

The Impacts of the Recent Hurricane Season on Energy Production and Infrastructure and Future Outlook

*Presentation Before Industrial Energy
Technology Conference, 2006*

New Orleans, LA

May 9, 2006



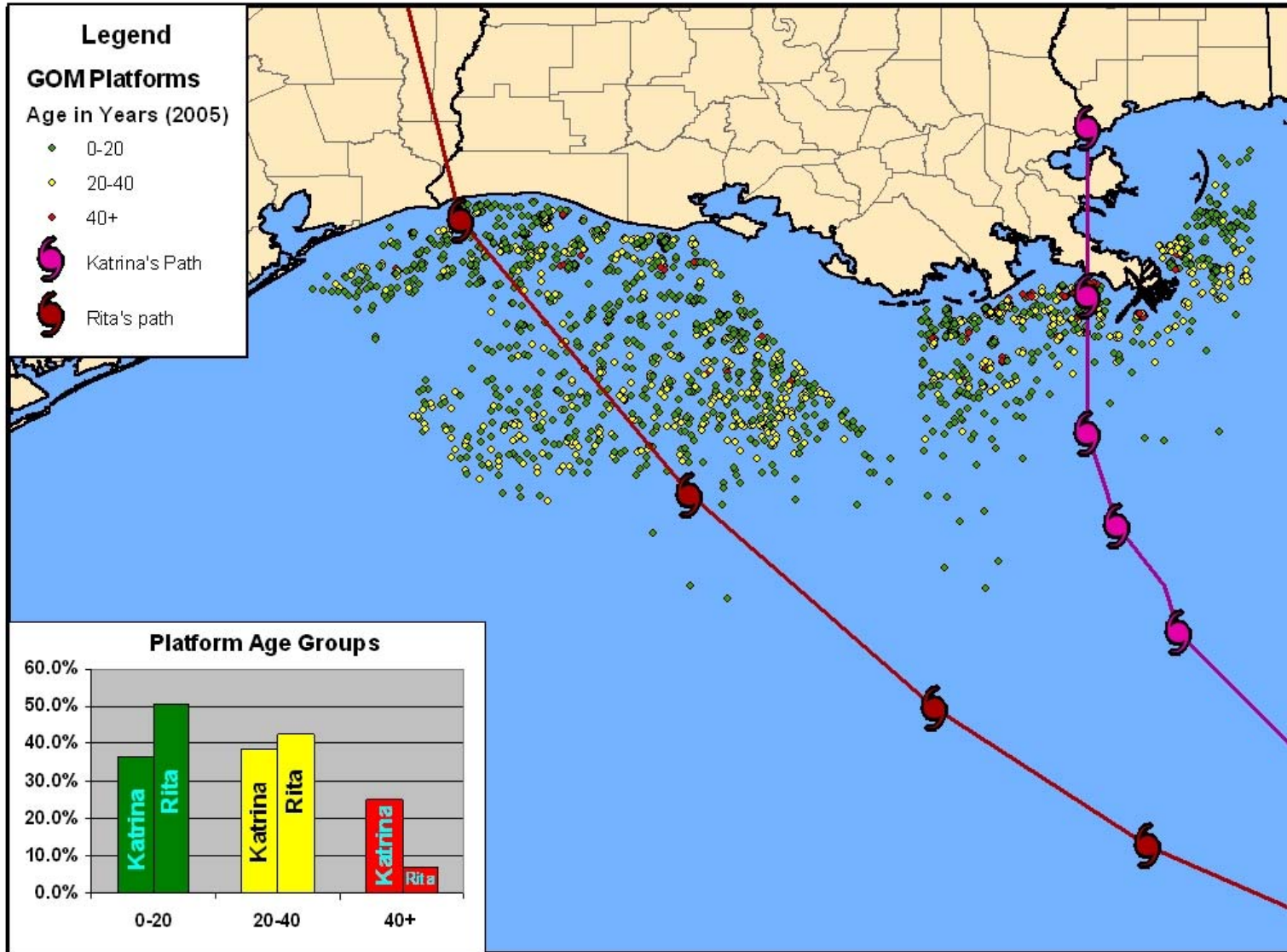
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Summary on Impacts of Hurricanes

- **Hurricanes were incredibly destructive to energy business – effects felt for some time. Was a shining moment for all in the industry.**
- **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 and internationally – drives home importance of Gulf coast and critical energy infrastructure.**
- **Energy markets are likely to not be back on their feet prior to the next hurricane season.**
- **This year’s tropical season will be the biggest challenge ever.**



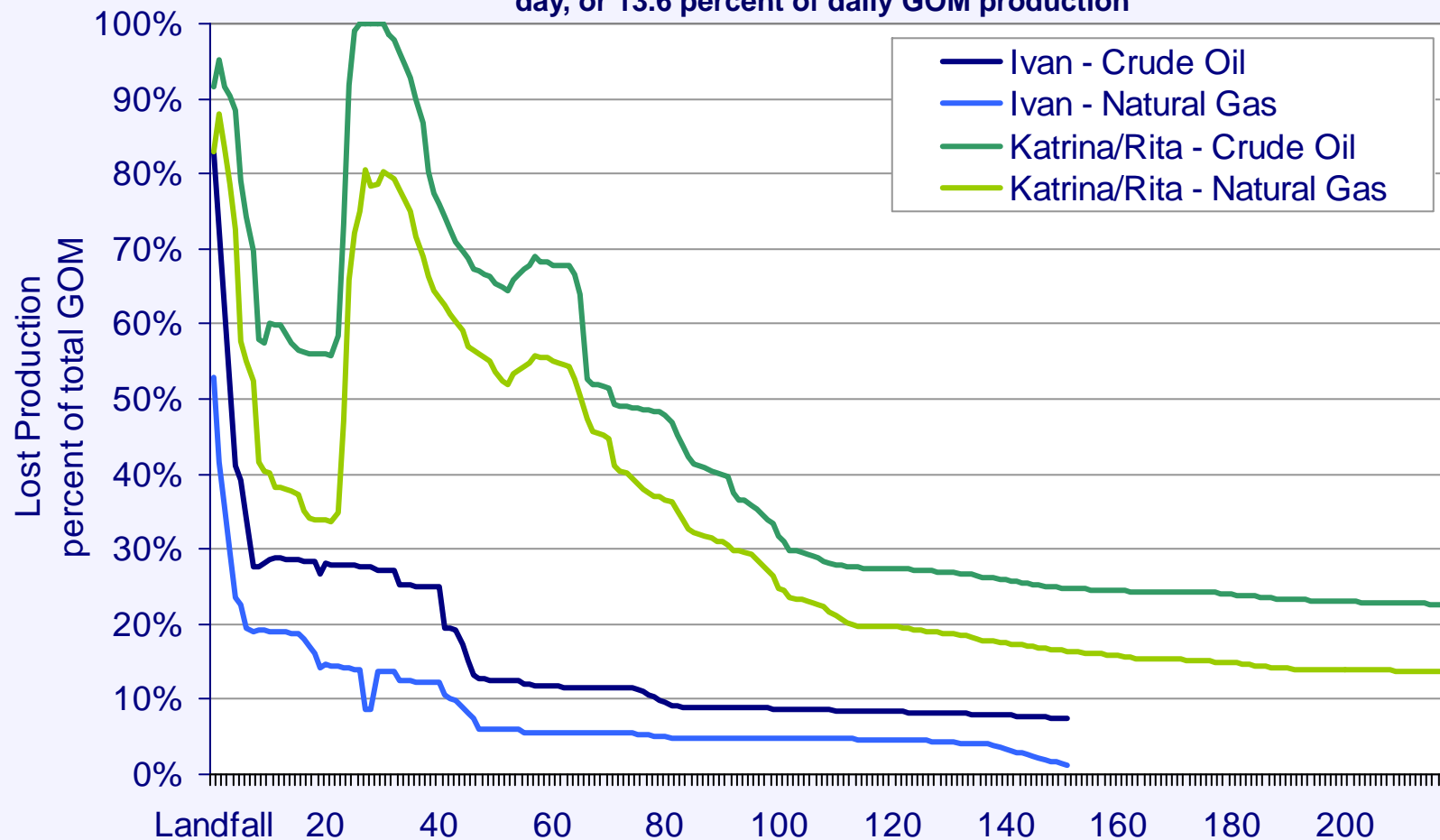
Platforms/Structures Impacted by Rita





Estimated Return of Existing Crude Oil and Natural Gas Production

As of April 5, 2006 shut in crude oil production was 340,438 barrels per day, or 22.7 percent of daily GOM production. Shut-in gas production was 1.362 bcf per day, or 13.6 percent of daily GOM production



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 April 5, 2006.

Source: Minerals Management Service



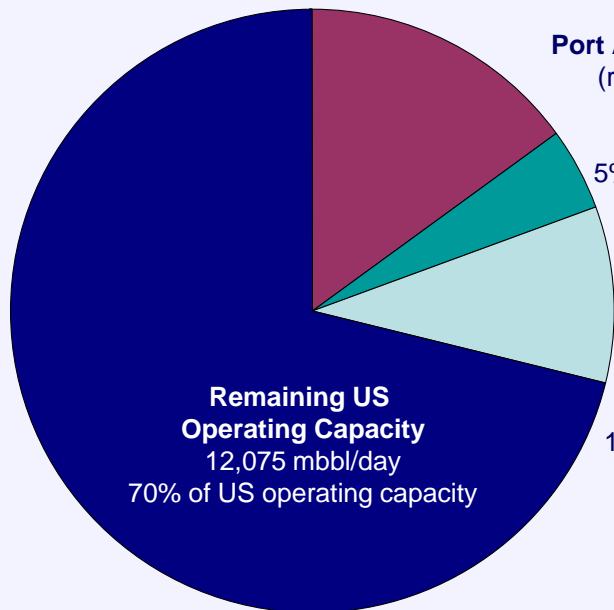
Total Immediate Refinery Impact

Hurricane Katrina

LA/MS/AL Gulf Coast Refiners
(reduced runs and shutdowns)
2,528 mbbbl/day
15% of US operating capacity

Port Arthur/Lake Charles
(reduced runs and supply loss)
775 mbbbl/day
5% of US operating capacity

Midwest
(reduced runs – supplied by Capline Pipeline)
1,628 mbbbl/day
10% of US operating capacity



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

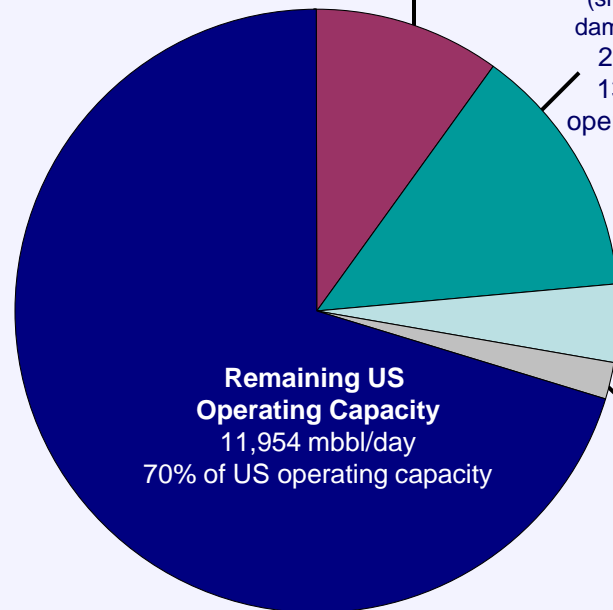
Hurricane Rita

Port Arthur/Lake Charles
(shutdowns and damaged facilities)
1,715 mbbbl/day
10% of US operating capacity

Houston/Texas City
(shutdowns and damaged facilities)
2,292 mbbbl/d
13.5% of US operating capacity

Corpus Christi
(shutdown and reduced runs)
706 mbbbl/day
4% of US operating capacity

Midwest
(reduced runs from supply loss)
338 mbbbl/day
2% of US operating capacity

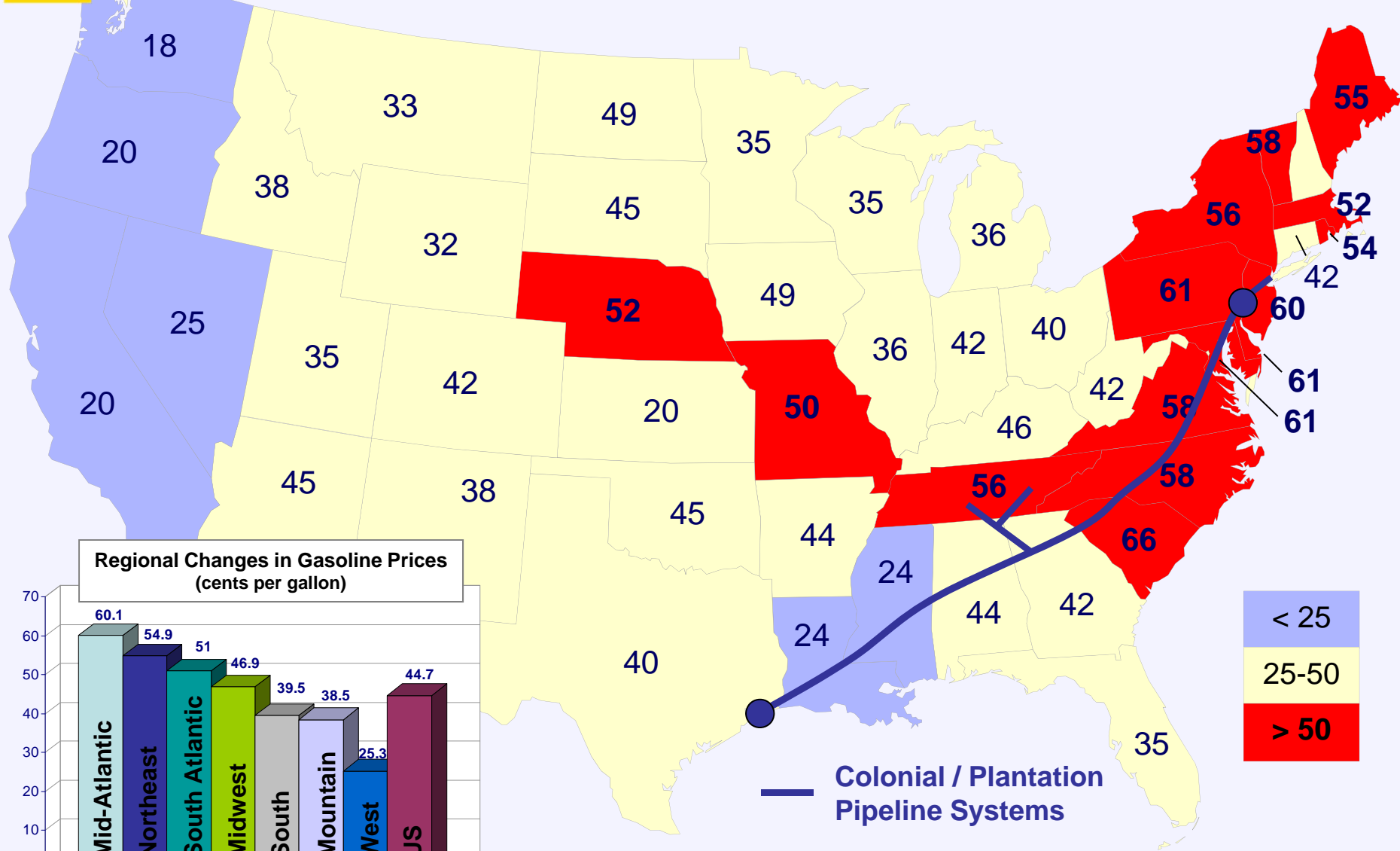


Total Refinery Impact
5,052 mbbbl/day
30% of US operating capacity



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

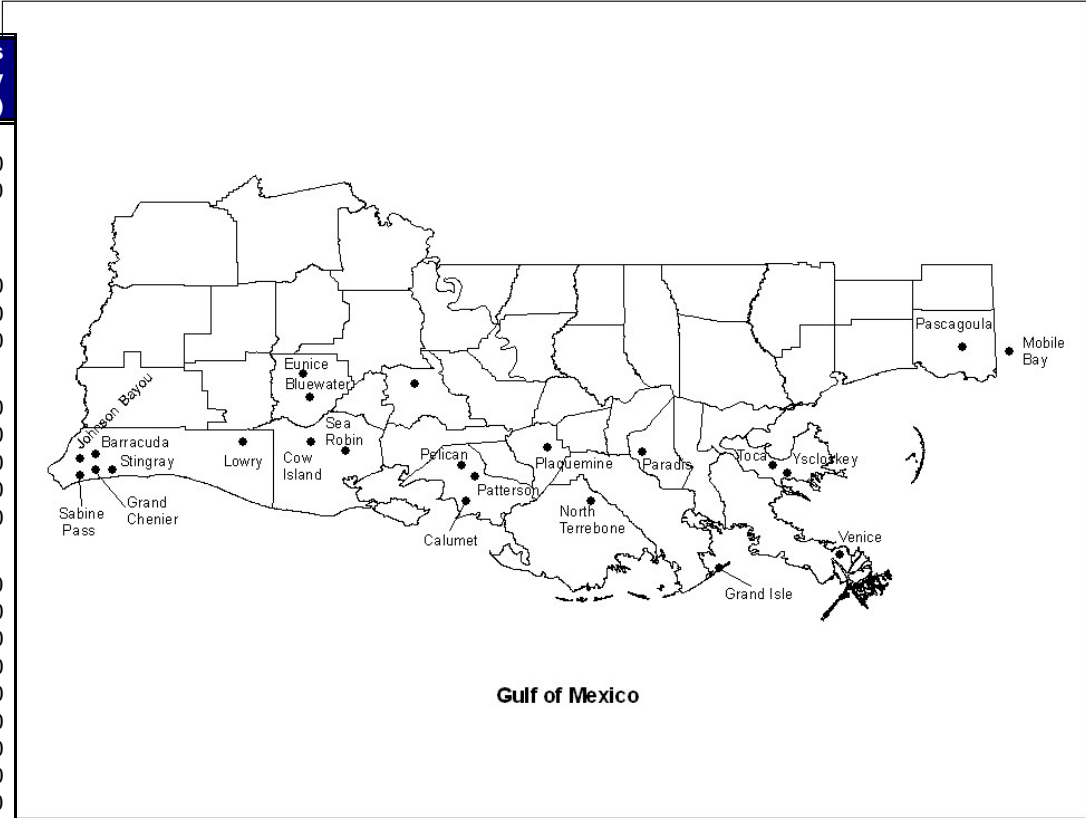




Number of Natural Gas Processing Facilities Out

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

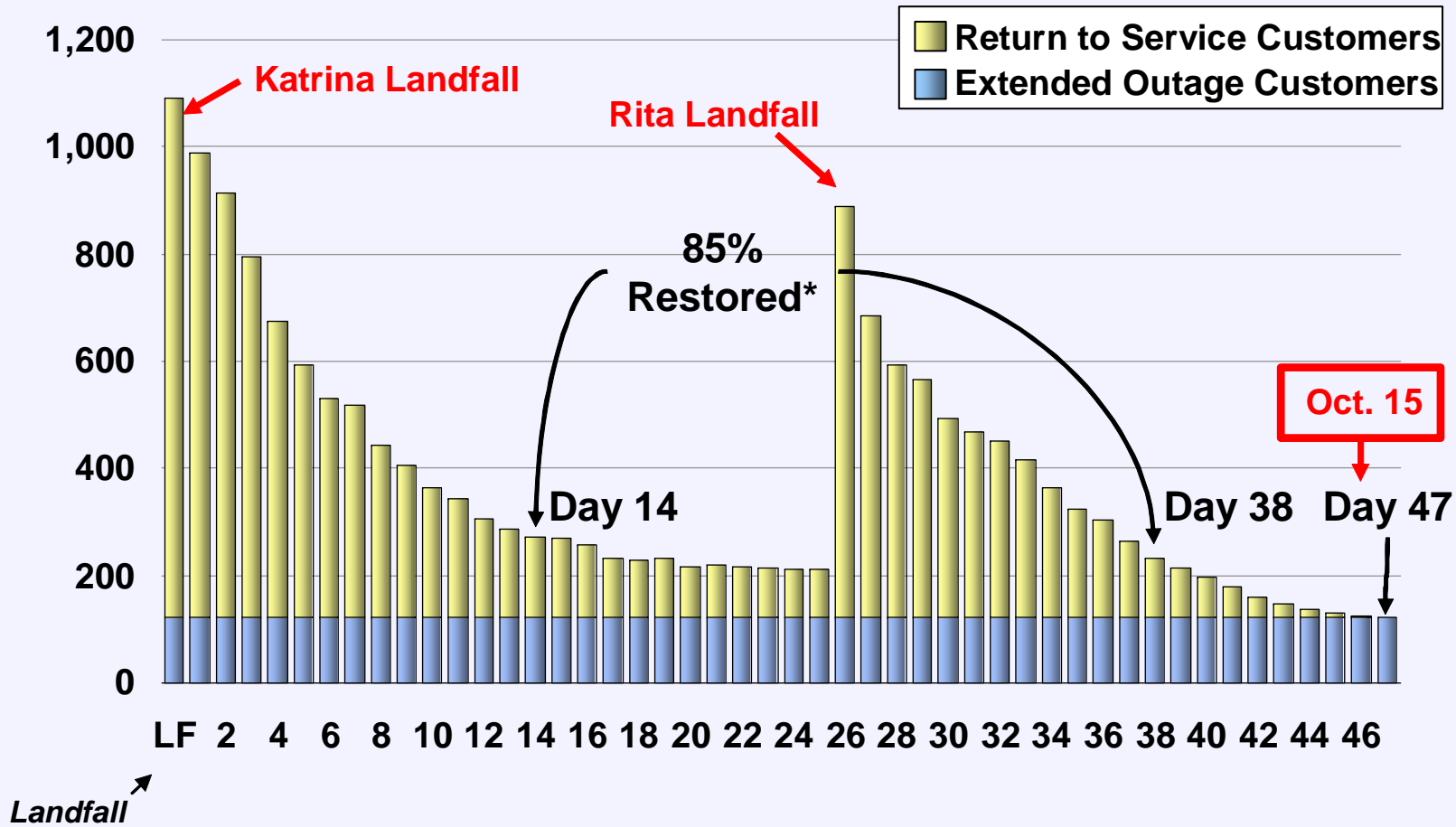
State/Company	Facility	Gas Capacity (MMcf/d)
Alabama		
Duke Energy Field Services	Mobile Bay	600.0
Shell Western E P Inc	Yellowhammer	200.0
Louisiana		
East Louisiana Plants		
Venice Energy Services Co LLC	Venice	1,300.0
Enterprise Products Operating LP	Toca	1,100.0
Dynegy Midstream Services LP	Yscloskey	1,850.0
West Louisiana Plants		
Dynegy Midstream Services LP	Barracuda	225.0
Dynegy Midstream Services LP	Stingray	305.0
BP PLC	Grand Chenier	600.0
Williams Cos	Johnson Bayou	425.0
Gulf Terra Energy Partners LP	Sabine Pass	300.0
Central Louisiana Plants		
Amerada Hess Corp	Sea Robin	900.0
Duke Energy Field Services	Patterson II Gas Plant	500.0
Dynegy Midstream Services LP	Lowry	300.0
Enterprise Products Operating LP	Calumet	1,600.0
Enterprise Products Operating LP	Neptune	650.0
Gulf Terra Energy Partners LP	Cow Island	500.0
Gulf Terra Energy Partners LP	Pelican	325.0
Marathon Oil Co	Burns Point	200.0
Norcen Explorer	Patterson	600.0
Mississippi		
BP PLC	Pascagoula	1,000.0
TOTAL		13,480.0
TOTAL GOM CAPACITY		20,285.0
PERCENT OF TOTAL GOM		66.5%





Power Outages From Hurricanes

Damage to power infrastructure (transmission) extensive. Restoration was monumental and impressive, but still created “nervous” moments for other energy infrastructure.





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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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Thunderhorse Tension Leg Platform



Source: Getty Pictures, Rigzone

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Ocean Warwick Dauphin Island, AL



Source: Rigzone.com

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Semi-Sub Stuck Under Bridge North Mobile Bay



Photo via Noble Drilling and GlobalSantaFe

© LSU Center for Energy Studies

Source: Rigzone.com



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Venice Port, Supply & Crew Bases



Source: LIOGA

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Chevron Refinery Pascagoula, MS



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Source: Chevron



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



© LSU Center for Energy Studies

Source: Air Products



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Air Products Facility – During Hurricane Katrina New Orleans, Louisiana



Source: Air Products

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Air Products Facility – Post Hurricane Katrina New Orleans, Louisiana



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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



© LSU Center for Energy Studies

Source: LIOGA



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Energy Transmission



Source: Entergy.com

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



Source: Citgo

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



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Source: Citgo



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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



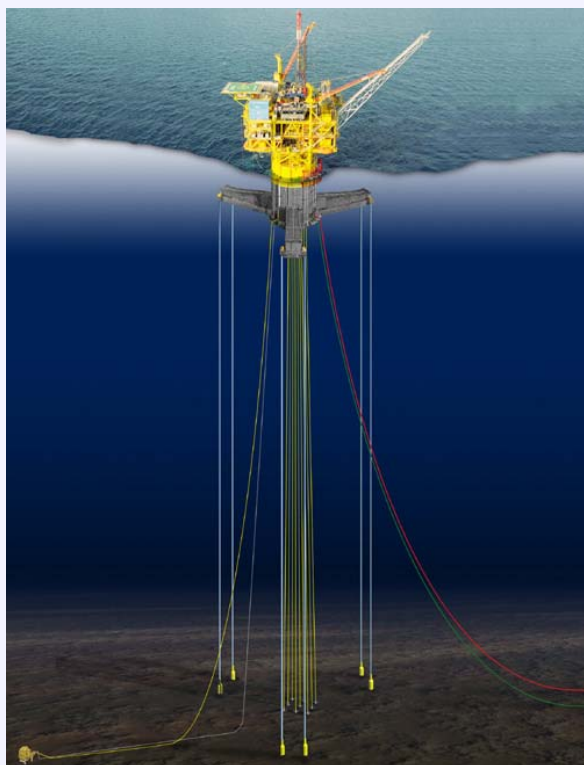


Temporary Natural Gas Release: To date, all subsea safety valves have held. There have been a couple of incidents where pipeline damage has allowed the temporary venting of gas that was in the pipeline. There are currently no known incidents of gas venting from wells and the temporary venting from pipelines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



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Chevron Typhoon TLP



Source: Chevron, Rigzone.com

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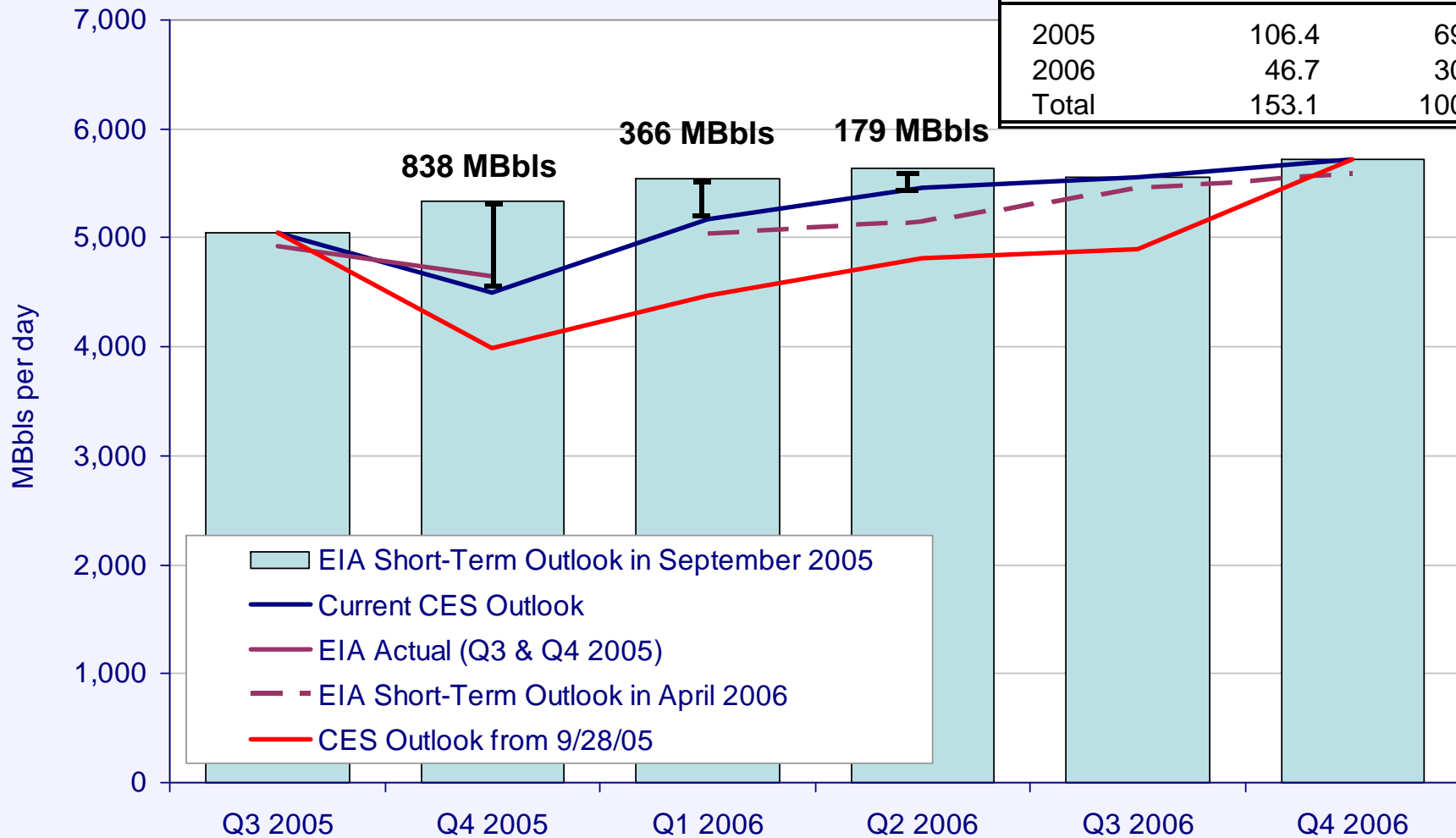
Energy Capacity Offline: Current and Forecast



Forecast versus New Forecast Crude Oil

Cumulative GOM crude oil production shut-ins equal to the processing capacity of one major U.S. refinery (419,000 Bbls/d)

Shut-in Oil Production		
	million barrels	percent of total
2005	106.4	69.5%
2006	46.7	30.5%
Total	153.1	100.0%



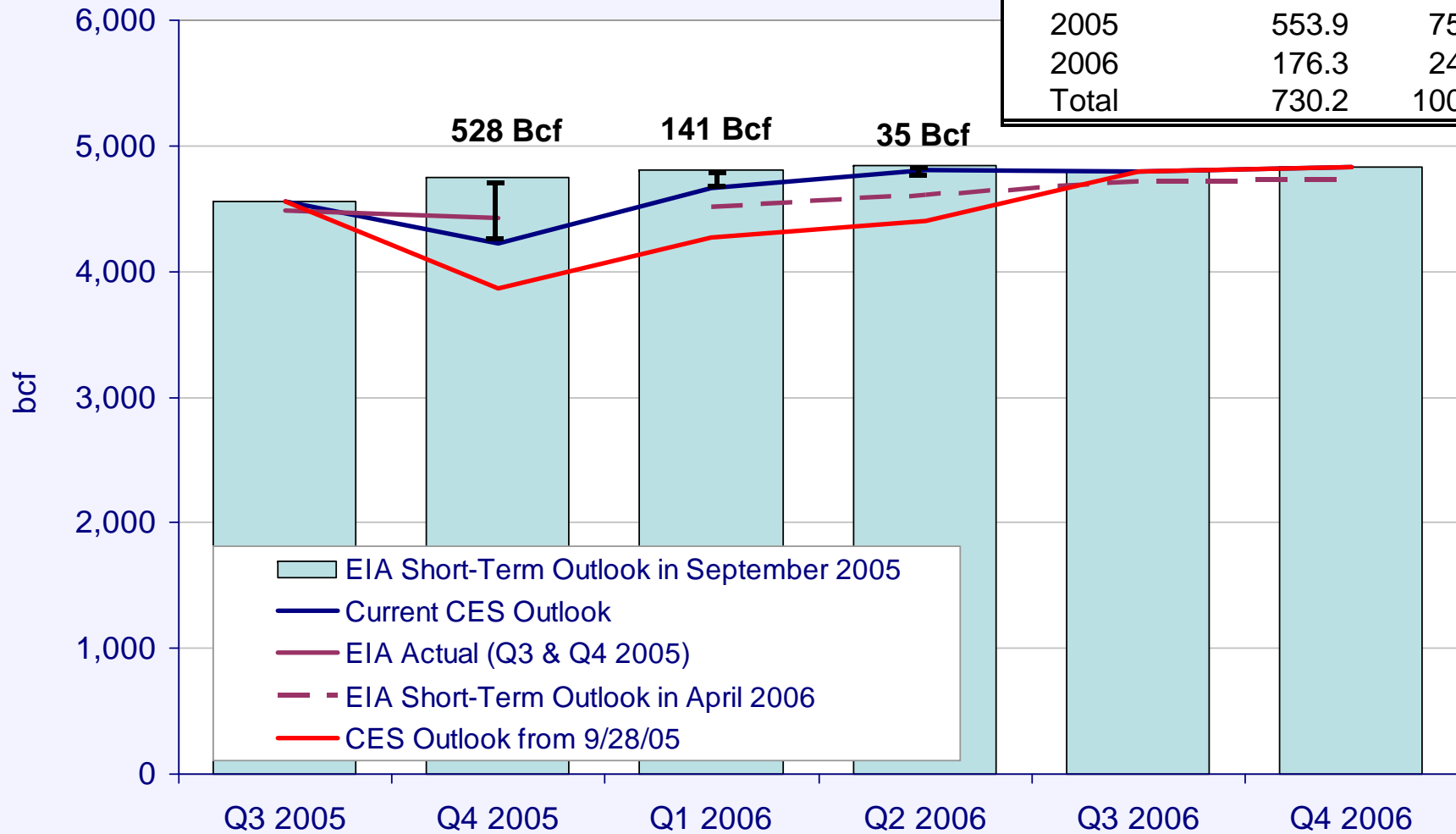
Note: Assuming recovery of 4.7 bcf per day after April 5, 2006.



Forecast versus New Forecast Natural Gas

Cumulative GOM natural gas production shut-ins equal to Florida's total annual gas usage (704 Bcf).

Shut-in Gas Production		
	bcf	percent of total
2005	553.9	75.9%
2006	176.3	24.1%
Total	730.2	100.0%

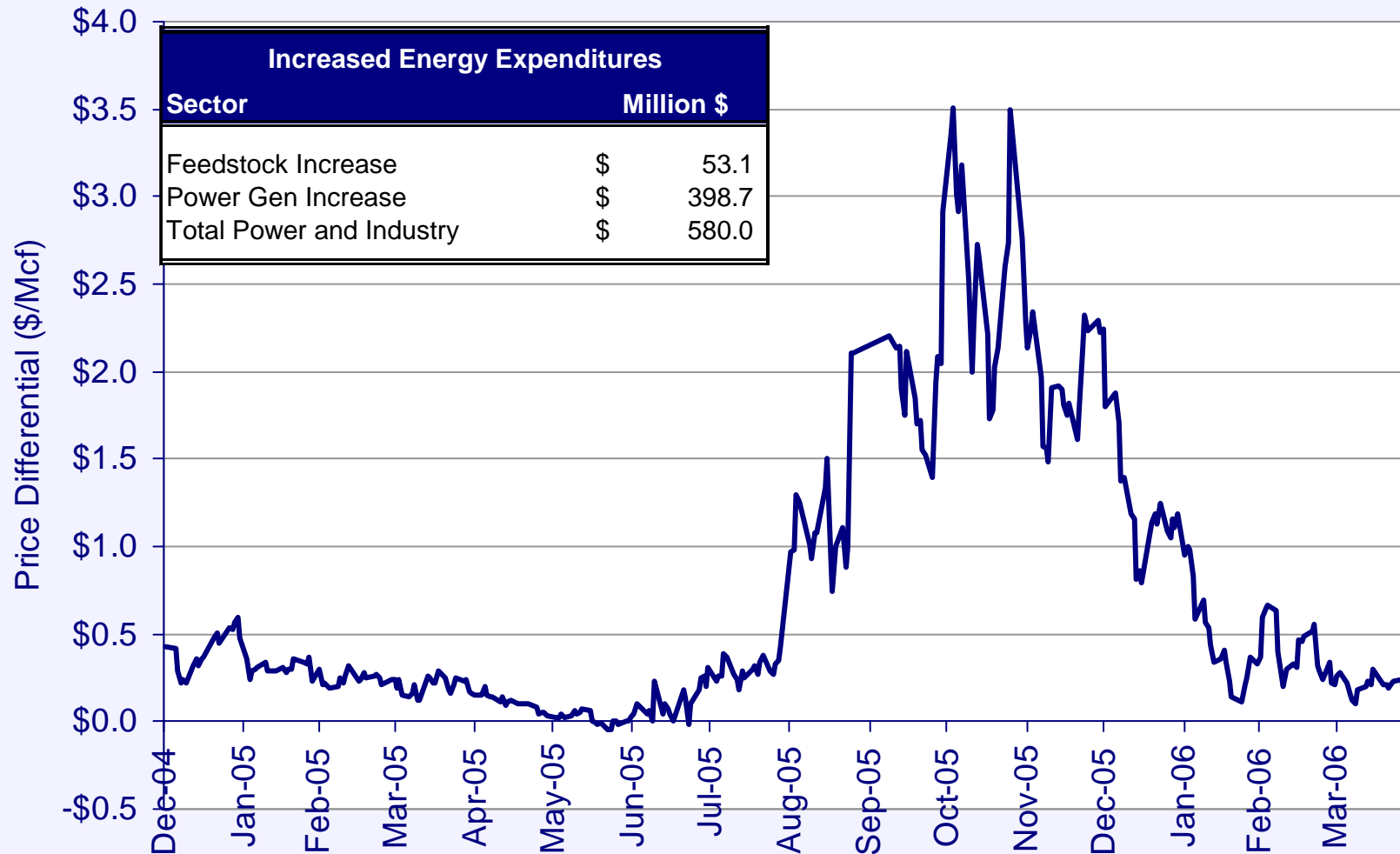


Note: Assuming recovery of 32 bcf per day after April 5, 2006.



Henry Hub and Houston Ship Channel Differential

Estimated energy expenditures increased dramatically for industry and utility customers in aftermath of hurricanes due to limited local supplies.



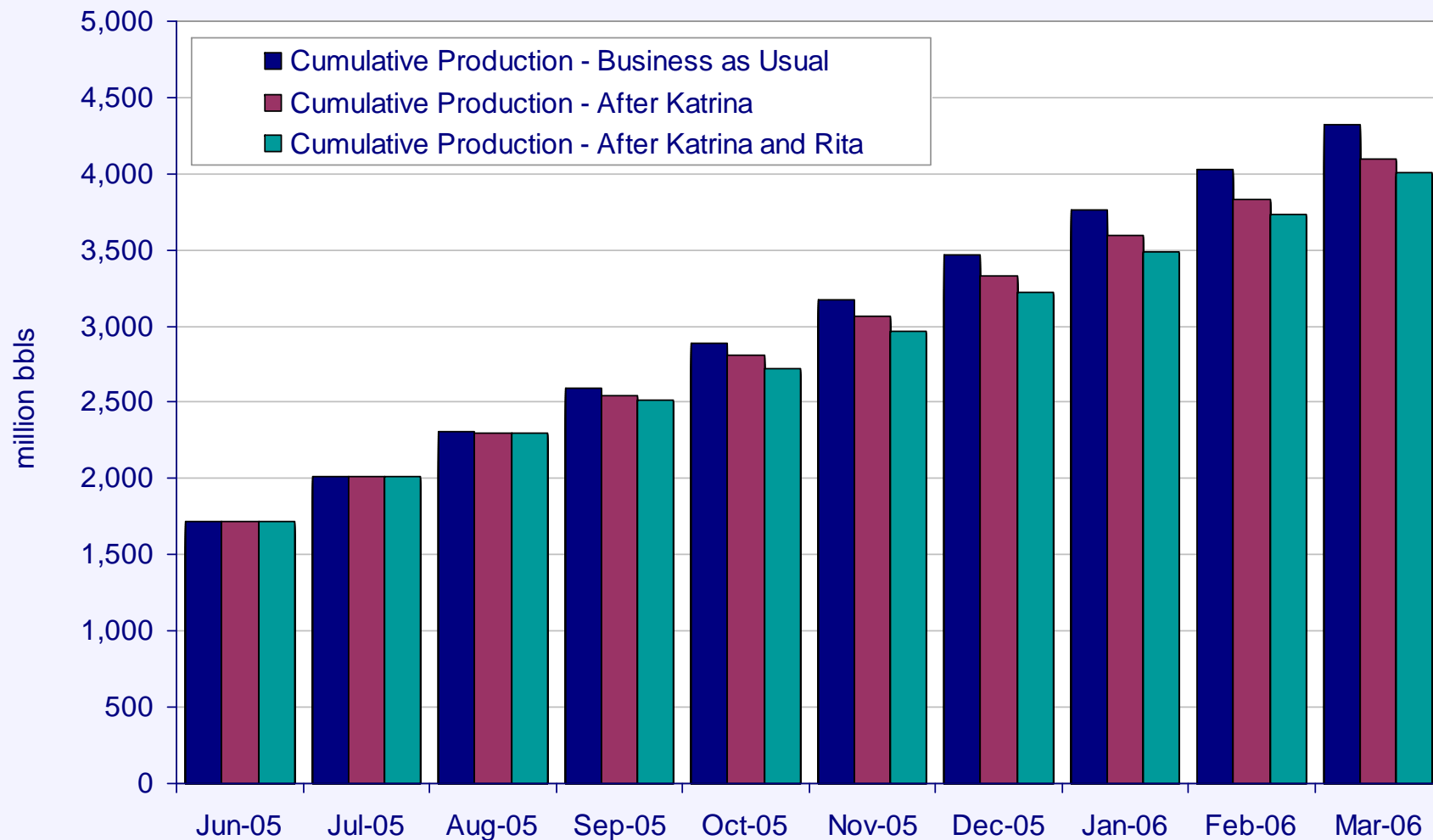
Note: CES estimated energy expenditures based upon daily 2005 average usage. For illustrative purposes only since usage is unadjusted for hurricane-related interruptions.



Cumulative Refining Production

Loss of 310 million barrels of productive capabilities (7 percent of total).

This is equivalent to shutting down all US refineries for over 18 days.



Source: Assumes 95 percent capacity factor



- **Short Run Impacts (January 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).
 - Gasoline will continue to be high and could set new records depending upon crude oil trends (geopolitics/tropical activity)
 - 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 economic activity started this problem and will ultimately decided where we go.



The 2006 Forecast includes the highest forecasted number of storms and "major" hurricanes this decade.

April "First" Forecast	Named Storms	Total Hurricanes	'Major' Hurricanes
2001	9	5	2
2002	13	8	4
2003	12	8	3
2004	13	7	3
2005	11	6	3
2006	17	9	5

Energy Industry Challenges for 2006 Tropical Season

- **Fuel Availability:** Many industry and government actions taken, potential challenges given changes in demographics and usage.
- **Early Evacuations:** Louisiana OEP officials indicate high likelihood of mandatory evacuations in coastal parishes for tropical storms.
- **Supporting Infrastructure:** Several assets are weak – power system challenges could exist.
- **Market Impacts:** Prices are well above prior-year levels. Crude is now at \$71 per Bbl (prior year April price = \$53) and natural gas is now \$7.50 per Mcf (prior year April price = \$7.20).
- **Supply Interruptions:** Active storm season could result in shut-ins. Assuming 8 storms in GOM, production shut-ins from the loss of 3 days activity for each storm as much as 33.6 MMBbls (6 percent of annual GOM) and 183.2 Bcf (5 percent of annual GOM).



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Questions, Comments, & Discussion

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