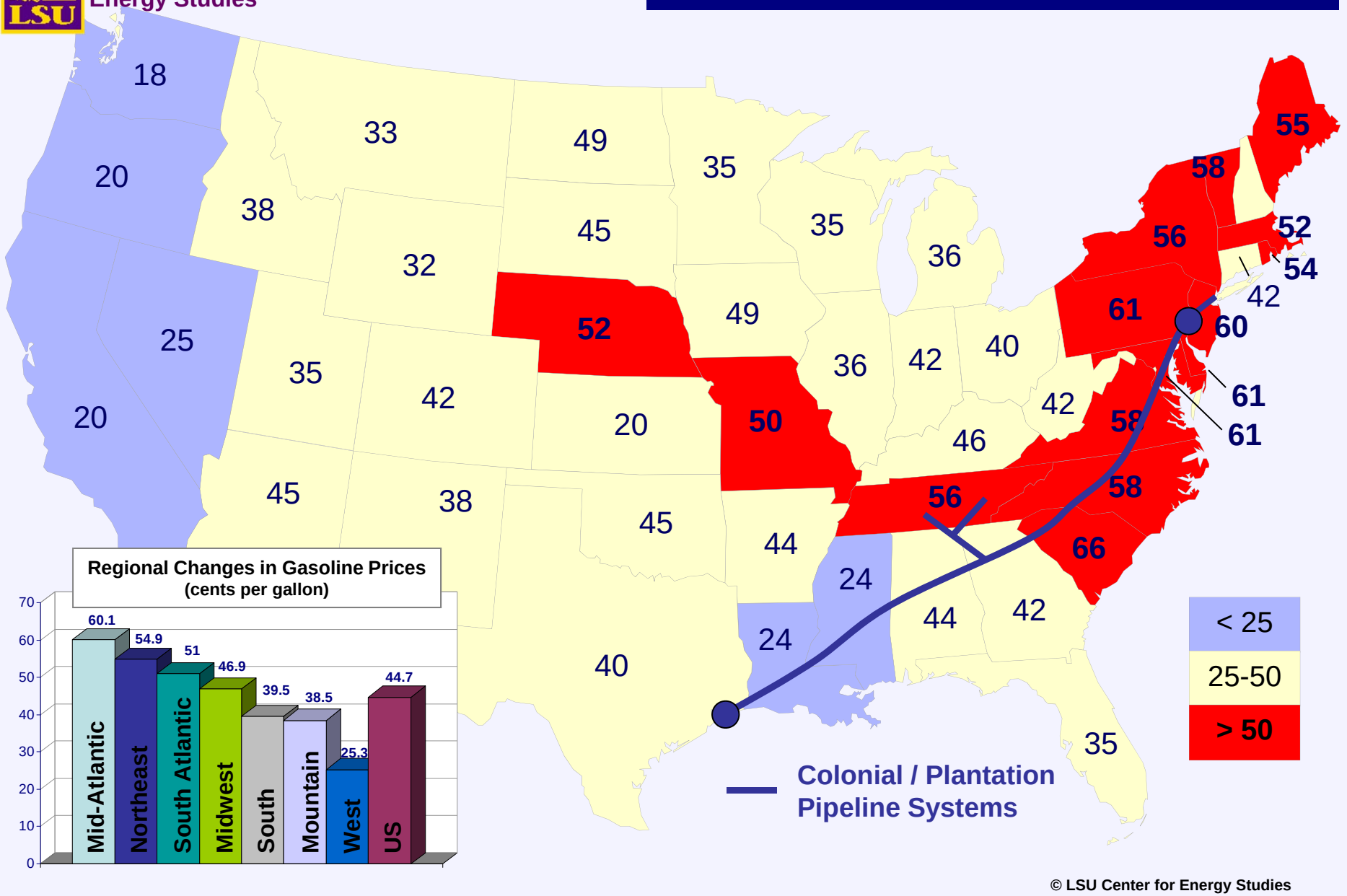
Gasoline Price Increases
August 30, 2005 to September 6, 2005



Source: American Petroleum Institute

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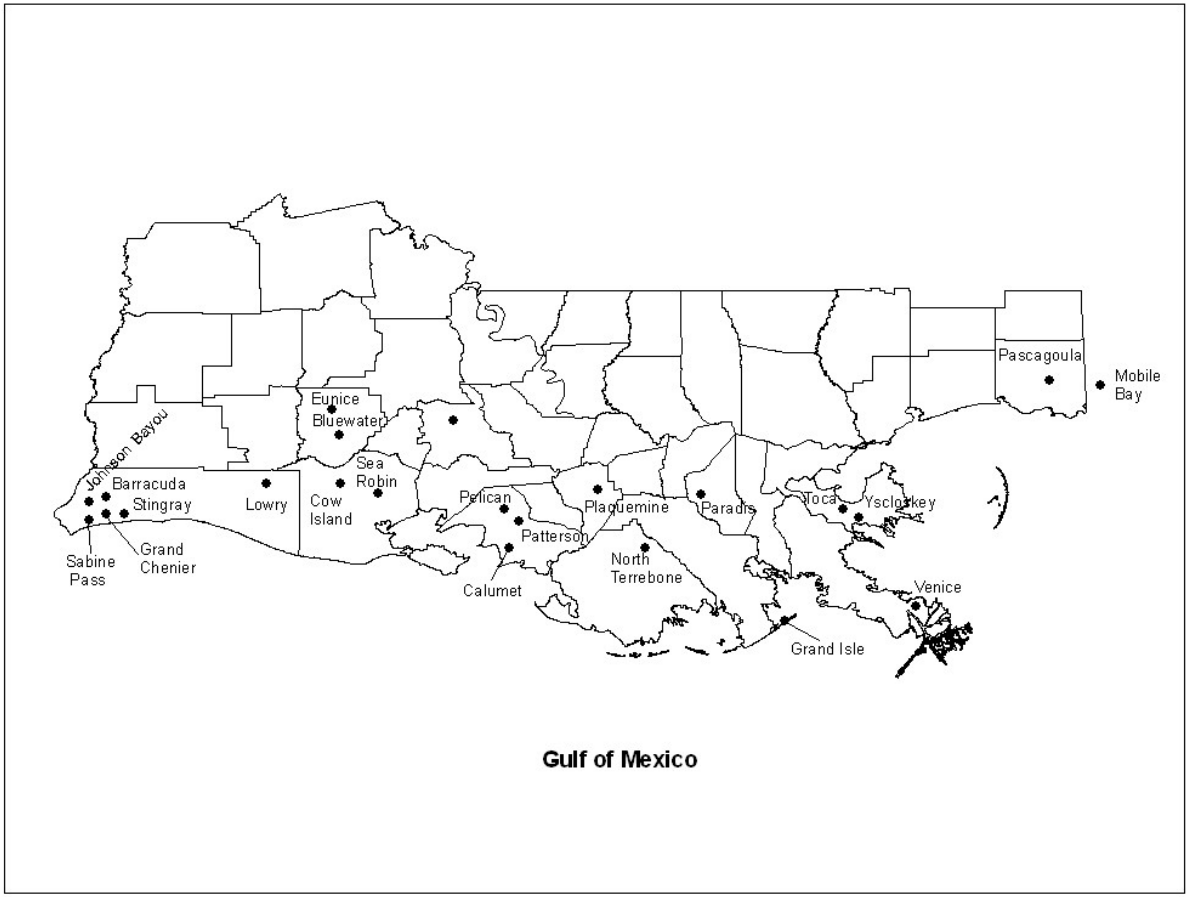
Number of Natural Gas Processing Facilities Out

Outages at gas processing facilities throughout all of south Louisiana was one of the more unique aspects of the combined hurricanes.

	Capacity (MMcf/d)	Throughput (MMcf/d)
Mississippi and Alabama Plants		
BP Pascagoula	1,000.0	768.0
DEFS Mobile Bay	600.0	272.0
RDS Yellowhammer	200.0	135.0
Total	1,800.0	1,175.0
East Louisiana Plants		
DYN Venice	1,300.0	997.0
EPD Toca	1,100.0	607.8
DYN Yscloskey	1,850.0	1,343.0
Total	**4,250.0**	**2,947.8**
West Louisiana Plants		
DYN Barracuda	225.0	155.0
BP Grand Chenier	600.0	344.0
WMB Johnson Bayou	425.0	114.0
EPD Sabine Pass	300.0	166.0
DYN Stingray	305.0	257.0
Total	**1,855.0**	**1,036.0**
Central Louisiana Plants		
DYN Lowry	300.0	195.0
EPD Cow Island	500.0	134.0
AHC Sea Robin	900.0	571.8
EPD Calumet	1,600.0	733.0
Norcen Patterson I	600.0	500.0
DUK Patterson II	500.0	246.0
EPD Pelican	325.0	290.0
Total	**4,725.0**	**2,669.8**
Grand Total	**12,630.0**	**7,828.6**
Assumed Total GOM Production		**10,000.0**
Percent of Total		**78.3%**



Source: LMOGA

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Examples of Energy Infrastructure Damage

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Shell Mars Tension Leg Platform

Source: Shell.com

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Shell Mars Tension Leg Platform

Source: Shell.com

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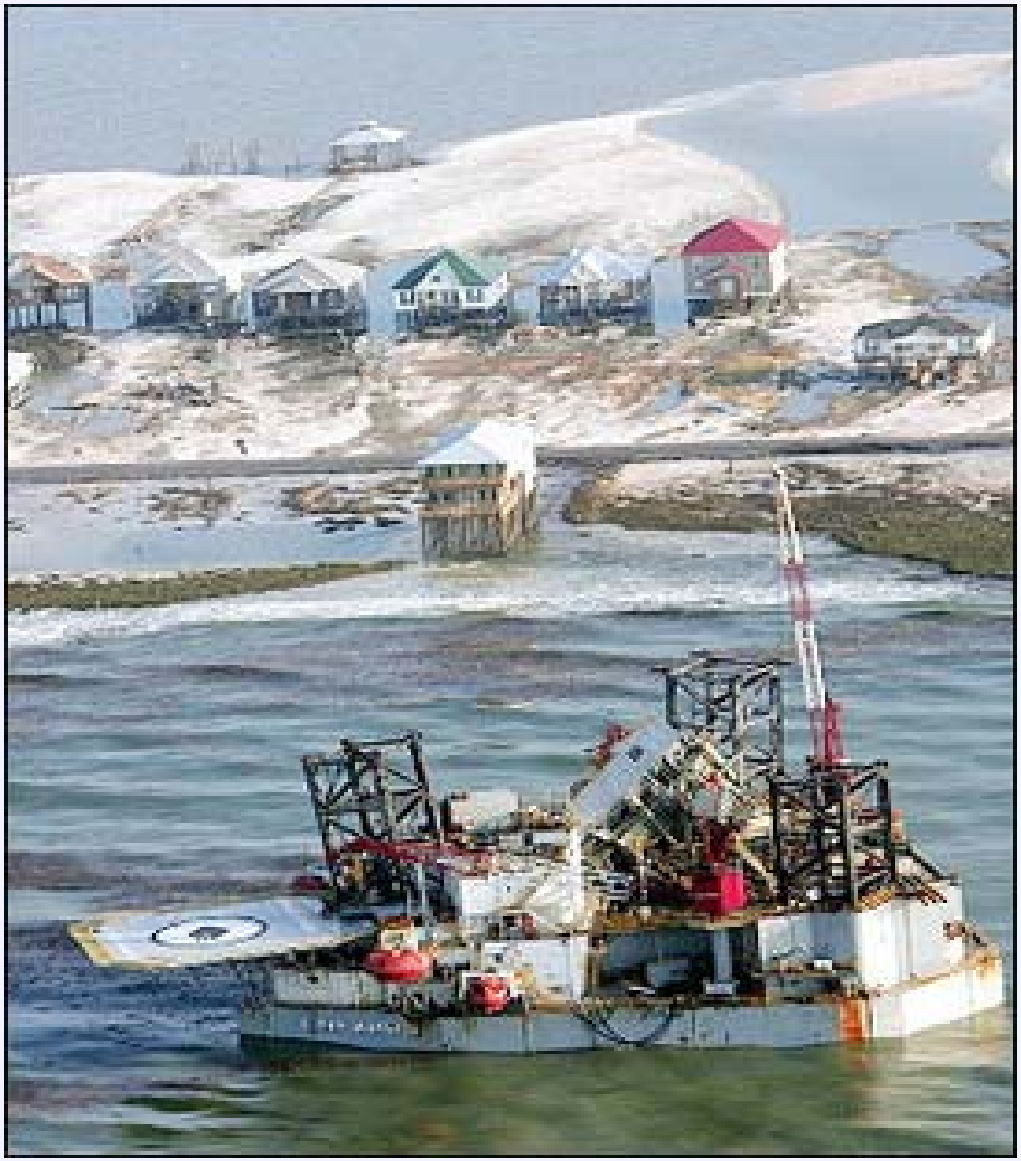
Ocean Warwick
Dauphin Island, AL



Source: Rigzone.com

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Semi-Sub Stuck Under Bridge
North Mobile Bay

Source: Rigzone.com

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Venice Port, Supply & Crew Bases

Source: LIOGA

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Chevron Refinery
Pascagoula, MS

Source: Chevron

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Air Products Facility – Normal Day
New Orleans, Louisiana (Intracoastal Drive)

Source: Air Products

Center for
Energy Studies

Air Products Facility – During Hurricane Katrina New Orleans, Louisiana

Source: Air Products

Center for
Energy Studies

Air Products Facility – Post Hurricane Katrina New Orleans, Louisiana

Source: Air Products

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Power Outages
Generating Stations – Entergy Patterson

Source: Entergy

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Power Outages
Substation Damage

Source: Entergy

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Then,
Along Comes Rita

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Henry Hub, September 25, 2005

Source: LIOGA

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Entergy Transmission

Source: Entergy.com

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Citgo Refinery – Storage Tank
Lake Charles, Louisiana
Post-Rita

Source: Citgo

Center for
Energy Studies

Citgo Refinery – Onsite Dock
Lake Charles, Louisiana
Post-Rita

Source: Citgo

Center for
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Citgo Refinery – Cooling Tower
Lake Charles, Louisiana
Post-Rita

Source: Citgo

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Citgo Refinery – Tent City
Lake Charles, Louisiana
Post-Rita

Facility rental of $3.5 million for 3 weeks – for 250 employees – roughly $156 per day per person

Source: Citgo

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Natural Gas Pipeline Leak

Temporary Natural Gas Release: To date, all subsea safety valves have held. There have been a couple of incidents where pipeline damage has allowed the temporary venting of gas that was in the pipeline. There are currently no known incidents of gas venting from wells and the temporary venting from pipelines appears to have stopped.

Source: MMS

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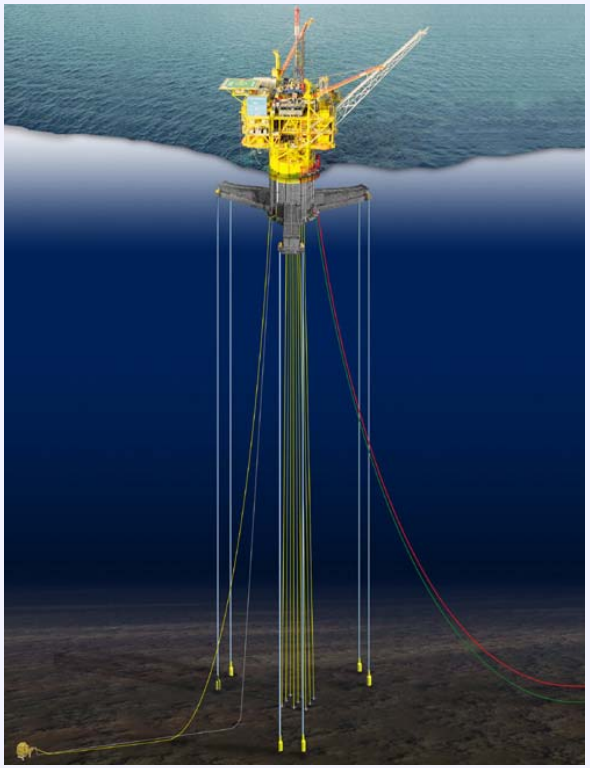
Chevron Typhoon TLP



Source: Chevron, Rigzone.com

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Energy Capacity Offline:
Current and Forecast

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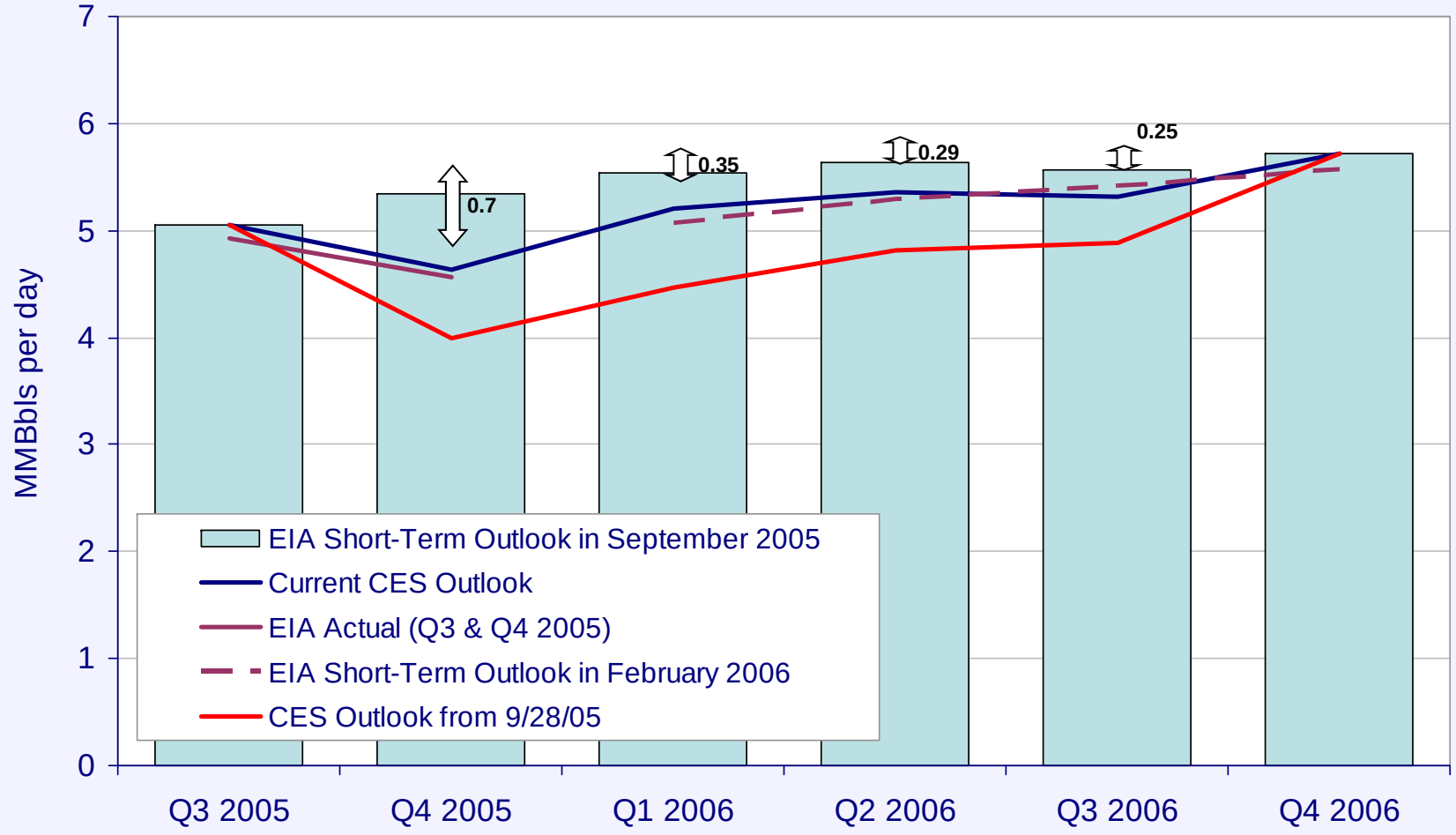
Forecast versus New Forecast Crude Oil

Shut in production will total 192.2 million barrels by the end of the third quarter 2006. Cumulative shut in for through 2005 totals 109.1 million barrels, while cumulative shut in for the first three quarters of 2006 total 83.1 million barrels – 43 % of total impact yet to be experienced.



Note: Assuming recovery of 15.65 bcf per day for 150 days.

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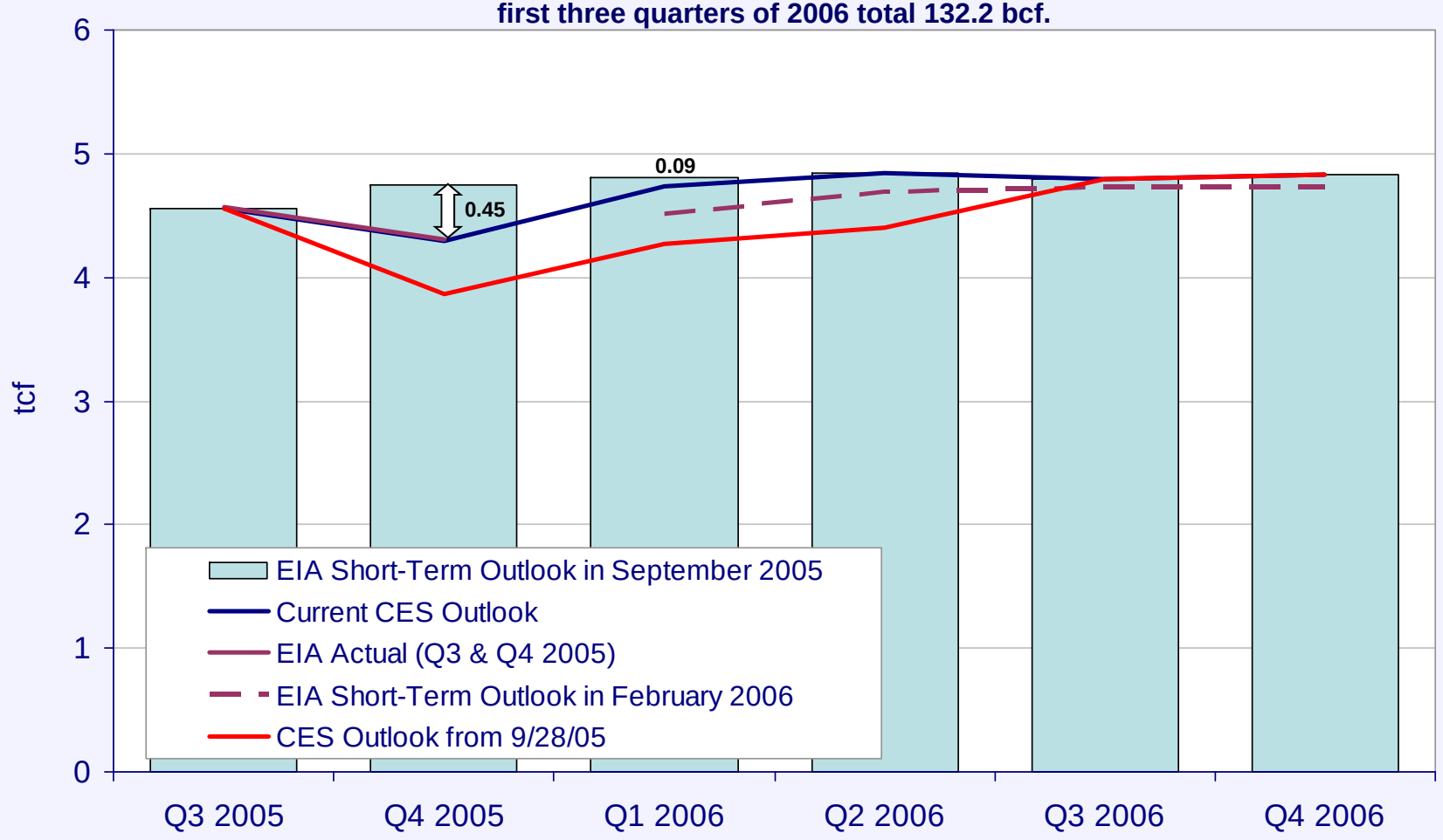
Forecast versus New Forecast Natural Gas

Shut in production will total 693.4 bcf by the end of the third quarter 2006. Cumulative shut in for through 2005 totals 561.2 bcf, while cumulative shut in for the first three quarters of 2006 total 132.2 bcf.



Note: Assuming recovery of 15.65 bcf per day for 150 days.

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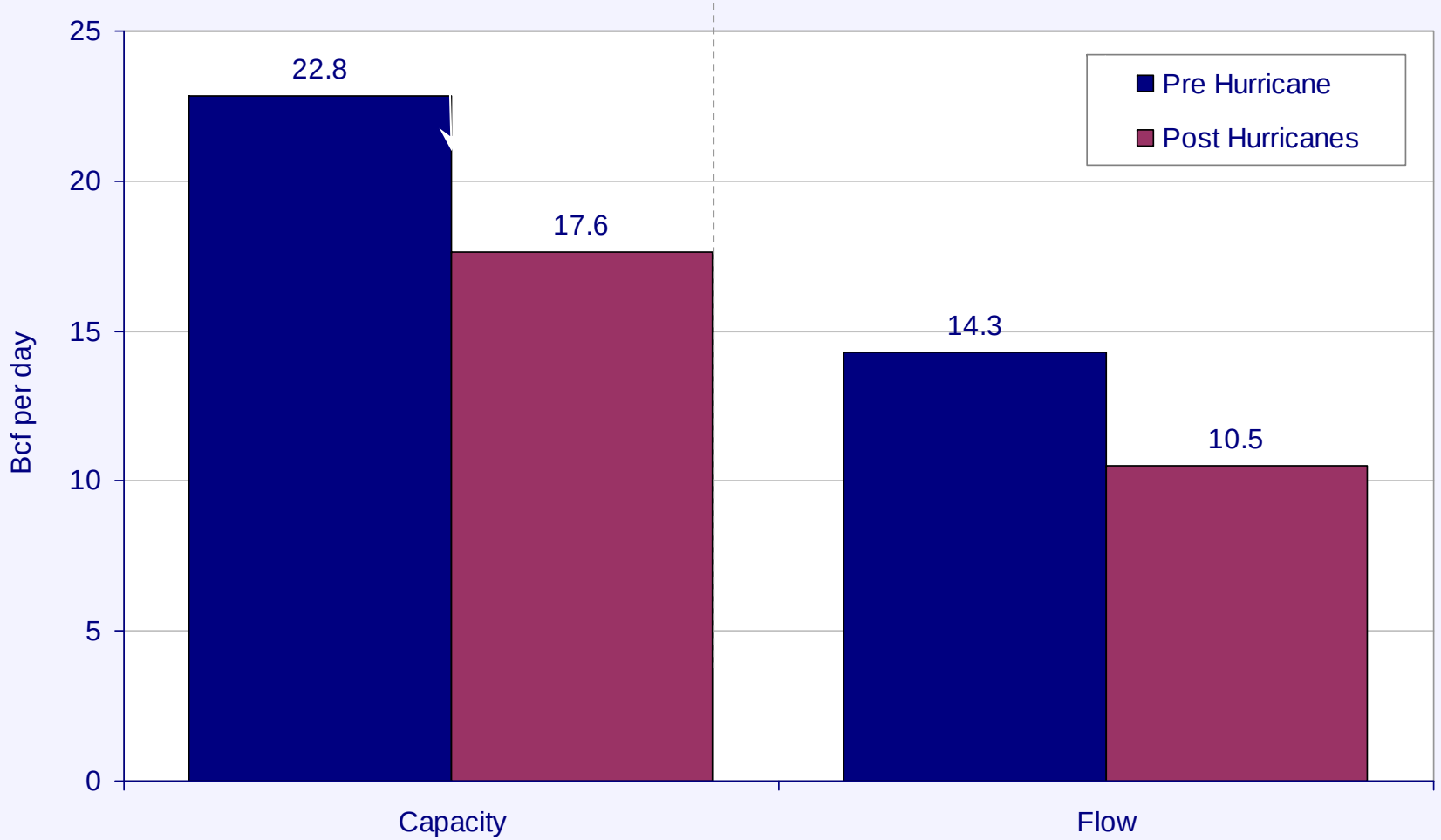
Current Status of Natural Gas Plants in the Coastal Gulf Region

23% of pre-storm gas processing capacity is still shut-in
27% of pre-storm gas processing volumes are not flowing



Note: Data are for plants with capacity equal to or greater than 100 MMcf per day, in the coastal counties of Texas, Louisiana, Mississippi and Alabama.

Source: Energy Information Administration, Department of Energy

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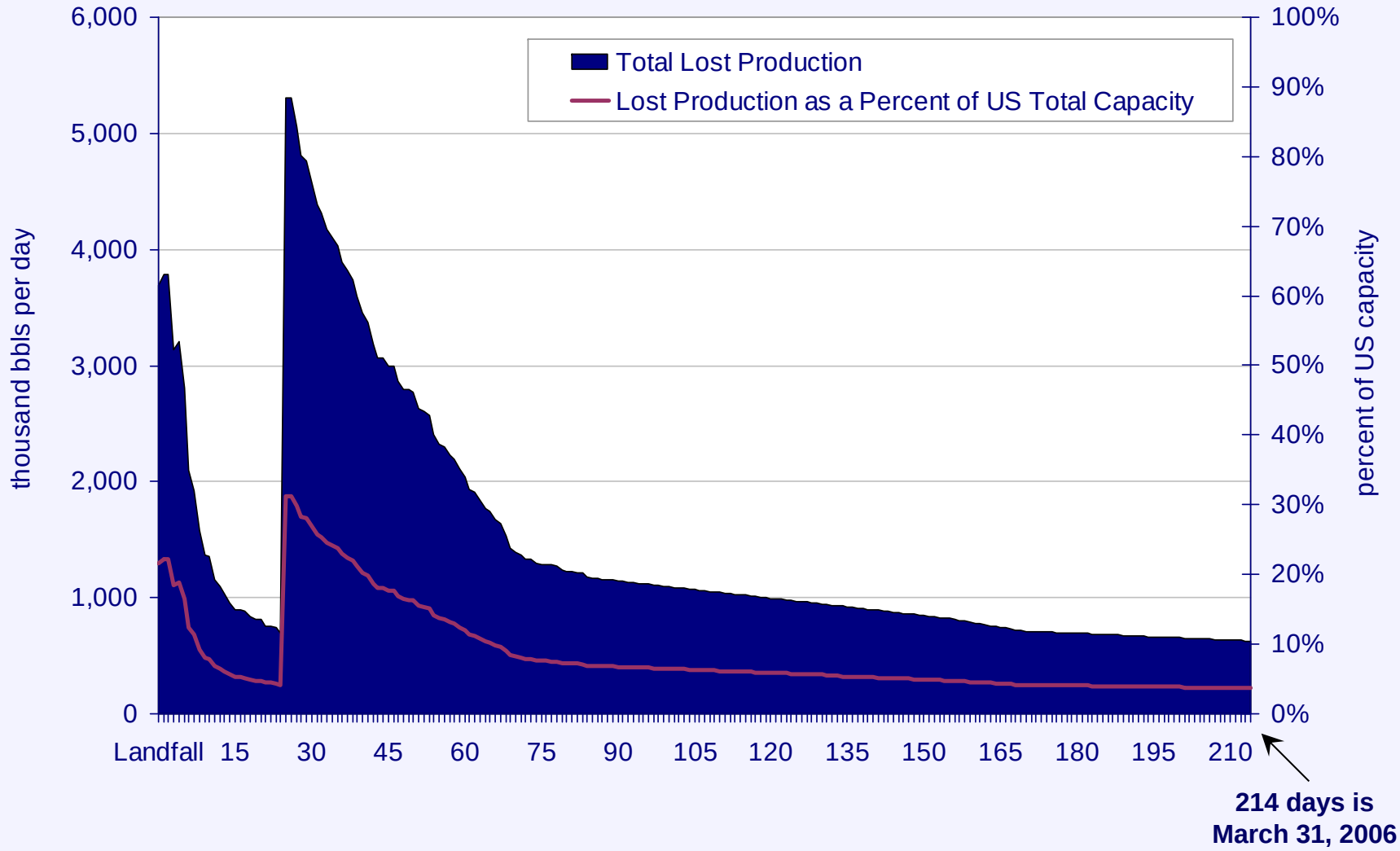
Estimated Decrease in Refining Production from both Katrina and Rita

Refining capacity should return to normal soon, but there will be a stubborn five percent of total capacity that has unknown return date – not good for tight markets



Source: Assumes 95 percent capacity factor; assumes 4 week recovery for facilities damaged by Rita.

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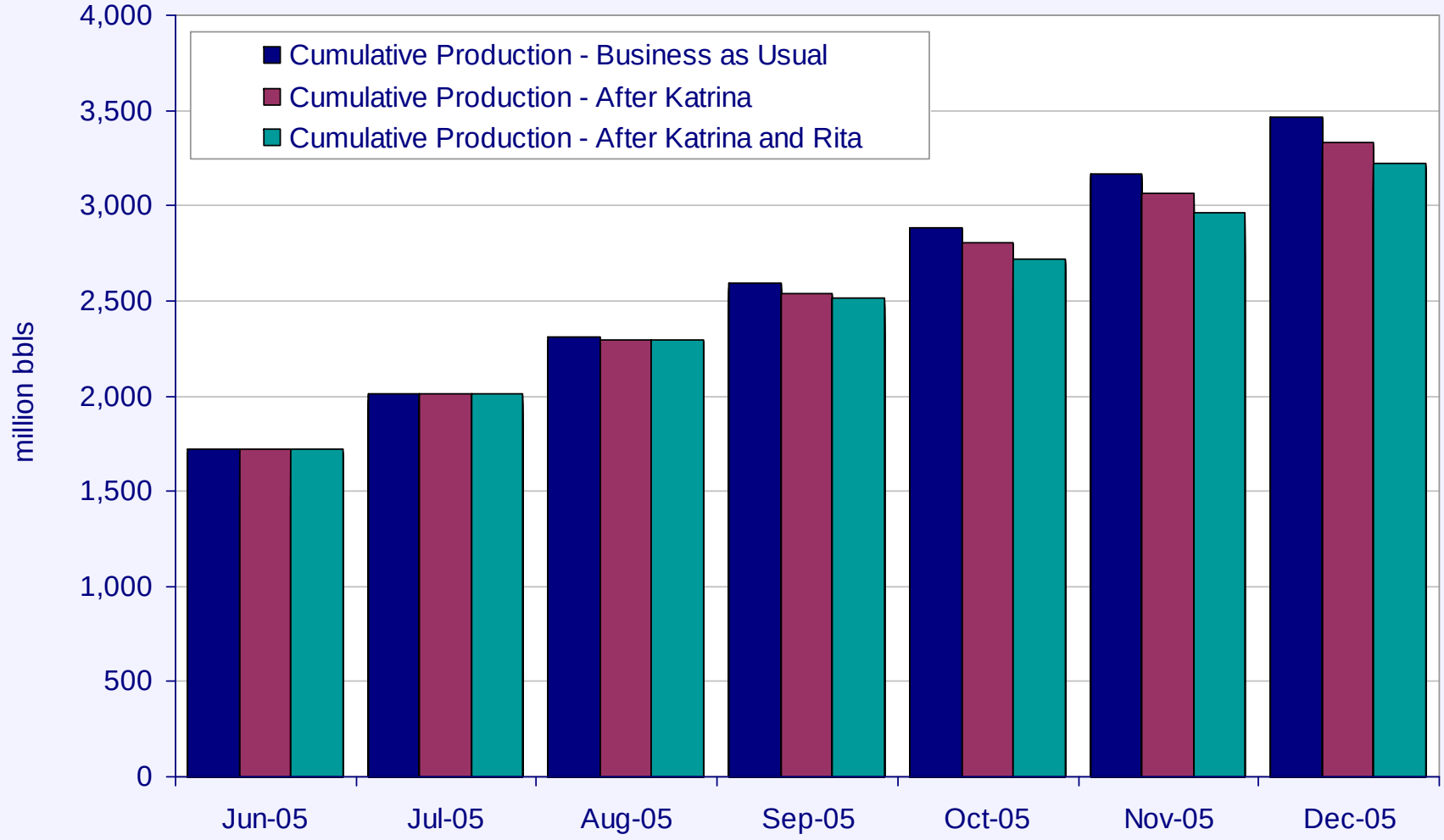
Cumulative Refining Production

Impacts of Katrina and Rita result in a loss of 240 million barrels, or 4 percent of total, by the end of the year. This is equivalent to shutting down all US refineries for 14 days.



Source: Assumes 95 percent capacity factor

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Economic Outlook

- **Short Run Impacts (Current to June, 2006)**
  - **•Mild winter has resulted in lower than anticipated demand.**
  - **•Economy generally strong running into this crisis and momentum will continue to carry.**
  - **•Continued mild weather will have bearish impact on natural gas prices through spring.**
  - **•Geopolitical concerns will drive crude (slight downward tendency).**
  - **•Attention to tropical season on both crude and natural gas.**

- **Longer Run Impacts: (6 months and beyond)**
  - **•Tropical activity could be concern (cyclical shift in weather trends)**
  - **•High prices are bad for energy sensitive industries – will eventually show up in trade deficit numbers (chemicals, refining, and paper and pulp).**
  - **•Imports for energy (crude, natural gas) will pick up and have impacts on trade deficit.**
  - **•Potential crash in energy prices in future versus "treadmill effect" created by more hurricane activity (global warming vs 20-year cycle) – global economic activity will decided where we go.**

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Questions, Comments, & Discussion

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