# LOUISIANA ENERGY FACTS

## ANNUAL 2006


Department of Natural Resources
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# General Questions and Comments

The **Louisiana Energy Facts Annual - 2006** was published by the Technology Assessment Division of the Louisiana Department of Natural Resources under the direction of Manuel Lam. The Division Director is T. Michael French. William J. Delmar, Jr, Assistant Director.

General questions and comments regarding the **Annual** may be referred to Technology Assessment Division staff at (225) 342-1270. Questions concerning specific areas of the **Annual** may be directed to the Technology Assessment Division staff members listed below.

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## INTRODUCTION

### ABOUT THIS PUBLICATION

The **Louisiana Energy Facts Annual** is published to provide a comprehensive compendium of Louisiana related energy production and use statistics on a yearly basis. The data tables are supplemented with numerous graphs and charts to aid in the interpretation of the data and the discernment of trends. The **Annual** is published as soon as sufficient data for the previous calendar year is available. Due to time lags in the availability of some of the data, there is approximately a nine month lag before the current **Annual** can be published. Some changes have been introduced in order to incorporate the latest available data.

If you receive our monthly **Louisiana Energy Facts**, you may find that some of the previously published data has been revised in the **Annual**. This data, by its nature, continues to be revised, sometimes years after its initial publication. We try to bring attention to these changes by marking them as revisions.

The most recent **Louisiana Energy Facts** monthly newsletter may contain even more updates. Please refer to the recent monthlies for the very latest data. The **Louisiana Energy Facts** monthly newsletter is available in print and online at our website:

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Note: the data in these tables will be updated throughout the year. The data files are not audited and will change as more reliable data becomes available.

The state oil and gas production data has been modified.  Starting with the 2002 Annual, current production data and all future reports will reflect changes due to modifications in the reporting system by the DNR Office of Conservation, Production Audit Section. The new data for oil does not include crude oil, condensate, or raw make recovered from gas plants. In the past, these products were added to the state production as crude oil or condensate. A separate report on gas plant liquids production is not available at present. The gas data system was adjusted to reflect production from the well on the date produced. It was previously reported on the date first purchased.

This new reporting system aims to produce more accurate and timely data. The Technology Assessment Division is not the source of the data, but merely reports data provided to us by the responsible agency. We understand that users of our time series data need consistency and, for that reason, our time series have been adjusted backward to reflect these new modifications.

We hope you find this document useful, and we welcome any comments or suggestions.

Any comments or suggestions about this publication should be directed to the Technology Assessment Division staff members listed on the General Questions and Comments page.

## 2006 HIGHLIGHTS

The data in the 2006 **Louisiana Energy Facts Annual** contains some recent trends.

### Crude oil increased and natural gas prices decreased

Gas spot price average was $9.05 per MCF in 2005, and it was $7.08 per MCF in 2006 which is 21% lower than in 2005. The Louisiana natural gas spot market average hit bottom at $1.85 per MCF in October 2001, the lowest price in five years, and peaked in October 2005 at $13.61 per MCF. The 2007 average price for gas is expected to be around $6.60 per MCF.

South Louisiana average spot crude oil price was $67.44 per barrel in 2006 and it was $56.88 per barrel in 2005, a 18% increase compared to 2005. The 2007 average is expected to be around $57.00 per barrel.

### Oil decreased and gas production increased

Louisiana state crude oil and condensate production, excluding federal Outer Continental Shelf (OCS), dropped to 74 million barrels in 2006, a 2% decrease from 2005. An additional 3% decrease in production is expected in 2007. Louisiana state natural gas and casinghead, excluding federal OCS, production was 1.35 TCF in 2006, a 4% increase from 2005. It is expected to decrease another 3% in 2007. The decline in oil and increase gas production in 2006 was related 2005 hurricanes, high prices, and higher drilling activities.

### Drilling activity increased in state jurisdiction areas and dropped in federal areas

The overall rig count in Louisiana, including the federal offshore area, increased 3% from an average of 182 rigs operating each month in 2005 to 188 in 2006. Looking at where the activity was, though, shows drilling activity dropped 5% in federal waters, dropped 25% in state offshore waters, dropped 21% in state inland waters, up 15% in South Louisiana on land, and up 15% in North Louisiana. Hurricanes Katrina and Rita lowered the trend of drilling activities over water areas in Louisiana and increased drilling in North Louisiana

### Other significant items

Louisiana's proved oil reserve and proved gas reserve were lower in 2005 than in 2004, despite higher drilling activities and high energy prices. The lower reserve was the reflexion of high oil and gas withdraw due to market conditions, the high cost in mature producing areas, and reserve lost caused by hurricane Katrina and Rita. Louisiana refineries are back on line. The 2006 daily crude oil average run to still was 2.41 miilion barrels per day, a 3% higher than in 2005 average after adjusment done to account damage from hurricanes in South Louisiana parishes.

# SUBDIVISIONS OF LOUISIANA

# Table 1

## LOUISIANA STATE CRUDE OIL PRODUCTION

**Excluding OCS**
**(Barrels)**

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1985 | 29,436,551 | 97,622,513 | 24,292,173 | 151,351,237 |
| 1986 | 26,795,748 | 97,853,602 | 24,619,169 | 149,268,519 |
| 1987 | 25,036,758 | 95,476,492 | 23,372,480 | 143,885,730 |
| 1988 | 23,966,252 | 88,701,776 | 22,800,047 | 135,468,075 |
| 1989 | 22,249,645 | 78,352,396 | 20,890,198 | 121,492,239 |
| 1990 | 22,681,173 | 72,770,216 | 21,356,618 | 116,808,007 |
| 1991 | 22,693,470 | 69,567,532 | 22,498,111 | 114,759,114 |
| 1992 | 21,914,801 | 68,285,536 | 21,820,087 | 112,020,424 |
| 1993 | 20,088,542 | 65,698,407 | 21,593,063 | 107,380,012 |
| 1994 | 17,236,407 | 59,754,375 | 21,163,672 | 98,154,453 |
| 1995 | 16,643,923 | 59,472,528 | 20,140,864 | 96,257,315 |
| 1996 | 16,900,516 | 58,970,676 | 19,117,088 | 94,988,280 |
| 1997 | 17,099,931 | 60,458,696 | 17,213,800 | 94,772,427 |
| 1998 | 15,607,719 | 60,784,952 | 15,120,246 | 91,512,918 |
| 1999 | 12,904,010 | 56,035,888 | 12,098,536 | 81,038,434 |
| 2000 | 11,740,711 r | 53,089,281 r | 11,131,309 r | 75,961,301 r |
| 2001 | 10,723,502 r | 50,690,397 r | 10,166,552 r | 71,580,451 r |
| 2002 | 8,934,528 r | 43,930,251 r | 8,138,717 r | 61,003,497 r |
| 2003 | 8,957,502 | 42,980,844 | 8,204,386 | 60,142,733 |
| 2004 | 8,423,047 r | 42,227,422 r | 6,942,688 r | 57,593,157 r |
| January | 697,544 r | 3,633,656 r | 605,563 r | 4,936,762 r |
| February | 640,634 r | 3,340,746 r | 564,351 r | 4,545,731 r |
| March | 710,538 r | 3,767,457 r | 625,251 r | 5,103,246 r |
| April | 693,624 r | 3,684,496 r | 610,102 r | 4,988,222 r |
| May | 716,714 r | 3,814,224 r | 630,345 r | 5,161,283 r |
| June | 679,946 r | 3,626,445 r | 607,220 r | 4,913,610 r |
| July | 655,647 r | 3,503,404 r | 585,608 r | 4,744,659 r |
| August | 632,578 r | 3,388,796 r | 582,402 r | 4,603,776 r |
| September | 718,515 r | 1,421,752 r | 243,914 r | 2,384,181 r |
| October | 931,400 r | 1,847,621 r | 316,976 r | 3,095,996 r |
| November | 934,379 r | 2,067,491 r | 354,071 r | 3,355,941 r |
| December | 795,851 r | 2,477,461 r | 423,539 r | 3,696,851 r |
| **2005 Total** | **8,807,369 r** | **36,573,548 r** | **6,149,341 r** | **51,530,258 r** |
| January | 782,594 | 2,666,520 | 455,056 | 3,904,170 |
| February | 653,472 | 2,511,311 | 419,310 | 3,584,093 |
| March | 583,014 | 3,034,545 | 530,049 | 4,147,608 |
| April | 563,931 | 2,961,127 | 515,639 | 4,040,696 |
| May | 587,575 | 3,064,140 | 539,297 | 4,191,011 |
| June | 574,222 | 3,032,178 | 527,615 | 4,134,016 |
| July | 601,544 | 3,209,969 | 554,974 | 4,366,487 |
| August | 616,090 | 3,177,697 | 574,040 | 4,367,827 |
| September | 594,239 | 3,060,400 | 539,104 | 4,193,743 |
| October | 597,652 | 3,085,753 | 565,098 | 4,248,503 |
| November | 599,887 p | 3,179,649 p | 575,859 p | 4,355,396 p |
| December | 596,472 p | 3,181,712 p | 557,009 p | 4,335,192 p |
| **2006 Total** | **7,350,691 p** | **36,165,001 p** | **6,353,051 p** | **49,868,742 p** |

e Estimated r Revised p Preliminary

# Table 2

## LOUISIANA STATE CONDENSATE PRODUCTION

**Excluding OCS**
**(Barrels)**

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1985 | 2,668,233 | 29,260,762 | 1,721,098 | 33,650,093 |
| 1986 | 2,755,749 | 26,709,496 | 2,176,970 | 31,642,215 |
| 1987 | 2,512,024 | 25,594,838 | 1,811,598 | 29,918,460 |
| 1988 | 2,780,394 | 27,008,968 | 1,739,471 | 31,528,833 |
| 1989 | 2,979,706 | 26,767,411 | 1,856,899 | 31,604,016 |
| 1990 | 3,341,804 | 26,878,867 | 1,686,289 | 31,906,959 |
| 1991 | 4,009,441 | 26,227,271 | 1,685,555 | 31,922,267 |
| 1992 | 3,787,973 | 25,395,894 | 1,601,573 | 30,785,440 |
| 1993 | 3,647,665 | 25,236,291 | 1,629,298 | 30,513,254 |
| 1994 | 3,726,903 | 23,751,352 | 1,497,320 | 28,975,575 |
| 1995 | 3,927,927 | 22,866,531 | 2,177,611 | 28,972,069 |
| 1996 | 5,162,593 | 26,495,266 | 2,313,383 | 33,971,242 |
| 1997 | 4,397,384 | 24,247,395 | 2,737,982 | 31,382,760 |
| 1998 | 3,962,756 | 24,405,878 | 2,400,173 | 30,768,807 |
| 1999 | 3,555,355 | 24,032,940 | 2,233,271 | 29,821,566 |
| 2000 | 3,666,715 r | 25,190,053 r | 2,337,471 r | 31,194,239 r |
| 2001 | 3,849,012 r | 26,914,937 r | 2,528,021 r | 33,291,971 r |
| 2002 | 3,771,099 r | 26,452,385 r | 2,445,056 r | 32,668,540 r |
| 2003 | 3,304,681 | 24,587,318 | 2,405,378 | 30,297,376 |
| 2004 | 2,680,869 r | 22,098,051 r | 1,300,500 r | 26,079,420 r |
| | | | | |
| January | 210,793 r | 1,784,713 r | 105,086 r | 2,100,592 r |
| February | 203,904 r | 1,642,302 r | 103,142 r | 1,949,348 r |
| March | 227,382 r | 1,941,639 r | 114,228 r | 2,283,248 r |
| April | 223,583 r | 1,917,536 r | 112,760 r | 2,253,879 r |
| May | 226,422 r | 1,950,503 r | 114,646 r | 2,291,571 r |
| June | 213,726 r | 1,849,441 r | 108,655 r | 2,171,821 r |
| July | 207,513 r | 1,803,958 r | 105,930 r | 2,117,402 r |
| August | 198,825 r | 1,736,242 r | 101,907 r | 2,036,974 r |
| September | 237,695 r | 1,114,741 r | 65,399 r | 1,417,834 r |
| October | 320,778 r | 1,266,355 r | 65,363 r | 1,652,496 r |
| November | 351,604 r | 1,430,431 r | 83,880 r | 1,865,915 r |
| December | 355,539 r | 1,541,476 r | 90,349 r | 1,987,364 r |
| **2005 Total** | **2,977,762 r** | **19,979,337 r** | **1,171,345 r** | **24,128,444 r** |
| | | | | |
| January | 317,752 | 1,601,770 | 103,902 | 2,023,423 |
| February | 246,277 | 1,504,443 | 98,697 | 1,849,417 |
| March | 207,438 | 1,720,458 | 110,670 | 2,038,566 |
| April | 193,927 | 1,626,028 | 104,482 | 1,924,437 |
| May | 205,454 | 1,724,745 | 106,504 | 2,036,703 |
| June | 200,225 | 1,704,721 | 112,997 | 2,017,943 |
| July | 199,369 | 1,707,308 | 109,621 | 2,016,299 |
| August | 197,699 | 1,672,006 | 107,389 | 1,977,094 |
| September | 191,520 | 1,617,860 | 99,962 | 1,909,342 |
| October | 232,782 | 1,905,291 | 122,873 | 2,260,946 |
| November | 196,787 p | 1,661,059 p | 106,702 p | 1,964,548 p |
| December | 202,770 p | 1,694,555 p | 108,679 p | 2,006,004 p |
| **2006 Total** | **2,592,001 p** | **20,140,243 p** | **1,292,478 p** | **24,024,721 p** |

e Estimated r Revised p Preliminary

# Table 3

## LOUISIANA STATE CRUDE OIL and CONDENSATE PRODUCTION

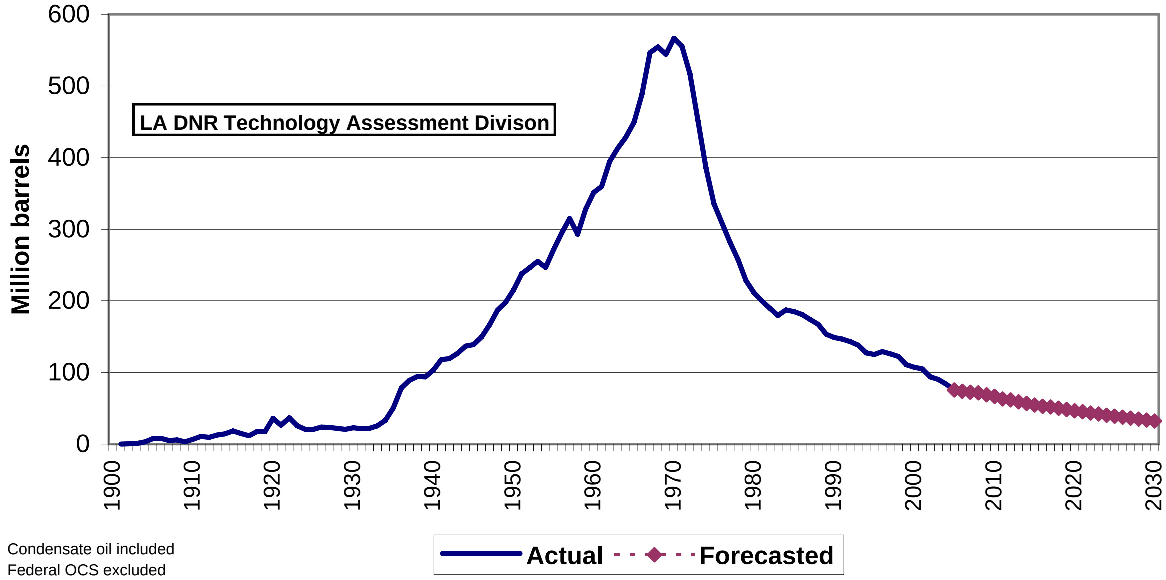
**Excluding OCS**
**(Barrels)**

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1985 | 32,104,784 | 126,883,275 | 26,013,271 | 185,001,330 |
| 1986 | 29,551,497 | 124,563,098 | 26,796,139 | 180,910,734 |
| 1987 | 27,548,782 | 121,071,330 | 25,184,078 | 173,804,190 |
| 1988 | 26,746,646 | 115,710,745 | 24,539,518 | 166,996,908 |
| 1989 | 25,229,350 | 105,119,808 | 22,747,097 | 153,096,255 |
| 1990 | 26,022,976 | 99,649,083 | 23,042,907 | 148,714,966 |
| 1991 | 26,702,911 | 95,794,803 | 24,183,667 | 146,681,381 |
| 1992 | 25,702,774 | 93,681,430 | 23,421,660 | 142,805,864 |
| 1993 | 23,736,207 | 90,934,698 | 23,222,361 | 137,893,266 |
| 1994 | 20,963,310 | 83,505,726 | 22,660,992 | 127,130,028 |
| 1995 | 20,571,849 | 82,339,060 | 22,318,475 | 125,229,384 |
| 1996 | 22,063,110 | 85,465,942 | 21,430,471 | 128,959,522 |
| 1997 | 21,497,315 | 84,706,090 | 19,951,782 | 126,155,187 |
| 1998 | 19,570,475 | 85,190,830 | 17,520,419 | 122,281,725 |
| 1999 | 16,459,365 | 80,068,828 | 14,331,807 | 110,860,000 |
| 2000 | 15,407,426 r | 78,279,334 r | 13,468,780 r | 107,155,540 r |
| 2001 | 14,572,514 r | 77,605,335 r | 12,694,573 r | 104,872,422 r |
| 2002 | 12,705,628 r | 70,382,637 r | 10,583,773 r | 93,672,037 r |
| 2003 | 12,262,183 | 67,568,162 | 10,609,764 | 90,440,109 |
| 2004 | 11,103,916 r | 64,325,473 r | 8,243,188 r | 83,672,577 r |
| | | | | |
| January | 908,337 r | 5,418,368 r | 710,649 r | 7,037,354 r |
| February | 844,539 r | 4,983,048 r | 667,492 r | 6,495,079 r |
| March | 937,920 r | 5,709,095 r | 739,479 r | 7,386,494 r |
| April | 917,207 r | 5,602,032 r | 722,862 r | 7,242,101 r |
| May | 943,136 r | 5,764,728 r | 744,991 r | 7,452,854 r |
| June | 893,671 r | 5,475,885 r | 715,875 r | 7,085,431 r |
| July | 863,160 r | 5,307,362 r | 691,539 r | 6,862,061 r |
| August | 831,403 r | 5,125,038 r | 684,309 r | 6,640,750 r |
| September | 956,209 r | 2,536,493 r | 309,313 r | 3,802,015 r |
| October | 1,252,177 r | 3,113,976 r | 382,339 r | 4,748,492 r |
| November | 1,285,983 r | 3,497,922 r | 437,951 r | 5,221,856 r |
| December | 1,151,390 r | 4,018,937 r | 513,888 r | 5,684,215 r |
| **2005 Total** | **11,785,131 r** | **56,552,885 r** | **7,320,686 r** | **75,658,702 r** |
| | | | | |
| January | 1,100,345 | 4,268,290 | 558,958 | 5,927,593 |
| February | 899,749 | 4,015,755 | 518,006 | 5,433,510 |
| March | 790,452 | 4,755,003 | 640,719 | 6,186,174 |
| April | 757,858 | 4,587,154 | 620,121 | 5,965,133 |
| May | 793,029 | 4,788,884 | 645,801 | 6,227,714 |
| June | 774,448 | 4,736,899 | 640,612 | 6,151,959 |
| July | 800,913 | 4,917,277 | 664,596 | 6,382,786 |
| August | 813,789 | 4,849,702 | 681,429 | 6,344,921 |
| September | 785,759 | 4,678,260 | 639,066 | 6,103,085 |
| October | 830,434 | 4,991,044 | 687,971 | 6,509,449 |
| November | 796,674 p | 4,840,708 p | 682,561 p | 6,319,943 p |
| December | 799,242 p | 4,876,266 p | 665,688 p | 6,341,196 p |
| **2006 Total** | **9,942,692 p** | **56,305,243 p** | **7,645,528 p** | **73,893,463 p** |

e Estimated r Revised p Preliminary

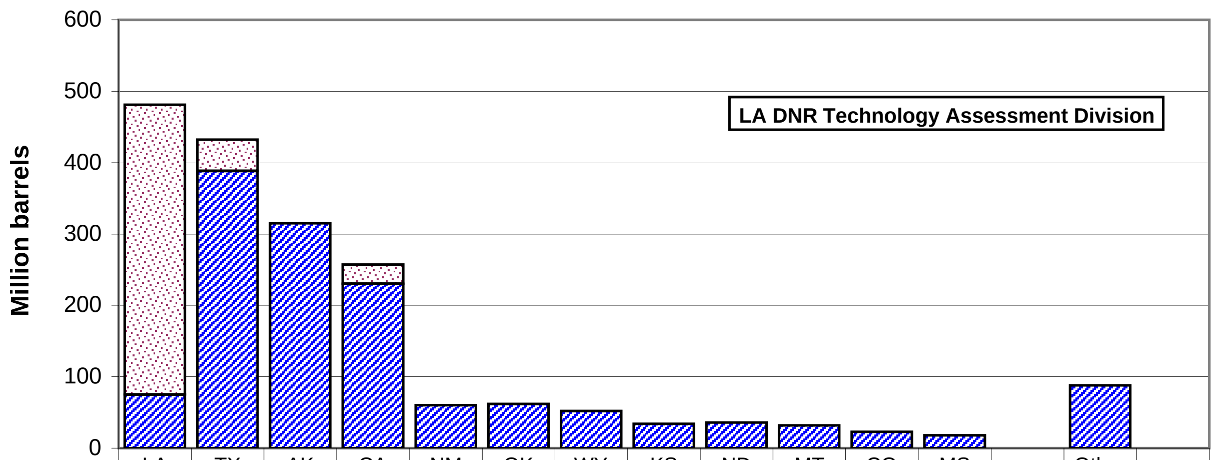
## Figure 1

### LOUISIANA STATE OIL PRODUCTION
**Actual and Forecasted Through Year 2030**




## Figure 2

### 2005 UNITED STATES OIL PRODUCTION BY STATE




| | LA | TX | AK | CA | NM | OK | WY | KS | ND | MT | CO | MS | | Other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fed. OCS | 406 | 44 | | 27 | | | | | | | | | | | |
| State | 75 | 388 | 315 | 230 | 60 | 62 | 52 | 34 | 36 | 32 | 23 | 18 | | 88 | |

# Table 4

## LOUISIANA TOTAL CRUDE OIL and CONDENSATE PRODUCTION
**(Barrels)**

| DATE | ONSHORE | OFFSHORE State | OFFSHORE Federal OCS | TOTAL |
|---|---|---|---|---|
| 1985 | 158,988,059 | 26,013,271 | 338,901,863 | 523,903,193 |
| 1986 | 154,114,595 | 26,796,139 | 340,152,276 | 521,063,010 |
| 1987 | 148,620,112 | 25,184,078 | 307,950,881 | 481,755,071 |
| 1988 | 142,457,390 | 24,539,518 | 261,936,530 | 428,933,438 |
| 1989 | 130,349,158 | 22,747,097 | 246,207,653 | 399,303,908 |
| 1990 | 125,672,059 | 23,042,907 | 264,670,535 | 413,385,501 |
| 1991 | 122,497,714 | 24,183,667 | 262,647,733 | 409,329,114 |
| 1992 | 119,384,204 | 23,421,660 | 288,918,208 | 431,724,072 |
| 1993 | 114,670,905 | 23,222,361 | 293,443,881 | 431,337,147 |
| 1994 | 104,469,036 | 22,660,992 | 293,077,191 | 420,207,219 |
| 1995 | 102,910,909 | 22,318,475 | 320,255,087 | 445,484,471 |
| 1996 | 107,529,051 | 21,430,471 | 349,101,048 | 478,060,570 |
| 1997 | 106,203,405 | 19,951,782 | 399,536,004 | 525,691,191 |
| 1998 | 104,761,306 | 17,520,419 | 425,865,901 | 548,147,626 |
| 1999 | 96,528,193 | 14,331,807 | 451,391,454 | 562,251,454 |
| 2000 | 93,686,760 r | 13,468,780 r | 477,645,662 | 584,801,202 r |
| 2001 | 92,177,849 r | 12,694,573 r | 502,115,031 | 606,987,453 r |
| 2002 | 83,088,264 r | 10,583,773 r | 508,630,349 | 602,302,386 r |
| 2003 | 79,830,345 | 10,609,764 | 505,203,116 e r | 595,643,225 e r |
| 2004 | 75,429,389 r | 8,243,188 r | 477,182,586 e r | 560,855,163 e r |
| | | | | |
| January | 6,326,705 r | 710,649 r | 40,952,398 e r | 47,989,752 e r |
| February | 5,827,587 r | 667,492 r | 36,763,277 e r | 43,258,356 e r |
| March | 6,647,015 r | 739,479 r | 42,916,398 e r | 50,302,892 e r |
| April | 6,519,239 r | 722,862 r | 41,912,001 e r | 49,154,102 e r |
| May | 6,707,863 r | 744,991 r | 44,674,827 e r | 52,127,681 e r |
| June | 6,369,556 r | 715,875 r | 42,043,446 e r | 49,128,877 e r |
| July | 6,170,522 r | 691,539 r | 39,394,750 e r | 46,256,811 e r |
| August | 5,956,441 r | 684,309 r | 36,689,134 e r | 43,329,884 e r |
| September | 3,492,702 r | 309,313 r | 10,037,158 e r | 13,839,173 e r |
| October | 4,366,153 r | 382,339 r | 17,871,091 e r | 22,619,583 e r |
| November | 4,783,905 r | 437,951 r | 24,327,146 e r | 29,549,002 e r |
| December | 5,170,327 r | 513,888 r | 29,572,627 e r | 35,256,842 e r |
| **2005 Total** | **68,338,016 r** | **7,320,686 r** | **407,154,253 e r** | **482,812,955 e r** |
| | | | | |
| January | 5,368,635 | 558,958 | 31,980,363 e | 37,907,956 e |
| February | 4,915,504 | 518,006 | 28,070,004 e | 33,503,514 e |
| March | 5,545,455 | 640,719 | 32,220,379 e | 38,406,553 e |
| April | 5,345,012 | 620,121 | 31,747,187 e | 37,712,320 e |
| May | 5,581,913 | 645,801 | 35,049,033 e | 41,276,747 e |
| June | 5,511,347 | 640,612 | 34,231,374 e | 40,383,333 e |
| July | 5,718,190 | 664,596 | 35,044,816 e | 41,427,602 e |
| August | 5,663,492 | 681,429 | 35,877,981 e | 42,222,902 e |
| September | 5,464,019 | 639,066 | 30,424,078 e | 36,527,163 e |
| October | 5,821,478 | 687,971 | 30,492,396 e | 37,001,845 e |
| November | 5,637,382 p | 682,561 p | N/A | 6,319,943 p |
| December | 5,675,508 p | 665,688 p | N/A | 6,341,196 p |
| **2006 Total** | **66,247,935 p** | **7,645,528 p** | **325,137,610 e** | **399,031,073 e p** |

e Estimated r Revised p Preliminary

# TABLE 5

## LOUISIANA STATE OIL PRODUCTION* BY TAX RATES AS PUBLISHED IN SEVERANCE TAX REPORTS[8]

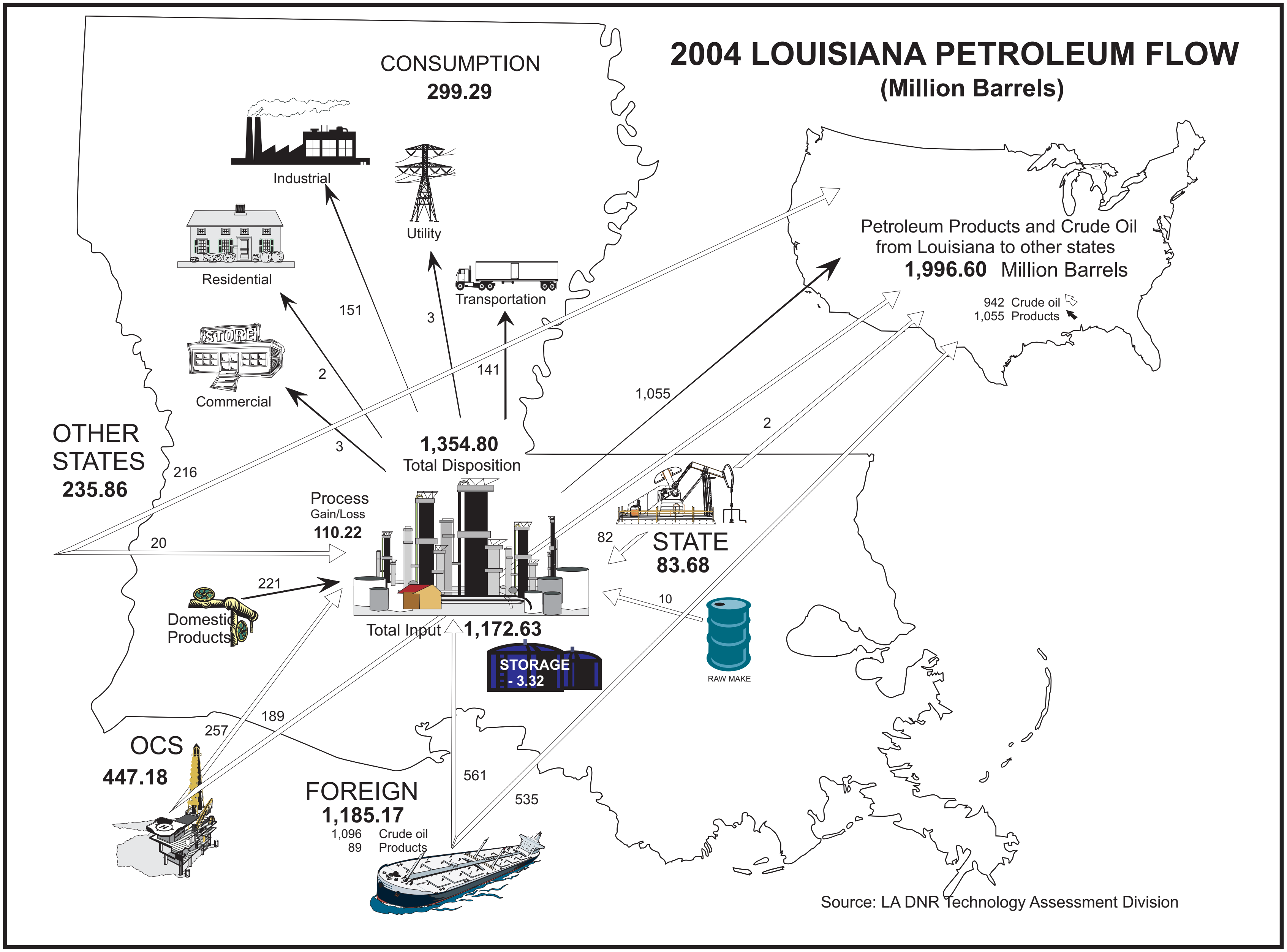
**(Barrels)**

| DATE | FULL RATE | INCAPABLE WELLS RATE | STRIPPER WELLS RATE | TAXED VOLUME |
|---|---|---|---|---|
| 1985 | 173,545,432 | 3,110,740 | 10,513,745 | 187,169,920 |
| 1986 | 180,108,437 | 3,208,451 | 10,059,344 | 193,376,232 |
| 1987 | 155,987,737 | 3,201,095 | 8,809,543 | 168,015,044 |
| 1988 | 142,605,746 | 3,288,994 | 8,242,330 | 154,150,151 |
| 1989 | 139,442,253 | 3,265,429 | 7,429,510 | 150,165,554 |
| 1990 | 131,140,448 | 3,274,774 | 7,154,125 | 141,577,610 |
| 1991 | 136,212,521 | 3,888,128 | 8,112,117 | 148,212,765 |
| 1992 | 133,399,849 | 3,665,298 | 7,718,696 | 144,783,843 |
| 1993 | 128,699,431 | 3,448,387 | 7,240,065 | 139,387,883 |
| 1994 | 118,109,958 | 3,691,802 | 6,347,047 e | 128,148,807 e |
| 1995 | 108,373,913 | 4,239,717 | 6,230,454 e | 118,844,084 e |
| 1996 | 103,524,192 | 3,786,147 | 6,240,956 e | 113,551,295 e |
| 1997 | 101,772,533 | 3,466,389 | 6,101,247 e | 111,340,169 e |
| 1998 | 89,083,365 | 2,878,225 | 5,892,007 e | 97,853,597 e |
| 1999 | 85,207,438 | 2,786,515 | 5,690,984 e | 93,684,937 e |
| 2000 | 88,411,207 | 2,783,268 | 5,322,515 | 96,516,990 |
| 2001 | 83,994,058 | 2,576,683 | 5,175,142 | 91,745,883 |
| 2002 | 79,038,703 e | 2,571,901 e | 4,681,607 e | 86,292,211 e |
| 2003 | 75,070,785 | 2,565,017 | 4,912,890 | 82,548,691 |
| 2004 | 75,070,785 | 2,565,017 | 4,912,890 | 82,548,691 |
| January | 4,776,085 | 181,497 | 335,558 | 5,293,140 |
| February | 7,251,033 | 278,100 | 574,729 | 8,103,862 |
| March | 5,687,032 | 279,917 | 401,176 | 6,368,126 |
| April | 5,913,119 | 84,676 | 391,565 | 6,389,360 |
| May | 7,936,012 | 519,651 | 481,075 | 8,936,738 |
| June | 5,186,757 | 166,804 | 424,605 | 5,778,167 |
| July | 4,918,487 | 211,194 | 406,675 | 5,536,356 |
| August | 5,666,571 | 383,275 | 385,716 | 6,435,562 |
| September | 5,391,573 | 205,243 | 386,699 | 5,983,516 |
| October | 3,668,196 | 112,462 | 238,295 | 4,018,953 |
| November | 2,097,261 | 162,240 | 326,706 | 2,586,206 |
| December | 2,864,843 | 169,851 | 431,731 | 3,466,426 |
| **2005 Total** | **61,356,971** r | **2,754,911** r | **4,784,530** r | **68,896,412** r |
| January | 2,631,713 | 151,960 | 239,089 | 3,022,762 |
| February | 4,146,801 | 198,826 | 498,833 | 4,844,459 |
| March | 4,602,680 | 114,855 | 222,163 | 4,939,699 |
| April | 6,269,311 | 340,870 | 554,060 | 7,164,241 |
| May | 6,393,818 | 242,260 | 476,905 | 7,112,983 |
| June | 4,601,913 | 130,052 | 368,641 | 5,100,605 |
| July | 6,086,120 | 248,057 | 490,910 | 6,825,087 |
| August | 5,160,257 | 251,743 | 366,199 | 5,778,200 |
| September | 6,076,545 | 282,271 | 477,864 | 6,836,680 |
| October | 4,266,640 | 187,631 | 367,740 | 4,822,012 |
| November | 5,395,525 | 250,600 | 400,360 | 6,046,484 |
| December | 5,889,043 | 222,467 | 324,055 | 6,435,565 |
| **2006 Total** | **61,520,365** | **2,621,592** | **4,786,820** | **68,928,778** |

e Estimated   r Revised   p Preliminary

* Due to reporting time lag and well exemptions the above figures are different from actual production. See footnote in Appendix B.

## Figure 3



2004 LOUISIANA PETROLEUM FLOW
(Million Barrels)
CONSUMPTION
299.29
Industrial
Utility
Residential
Transportation
Commercial
151
3
2
141
3
1,354.80
Total Disposition
OTHER STATES
235.86
216
20
Process
Gain/Loss
110.22
221
Domestic Products
Total Input
1,172.63
STORAGE
- 3.32
Petroleum Products and Crude Oil from Louisiana to other states
1,996.60 Million Barrels
942 Crude oil
1,055 Products
1,055
2
82
STATE
83.68
10
RAW MAKE
OCS
447.18
257
189
FOREIGN
1,185.17
1,096 Crude oil
89 Products
561
535
Source: LA DNR Technology Assessment Division

# Table 6

## UNITED STATES OCS CRUDE OIL AND CONDENSATE PRODUCTION[12]

**(Barrels)**

| YEAR | LOUISIANA | TEXAS | CALIFORNIA | TOTAL |
|---|---|---|---|---|
| 1960 | 49,665,891 | 98 | 0 | 49,665,989 |
| 1961 | 64,330,078 | 0 | 0 | 64,330,078 |
| 1962 | 89,733,099 | 3,483 | 0 | 89,736,582 |
| 1963 | 104,526,436 | 52,804 | 0 | 104,579,240 |
| 1964 | 122,495,173 | 4,953 | 0 | 122,500,126 |
| 1965 | 144,964,868 | 3,747 | 0 | 144,968,615 |
| 1966 | 187,831,472 | 882,598 | 0 | 188,714,070 |
| 1967 | 218,995,828 | 2,865,786 | 0 | 221,861,614 |
| 1968 | 263,825,359 | 3,110,642 | 2,059,889 | 268,995,890 |
| 1969 | 300,159,292 | 2,759,851 | 9,940,844 | 312,859,987 |
| 1970 | 333,411,492 | 2,247,048 | 24,987,628 | 360,646,168 |
| 1971 | 385,760,351 | 1,685,047 | 31,103,548 | 418,548,946 |
| 1972 | 387,590,662 | 1,733,018 | 22,562,213 | 411,885,893 |
| 1973 | 374,196,856 | 1,617,829 | 18,915,314 | 394,729,999 |
| 1974 | 342,435,496 | 1,381,825 | 16,776,744 | 360,594,065 |
| 1975 | 313,592,559 | 1,340,136 | 15,304,757 | 330,237,452 |
| 1976 | 301,887,002 | 1,054,554 | 13,978,553 | 316,920,109 |
| 1977 | 290,771,605 | 909,037 | 12,267,598 | 303,948,240 |
| 1978 | 278,071,535 | 2,107,599 | 12,085,908 | 292,265,042 |
| 1979 | 271,008,916 | 3,595,546 | 10,961,076 | 285,565,538 |
| 1980 | 256,688,082 | 10,502,007 | 10,198,886 | 277,388,975 |
| 1981 | 255,875,717 | 14,284,661 | 19,605,027 | 289,765,405 |
| 1982 | 275,513,489 | 17,263,766 | 28,434,202 | 321,211,457 |
| 1983 | 298,093,559 | 19,710,197 | 30,527,487 | 348,331,243 |
| 1984 | 318,024,622 | 21,960,086 | 30,254,306 | 370,239,014 |
| 1985 | 338,901,863 | 20,640,957 | 29,781,465 | 389,324,285 |
| 1986 | 340,152,276 | 19,835,882 | 29,227,846 | 389,216,004 |
| 1987 | 307,950,881 | 24,634,142 | 33,556,686 | 366,141,709 |
| 1988 | 261,936,530 | 26,115,776 | 32,615,118 | 320,667,424 |
| 1989 | 246,207,653 | 25,887,841 | 33,072,161 | 305,167,655 |
| 1990 | 264,670,535 | 24,970,114 | 33,312,719 | 324,423,181 |
| 1991 | 262,647,733 | 24,380,908 | 29,146,090 | 323,831,064 |
| 1992 | 288,918,208 | 23,639,788 | 41,222,801 | 346,053,626 |
| 1993 | 293,443,881 | 20,376,996 | 50,078,144 | 358,655,540 |
| 1994 | 293,077,191 | 26,819,958 | 57,229,464 | 371,300,873 |
| 1995 | 320,255,087 | 20,419,104 | 71,254,440 | 416,293,300 |
| 1996 | 349,101,048 | 25,841,553 | 67,804,200 | 436,634,538 |
| 1997 | 399,536,004 | 28,718,405 | 58,279,489 | 469,873,968 |
| 1998 | 425,865,901 | 27,837,631 | 40,636,231 | 484,861,417 |
| 1999 | 451,391,454 | 31,758,296 | 42,071,101 | 537,198,889 |
| 2000 | 477,645,662 | 35,044,216 | 34,373,524 | 557,370,524 |
| 2001 | 502,115,031 | 42,991,844 | 34,763,192 | 592,514,727 |

| | GULF OF MEXICO | | PACIFIC | TOTAL |
|---|---|---|---|---|
| | CENTRAL | WESTERN | | |
| 2002 | 478,652,767 | 88,169,359 | 29,783,000 | 596,606,889 |
| 2003 | 476,746,239 | 83,696,697 | 30,001,000 | 596,824,889 |
| 2004 | 447,625,460 | 86,932,724 | 27,052,000 | 593,875,889 |
| 2005 | 327,825,527 | 74,791,038 | 26,582,000 | 593,405,889 |

NOTE: Starting in 2002 MMS has not formaly published production by state adjacente areas

# Table 7

## UNITED STATES CRUDE OIL AND CONDENSATE PRODUCTION AND IMPORTS
**(Thousand barrels)**

| DATE | ALL OCS[12] | DOMESTIC PRODUCTION[7] | IMPORTS OTHER[7] | IMPORTS SPR[7] |
|---|---|---|---|---|
| 1985 | 389,324 | 3,274,415 | 1,125,295 | 43,070 |
| 1986 | 389,216 | 3,168,200 | 1,507,450 | 17,520 |
| 1987 | 366,142 | 3,047,385 | 1,679,365 | 26,645 |
| 1988 | 320,667 | 2,979,240 | 1,850,130 | 18,666 |
| 1989 | 305,168 | 2,778,745 | 2,112,255 | 20,440 |
| 1990 | 324,423 | 2,684,575 | 2,141,455 | 9,855 |
| 1991 | 315,693 | 2,707,039 | 2,110,332 | 0 |
| 1992 | 353,726 | 2,618,125 | 2,212,344 | 3,594 |
| 1993 | 362,676 | 2,495,933 | 2,451,415 | 5,367 |
| 1994 | 369,474 | 2,418,981 | 2,560,220 | 4,485 |
| 1995 | 408,875 | 2,383,404 | 2,642,689 | 0 |
| 1996 | 438,004 | 2,368,535 | 2,738,387 | 0 |
| 1997 | 478,775 | 2,339,981 | 2,918,425 | 0 |
| 1998 | 476,655 | 2,293,763 | 3,120,791 | 0 |
| 1999 | 513,318 | 2,162,752 | 3,132,376 | 2,065 |
| 2000 | 558,242 r | 2,135,062 | 3,271,257 | 3,006 |
| 2001 | 591,588 r | 2,136,179 | 3,334,438 | 3,914 |
| 2002 | 597,594 r | 2,097,124 | 3,330,408 | 5,767 |
| 2003 | 599,132 r | 2,073,454 | 3,527,696 | 747 |
| 2004 | 558,952 r | 1,983,300 | 3,692,063 | 28,755 |
| | | | | |
| January | 47,686 r | 167,214 | 302,909 | 1,224 |
| February | 44,838 r | 153,122 | 283,205 | 3,361 |
| March | 50,554 r | 170,427 | 311,100 | 2,622 |
| April | 49,099 r | 164,640 | 315,141 | 0 |
| May | 51,236 r | 170,328 | 320,676 | 1,907 |
| June | 48,699 r | 162,832 | 316,319 | 1,603 |
| July | 46,590 r | 162,553 | 319,530 | 1,048 |
| August | 45,519 r | 163,471 | 272,347 | 0 |
| September | 15,393 r | 126,410 | 272,347 | 0 |
| October | 18,075 r | 131,693 | 290,777 | 0 |
| November | 29,003 r | 142,084 | 307,961 | 0 |
| December | 38,045 r | 154,216 r | 309,620 r | 0 r |
| **2005 Total** | **484,737 r** | **1,868,990 r** | **3,621,932 r** | **11,765 r** |
| | | | | |
| January | 39,565 | 156,450 | 301,113 | 0 |
| February | 36,570 | 141,357 | 277,104 | 378 |
| March | 41,102 | 155,481 | 304,670 | 0 |
| April | 40,176 | 152,012 | 294,953 | 0 |
| May | 42,375 | 158,115 | 317,672 | 0 |
| June | 44,185 | 156,576 | 320,429 | 0 |
| July | 47,369 | 160,307 | 314,747 | 0 |
| August | 48,384 | 159,808 | 326,640 | 0 |
| September | N/A | 155,632 | 321,103 | 0 |
| October | N/A | 161,035 | 314,081 | 0 |
| November | N/A | N/A | N/A | N/A |
| December | N/A | N/A | N/A | N/A |
| **2006 Total** | **339,726** | **1,556,773** | **3,092,512** | **378** |

e Estimated    r Revised    p Preliminary

# Table 8

## LOUISIANA STATE ROYALTY OIL, GAS AND PLANT PRODUCTS CALCULATED VOLUMES, Excluding OCS

| DATE | OIL (Barrels) | GAS (MCF) | PLANT LIQUIDS (Barrels) |
|---|---|---|---|
| 1985 | 8,404,223 | 76,612,605 | 845,349 |
| 1986 | 8,859,310 | 81,463,285 | 1,751,664 |
| 1987 | 8,040,773 | 78,166,315 | 511,790 |
| 1988 | 7,544,770 | 69,991,244 | 456,976 |
| 1989 | 7,184,774 | 69,936,929 | 461,237 |
| 1990 | 6,781,765 | 66,417,089 | 348,776 |
| 1991 | 6,923,565 | 61,809,109 | 1,063,909 |
| 1992 | 6,837,552 | 57,911,258 | 1,689,942 |
| 1993 | 6,721,350 | 67,052,274 | 698,857 |
| 1994 | 6,288,843 | 54,798,617 | 600,660 |
| 1995 | 6,301,254 | 57,032,170 | 938,660 |
| 1996 | 6,489,394 | 60,326,587 | 477,640 |
| 1997 | 6,534,913 | 60,778,002 | 1,440,435 |
| 1998 | 6,604,124 | 56,691,269 | 331,767 |
| 1999 | 6,030,138 | 51,051,870 | 204,124 |
| 2000 | 5,757,909 | 53,780,835 | 355,112 |
| 2001 | 6,149,144 | 62,021,883 | 983,641 |
| 2002 | 4,693,387 | 52,820,219 | 800,697 |
| 2003 | 4,910,469 | 53,135,969 | 1,459,006 |
| 2004 | 4,222,899 | 45,261,610 | 2,185,235 |
| | | | |
| January | 346,680 r | 3,569,946 r | 75,803 r |
| February | 319,276 r | 3,178,224 r | 104,193 r |
| March | 326,815 r | 3,520,718 r | 97,198 r |
| April | 403,400 r | 3,372,384 r | 98,942 r |
| May | 375,956 r | 3,510,259 r | 101,589 r |
| June | 358,356 r | 3,392,096 r | 110,781 r |
| July | 318,934 r | 3,319,653 r | 97,025 r |
| August | 314,929 r | 2,951,793 r | 88,518 r |
| September | 78,630 r | 1,299,155 r | 17,971 r |
| October | 114,617 r | 1,401,573 r | 48,463 r |
| November | 180,963 r | 2,218,310 r | 132,449 r |
| December | 196,929 r | 2,689,923 r | 123,428 r |
| **2005 Total** | **3,335,485 r** | **34,424,034 r** | **1,096,361 r** |
| | | | |
| January | 228,814 | 2,906,280 | 93,551 |
| February | 219,805 | 2,863,237 | 77,726 |
| March | 249,347 | 3,080,446 | 57,635 |
| April | 282,772 | 3,123,219 | 58,788 |
| May | 273,528 | 3,308,199 | 75,286 |
| June | 289,204 | 3,610,631 | 210,559 |
| July | 312,408 | 3,687,583 | 122,536 |
| August | 334,155 | 3,573,997 | 92,888 |
| September | 318,601 | 3,486,884 | 76,143 |
| October | 334,135 | 3,028,080 | 78,710 |
| November | 303,551 p | 3,072,875 p | 69,276 p |
| December | N/A | N/A | N/A |
| **2006 Total** | **3,146,323** | **35,741,431** | **1,013,098** |

e Estimated r Revised p Preliminary

# Table 9
## LOUISIANA STATE NATURAL GAS PRODUCTION
## WET AFTER LEASE SEPARATION
### Excluding OCS and Casinghead Gas
### (Thousand Cubic Feet (MCF) at 15.025 psia and 60 degrees Fahrenheit)

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1985 | 295,244,077 | 1,137,225,154 | 220,415,274 | 1,652,884,505 |
| 1986 | 308,388,203 | 1,106,084,855 | 212,591,069 | 1,627,064,127 |
| 1987 | 303,050,793 | 1,041,232,533 | 199,093,721 | 1,543,377,047 |
| 1988 | 322,955,920 | 1,058,079,256 | 191,498,869 | 1,572,534,045 |
| 1989 | 335,963,137 | 1,035,013,840 | 180,876,988 | 1,551,853,965 |
| 1990 | 354,696,578 | 1,040,239,002 | 160,569,034 | 1,555,504,613 |
| 1991 | 345,612,948 | 1,022,125,055 | 129,387,685 | 1,497,125,688 |
| 1992 | 343,439,890 | 994,039,578 | 123,902,708 | 1,461,382,176 |
| 1993 | 333,395,251 | 970,764,461 | 130,660,784 | 1,434,820,496 |
| 1994 | 334,564,842 | 925,335,735 | 134,106,599 | 1,394,007,176 |
| 1995 | 344,719,040 | 908,236,089 | 140,906,019 | 1,393,861,148 |
| 1996 | 392,345,447 | 933,446,378 | 166,901,010 | 1,492,692,835 |
| 1997 | 405,754,260 | 871,963,879 | 165,420,090 | 1,443,138,229 |
| 1998 | 394,713,751 | 846,071,218 | 158,947,618 | 1,399,732,587 |
| 1999 | 361,118,420 | 814,417,104 | 134,177,750 | 1,309,713,274 |
| 2000 | 357,262,312 | 837,428,601 | 135,287,922 | 1,329,978,835 |
| 2001 | 353,402,704 | 852,125,523 | 134,471,567 | 1,339,999,794 |
| 2002 | 320,766,521 | 793,710,106 | 120,465,188 | 1,234,941,815 |
| 2003 | 312,219,007 | 797,397,331 | 118,596,770 | 1,228,213,107 r |
| 2004 | 298,685,349 | 823,226,142 | 115,626,769 | 1,237,538,260 r |
| | | | | |
| January | 30,704,221 r | 62,949,618 r | 8,814,819 r | 102,468,658 r |
| February | 28,503,847 r | 57,439,479 r | 8,071,386 r | 94,014,712 r |
| March | 32,472,272 r | 64,308,437 r | 9,250,540 r | 106,031,250 r |
| April | 32,115,247 r | 62,495,540 r | 9,035,406 r | 103,646,193 r |
| May | 33,526,198 r | 64,096,886 r | 9,383,048 r | 107,006,132 r |
| June | 32,838,396 r | 61,670,885 r | 9,186,261 r | 103,695,542 r |
| July | 33,937,691 r | 62,597,231 r | 9,429,514 r | 105,964,436 r |
| August | 32,979,275 r | 59,733,133 r | 9,117,176 r | 101,829,584 r |
| September | 32,599,946 r | 43,006,666 r | 4,920,825 r | 80,527,437 r |
| October | 31,026,989 r | 52,409,829 r | 4,869,373 r | 88,306,190 r |
| November | 32,151,328 r | 55,568,504 r | 7,631,264 r | 95,351,096 r |
| December | 35,080,653 r | 58,248,991 r | 7,731,349 r | 101,060,994 r |
| **2005 Total** | **387,936,064 r** | **704,525,199 r** | **97,440,961 r** | **1,189,902,224 r** |
| | | | | |
| January | 31,204,279 | 64,391,864 | 7,550,234 | 103,146,377 |
| February | 27,412,202 | 60,646,547 | 6,771,947 | 94,830,696 |
| March | 28,718,149 | 70,541,347 | 8,247,414 | 107,506,910 |
| April | 26,928,881 | 68,860,751 | 7,968,185 | 103,757,817 |
| May | 27,525,042 | 72,343,615 | 8,357,996 | 108,226,653 |
| June | 26,782,388 | 70,979,227 | 7,916,532 | 105,678,146 |
| July | 27,214,679 | 71,273,940 | 8,506,695 | 106,995,315 |
| August | 26,941,022 | 73,185,784 | 6,545,452 | 106,672,259 |
| September | 26,064,370 | 71,020,249 | 6,324,288 | 103,408,907 |
| October | 26,806,029 | 73,263,815 | 6,495,578 | 106,565,422 |
| November | 25,256,317 p | 71,540,618 p | 6,111,815 p | 102,908,750 p |
| December | 25,114,351 p | 73,638,009 p | 6,003,120 p | 104,755,480 p |
| **2006 Total** | **325,967,708 p** | **841,685,767 p** | **86,799,257 p** | **1,254,452,732 p** |

e Estimated   r Revised   p Preliminary

# Table 10

## LOUISIANA STATE CASINGHEAD GAS PRODUCTION, WET AFTER LEASE SEPARATION, Excluding OCS

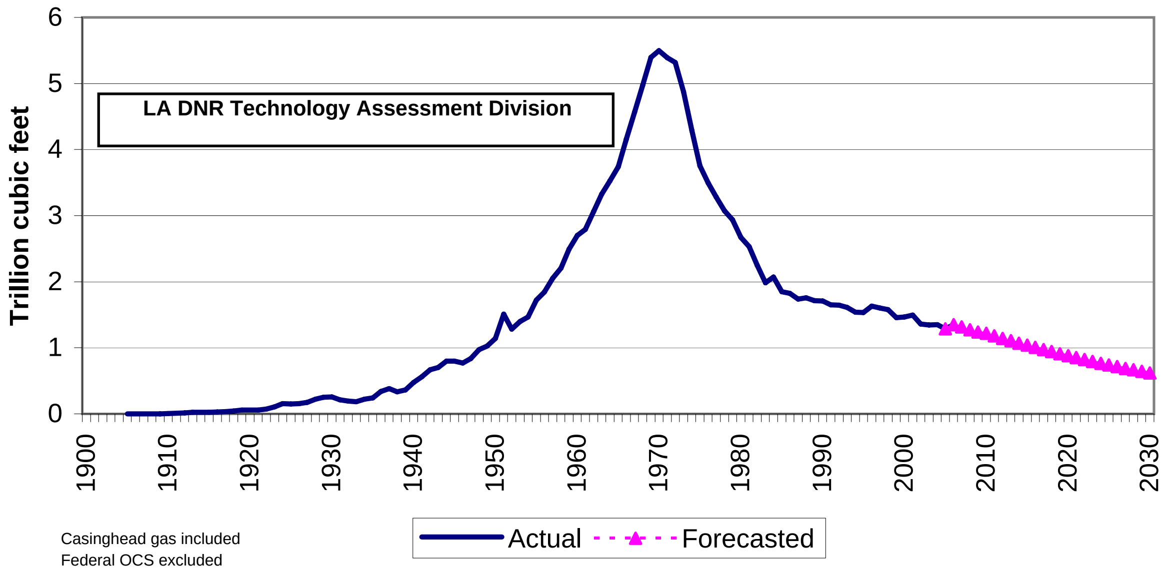
**(Thousand Cubic Feet (MCF) at 15.025 psia and 60 degrees Fahrenheit)**

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1985 | 55,759,287 | 112,357,808 | 29,648,675 | 197,765,770 |
| 1986 | 55,231,487 | 110,445,487 | 33,513,264 | 199,190,237 |
| 1987 | 53,608,927 | 111,178,438 | 29,030,143 | 193,817,508 |
| 1988 | 51,642,390 | 111,388,728 | 22,754,523 | 185,785,641 |
| 1989 | 43,226,234 | 95,636,544 | 22,432,765 | 161,295,543 |
| 1990 | 35,720,964 | 97,403,093 | 21,463,782 | 154,587,839 |
| 1991 | 36,360,803 | 94,750,220 | 20,506,337 | 151,617,360 |
| 1992 | 28,776,676 | 130,335,922 | 23,086,767 | 182,199,364 |
| 1993 | 20,416,003 | 134,059,073 | 23,177,673 | 177,652,749 |
| 1994 | 19,490,914 | 102,313,166 | 21,100,651 | 142,904,730 |
| 1995 | 18,712,027 | 100,070,988 | 23,542,867 | 142,325,882 |
| 1996 | 24,806,243 | 93,986,744 | 18,713,358 | 137,506,345 |
| 1997 | 36,266,759 | 103,835,554 | 20,423,408 | 160,525,721 |
| 1998 | 42,665,167 | 114,280,211 | 20,701,170 | 177,646,548 |
| 1999 | 33,073,036 | 96,225,193 | 15,421,052 | 144,719,281 |
| 2000 | 30,795,461 | 89,898,681 | 14,206,864 | 134,901,007 |
| 2001 | 36,179,716 | 102,787,408 | 16,604,376 | 155,571,500 |
| 2002 | 31,284,153 | 81,034,470 | 14,482,576 | 126,801,199 |
| 2003 | 31,251,783 | 74,363,669 | 11,808,544 | 117,423,996 |
| 2004 | 31,121,110 r | 70,537,633 r | 11,082,710 r | 112,741,453 r |
| | | | | |
| January | 2,108,668 r | 6,301,153 r | 811,281 r | 9,221,102 r |
| February | 1,869,326 r | 5,828,931 r | 737,955 r | 8,436,212 r |
| March | 2,046,258 r | 6,178,671 r | 807,780 r | 9,032,709 r |
| April | 1,976,748 r | 6,047,766 r | 776,266 r | 8,800,781 r |
| May | 2,048,903 r | 6,293,420 r | 805,995 r | 9,148,318 r |
| June | 1,921,209 r | 5,925,330 r | 757,129 r | 8,603,668 r |
| July | 1,899,975 r | 5,886,251 r | 750,055 r | 8,536,281 r |
| August | 1,810,986 r | 5,633,233 r | 716,185 r | 8,160,404 r |
| September | 1,944,615 r | 2,882,400 r | 365,617 r | 5,192,632 r |
| October | 2,366,487 r | 3,367,156 r | 426,119 r | 6,159,762 r |
| November | 2,438,006 r | 3,879,304 r | 489,790 r | 6,807,101 r |
| December | 2,675,159 r | 3,972,817 r | 673,885 r | 7,321,861 r |
| **2005 Total** | **25,106,341 r** | **62,196,432 r** | **8,118,058 r** | **95,420,831 r** |
| | | | | |
| January | 2,779,264 | 4,523,836 | 663,754 | 7,966,854 |
| February | 2,208,831 | 3,965,774 | 604,782 | 6,779,386 |
| March | 2,344,096 | 4,662,336 | 681,709 | 7,688,141 |
| April | 2,361,144 | 4,697,381 | 685,640 | 7,744,165 |
| May | 2,562,713 | 5,223,226 | 761,064 | 8,547,004 |
| June | 2,293,012 | 4,674,773 | 679,960 | 7,647,745 |
| July | 2,448,052 | 4,982,569 | 723,126 | 8,153,746 |
| August | 2,553,596 | 4,820,394 | 790,814 | 8,164,804 |
| September | 2,530,170 | 4,777,235 | 782,412 | 8,089,818 |
| October | 2,583,103 | 4,878,262 | 797,607 | 8,258,973 |
| November | 2,394,194 p | 4,522,508 p | 738,186 p | 7,654,889 p |
| December | 2,391,993 p | 4,702,016 p | 762,694 p | 7,856,703 p |
| **2006 Total** | **29,450,169 p** | **56,430,311 p** | **8,671,748 p** | **94,552,228 p** |

e Estimated r Revised p Preliminary

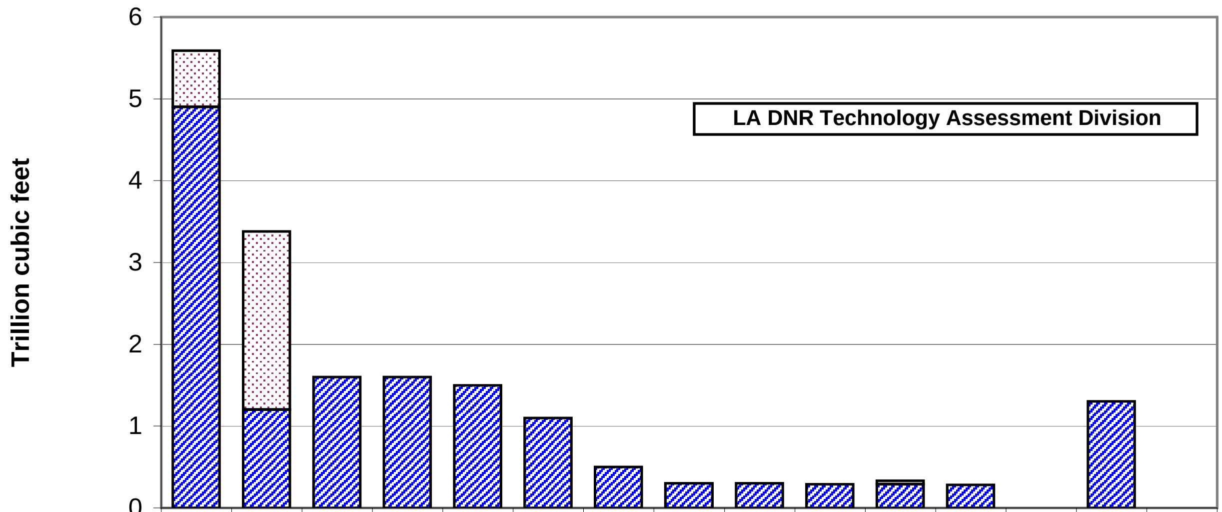
## Figure 4

### LOUISIANA STATE GAS PRODUCTION
**Actual and Forecasted Through Year 2030**




## Figure 5

### 2005 UNITED STATES MARKETED GAS PRODUCTION BY STATE




| | TX | LA | OK | WY | NM | CO | AK | KS | CA | UT | AL | MI | | Other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fed. OCS | 0.7 | 2.2 | | | | | 0.0 | | 0.0 | | 0.0 | | | | |
| State | 4.9 | 1.2 | 1.6 | 1.6 | 1.5 | 1.1 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | | 1.3 | |

# Table 11

## LOUISIANA STATE GAS PRODUCTION, WET AFTER LEASE SEPARATION

**Natural Gas and Casinghead Gas, Excluding OCS**

**(Thousand Cubic Feet (MCF) at 15.025 psia and 60 degrees Fahrenheit)***

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1985 | 351,003,364 | 1,249,582,962 | 250,063,949 | 1,850,650,275 |
| 1986 | 363,619,690 | 1,216,530,342 | 246,104,333 | 1,826,254,364 |
| 1987 | 356,659,720 | 1,152,410,971 | 228,123,864 | 1,737,194,555 |
| 1988 | 374,598,311 | 1,169,467,984 | 214,253,392 | 1,758,319,686 |
| 1989 | 379,189,370 | 1,130,650,385 | 203,309,753 | 1,713,149,508 |
| 1990 | 390,417,542 | 1,137,642,094 | 182,032,816 | 1,710,092,452 |
| 1991 | 381,973,751 | 1,116,875,275 | 149,894,021 | 1,648,743,048 |
| 1992 | 372,216,566 | 1,124,375,499 | 146,989,475 | 1,643,581,540 |
| 1993 | 353,811,255 | 1,104,823,534 | 153,838,456 | 1,612,473,245 |
| 1994 | 354,055,756 | 1,027,648,900 | 155,207,250 | 1,536,911,906 |
| 1995 | 363,431,067 | 1,008,307,077 | 164,448,886 | 1,536,187,030 |
| 1996 | 417,151,690 | 1,027,433,122 | 185,614,368 | 1,630,199,180 |
| 1997 | 442,021,019 | 975,799,433 | 185,843,498 | 1,603,663,950 |
| 1998 | 437,378,918 | 960,351,429 | 179,648,787 | 1,577,379,135 |
| 1999 | 394,191,456 | 910,642,297 | 149,598,802 | 1,454,432,555 |
| 2000 | 388,057,774 | 927,327,282 | 149,707,135 | 1,464,879,842 |
| 2001 | 389,582,420 | 954,912,931 | 150,157,925 | 1,495,571,294 |
| 2002 | 352,050,674 | 874,744,577 | 134,171,613 | 1,361,743,014 |
| 2003 | 343,470,789 | 871,761,000 | 130,008,901 | 1,345,637,103 |
| 2004 | 329,806,459 r | 893,763,775 r | 125,788,689 r | 1,350,279,713 r |
| | | | | |
| January | 32,812,889 r | 69,250,770 r | 8,809,341 r | 111,689,760 r |
| February | 30,373,173 r | 63,268,410 r | 10,058,320 r | 102,450,924 r |
| March | 34,518,531 r | 70,487,108 r | 9,811,672 r | 115,063,959 r |
| April | 34,091,996 r | 68,543,306 r | 10,189,043 r | 112,446,974 r |
| May | 35,575,101 r | 70,390,306 r | 9,943,390 r | 116,154,450 r |
| June | 34,759,605 r | 67,596,214 r | 10,179,568 r | 112,299,210 r |
| July | 35,837,666 r | 68,483,482 r | 9,833,362 r | 114,500,717 r |
| August | 34,790,261 r | 65,366,366 r | 5,286,442 r | 109,989,988 r |
| September | 34,544,561 r | 45,889,067 r | 5,295,492 r | 85,720,069 r |
| October | 33,393,476 r | 55,776,985 r | 8,121,054 r | 94,465,952 r |
| November | 34,589,334 r | 59,447,808 r | 8,405,234 r | 102,158,197 r |
| December | 37,755,812 r | 62,221,808 r | 8,213,988 r | 108,382,855 r |
| **2005 Total** | **413,042,405 r** | **766,721,631 r** | **104,146,907 r** | **1,285,323,055 r** |
| | | | | |
| January | 33,983,543 | 68,915,700 | 7,376,729 | 111,113,231 |
| February | 29,621,032 | 64,612,321 | 8,929,123 | 101,610,082 |
| March | 31,062,245 | 75,203,683 | 8,653,825 | 115,195,051 |
| April | 29,290,025 | 73,558,132 | 9,119,060 | 111,501,982 |
| May | 30,087,755 | 77,566,842 | 8,596,492 | 116,773,657 |
| June | 29,075,400 | 75,653,999 | 9,229,821 | 113,325,891 |
| July | 29,662,731 | 76,256,509 | 7,336,266 | 115,149,061 |
| August | 29,494,618 | 78,006,179 | 7,106,700 | 114,837,063 |
| September | 28,594,541 | 75,797,484 | 7,293,185 | 111,498,725 |
| October | 29,389,132 | 78,142,077 | 6,850,001 | 114,824,395 |
| November | 27,650,511 p | 76,063,126 p | 6,765,814 p | 110,563,638 p |
| December | 27,506,344 p | 78,340,026 p | 7,156,990 p | 112,612,184 p |
| **2006 Total** | **355,417,876 p** | **898,116,078 p** | **94,414,007 p** | **1,349,004,960 p** |

e Estimated r Revised p Preliminary

* See Appendix D-1 for corresponding volumes at 14.73 psia and footnote in Appendix B.

# Table 12

## LOUISIANA TOTAL GAS PRODUCTION, WET AFTER LEASE SEPARATION

**Natural Gas and Casinghead Gas**

**(Thousand Cubic Feet (MCF) at 15.025 psia and 60 degrees Fahrenheit)***

| | ONSHORE | OFFSHORE | | TOTAL |
|---|---|---|---|---|
| DATE | | State | Federal OCS[12] | |
| 1985 | 1,600,586,326 | 250,063,949 | 3,055,687,773 | 4,906,338,048 |
| 1986 | 1,580,150,031 | 246,104,333 | 2,870,347,386 | 4,696,601,750 |
| 1987 | 1,509,070,691 | 228,123,864 | 3,117,669,167 | 4,854,863,722 |
| 1988 | 1,544,066,294 | 214,253,392 | 3,036,077,646 | 4,794,397,332 |
| 1989 | 1,509,839,755 | 203,309,753 | 2,947,545,132 | 4,660,694,640 |
| 1990 | 1,528,059,636 | 182,032,816 | 3,633,554,307 | 5,343,646,759 |
| 1991 | 1,498,849,027 | 149,894,021 | 3,225,373,562 | 4,874,116,610 |
| 1992 | 1,496,592,065 | 146,989,475 | 3,272,561,370 | 4,916,142,910 |
| 1993 | 1,458,634,789 | 153,838,456 | 3,320,312,261 | 4,932,785,506 |
| 1994 | 1,381,704,656 | 155,207,250 | 3,423,837,064 | 4,960,748,970 |
| 1995 | 1,371,738,144 | 164,448,886 | 3,564,677,663 | 5,100,864,693 |
| 1996 | 1,444,584,812 | 185,614,368 | 3,709,198,609 | 5,410,100,330 |
| 1997 | 1,417,820,452 | 185,843,498 | 3,825,354,038 | 5,400,353,243 |
| 1998 | 1,397,730,348 | 179,648,787 | 3,814,583,541 | 5,347,968,497 |
| 1999 | 1,304,833,753 | 149,598,802 | 3,836,619,562 | 5,215,724,146 |
| 2000 | 1,315,385,056 | 149,494,786 | 3,761,812,062 | 5,153,798,359 |
| 2001 | 1,344,495,351 | 151,075,943 | 3,818,657,416 | 5,314,228,710 |
| 2002 | 1,226,795,250 | 134,947,764 | 3,457,864,868 | 4,819,607,882 |
| 2003 | 1,215,231,789 | 130,405,314 | 3,276,387,510 e | 4,622,024,613 e |
| 2004 | 1,223,570,234 r | 126,709,479 r | 2,840,552,489 e | 4,190,832,202 e r |
| | | | | |
| January | 102,063,659 r | 9,626,101 r | 219,582,466 e r | 331,272,226 e r |
| February | 93,641,583 r | 8,809,341 r | 204,599,022 e r | 307,049,946 e r |
| March | 105,005,639 r | 10,058,320 r | 231,499,552 e r | 346,563,511 e r |
| April | 102,635,302 r | 9,811,672 r | 223,699,993 e r | 336,146,967 e r |
| May | 105,965,407 r | 10,189,043 r | 237,129,038 e r | 353,283,488 e r |
| June | 102,355,820 r | 9,943,390 r | 224,053,646 e r | 336,352,856 e r |
| July | 104,321,149 r | 10,179,568 r | 207,391,216 e r | 321,891,933 e r |
| August | 100,156,626 r | 9,833,362 r | 191,818,776 e r | 301,808,764 e r |
| September | 80,433,627 r | 5,286,442 r | 77,562,901 e r | 163,282,970 e r |
| October | 89,170,460 r | 5,295,492 r | 88,742,740 e r | 183,208,692 e r |
| November | 94,037,143 r | 8,121,054 r | 126,945,578 e r | 229,103,775 e r |
| December | 99,977,621 r | 8,405,234 r | 152,566,716 e r | 260,949,571 e r |
| **2005 Total** | **1,179,764,036** r | **105,559,019** r | **2,185,591,643 e r** | **3,470,914,698 e r** |
| | | | | |
| January | 102,899,243 | 8,213,988 | 165,984,030 e | 277,097,261 e |
| February | 94,233,353 | 7,376,729 | 145,488,774 e | 247,098,856 e |
| March | 106,265,928 | 8,929,123 | 165,036,038 e | 280,231,089 e |
| April | 102,848,157 | 8,653,825 | 168,091,903 e | 279,593,885 e |
| May | 107,654,597 | 9,119,060 | 180,257,917 e | 297,031,574 e |
| June | 104,729,399 | 8,596,492 | 171,685,874 e | 285,011,765 e |
| July | 105,919,240 | 9,229,821 | 175,906,241 e | 291,055,302 e |
| August | 107,500,797 | 7,336,266 | 161,630,501 e | 276,467,564 e |
| September | 104,392,025 | 7,106,700 | 162,754,070 e | 274,252,795 e |
| October | 107,531,210 | 7,293,185 | 173,361,681 e | 288,186,076 e |
| November | 103,713,637 p | 6,850,001 p | 165,915,417 e | 276,479,056 e p |
| December | 105,846,370 p | 6,765,814 p | N/A e | 112,612,184 e p |
| **2006 Total** | **1,253,533,955 p** | **95,471,005 p** | **1,836,112,446 e** | **3,185,117,406** e p |

e Estimated r Revised p Preliminary

* See Appendix D-2 for corresponding volumes at 14.73 psia and footnote in Appendix B.

# Table 13

## LOUISIANA MARKETED AND DRY GAS PRODUCTION

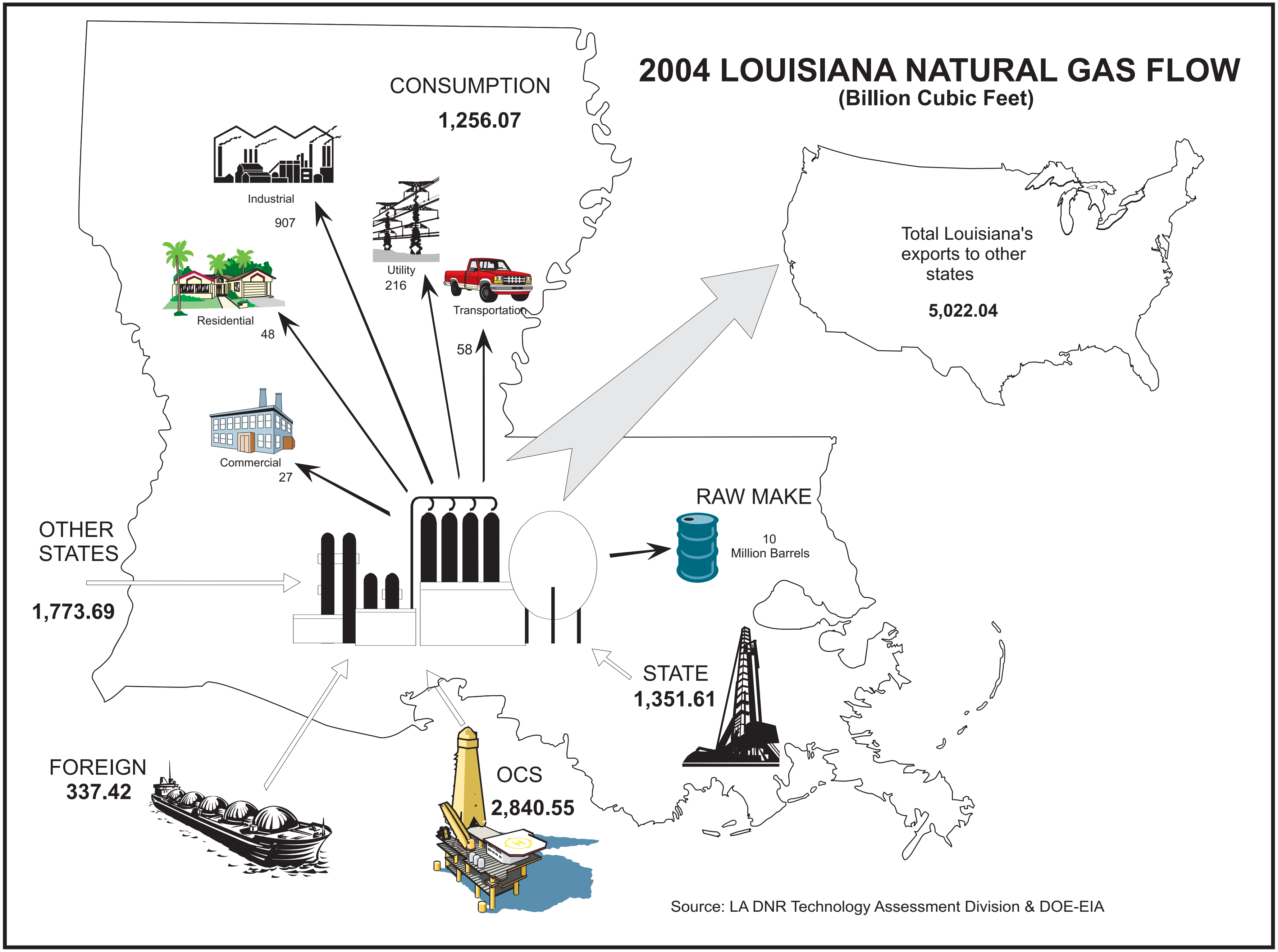
**(Billion Cubic Feet (BCF) at 15.025 psia and 60 degrees Fahrenheit)***

| DATE | MARKETED State | MARKETED OCS | MARKETED Total[3] | EXTRACTION LOSS[3] | DRY[3] |
|---|---|---|---|---|---|
| 1964 | 3,451 e | 603 12 | 4,054 e | N/A | N/A |
| 1965 | 3,658 e | 627 12 | 4,285 e | N/A | N/A |
| 1966 | 4,063 e | 937 12 | 5,000 e | N/A | N/A |
| 1967 | 4,549 e | 1,055 12 | 5,605 | 113 | 5,492 |
| 1968 | 4,918 e | 1,372 12 | 6,290 | 138 | 6,153 |
| 1969 | 5,317 e | 1,769 12 | 7,086 | 176 | 6,910 |
| 1970 | 5,429 e | 2,206 12 | 7,635 | 189 | 7,446 |
| 1971 | 5,367 e | 2,556 12 | 7,923 | 191 | 7,732 |
| 1972 | 5,020 e | 2,797 12 | 7,816 | 194 | 7,622 |
| 1973 | 5,115 e | 2,966 12 | 8,081 | 203 | 7,878 |
| 1974 | 4,351 e | 3,251 12 | 7,601 | 191 | 7,411 |
| 1975 | 3,717 e | 3,234 12 | 6,951 | 186 | 6,766 |
| 1976 | 3,472 e | 3,397 12 | 6,869 | 169 | 6,700 |
| 1977 | 3,533 e | 3,540 12 | 7,073 | 163 | 6,910 |
| 1978 | 3,302 e | 4,028 12 | 7,330 | 158 | 7,171 |
| 1979 | 3,087 e | 4,036 12 | 7,124 | 162 | 6,961 |
| 1980 | 2,908 e | 3,896 12 | 6,804 | 139 | 6,664 |
| 1981 | 2,661 e | 3,986 12 | 6,647 | 140 | 6,507 |
| 1982 | 2,359 e | 3,692 12 | 6,050 | 126 | 5,924 |
| 1983 | 2,147 e | 3,080 12 | 5,227 | 122 | 5,106 |
| 1984 | 2,237 e | 3,473 12 | 5,711 | 130 | 5,581 |
| 1985 | 1,890 e | 3,025 12 | 4,915 | 115 | 4,800 |
| 1986 | 1,958 e | 2,842 12 | 4,799 | 113 | 4,686 |
| 1987 | 1,935 e | 3,086 12 | 5,022 | 122 | 4,899 |
| 1988 | 2,073 e | 3,006 12 | 5,079 | 118 | 4,961 |
| 1989 | 2,060 e | 2,918 12 | 4,978 | 119 | 4,859 |
| 1990 | 1,542 e | 3,597 12 | 5,139 | 117 | 5,022 |
| 1991 | 1,742 e | 3,193 12 | 4,936 | 127 | 4,809 |
| 1992 | 1,617 e | 3,201 | 4,818 | 130 | 4,688 |
| 1993 | 1,642 e | 3,252 | 4,893 | 128 | 4,765 |
| 1994 | 1,658 e | 3,410 | 5,068 | 126 | 4,942 |
| 1995 | 1,650 e | 3,358 | 5,008 | 143 | 4,865 |
| 1996 | 1,596 e | 3,590 | 5,186 | 137 | 5,049 |
| 1997 | 1,505 r | 3,580 | 5,085 r | 144 | 4,882 |
| 1998 | 1,552 r | 3,580 | 5,132 r | 139 | 4,933 |
| 1999 | 1,567 r | 3,565 | 5,132 r | 158 | 4,912 |
| 2000 | 1,455 r | 3,592 | 5,047 r | 159 | 4,860 |
| 2001 | 1,502 r | 3,601 | 5,103 r | 147 | 4,926 |
| 2002 | 1,362 r | 3,354 | 4,716 r | 157 | 4,532 |
| 2003 | 1,350 r | 3,298 | 4,648 r | 155 | 4,467 |
| 2004 | 1,357 r | 3,042 | 4,399 r | 151 | 4,249 |
| 2005 | 1,295 p | 2,116 p | 3,411 p | 130 p | 3,272 p |

e Estimated r Revised p Preliminary

* See Appendix D-3 for corresponding volumes at 14.73 psia and footnote in Appendix B.

**Figure 6**


2004 LOUISIANA NATURAL GAS FLOW
(Billion Cubic Feet)
CONSUMPTION
1,256.07
Industrial
907
Utility
216
Transportation
58
Residential
48
Commercial
27
Total Louisiana's exports to other states
5,022.04
OTHER STATES
1,773.69
RAW MAKE
10
Million Barrels
STATE
1,351.61
FOREIGN
337.42
OCS
2,840.55
Source: LA DNR Technology Assessment Division & DOE-EIA

# Table 14

## LOUISIANA STATE GAS PRODUCTION BY TAX RATES

### AS PUBLISHED IN SEVERANCE TAX REPORTS[8]

### (MCF at 15.025psia and 60 degrees Fahrenheit)

| DATE | FULL RATE | INCAPABLE GAS WELLS RATE | OTHER RATES | TAXED VOLUME |
|---|---|---|---|---|
| 1985 | 1,849,689,870 | 61,394,328 | 22,460,870 | 1,933,548,068 |
| 1986 | 1,710,600,175 | 56,471,054 | 22,020,986 | 1,789,092,195 |
| 1987 | 1,748,310,878 | 56,729,077 | 22,829,692 | 1,827,869,647 |
| 1988 | 1,577,841,418 | 56,316,278 | 20,374,445 | 1,654,532,141 |
| 1989 | 1,487,438,834 | 54,709,819 | 22,370,768 | 1,564,519,421 |
| 1990 | 1,529,057,929 | 54,419,642 | 31,800,386 | 1,615,277,957 |
| 1991 | 1,525,451,737 | 53,547,797 | 19,438,902 | 1,598,438,436 |
| 1992 | 1,492,986,396 | 52,500,178 | 35,820,609 | 1,581,307,183 |
| 1993 | 1,499,489,622 | 55,146,661 | 25,466,874 | 1,580,103,157 |
| 1994 | 1,463,723,027 | 46,017,071 | 13,839,450 | 1,523,579,548 |
| 1995 | 1,410,035,722 | 52,417,334 | 13,688,870 | 1,476,141,926 |
| 1996 | 1,334,980,887 | 53,491,942 | 13,759,192 | 1,402,232,021 |
| 1997 | 1,354,105,430 | 52,368,159 | 11,191,715 | 1,417,665,304 |
| 1998 | 1,343,182,922 | 57,663,413 | 9,951,387 | 1,410,797,722 |
| 1999 | 1,191,471,607 | 60,242,544 | 11,733,098 | 1,263,447,249 |
| 2000 | 1,151,493,116 | 57,308,865 | 10,617,631 | 1,219,419,612 |
| 2001 | 1,217,171,149 | 53,797,867 | 8,198,104 | 1,279,167,120 |
| 2002 | 1,068,512,639 | 75,724,074 | 7,748,258 | 1,151,984,971 |
| 2003 | 1,091,483,424 | 80,659,914 | 7,963,553 | 1,180,106,891 |
| 2004 | 1,091,483,424 | 80,659,914 | 7,963,553 | 1,180,106,891 |
| January | 109,165,945 | 5,913,751 | 254,537 | 115,334,233 |
| February | 98,950,242 | 6,456,239 | 424,728 | 105,831,209 |
| March | 91,734,364 | 6,377,383 | 281,672 | 98,393,419 |
| April | 80,774,222 | 6,180,721 | 444,688 | 87,399,631 |
| May | 104,546,201 | 1,522,884 | -56,667 | 106,012,418 |
| June | 92,235,183 | 5,206,177 | 285,969 | 97,727,329 |
| July | 100,235,396 | 8,201,954 | 520,212 | 108,957,562 |
| August | 94,355,504 | 8,526,008 | 1,268,784 | 104,150,296 |
| September | 101,799,503 | 18,614,459 | 468,413 | 120,882,375 |
| October | 137,599,147 | 14,086,270 | 315,062 | 152,000,479 |
| November | 42,743,058 | 5,677,735 | 252,714 | 48,673,507 |
| December | 75,875,260 | 5,187,998 | 182,339 | 81,245,597 |
| **2005 Total** | **1,130,014,025** | **91,951,579** | **4,642,451** | **1,226,608,055** |
| January | 94,236,387 | 16,800,384 | 314,524 | 111,351,295 |
| February | 76,432,000 | 7,028,368 | 321,643 | 83,782,011 |
| March | 81,691,445 | 7,976,922 | 187,590 | 89,855,957 |
| April | 107,719,354 | 8,357,368 | 705,946 | 116,782,668 |
| May | 101,474,634 | 8,503,622 | 332,811 | 110,311,067 |
| June | 106,861,134 | 10,823,829 | 781,161 | 118,466,124 |
| July | 97,218,050 | 9,032,031 | 267,661 | 106,517,742 |
| August | 83,463,518 | 7,048,123 | 559,997 | 91,071,638 |
| September | 101,607,295 | 7,950,729 | 531,936 | 110,089,960 |
| October | 79,235,656 | 9,723,032 | 292,635 | 89,251,323 |
| November | 103,591,235 | 10,899,950 | 466,417 | 114,957,602 |
| December | 101,013,777 | 9,346,485 | 783,481 | 111,143,743 |
| **2006 Total** | **1,134,544,485** | **113,490,843** | **5,545,802** | **1,253,581,130** |

e Estimated r Revised p Preliminary

See footnote in Appendix B.

# Table 15

## UNITED STATES OCS GAS PRODUCTION[12]

**Natural Gas and Casinghead Gas**
**(MCF at 15.025 psia and 60 degrees Fahrenheit)***

| YEAR | LOUISIANA | TEXAS | CALIFORNIA | TOTAL |
|---|---|---|---|---|
| 1961 | 312,031,003 | 0 | 0 | 312,031,003 |
| 1962 | 443,079,048 | 0 | 0 | 443,079,048 |
| 1963 | 553,272,142 | 0 | 0 | 553,272,142 |
| 1964 | 609,524,401 | 0 | 0 | 609,524,401 |
| 1965 | 632,914,005 | 0 | 0 | 632,914,005 |
| 1966 | 946,433,484 | 41,233,595 | 0 | 987,667,078 |
| 1967 | 1,065,915,553 | 97,990,476 | 0 | 1,163,906,029 |
| 1968 | 1,385,715,670 | 107,752,805 | 783,984 | 1,494,252,460 |
| 1969 | 1,786,760,423 | 124,601,568 | 4,750,708 | 1,916,112,699 |
| 1970 | 2,228,516,212 | 130,683,192 | 11,989,041 | 2,371,188,444 |
| 1971 | 2,582,297,962 | 124,857,371 | 15,363,786 | 2,722,519,119 |
| 1972 | 2,824,792,196 | 144,267,198 | 9,836,582 | 2,978,895,976 |
| 1973 | 2,995,634,220 | 145,754,588 | 7,143,485 | 3,148,532,293 |
| 1974 | 3,283,413,450 | 156,838,375 | 5,464,209 | 3,445,716,035 |
| 1975 | 3,266,745,456 | 120,166,178 | 3,874,047 | 3,390,785,681 |
| 1976 | 3,431,149,749 | 90,764,667 | 3,406,969 | 3,525,321,386 |
| 1977 | 3,575,898,616 | 85,236,246 | 3,225,368 | 3,664,360,230 |
| 1978 | 4,068,255,571 | 227,305,175 | 3,404,117 | 4,298,964,864 |
| 1979 | 4,076,873,552 | 501,546,069 | 2,810,535 | 4,581,230,155 |
| 1980 | 3,934,902,550 | 612,378,333 | 3,046,020 | 4,550,326,904 |
| 1981 | 4,025,867,929 | 715,937,640 | 12,515,654 | 4,754,321,224 |
| 1982 | 3,729,057,653 | 841,173,981 | 17,402,403 | 4,587,634,037 |
| 1983 | 3,111,576,348 | 834,112,318 | 15,709,672 | 3,961,398,338 |
| 1984 | 3,508,475,799 | 913,008,621 | 27,260,940 | 4,448,745,360 |
| 1985 | 3,055,687,773 | 818,533,627 | 48,198,926 | 3,922,420,326 |
| 1986 | 2,870,347,386 | 959,161,285 | 41,850,867 | 3,871,359,539 |
| 1987 | 3,117,669,167 | 1,180,839,487 | 40,181,438 | 4,338,690,093 |
| 1988 | 3,036,077,646 | 1,155,285,485 | 33,891,880 | 4,225,255,011 |
| 1989 | 2,947,545,132 | 1,142,237,197 | 28,013,874 | 4,117,796,204 |
| 1990 | 3,633,554,307 | 1,321,607,333 | 37,775,234 | 4,992,936,873 |
| 1991 | 3,225,373,562 | 1,161,671,524 | 39,828,917 | 4,426,874,003 |
| 1992 | 3,272,561,370 | 1,215,055,449 | 40,071,149 | 4,593,647,066 |
| 1993 | 3,320,312,261 | 1,007,755,289 | 41,255,853 | 4,444,381,437 |
| 1994 | 3,423,837,064 | 994,291,314 | 40,860,740 | 4,565,582,229 |
| 1995 | 3,564,677,663 | 890,682,224 | 35,710,325 | 4,600,143,070 |
| 1996 | 3,709,198,609 | 953,772,416 | 37,080,328 | 4,925,771,640 |
| 1997 | 3,825,354,038 | 946,381,458 | 39,922,549 | 4,977,314,878 |
| 1998 | 3,814,583,541 | 850,572,237 | 25,912,242 | 4,740,449,969 |
| 1999 | 3,836,619,562 | 798,140,396 | 36,529,861 | 4,894,344,157 |
| 2000 | 3,761,812,062 | 869,068,079 | 36,131,657 | 4,879,959,028 |
| 2001 | 3,818,657,416 | 898,035,393 | 39,653,837 | 5,114,612,578 |

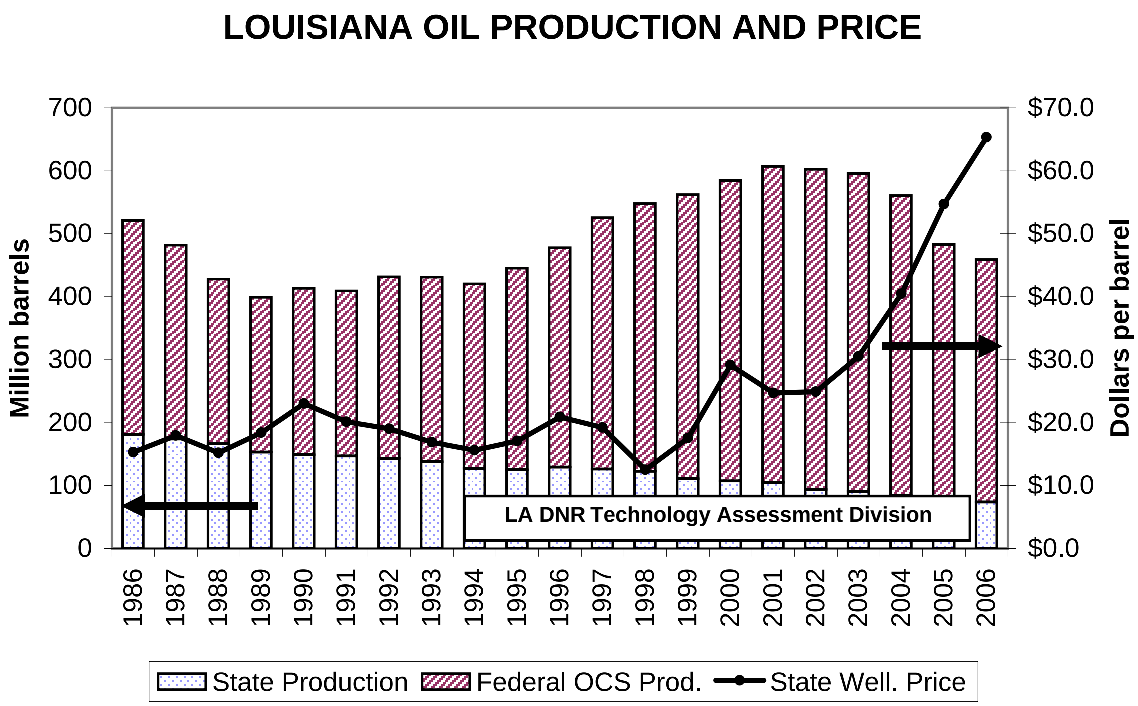
| | GULF OF MEXICO | | PACIFIC | TOTAL |
|---|---|---|---|---|
| | CENTRAL | WESTERN | | |
| 2002 | 3,510,522,709 | 999,720,152 | 35,248,976 | 4,575,073,329 |
| 2003 | 3,326,281,736 | 1,065,770,532 | 37,453,422 | 4,482,554,088 |
| 2004 | 2,883,809,634 | 1,099,125,084 | 37,501,415 | 4,087,674,506 |
| 2005 | 1,935,105,938 | 773,450,925 | 36,734,604 | 2,746,755,154 |

NOTE: Starting in 2002 MMS has not formaly published production by state adjacente areas

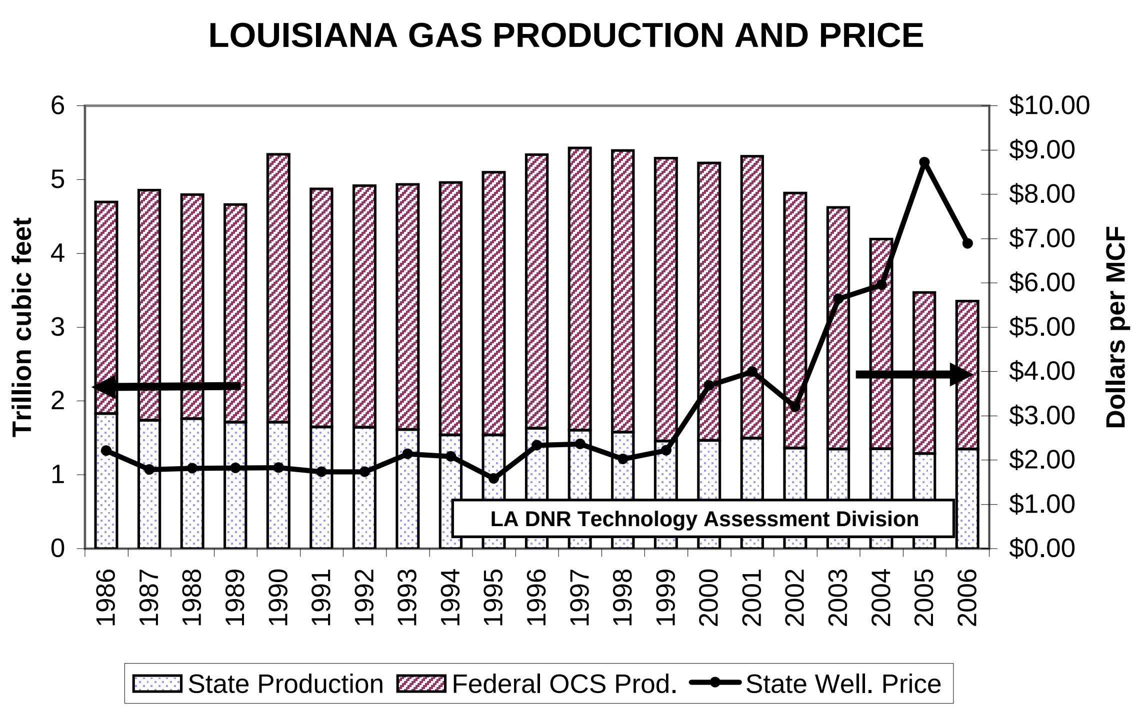
e Estimated r Revised p Preliminary

* See Appendix D-4 for corresponding volumes at 14.73 psia and footnote in Appendix B.

## Figure 7




## Figure 8



# Table 16

## UNITED STATES NATURAL GAS AND CASINGHEAD GAS PRODUCTION[3]

**(Billion Cubic Feet (BCF) at 15.025 psia and 60 degrees Fahrenheit)***

| DATE | GROSS | WET AFTER LEASE SEPARATION | MARKETED | DRY | GROSS IMPORTS |
|---|---|---|---|---|---|
| 1985 | 19,222 | 17,024 | 16,931 | 16,131 | 931 |
| 1986 | 18,755 | 16,623 | 16,528 | 15,744 | 736 |
| 1987 | 19,745 | 17,212 | 17,091 | 16,294 | 973 |
| 1988 | 20,587 | 17,706 | 17,567 | 16,767 | 1,268 |
| 1989 | 20,661 | 17,879 | 17,740 | 16,971 | 1,354 |
| 1990 | 21,100 | 18,376 | 18,229 | 17,460 | 1,502 |
| 1991 | 21,322 | 18,336 | 18,169 | 17,351 | 1,738 |
| 1992 | 21,698 | 18,509 | 18,344 | 17,490 | 2,096 |
| 1993 | 22,279 | 18,832 | 18,609 | 17,740 | 2,304 |
| 1994 | 23,118 | 19,547 | 19,323 | 18,451 | 2,572 |
| 1995 | 23,277 | 19,402 | 19,123 | 18,233 | 2,785 |
| 1996 | 23,640 | 19,690 | 19,423 | 18,484 | 2,880 |
| 1997 | 23,737 | 19,727 | 19,475 | 18,531 | 2,935 |
| 1998 | 23,635 | 19,670 | 19,569 | 18,650 | 3,090 |
| 1999 | 23,355 | 19,524 | 19,416 | 18,462 | 3,515 |
| 2000 | 23,699 | 19,890 | 19,801 | 18,805 | 3,707 |
| 2001 | 24,020 | 20,261 | 20,166 | 19,231 | 3,899 |
| 2002 | 23,471 | 19,627 | 19,530 | 18,591 | 3,937 |
| 2003 | 23,645 | 19,678 | 19,582 | 18,724 | 3,866 |
| 2004 | 23,583 | 19,393 | 19,298 | 18,389 | 4,175 r |
| | | | | | |
| January | 2,029 | 1,653 | 1,645 | 1,567 | 395 r |
| February | 1,853 | 1,509 | 1,502 | 1,431 | 347 |
| March | 2,039 | 1,659 | 1,651 | 1,573 | 370 r |
| April | 1,943 | 1,597 | 1,589 | 1,514 | 319 r |
| May | 1,984 | 1,627 | 1,619 | 1,543 | 326 r |
| June | 1,920 | 1,598 | 1,589 | 1,515 | 314 r |
| July | 1,934 | 1,612 | 1,604 | 1,528 | 377 r |
| August | 1,952 | 1,619 | 1,610 | 1,534 | 343 r |
| September | 1,728 | 1,401 | 1,393 | 1,327 | 338 |
| October | 1,837 | 1,481 | 1,473 | 1,404 | 360 |
| November | 1,890 | 1,520 | 1,513 | 1,442 | 352 |
| December | 1,946 | 1,589 | 1,581 | 1,507 | 402 |
| **2005 Total** | **23,056** | **18,865** | **18,769** | **17,885** | **4,242** |
| | | | | | |
| January | 1,972 | 1,604 | 1,596 | 1,527 | 355 |
| February | 1,780 | 1,444 | 1,437 | 1,375 | 316 |
| March | 1,993 | 1,619 | 1,610 | 1,541 | 343 |
| April | 1,923 | 1,559 | 1,551 | 1,482 | 330 |
| May | 1,964 | 1,601 | 1,592 | 1,521 | 346 |
| June | 1,889 | 1,559 | 1,549 | 1,480 | 343 |
| July | 1,920 | 1,597 | 1,587 | 1,516 | 355 |
| August | 1,890 | 1,646 | 1,637 | 1,567 | 350 |
| September | 1,892 | 1,594 | 1,584 | 1,514 | 312 |
| October | 1,924 | 1,632 | 1,623 | 1,554 | 314 |
| November | N/A | N/A | N/A | N/A | N/A |
| December | N/A | N/A | N/A | N/A | N/A |
| **2006 Total** | **19,147** | **15,854** | **15,765** | **15,076** | **3,365** |

e Estimated r Revised p Preliminary

* See Appendix D-5 for corresponding volumes at 14.73 psia and footnote in Appendix B.

# TABLE 17

## LOUISIANA AVERAGE CRUDE OIL PRICES

**(Dollars per Barrel)**

| | SOUTH LOUISIANA SWEET | | ALL GRADES AT WELLHEAD | | | |
|---|---|---|---|---|---|---|
| **DATE** | **Spot Market[10]** | **Refinery Posted** | **State[6]** | **OCS Gulf[6]** | **Severance Tax[8]** | **State Royalty** |
| 1985 | 28.42 | 27.86 | 27.22 | 27.33 | 27.18 | 27.40 |
| 1986 | 14.72 | 15.71 | 15.32 | 15.27 | 17.23 | 15.78 |
| 1987 | 19.38 | 18.52 | 17.97 | 17.54 | 17.55 | 17.85 |
| 1988 | 16.13 | 15.75 | 15.22 | 14.71 | 16.38 | 14.67 |
| 1989 | 19.75 | 18.97 | 18.39 | 17.83 | 17.87 | 17.92 |
| 1990 | 25.11 | 23.35 | 23.04 | 22.40 | 22.54 | 22.76 |
| 1991 | 21.70 | 20.60 | 20.15 | 19.40 | 21.13 | 19.90 |
| 1992 | 20.77 | 19.72 | 19.01 | 18.38 | 19.31 | 19.10 |
| 1993 | 18.56 | 17.27 | 16.72 | 16.17 | 17.39 | 16.84 |
| 1994 | 17.25 | 15.84 | 15.61 | 14.72 | 15.46 | 15.52 |
| 1995 | 18.60 | 17.16 | 17.06 | 16.16 | 16.98 | 17.06 |
| 1996 | 22.32 | 20.77 | 20.87 | 20.00 | 20.56 | 21.24 |
| 1997 | 20.69 | 18.90 | 19.23 | 18.63 | 19.80 | 19.22 |
| 1998 | 14.21 | 12.17 | 12.52 | 12.03 | 13.47 | 12.31 |
| 1999 | 19.00 | 16.73 | 17.55 | 16.46 | 16.09 | 17.22 |
| 2000 | 30.29 | 27.88 | 29.14 | 27.57 | 28.10 | 25.96 |
| 2001 | 25.84 | 23.23 | 24.70 | 23.36 | 26.23 | 19.81 |
| 2002 | 26.18 | 23.14 | 24.92 | 23.36 | 25.17 | 24.39 |
| 2003 | 31.20 | 27.88 | 30.50 | 28.69 | 30.28 | 29.77 |
| 2004 | 41.47 | 37.85 | 40.43 | 37.54 | 38.34 | 39.06 |
| January | 46.60 | 43.18 | 45.04 | 41.02 | 47.82 | 41.83 |
| February | 47.67 | 44.41 | 46.41 | 42.44 | 49.14 | 45.99 |
| March | 54.49 | 50.88 | 52.39 | 47.43 | 48.79 | 55.73 |
| April | 53.48 | 49.51 | 51.11 | 49.25 | 49.84 | 43.65 |
| May | 50.42 | 45.88 | 47.68 | 45.42 | 49.66 | 44.87 |
| June | 56.64 | 52.59 | 54.21 | 48.92 | 43.21 | 49.99 |
| July | 58.98 | 55.16 | 56.89 | 53.14 | 53.32 | 55.71 |
| August | 65.66 | 61.12 | 62.45 | 57.40 | 65.06 | 59.97 |
| September | 67.19 | 61.59 | 63.41 | 59.22 | 60.39 | 62.88 |
| October | 62.77 | 58.71 | 61.48 | 58.10 | 65.12 | 56.98 |
| November | 58.59 | 54.56 | 57.67 | 55.41 | 60.50 | 52.03 |
| December | 59.78 | 55.36 | 57.42 | 53.91 | 62.57 | 56.91 |
| **2005 Total** | **56.86** | **52.75** | **54.68** | **50.97** | **54.62** | **52.21** |
| January | 66.01 | 61.38 | 62.92 | 56.91 | 58.61 | 58.97 |
| February | 62.22 | 58.29 | 60.11 | 57.00 | 58.70 | 59.56 |
| March | 64.33 | 59.02 | 60.67 | 57.99 | 61.79 | 60.89 |
| April | 71.43 | 66.27 | 67.89 | 62.01 | 60.26 | 61.06 |
| May | 72.51 | 67.08 | 68.72 | 64.58 | 62.64 | 68.73 |
| June | 71.84 | 67.27 | 69.58 | 63.34 | 66.56 | 69.39 |
| July | 76.27 | 70.69 | 70.96 | 67.48 | 64.68 | 72.67 |
| August | 75.05 | 69.40 | 71.79 | 68.52 | 70.16 | 71.08 |
| September | 63.91 | 60.66 | 63.40 | 62.96 | 71.34 | N/A |
| October | 59.52 | 55.41 | 57.03 | 55.45 | 67.20 | 54.30 |
| November | 61.53 | 55.11 | N/A | N/A | 63.37 | 55.74 |
| December | 64.67 | 58.36 | N/A | N/A | 57.35 | 55.14 |
| **2006 Total** | **67.44** | **62.41** | **65.31** | **61.62** | **63.55** | **62.50** |

e Estimated r Revised p Preliminary

See footnote in Appendix B.

**Figure 9**

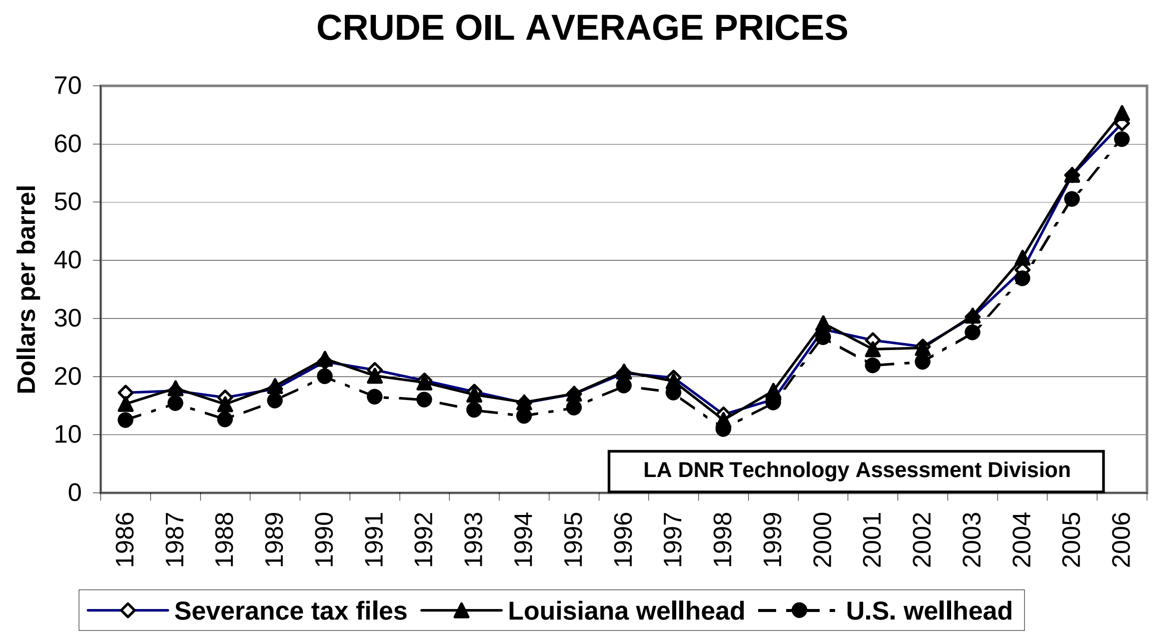
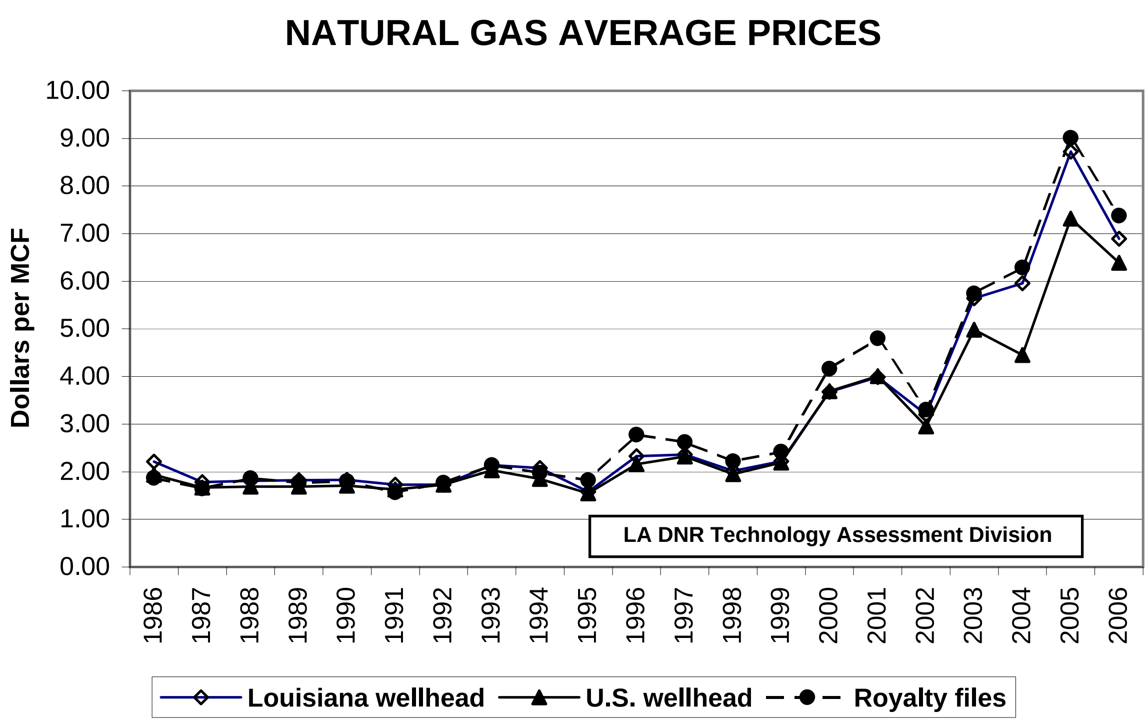



**Figure 10**



# TABLE 18

## UNITED STATES AVERAGE CRUDE OIL PRICES[2]

(Dollars per Barrel)

| DATE | REFINERY ACQUISITION Domestic Costs | REFINERY ACQUISITION Imports Costs | DOMESTIC WELLHEAD | IMPORTS LANDED | IMPORTS FOB | IMPORTS OPEC FOB |
|---|---|---|---|---|---|---|
| 1986 | 14.82 | 14.00 | 12.51 | 13.49 | 12.52 | 12.21 |
| 1987 | 17.76 | 18.13 | 15.40 | 17.65 | 16.69 | 16.43 |
| 1988 | 14.74 | 14.56 | 12.58 | 14.08 | 13.25 | 13.43 |
| 1989 | 17.87 | 18.08 | 15.86 | 17.68 | 16.89 | 17.06 |
| 1990 | 22.59 | 21.76 | 20.03 | 21.13 | 20.37 | 20.40 |
| 1991 | 19.35 | 18.74 | 16.53 | 18.02 | 16.91 | 17.01 |
| 1992 | 18.62 | 18.12 | 16.00 | 17.65 | 16.66 | 16.76 |
| 1993 | 16.66 | 16.17 | 14.24 | 15.75 | 14.72 | 14.72 |
| 1994 | 15.64 | 15.41 | 13.19 | 15.07 | 14.13 | 13.94 |
| 1995 | 17.32 | 17.15 | 14.62 | 16.77 | 15.69 | 15.35 |
| 1996 | 20.81 | 20.60 | 18.46 | 20.27 | 19.24 | 18.87 |
| 1997 | 19.65 | 18.55 | 17.23 | 18.14 | 16.98 | 16.33 |
| 1998 | 13.15 | 12.35 | 10.94 | 11.86 | 10.75 | 10.17 |
| 1999 | 17.64 | 17.27 | 15.53 | 17.38 | 16.48 | 16.01 |
| 2000 | 29.08 | 27.68 | 26.72 | 27.54 | 26.26 | 25.55 |
| 2001 | 24.34 | 21.99 | 21.90 | 21.77 | 20.45 | 19.56 |
| 2002 | 24.56 | 23.63 | 22.50 | 23.82 | 22.57 | 22.19 |
| 2003 | 29.78 | 27.87 | 27.54 | 27.83 | 26.06 | 25.61 |
| 2004 | 38.97 | 35.79 | 36.86 | 36.05 | 33.73 | 33.99 |
| January | 41.82 | 37.56 | 40.18 | 38.49 | 35.76 | 37.51 |
| February | 43.80 | 39.72 | 42.19 | 40.71 | 39.06 | 41.07 |
| March | 48.87 | 45.73 | 47.56 | 45.95 | 44.29 | 45.71 |
| April | 49.64 | 45.25 | 47.26 | 45.43 | 43.90 | 45.34 |
| May | 47.91 | 43.19 | 44.03 | 44.51 | 42.88 | 44.44 |
| June | 52.13 | 49.28 | 49.83 | 49.99 | 48.53 | 51.11 |
| July | 55.80 | 52.79 | 53.35 | 53.85 | 51.87 | 53.46 |
| August | 60.57 | 58.67 | 58.90 | 58.33 | 57.10 | 59.86 |
| September | 62.84 | 58.79 | 59.64 | 58.26 | 57.87 | 60.70 r |
| October | 60.79 | 55.31 | 56.99 | 54.32 | 52.69 | 54.61 r |
| November | 56.52 | 49.97 | 53.20 | 51.03 | 48.82 | 50.88 r |
| December | 55.89 | 50.85 | 53.24 | 52.04 | 50.06 | 52.26 r |
| **2005 Total** | **53.05** | **48.93** | **50.53** | **49.41** | **47.74** | **49.75 r** |
| January | 60.12 | 55.90 | 57.85 | 55.52 | 53.96 | 56.15 |
| February | 59.06 | 52.80 | 55.69 | 52.92 | 51.35 | 54.41 |
| March | 58.44 | 55.31 | 55.59 | 56.58 | 54.72 | 58.37 |
| April | 64.03 | 62.41 | 62.51 | 63.39 | 62.12 | 65.03 |
| May | 67.13 | 64.39 | 64.31 | 64.66 | 62.98 | 65.34 |
| June | 67.75 | 63.97 | 64.36 | 64.45 | 61.49 | 64.69 |
| July | 70.57 | 67.99 | 67.72 | 67.87 | 65.68 | 67.59 |
| August | 70.38 | 66.19 | 67.21 | 65.13 | 62.75 | 62.75 |
| September | 62.56 | 57.29 | 59.36 | 57.30 | 54.68 | 55.83 |
| October | 56.80 | 52.71 | 53.26 | 52.10 | 50.05 | 51.39 |
| November | 55.22 | 52.54 | N/A | N/A | N/A | N/A |
| December | N/A | N/A | N/A | N/A | N/A | N/A |
| **2006 Total** | **62.91** | **59.23** | **60.79** | **59.99** | **57.98** | **60.16** |

e Estimated r Revised p Preliminary

See footnote in Appendix B.

# Table 19

## LOUISIANA NATURAL GAS WELLHEAD PRICES (MCF)

**(Dollars/Thousand Cubic Feet)**

| DATE | MMS OCS[12] | DOE State Wells[3] | DNR State Royalty | Henry Hub Settled NYMEX | SPOT MARKET[5] Low | High | Average |
|---|---|---|---|---|---|---|---|
| 1986 | 2.26 | 2.21 | 1.87 | N/A | 1.46 | 2.34 | 1.76 |
| 1987 | 1.82 | 1.78 | 1.65 | N/A | 1.40 | 1.82 | 1.55 |
| 1988 | 1.84 | 1.81 | 1.86 | N/A | 1.40 | 2.29 | 1.79 |
| 1989 | 1.86 | 1.82 | 1.77 | N/A | 1.40 | 2.29 | 1.76 |
| 1990 | 1.87 | 1.83 | 1.80 | N/A | 1.35 | 2.60 | 1.77 |
| 1991 | 1.77 | 1.73 | 1.57 | N/A | 1.43 | 1.56 | 1.50 |
| 1992 | 1.77 | 1.73 | 1.77 | N/A | 1.74 | 1.85 | 1.80 |
| 1993 | 2.18 | 2.14 | 2.14 | 2.19 | 2.08 | 2.21 | 2.15 |
| 1994 | 2.10 | 2.08 | 1.98 | 1.97 | 1.86 | 1.95 | 1.91 |
| 1995 | 1.61 | 1.58 | 1.82 | 1.70 | 1.62 | 1.68 | 1.65 |
| 1996 | 2.37 | 2.33 | 2.78 | 2.69 | 2.47 | 2.69 | 2.60 |
| 1997 | 2.63 | 2.36 | 2.62 | 2.69 | 2.54 | 2.67 | 2.60 |
| 1998 | 2.36 | 2.02 | 2.22 | 2.19 | 2.08 | 2.18 | 2.14 |
| 1999 | 2.18 | 2.22 | 2.42 | 2.36 | 2.25 | 2.36 | 2.31 |
| 2000 | 3.59 | 3.68 | 4.16 | 4.04 | 3.92 | 4.03 | 3.98 |
| 2001 | 4.05 | 3.99 | 4.80 | 4.44 | 4.27 | 4.47 | 4.38 |
| 2002 | 2.98 | 3.20 | 3.30 | 3.39 | 3.29 | 3.43 | 3.37 |
| 2003 | 5.12 | 5.64 | 5.74 | 5.61 | 5.32 | 5.92 | 5.66 |
| 2004 | 6.04 | 5.96 | 6.29 | 6.39 | 5.98 | 6.18 | 6.08 |
| January | N/A | N/A | 6.25 | 6.46 | 6.34 | 6.49 | 6.43 |
| February | N/A | N/A | 6.49 | 6.54 | 6.27 | 6.42 | 6.35 |
| March | N/A | N/A | 6.84 | 6.56 | 6.93 | 7.13 | 7.03 |
| April | N/A | N/A | 7.68 | 7.62 | 7.37 | 7.58 | 7.47 |
| May | N/A | N/A | 7.03 | 7.02 | 6.70 | 6.87 | 6.81 |
| June | N/A | N/A | 6.84 | 6.37 | 7.10 | 7.25 | 7.17 |
| July | N/A | N/A | 7.41 | 7.26 | 7.62 | 7.76 | 7.68 |
| August | N/A | N/A | 8.73 | 7.95 | 8.90 | 9.11 | 9.00 |
| September | N/A | N/A | 11.94 | 11.28 | 11.78 | 12.70 | 12.17 |
| October | N/A | N/A | 14.87 | 14.46 | 13.77 | 14.67 | 14.15 |
| November | N/A | N/A | 11.78 | 14.39 | 10.34 | 11.44 | 10.97 |
| December | N/A | N/A | 12.27 | 11.63 | 12.93 | 13.69 | 13.37 |
| **2005 Total** | **8.58** | **8.72** | **9.01** | **8.96** | **8.84** | **9.26** | **9.05** |
| January | N/A | N/A | 10.92 | 11.89 | 8.97 | 9.84 | 9.48 |
| February | N/A | N/A | 8.42 | 8.74 | 7.90 | 8.17 | 8.03 |
| March | N/A | N/A | 7.59 | 7.40 | 6.82 | 7.18 | 7.04 |
| April | N/A | N/A | 7.58 | 7.52 | 7.22 | 7.44 | 7.33 |
| May | N/A | N/A | 7.41 | 7.49 | 6.64 | 6.79 | 6.72 |
| June | N/A | N/A | 6.45 | 6.21 | 6.36 | 6.55 | 6.44 |
| July | N/A | N/A | 6.47 | 6.35 | 6.16 | 6.40 | 6.24 |
| August | N/A | N/A | 7.63 | 7.32 | 7.44 | 7.84 | 7.56 |
| September | N/A | N/A | 6.19 | 7.09 | 5.27 | 5.78 | 5.62 |
| October | N/A | N/A | 5.18 | 4.37 | 5.31 | 5.48 | 5.38 |
| November | N/A | N/A | 7.30 | 7.44 | 7.41 | 7.61 | 7.52 |
| December | N/A | N/A | N/A | 8.65 | 7.38 | 7.77 | 7.62 |
| **2006 Total** | **6.77** | **6.89** | **7.38** | **7.54** | **6.91** | **7.24** | **7.08** |

e Estimated r Revised p Preliminary

See footnote in Appendix B.

# Table 19A

## LOUISIANA NATURAL GAS WELLHEAD PRICES (MMBTU)

**(Dollars/MMBTU)**

| DATE | MMS OCS[12] | DOE State Wells[3] | DNR State Royalty | Henry Hub Settled NYMEX | SPOT MARKET[5] Low | High | Average |
|---|---|---|---|---|---|---|---|
| 1986 | 2.17 | 2.13 | 1.80 | N/A | 1.40 | 2.25 | 1.69 |
| 1987 | 1.75 | 1.71 | 1.59 | N/A | 1.35 | 1.75 | 1.49 |
| 1988 | 1.77 | 1.74 | 1.79 | N/A | 1.35 | 2.20 | 1.73 |
| 1989 | 1.79 | 1.75 | 1.70 | N/A | 1.35 | 2.20 | 1.70 |
| 1990 | 1.80 | 1.76 | 1.73 | N/A | 1.30 | 2.50 | 1.70 |
| 1991 | 1.70 | 1.66 | 1.51 | N/A | 1.38 | 1.50 | 1.44 |
| 1992 | 1.70 | 1.66 | 1.70 | N/A | 1.68 | 1.78 | 1.73 |
| 1993 | 2.10 | 2.06 | 2.05 | N/A | 2.00 | 2.12 | 2.06 |
| 1994 | 2.02 | 2.00 | 1.91 | 1.89 | 1.79 | 1.88 | 1.84 |
| 1995 | 1.55 | 1.52 | 1.75 | 1.63 | 1.56 | 1.61 | 1.59 |
| 1996 | 2.28 | 2.24 | 2.67 | 2.59 | 2.37 | 2.58 | 2.50 |
| 1997 | 2.53 | 2.27 | 2.52 | 2.59 | 2.44 | 2.57 | 2.50 |
| 1998 | 2.27 | 1.94 | 2.13 | 2.10 | 2.00 | 2.10 | 2.05 |
| 1999 | 2.10 | 2.13 | 2.33 | 2.27 | 2.17 | 2.27 | 2.22 |
| 2000 | 3.45 | 3.54 | 4.00 | 3.88 | 3.77 | 3.88 | 3.83 |
| 2001 | 3.89 | 3.84 | 4.62 | 4.27 | 4.11 | 4.30 | 4.21 |
| 2002 | 2.87 | 2.93 | 3.17 | 3.26 | 3.16 | 3.30 | 3.24 |
| 2003 | 4.92 | 5.03 | 5.52 | 5.40 | 5.11 | 5.69 | 5.44 |
| 2004 | 5.81 | 5.73 | 6.04 | 6.15 | 5.75 | 5.95 | 5.85 |
| January | N/A | N/A | 6.01 | 6.21 | 6.10 | 6.24 | 6.18 |
| February | N/A | N/A | 6.24 | 6.29 | 6.03 | 6.17 | 6.10 |
| March | N/A | N/A | 6.58 | 6.30 | 6.66 | 6.86 | 6.76 |
| April | N/A | N/A | 7.39 | 7.32 | 7.09 | 7.29 | 7.18 |
| May | N/A | N/A | 6.76 | 6.75 | 6.44 | 6.60 | 6.55 |
| June | N/A | N/A | 6.57 | 6.12 | 6.83 | 6.97 | 6.89 |
| July | N/A | N/A | 7.13 | 6.98 | 7.32 | 7.46 | 7.39 |
| August | N/A | N/A | 8.39 | 7.65 | 8.56 | 8.76 | 8.65 |
| September | N/A | N/A | 11.48 | 10.85 | 11.33 | 12.21 | 11.70 |
| October | N/A | N/A | 14.30 | 13.91 | 13.24 | 14.11 | 13.61 |
| November | N/A | N/A | 11.32 | 13.83 | 9.94 | 11.00 | 10.55 |
| December | N/A | N/A | 11.80 | 11.18 | 12.43 | 13.16 | 12.86 |
| **2005 Total** | **8.25** | **8.38** | **8.66** | **8.62** | **8.50** | **8.90** | **8.70** |
| January | N/A | N/A | 10.50 | 11.43 | 8.62 | 9.46 | 9.11 |
| February | N/A | N/A | 8.10 | 8.40 | 7.59 | 7.86 | 7.72 |
| March | N/A | N/A | 7.30 | 7.11 | 6.56 | 6.91 | 6.77 |
| April | N/A | N/A | 7.29 | 7.23 | 6.94 | 7.16 | 7.05 |
| May | N/A | N/A | 7.12 | 7.20 | 6.38 | 6.53 | 6.46 |
| June | N/A | N/A | 6.20 | 5.98 | 6.11 | 6.30 | 6.19 |
| July | N/A | N/A | 6.22 | 6.11 | 5.93 | 6.15 | 6.00 |
| August | N/A | N/A | 7.34 | 7.04 | 7.15 | 7.54 | 7.27 |
| September | N/A | N/A | 5.96 | 6.82 | 5.07 | 5.56 | 5.41 |
| October | N/A | N/A | 4.98 | 4.20 | 5.10 | 5.27 | 5.17 |
| November | N/A | N/A | 7.02 | 7.15 | 7.13 | 7.32 | 7.23 |
| December | N/A | N/A | N/A | 8.32 | 7.10 | 7.47 | 7.33 |
| **2006 Total** | **6.51** | **6.63** | **7.09** | **7.25** | **6.64** | **6.96** | **6.81** |

e Estimated r Revised p Preliminary

See footnote in Appendix B.

# Table 20

## LOUISIANA AVERAGE NATURAL GAS PRICES
## DELIVERED TO CONSUMER [3] (MCF)
### (Dollars/Thousand Cubic Feet)

| DATE | CITY GATES | RESIDENTIAL | COMMERCIAL | INDUSTRIAL | UTILITY |
|---|---|---|---|---|---|
| 1986 | 2.95 | 5.77 | 5.25 | 1.91 | 1.94 |
| 1987 | 2.38 | 5.56 | 4.97 | 1.80 | 1.67 |
| 1988 | 2.93 | 5.74 | 5.14 | 1.99 | 1.70 |
| 1989 | 3.01 | 5.97 | 5.19 | 1.97 | 1.78 |
| 1990 | 2.97 | 6.09 | 5.26 | 2.00 | 1.73 |
| 1991 | 2.56 | 6.24 | 4.91 | 1.74 | 1.63 |
| 1992 | 2.48 | 6.19 | 4.85 | 2.00 | 1.93 |
| 1993 | 2.75 | 6.68 | 5.41 | 2.31 | 2.49 |
| 1994 | 2.52 | 6.78 | 5.39 | 2.18 | 2.24 |
| 1995 | 2.17 | 6.59 | 5.15 | 1.82 | 1.92 |
| 1996 | 3.03 | 7.55 | 6.18 | 2.83 | 3.07 |
| 1997 | 2.94 | 7.60 | 6.12 | 2.87 | 2.88 |
| 1998 | 2.32 | 7.51 | 5.72 | 2.43 | 2.40 |
| 1999 | 2.73 | 7.55 | 5.83 | 2.51 | 2.55 |
| 2000 | 4.50 | 9.20 | 7.52 | 4.01 | 4.56 |
| 2001 | 5.11 | 9.99 | 7.85 | 5.22 | 4.56 |
| 2002 | 4.07 | 9.06 | 6.82 | 3.68 | 3.71 |
| 2003 | 5.43 | 11.69 | 8.87 | 5.59 | 6.18 |
| 2004 | 6.46 | 12.50 | 9.66 | 6.50 | 6.56 |
| | | | | | |
| January | 6.79 | 10.87 | 10.40 | 6.86 | 6.74 |
| February | 6.91 | 10.90 | 10.01 | 7.31 | 6.70 |
| March | 6.85 | 11.22 | 9.95 | 6.81 | 7.20 |
| April | 7.62 | 12.71 | 10.11 | 7.81 | 7.78 |
| May | 6.93 | 14.19 | 10.12 | 7.14 | 7.15 |
| June | 6.92 | 14.62 | 9.82 | 6.88 | 7.46 |
| July | 7.78 | 15.88 | 10.41 | 7.69 | 7.96 |
| August | 8.59 | 16.75 | 11.57 | 8.45 | 9.15 r |
| September | 11.20 | 18.81 | 13.47 | 11.78 | 13.07 |
| October | 13.86 | 20.80 | 15.04 | 14.71 | 14.91 |
| November | 12.65 | 17.61 | 14.58 | 13.93 | 12.25 |
| December | 11.06 | 14.15 | 14.01 | 12.54 | 13.64 |
| **2005 Total** | **8.93** | **14.88** | **11.62** | **9.33** | **9.50 r** |
| | | | | | |
| January | 11.29 | 14.51 | 13.69 | 11.80 | 11.24 |
| February | 8.02 | 12.61 | 12.04 | 8.83 | 8.56 |
| March | 7.64 | 13.98 | 12.25 | 7.37 | 7.98 |
| April | 7.58 | 14.66 | 11.36 | 7.45 | 7.69 |
| May | 7.17 | 16.87 | 11.79 | 7.26 | 6.99 |
| June | 6.95 | N/A | N/A | 7.07 | 6.88 |
| July | 6.92 | N/A | 10.69 | 7.14 | 6.78 |
| August | 7.34 | 17.51 | 10.35 | 7.82 | 7.90 |
| September | 6.35 | 16.83 | 9.32 | 7.19 | N/A |
| October | 5.35 | 14.22 | 9.96 | 5.23 | N/A |
| November | N/A | N/A | N/A | N/A | N/A |
| December | N/A | N/A | N/A | N/A | N/A |
| **2006 Total** | **7.46** | **15.15** | **11.27** | **7.72** | **8.00** |

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See footnote in Appendix B.

# Table 20A

## LOUISIANA AVERAGE NATURAL GAS PRICES
## DELIVERED TO CONSUMER [3] (MMBTU)
### (Dollars/MMBTU)

| DATE | CITY GATES | RESIDENTIAL | COMMERCIAL | INDUSTRIAL | UTILITY |
|---|---|---|---|---|---|
| 1986 | 2.84 | 5.55 | 5.05 | 1.84 | 1.87 |
| 1987 | 2.29 | 5.35 | 4.78 | 1.73 | 1.61 |
| 1988 | 2.82 | 5.52 | 4.94 | 1.91 | 1.63 |
| 1989 | 2.89 | 5.74 | 4.99 | 1.89 | 1.71 |
| 1990 | 2.86 | 5.86 | 5.06 | 1.92 | 1.66 |
| 1991 | 2.46 | 6.00 | 4.72 | 1.67 | 1.57 |
| 1992 | 2.38 | 5.95 | 4.66 | 1.92 | 1.86 |
| 1993 | 2.64 | 6.42 | 5.20 | 2.22 | 2.39 |
| 1994 | 2.42 | 6.52 | 5.18 | 2.09 | 2.16 |
| 1995 | 2.09 | 6.33 | 4.95 | 1.75 | 1.84 |
| 1996 | 2.91 | 7.26 | 5.94 | 2.72 | 2.95 |
| 1997 | 2.83 | 7.30 | 5.88 | 2.76 | 2.77 |
| 1998 | 2.23 | 7.22 | 5.50 | 2.34 | 2.31 |
| 1999 | 2.63 | 7.26 | 5.60 | 2.42 | 2.45 |
| 2000 | 4.33 | 8.84 | 7.23 | 3.85 | 4.39 |
| 2001 | 4.91 | 9.60 | 7.55 | 5.02 | 4.39 |
| 2002 | 3.92 | 8.71 | 6.56 | 3.54 | 3.56 |
| 2003 | 5.22 | 11.24 | 8.53 | 5.37 | 5.94 |
| 2004 | 6.21 | 12.02 | 9.29 | 6.25 | 6.29 |
| | | | | | |
| January | 6.53 | 10.45 | 10.00 | 6.60 | 6.48 |
| February | 6.64 | 10.48 | 9.63 | 7.03 | 6.44 |
| March | 6.59 | 10.79 | 9.57 | 6.55 | 6.92 |
| April | 7.33 | 12.22 | 9.72 | 7.51 | 7.48 |
| May | 6.66 | 13.64 | 9.73 | 6.87 | 6.88 |
| June | 6.65 | 14.06 | 9.44 | 6.62 | 7.17 |
| July | 7.48 | 15.27 | 10.01 | 7.39 | 7.65 |
| August | 8.26 | 16.11 | 11.13 | 8.13 | 8.80 |
| September | 10.77 | 18.09 | 12.95 | 11.33 | 12.57 |
| October | 13.33 | 20.00 | 14.46 | 14.14 | 14.34 |
| November | 12.16 | 16.93 | 14.02 | 13.39 | 11.78 |
| December | 10.63 | 13.61 | 13.47 | 12.06 | 13.12 |
| **2005 Total** | **8.59** | **14.30** | **11.18** | **8.97** | **9.14** |
| | | | | | |
| January | 10.86 | 13.95 | 13.16 | 11.35 | 10.81 |
| February | 7.71 | 12.13 | 11.58 | 8.49 | 8.23 |
| March | 7.35 | 13.44 | 11.78 | 7.09 | 7.67 |
| April | 7.29 | 14.10 | 10.92 | 7.16 | 7.39 |
| May | 6.89 | 16.22 | 11.34 | 6.98 | 6.72 |
| June | 6.68 | N/A | N/A | 6.80 | 6.62 |
| July | 6.65 | N/A | 10.28 | 6.87 | 6.52 |
| August | 7.06 | 16.84 | 9.95 | 7.52 | 7.60 |
| September | 6.11 | 16.18 | 8.96 | 6.91 | N/A |
| October | 5.14 | 13.67 | 9.58 | 5.03 | N/A |
| November | N/A | N/A | N/A | N/A | N/A |
| December | N/A | N/A | N/A | N/A | N/A |
| **2006 Total** | **7.17** | **14.57** | **10.84** | **7.42** | **7.69** |

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See footnote in Appendix B.

# Table 21

## UNITED STATES AVERAGE NATURAL GAS PRICES (MCF)

**(Dollars/Thousand Cubic Feet)**

| DATE | WELLHEAD[3] | SPOT MARKET[5] | FOREIGN IMPORTS[3] | CITY GATES[3] | DELIVERED TO RESIDENTIAL[3] |
|---|---|---|---|---|---|
| 1986 | 1.94 | 1.68 | 2.53 | 3.22 | 5.83 |
| 1987 | 1.67 | 1.48 | 2.17 | 2.87 | 5.54 |
| 1988 | 1.69 | 1.69 | 2.00 | 2.92 | 5.47 |
| 1989 | 1.69 | 1.64 | 2.04 | 3.01 | 5.64 |
| 1990 | 1.71 | 1.67 | 1.94 | 3.03 | 5.80 |
| 1991 | 1.63 | 1.45 | 1.82 | 2.90 | 6.22 |
| 1992 | 1.73 | 1.75 | 1.85 | 3.01 | 6.28 |
| 1993 | 2.03 | 2.10 | 2.03 | 3.21 | 6.67 |
| 1994 | 1.85 | 1.84 | 1.87 | 3.07 | 6.89 |
| 1995 | 1.55 | 1.56 | 1.49 | 2.78 | 6.58 |
| 1996 | 2.16 | 2.39 | 1.96 | 3.27 | 6.97 |
| 1997 | 2.32 | 2.54 | 2.15 | 3.66 | 6.94 |
| 1998 | 1.95 | 2.11 | 1.97 | 3.07 | 7.45 |
| 1999 | 2.19 | 2.28 | 2.23 | 3.10 | 7.34 |
| 2000 | 3.69 | 3.94 | 3.88 | 4.62 | 8.51 |
| 2001 | 4.02 | 4.34 | 4.36 | 5.24 | 9.91 |
| 2002 | 2.95 | 3.26 | 3.14 | 4.10 | 8.60 |
| 2003 | 4.98 | 5.48 | 5.18 | 5.84 | 10.48 |
| 2004 | 5.45 | 5.94 | 5.78 | 6.61 | 11.63 |
| January | 5.80 | 6.62 | 6.30 | 7.05 | 11.03 |
| February | 5.74 | 6.30 | 6.14 | 7.09 | 11.02 |
| March | 5.95 | 7.02 | 6.25 | 7.24 | 11.00 |
| April | 6.58 | 7.45 | 6.92 | 7.79 | 12.02 |
| May | 6.24 | 6.66 | 6.58 | 7.51 | 12.88 |
| June | 6.09 | 6.89 | 6.35 | 7.30 | 13.92 |
| July | 6.71 | 7.44 | 6.83 | 7.68 | 14.99 |
| August | 6.48 | 8.58 | 7.50 | 8.20 | 15.66 |
| September | 8.96 | 12.12 | 9.95 | 10.26 | 16.70 |
| October | 10.35 | 12.66 | 11.99 | 12.16 | 16.56 |
| November | 9.91 | 9.84 | 11.31 | 11.57 | 15.78 |
| December | 9.08 | 12.48 | 10.91 | 10.77 | 14.75 |
| **2005 Total** | **7.32** | **8.67** | **8.09** | **8.72** | **13.86** |
| January | 8.66 | 9.02 | 10.11 | 10.66 | 14.94 |
| February | 7.28 | 7.76 | 7.96 | 9.27 | 14.03 |
| March | 6.52 | 6.72 | 7.01 | 8.74 | 13.20 |
| April | 6.59 | 6.90 | 6.72 | 8.11 | 13.30 |
| May | 6.19 | 6.37 | 6.53 | 7.86 | 14.39 |
| June | 5.80 | 6.19 | 5.82 | 7.22 | 14.98 |
| July | 5.82 | 6.11 | 5.81 | 7.13 | 15.67 |
| August | 6.51 | 7.28 | N/A | 7.97 | 16.11 |
| September | 5.51 | 5.53 | N/A | 7.54 | 15.46 |
| October | 5.03 | 5.25 | N/A | 6.38 | 12.74 |
| November | N/A | 7.15 | N/A | N/A | N/A |
| December | N/A | 7.43 | N/A | N/A | N/A |
| **2006 Total** | **6.39** | **6.81** | **7.14** | **8.09** | **14.48** |

e Estimated r Revised p Preliminary

See footnote in Appendix B.

# Table 21A

## UNITED STATES AVERAGE NATURAL GAS PRICES (MMBTU)
**(Dollars/MMBTU)**

| DATE | WELLHEAD[3] | SPOT MARKET[5] | FOREIGN IMPORTS[3] | CITY GATES[3] | DELIVERED TO RESIDENTIAL[3] |
|---|---|---|---|---|---|
| 1986 | 1.87 | 1.62 | 2.43 | 3.10 | 5.61 |
| 1987 | 1.61 | 1.42 | 2.09 | 2.76 | 5.33 |
| 1988 | 1.63 | 1.63 | 1.92 | 2.81 | 5.26 |
| 1989 | 1.63 | 1.58 | 1.96 | 2.89 | 5.42 |
| 1990 | 1.64 | 1.61 | 1.87 | 2.91 | 5.58 |
| 1991 | 1.57 | 1.40 | 1.75 | 2.76 | 5.98 |
| 1992 | 1.67 | 1.68 | 1.78 | 2.91 | 6.04 |
| 1993 | 1.95 | 2.02 | 1.95 | 3.14 | 6.42 |
| 1994 | 1.78 | 1.77 | 1.80 | 2.95 | 6.63 |
| 1995 | 1.49 | 1.50 | 1.43 | 2.69 | 6.33 |
| 1996 | 2.08 | 2.30 | 1.88 | 3.19 | 6.70 |
| 1997 | 2.23 | 2.44 | 2.07 | 3.44 | 7.16 |
| 1998 | 1.88 | 2.03 | 1.89 | 2.94 | 7.16 |
| 1999 | 2.11 | 2.19 | 2.15 | 3.04 | 7.06 |
| 2000 | 3.54 | 3.79 | 3.73 | 4.48 | 8.18 |
| 2001 | 3.86 | 4.17 | 4.19 | 5.04 | 9.53 |
| 2002 | 2.83 | 3.14 | 3.02 | 3.94 | 8.27 |
| 2003 | 4.78 | 5.27 | 4.98 | 5.62 | 10.07 |
| 2004 | 5.24 | 5.71 | 5.56 | 6.35 | 11.18 |
| January | 5.58 | 6.37 | 6.06 | 6.78 | 10.61 |
| February | 5.52 | 6.06 | 5.90 | 6.82 | 10.60 |
| March | 5.72 | 6.75 | 6.01 | 6.96 | 10.58 |
| April | 6.33 | 7.16 | 6.65 | 7.49 | 11.56 |
| May | 6.00 | 6.40 | 6.33 | 7.22 | 12.38 |
| June | 5.86 | 6.63 | 6.11 | 7.02 | 13.38 |
| July | 6.45 | 7.15 | 6.57 | 7.38 | 14.41 |
| August | 6.23 | 8.25 | 7.21 | 7.88 | 15.06 |
| September | 8.62 | 11.65 | 9.57 | 9.87 | 16.06 |
| October | 9.95 | 12.17 | 11.53 | 11.69 | 15.92 |
| November | 9.53 | 9.46 | 10.88 | 11.13 | 15.17 |
| December | 8.73 | 12.00 | 10.49 | 10.36 | 14.18 |
| **2005 Total** | **7.04** | **8.34** | **7.77** | **8.38** | **13.33** |
| January | 8.33 | 8.67 | 9.72 | 10.25 | 14.37 |
| February | 7.00 | 7.46 | 7.65 | 8.91 | 13.49 |
| March | 6.27 | 6.46 | 6.74 | 8.40 | 12.69 |
| April | 6.34 | 6.64 | 6.46 | 7.80 | 12.79 |
| May | 5.95 | 6.13 | 6.28 | 7.56 | 13.84 |
| June | 5.58 | 5.96 | 5.60 | 6.94 | 14.40 |
| July | 5.60 | 5.87 | 5.59 | 6.86 | 15.07 |
| August | 6.26 | 7.00 | N/A | 7.66 | 15.49 |
| September | 5.30 | 5.32 | N/A | 7.25 | 14.87 |
| October | 4.84 | 5.05 | N/A | 6.13 | 12.25 |
| November | N/A | 6.87 | N/A | N/A | N/A |
| December | N/A | 7.14 | N/A | N/A | N/A |
| **2006 Total** | **6.15** | **6.55** | **6.86** | **7.78** | **13.93** |

e Estimated r Revised p Preliminary

See footnote in Appendix B.

# Table 22

## LOUISIANA STATE OIL AND GAS DRILLING PERMITS ISSUED BY TYPE

**Excluding OCS**

| DATE | DEVELOPMENTAL + | WILDCATS | = TOTAL = | OFFSHORE + | ONSHORE |
|---|---|---|---|---|---|
| 1985 | 4,811 | 599 | 5,410 | 165 | 5,245 |
| 1986 | 1,984 | 298 | 2,282 | 84 | 2,198 |
| 1987 | 2,148 | 284 | 2,432 | 73 | 2,359 |
| 1988 | 1,601 | 249 | 1,850 | 94 | 1,756 |
| 1989 | 1,486 | 204 | 1,690 | 75 | 1,615 |
| 1990 | 1,526 | 181 | 1,707 | 85 | 1,622 |
| 1991 | 1,209 | 100 | 1,309 | 77 | 1,232 |
| 1992 | 1,044 | 92 | 1,136 | 59 | 1,077 |
| 1993 | 1,040 | 109 | 1,149 | 76 | 1,073 |
| 1994 | 1,015 | 98 | 1,113 | 74 | 1,039 |
| 1995 | 979 | 86 | 1,065 | 68 | 997 |
| 1996 | 1,248 | 133 | 1,381 | 121 | 1,260 |
| 1997 | 1,424 | 138 | 1,562 | 85 | 1,477 |
| 1998 | 1,171 | 115 | 1,286 | 96 | 1,190 |
| 1999 | 908 | 109 | 1,017 | 79 | 938 |
| 2000 | 1,363 | 90 | 1,453 | 151 | 1,302 |
| 2001 | 1,277 | 88 | 1,365 | 96 | 1,269 |
| 2002 | 902 | 123 | 1,025 | 90 | 935 |
| 2003 | 1,152 | 112 | 1,264 | 83 | 1,181 |
| 2004 | 1,535 | 98 | 1,633 | 57 | 1,576 |
| January | 161 | 10 | 171 | 7 | 164 |
| February | 125 | 13 | 138 | 3 | 135 |
| March | 156 | 7 | 163 | 6 | 157 |
| April | 105 | 9 | 114 | 5 | 109 |
| May | 191 | 7 | 198 | 10 | 188 |
| June | 173 | 16 | 189 | 5 | 184 |
| July | 187 | 14 | 201 | 5 | 196 |
| August | 150 | 9 | 159 | 10 | 149 |
| September | 153 | 8 | 161 | 4 | 157 |
| October | 147 | 8 | 155 | 11 | 144 |
| November | 194 | 7 | 201 | 6 | 195 |
| December | 140 | 6 | 146 | 2 | 144 |
| **2005 Total** | **1,882** | **114** | **1,996** | **74** | **1,922** |
| January | 150 | 7 | 157 | 4 | 153 |
| February | 149 | 6 | 155 | 10 | 145 |
| March | 209 | 1 | 210 | 1 | 209 |
| April | 166 | 5 | 171 | 11 | 160 |
| May | 180 | 9 | 189 | 2 | 187 |
| June | 203 | 19 | 222 | 6 | 216 |
| July | 164 | 4 | 168 | 7 | 161 |
| August | 155 | 11 | 166 | 3 | 163 |
| September | 175 | 11 | 186 | 6 | 180 |
| October | 159 | 6 | 165 | 5 | 160 |
| November | 175 | 8 | 183 | 1 | 182 |
| December | 155 | 10 | 165 | 5 | 160 |
| **2006 Total** | **2,040** | **97** | **2,137** | **61** | **2,076** |

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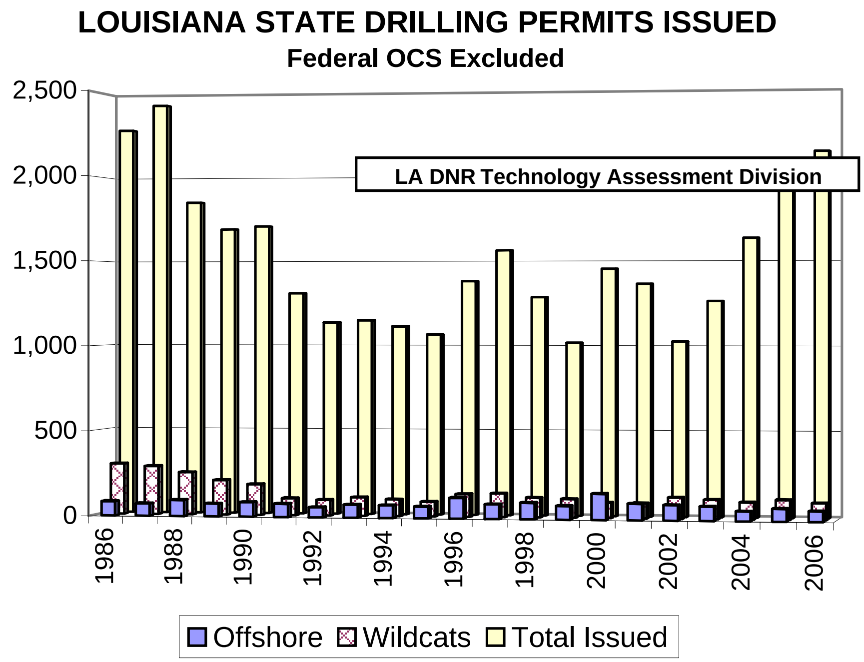
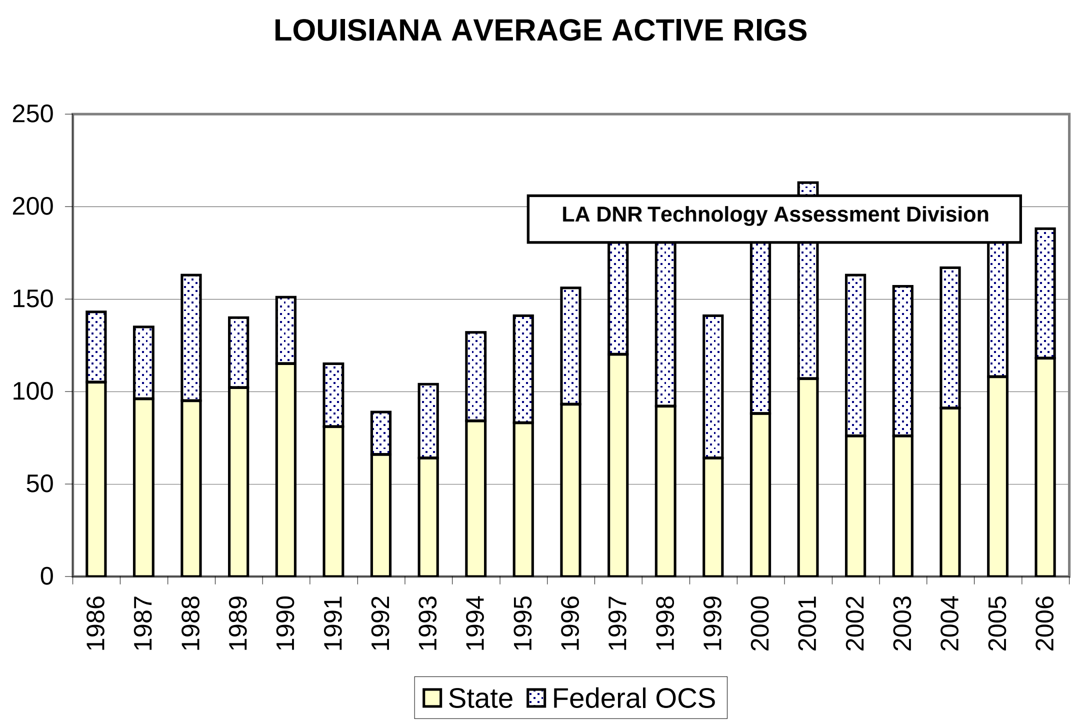
## Figure 11




## Figure 12



# Table 23

## LOUISIANA AVERAGE RIGS RUNNING

| DATE | State North[4] | State South Inland Water[4] | State South Inland Land[4] | State Offshore | Total State | Federal Offshore | Total Offshore[4] (State+OCS) | LA[4] TOTAL |
|---|---|---|---|---|---|---|---|---|
| 1985 | 25 | 44 | 86 | 78 | 232 | 52 | 130 | 283 |
| 1986 | 12 | 20 | 42 | 31 | 105 | 38 | 69 | 143 |
| 1987 | 11 | 23 | 36 | 26 | 96 | 39 | 65 | 135 |
| 1988 | 14 | 27 | 35 | 20 | 95 | 68 | 88 | 163 |
| 1989 | 16 | 17 | 35 | 34 | 102 | 38 | 72 | 140 |
| 1990 | 19 | 20 | 36 | 40 | 115 | 36 | 76 | 151 |
| 1991 | 11 | 16 | 31 | 23 | 81 | 34 | 57 | 115 |
| 1992 | 9 | 13 | 27 | 16 | 66 | 23 | 39 | 88 |
| 1993 | 11 | 12 | 22 | 19 | 64 | 40 | 59 | 104 |
| 1994 | 14 | 16 | 25 | 29 | 84 | 48 | 78 | 132 |
| 1995 | 16 | 15 | 28 | 23 | 82 | 58 | 81 | 141 |
| 1996 | 19 | 19 | 31 | 25 | 93 | 63 | 88 | 156 |
| 1997 | 21 | 23 | 48 | 28 | 120 | 74 | 102 | 194 |
| 1998 | 19 | 21 | 38 | 14 | 93 | 92 | 106 | 184 |
| 1999 | 16 | 16 | 21 | 12 | 65 | 76 | 88 | 141 |
| 2000 | 24 | 16 | 37 | 10 | 86 | 108 | 118 | 195 |
| 2001 | 30 | 20 | 44 | 10 | 104 | 108 | 119 | 213 |
| 2002 | 23 | 16 | 32 | 5 | 76 | 87 | 92 | 163 |
| 2003 | 29 | 14 | 29 | 4 | 76 | 81 | 85 | 157 |
| 2004 | 39 | 18 | 30 | 3 | 91 | 76 | 79 | 167 |
| January | 39 | 21 | 26 | 4 | 90 | 73 | 77 | 163 |
| February | 44 | 26 | 32 | 5 | 107 | 77 | 82 | 184 |
| March | 48 | 26 | 35 | 6 | 115 | 73 | 79 | 188 |
| April | 45 | 27 | 32 | 5 | 109 | 70 | 75 | 179 |
| May | 45 | 24 | 28 | 5 | 102 | 75 | 80 | 177 |
| June | 50 | 23 | 29 | 4 | 106 | 81 | 85 | 187 |
| July | 50 | 25 | 31 | 3 | 109 | 87 | 90 | 196 |
| August | 53 | 24 | 34 | 4 | 114 | 86 | 90 | 201 |
| September | 54 | 21 | 36 | 4 | 115 | 72 | 76 | 187 |
| October | 51 | 19 | 34 | 5 | 109 | 68 | 73 | 177 |
| November | 51 | 21 | 37 | 3 | 112 | 68 | 71 | 180 |
| December | 49 | 19 | 35 | 5 | 108 | 59 | 64 | 167 |
| **2005 Total** | **48** | **23** | **32** | **4** | **108** | **74** | **79** | **182** |
| January | 52 | 18 | 33 | 5 | 108 | 58 | 63 | 166 |
| February | 57 | 19 | 37 | 5 | 118 | 54 | 59 | 172 |
| March | 57 | 20 | 35 | 4 | 116 | 65 | 69 | 181 |
| April | 56 | 19 | 35 | 2 | 112 | 75 | 77 | 187 |
| May | 59 | 19 | 38 | 2 | 118 | 78 | 80 | 196 |
| June | 59 | 20 | 36 | 3 | 118 | 75 | 78 | 193 |
| July | 57 | 17 | 34 | 3 | 111 | 77 | 80 | 188 |
| August | 55 | 18 | 39 | 3 | 115 | 79 | 82 | 194 |
| September | 57 | 20 | 45 | 2 | 124 | 76 | 79 | 200 |
| October | 58 | 19 | 43 | 2 | 122 | 70 | 72 | 192 |
| November | 57 | 20 | 44 | 2 | 123 | 70 | 72 | 193 |
| December | 60 | 21 | 42 | 3 | 126 | 65 | 68 | 191 |
| **2006 Total** | **57** | **19** | **38** | **3** | **118** | **70** | **73** | **188** |

e Estimated r Revised p Preliminary

# Table 24

## LOUISIANA STATE PRODUCING CRUDE OIL WELLS
**Excluding OCS**

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1960 | 11,501 | 11,173 | N/A | 22,674 |
| 1961 | 11,790 | 12,202 | N/A | 23,993 |
| 1962 | 12,192 | 13,344 | N/A | 25,536 |
| 1963 | 12,833 | 14,144 | N/A | 26,977 |
| 1964 | 13,901 | 13,661 | 1,265 | 28,826 |
| 1965 | 14,505 | 11,558 | 3,938 | 30,001 |
| 1966 | 14,419 | 12,165 | 4,330 | 30,915 |
| 1967 | 14,191 | 12,183 | 4,677 | 31,051 |
| 1968 | 13,856 | 11,698 | 4,767 | 30,321 |
| 1969 | 13,670 | 11,131 | 4,954 | 29,756 |
| 1970 | 13,166 | 10,363 | 1,179 | 24,707 |
| 1971 | 12,889 | 9,626 | 1,107 | 23,623 |
| 1972 | 12,475 | 8,912 | 1,048 | 22,436 |
| 1973 | 11,698 | 8,249 | 1,025 | 20,972 |
| 1974 | 11,984 | 8,262 | 985 | 21,230 |
| 1975 | 12,259 | 8,094 | 936 | 21,288 |
| 1976 | 12,393 | 7,730 | 1,073 | 21,196 |
| 1977 | 12,915 | 7,444 | 1,067 | 21,425 |
| 1978 | 13,019 | 7,219 | 1,086 | 21,324 |
| 1979 | 12,961 | 6,859 | 1,078 | 20,898 |
| 1980 | 13,981 | 6,832 | 1,073 | 21,885 |
| 1981 | 15,084 | 6,777 | 1,105 | 22,966 |
| 1982 | 15,540 | 6,608 | 1,112 | 23,259 |
| 1983 | 16,299 | 6,374 | 1,037 | 23,710 |
| 1984 | 17,544 | 6,300 | 1,038 | 24,882 |
| 1985 | 18,794 | 6,223 | 1,014 | 26,031 |
| 1986 | 19,346 | 6,061 | 1,001 | 26,408 |
| 1987 | 18,630 | 5,768 | 945 | 25,343 |
| 1988 | 17,953 | 5,698 | 964 | 24,615 |
| 1989 | 16,849 | 5,474 | 927 | 23,250 |
| 1990 | 17,369 | 5,215 | 906 | 23,490 |
| 1991 | 17,731 | 5,143 | 868 | 23,742 |
| 1992 | 17,449 | 5,155 | 842 | 23,446 |
| 1993 | 16,810 | 5,015 | 814 | 22,640 |
| 1994 | 15,904 | 4,682 | 805 | 21,392 |
| 1995 | 15,260 | 4,451 | 769 | 20,479 |
| 1996 | 15,148 | 4,295 | 719 | 20,163 |
| 1997 | 14,573 | 4,165 | 619 | 20,358 |
| 1998 | 13,975 | 3,962 | 546 | 18,484 |
| 1999 | 13,747 | 3,971 | 546 | 18,264 |
| 2000 | 16,795 r | 3,914 r | 408 r | 21,117 r |
| 2001 | 16,494 r | 4,257 r | 393 r | 21,144 r |
| 2002 | 16,531 r | 4,071 r | 423 r | 21,026 r |
| 2003 | 16,516 r | 3,583 r | 467 r | 20,566 r |
| 2004 | 16,148 r | 3,485 r | 462 r | 20,095 r |
| 2005 | 17,153 r | 3,648 r | 317 r | 21,117 r |
| 2006 | 19,299 e | 4,087 e | 272 e | 23,658 e |

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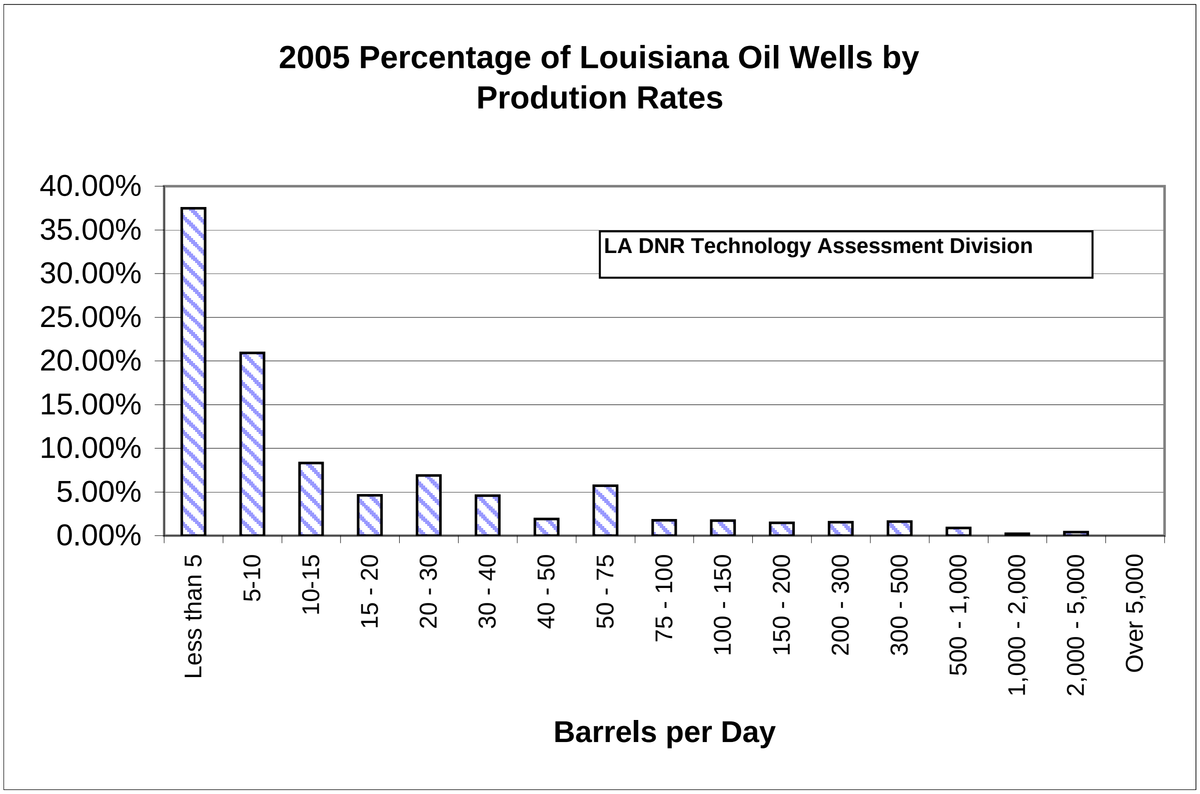
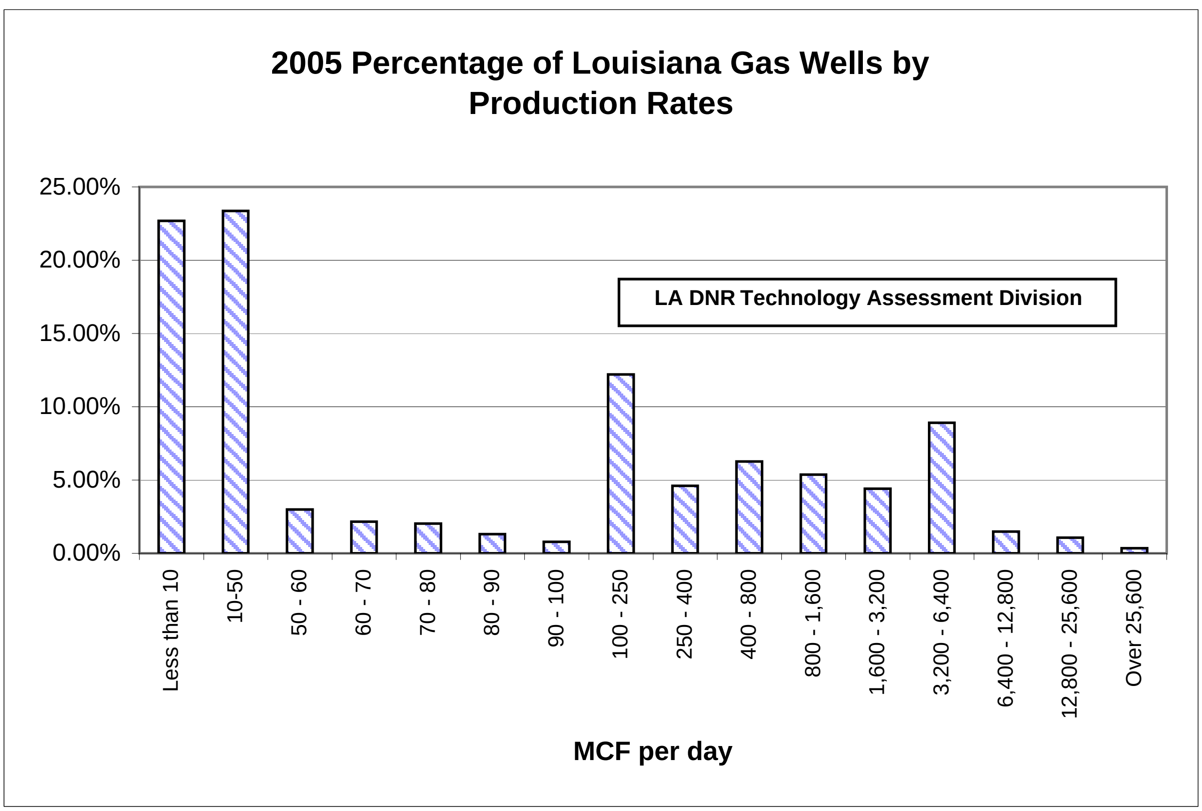
## Figure 13




## Figure 14



# Table 25

## LOUISIANA STATE PRODUCING NATURAL GAS WELLS

**Excluding OCS**

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1960 | 3,449 | 2,714 | 0 | 6,163 |
| 1961 | 3,611 | 2,996 | 0 | 6,607 |
| 1962 | 3,843 | 3,304 | 0 | 7,148 |
| 1963 | 4,103 | 3,545 | 0 | 7,648 |
| 1964 | 4,336 | 3,502 | 187 | 8,025 |
| 1965 | 4,477 | 3,227 | 618 | 8,321 |
| 1966 | 4,566 | 3,381 | 748 | 8,694 |
| 1967 | 4,548 | 3,448 | 882 | 8,878 |
| 1968 | 4,563 | 3,582 | 1048 | 9,194 |
| 1969 | 4,558 | 3,451 | 1,297 | 9,306 |
| 1970 | 4,511 | 3,438 | 311 | 8,260 |
| 1971 | 4,449 | 3,389 | 327 | 8,164 |
| 1972 | 4,664 | 3,397 | 316 | 8,378 |
| 1973 | 4,927 | 3,449 | 332 | 8,707 |
| 1974 | 5,159 | 3,458 | 313 | 8,929 |
| 1975 | 5,373 | 3,331 | 308 | 9,012 |
| 1976 | 5,851 | 3,289 | 362 | 9,502 |
| 1977 | 6,343 | 3,331 | 449 | 10,123 |
| 1978 | 6,915 | 3,253 | 472 | 10,640 |
| 1979 | 7,372 | 3,214 | 514 | 11,100 |
| 1980 | 8,360 | 3,277 | 551 | 12,188 |
| 1981 | 9,479 | 3,226 | 557 | 13,262 |
| 1982 | 10,154 | 3,136 | 564 | 13,855 |
| 1983 | 10,502 | 3,065 | 549 | 14,115 |
| 1984 | 10,812 | 2,955 | 532 | 14,299 |
| 1985 | 11,026 | 2,887 | 511 | 14,424 |
| 1986 | 11,049 | 2,730 | 436 | 14,216 |
| 1987 | 10,726 | 2,635 | 413 | 13,774 |
| 1988 | 10,813 | 2,539 | 445 | 13,796 |
| 1989 | 10,861 | 2,474 | 501 | 13,836 |
| 1990 | 10,802 | 2,407 | 512 | 13,721 |
| 1991 | 10,702 | 2,261 | 496 | 13,459 |
| 1992 | 10,498 | 2,149 | 496 | 13,143 |
| 1993 | 10,506 | 2,192 | 490 | 13,189 |
| 1994 | 10,596 | 2,260 | 473 | 13,329 |
| 1995 | 10,452 | 2,200 | 335 | 12,987 |
| 1996 | 10,376 | 2,148 | 274 | 12,799 |
| 1997 | 10,446 | 2,149 | 296 | 12,891 |
| 1998 | 10,579 | 1,995 | 259 | 12,833 |
| 1999 | 10,581 | 2,010 | 262 | 12,853 |
| 2000 | 13,704 r | 3,194 r | 333 r | 17,231 r |
| 2001 | 13,054 r | 3,369 r | 311 r | 16,734 r |
| 2002 | 13,438 r | 3,309 r | 344 r | 17,092 r |
| 2003 | 13,607 r | 2,952 r | 384 r | 16,944 r |
| 2004 | 13,924 r | 3,005 r | 398 r | 17,327 r |
| 2005 | 13,996 r | 2,977 r | 258 r | 17,231 r |
| 2006 | 13,599 e | 2,880 e | 192 e | 16,671 e |

e Estimated r Revised p Preliminary

# Table 26

## LOUISIANA STATE WELL COMPLETION BY TYPE AND BY REGION

**Excluding OCS**

| | YEAR | OFFSHORE | SOUTH | NORTH | TOTAL |
|---|---|---|---|---|---|
| CRUDE OIL | 1989 | 7 | 126 | 170 | 303 |
| | 1990 | 9 | 164 | 288 | 461 |
| | 1991 | 22 | 178 | 266 | 466 |
| | 1992 | 19 | 163 | 222 | 404 |
| | 1993 | 24 | 136 | 173 | 333 |
| | 1994 | 13 | 103 | 117 | 233 |
| | 1995 | 31 | 100 | 137 | 268 |
| | 1996 | 34 | 67 | 122 | 223 |
| | 1997 | 39 | 168 | 106 | 313 |
| | 1998 | 24 e | 100 e | 64 e | 188 |
| | 1999 | 4 e | 35 e | 60 e | 99 |
| | 2000 | 10 e | 51 e | 77 e | 138 |
| | 2001 | 11 e | 92 e | 137 e | 240 |
| | 2002 | 10 e | 86 e | 117 e | 213 |
| | 2003 | 38 e | 87 e | 163 e | 288 |
| NATURAL GAS | 1989 | 17 | 132 | 254 | 403 |
| | 1990 | 11 | 157 | 258 | 426 |
| | 1991 | 9 | 126 | 192 | 327 |
| | 1992 | 8 | 111 | 113 | 232 |
| | 1993 | 6 | 89 | 176 | 271 |
| | 1994 | 9 | 141 | 180 | 330 |
| | 1995 | 8 | 126 | 216 | 350 |
| | 1996 | 22 | 154 | 325 | 501 |
| | 1997 | 22 | 160 | 383 | 565 |
| | 1998 | 23 e | 170 e | 407 e | 600 |
| | 1999 | 17 e | 169 e | 287 e | 473 |
| | 2000 | 21 e | 166 e | 359 e | 546 |
| | 2001 | 20 e | 279 e | 426 e | 725 |
| | 2002 | 15 e | 215 e | 219 e | 449 |
| | 2003 | 21 e | 198 e | 427 e | 646 |
| DRY HOLE* | 1989 | 13 | 281 | 373 | 667 |
| | 1990 | 15 | 283 | 366 | 664 |
| | 1991 | 11 | 205 | 228 | 444 |
| | 1992 | 5 | 158 | 190 | 353 |
| | 1993 | 4 | 168 | 234 | 406 |
| | 1994 | 12 | 141 | 236 | 389 |
| | 1995 | 8 | 138 | 155 | 301 |
| | 1996 | 12 | 151 | 170 | 333 |
| | 1997 | 9 | 165 | 188 | 362 |
| | 1998 | 7 e | 104 e | 121 e | 232 e |
| | 1999 | 8 e | 80 e | 135 e | 223 e |
| | 2000 | 9 e | 98 e | 154 e | 261 e |
| | 2001 | 10 e | 184 e | 205 e | 399 e |
| | 2002 | 4 e | 122 e | 147 e | 273 e |
| | 2003 | 12 e | 125 e | 177 e | 314 e |

e Estimated

* Includes non-producing wells

Note: Data beyond 2003 is not available.

# Table 27

## LOUISIANA STATE MINERAL BONUS, RENTAL AND ROYALTY OVERRIDE REVENUES, Excluding OCS

**(Million Dollars)**

| DATE | BONUSES | OVERRIDE ROYALTY | RENTALS | TOTAL |
|---|---|---|---|---|
| 1985 | 32.08 | 0.90 | 20.86 | 53.84 |
| 1986 | 15.89 | 0.50 | 12.25 | 28.64 |
| 1987 | 26.82 | 0.39 | 6.70 | 33.90 |
| 1988 | 17.65 | 0.29 | 9.28 | 27.22 |
| 1989 | 11.59 | 0.29 | 8.34 | 20.21 |
| 1990 | 19.02 | 0.32 | 6.76 | 26.10 |
| 1991 | 9.82 | 0.32 | 8.71 | 18.85 |
| 1992 | 4.26 | 0.32 | 6.97 | 11.55 |
| 1993 | 13.29 | 0.20 | 4.20 | 17.68 |
| 1994 | 15.31 | 0.19 | 6.15 | 21.65 |
| 1995 | 31.96 | 0.69 | 9.47 | 42.12 |
| 1996 | 39.63 | -0.27 | 18.40 | 57.76 |
| 1997 | 38.27 | 0.84 | 25.00 | 64.11 |
| 1998 | 42.27 | 0.69 | 25.86 | 68.82 |
| 1999 | 14.17 | 0.45 | 20.27 | 34.89 |
| 2000 | 21.12 | 1.13 | 14.16 | 36.41 |
| 2001 | 29.70 | 1.89 | 13.75 | 45.34 |
| 2002 | 24.74 | 2.29 | 14.26 | 41.28 |
| 2003 | 19.54 | 3.36 | 12.93 | 35.83 |
| 2004 | 29.79 | 5.05 | 9.47 | 44.31 |
| January | 1.00 | 0.06 | 0.80 | 1.86 |
| February | 5.09 | 0.15 | 1.60 | 6.85 |
| March | 3.04 | 0.19 | 1.40 | 4.62 |
| April | 2.86 | 0.14 | 0.77 | 3.76 |
| May | 4.69 | 0.24 | 2.38 | 7.32 |
| June | 2.22 | 0.13 | 0.92 | 3.27 |
| July | 4.86 | 0.15 | 1.00 | 6.01 |
| August | 1.83 | 0.18 | 1.66 | 3.67 |
| September | 4.23 | 0.26 | 0.86 | 5.35 |
| October | 0.84 | 0.18 | 1.23 | 2.25 |
| November | 1.36 | 0.20 | 0.77 | 2.33 |
| December | 3.75 | 0.15 | 0.37 | 4.27 |
| **2005 Total** | **35.78** | **2.03** | **13.75** | **51.56** |
| January | 1.92 | 0.13 | 2.81 | 4.87 |
| February | 1.43 | 0.41 | 1.58 | 3.41 |
| March | 6.08 | 0.20 | 1.69 | 7.96 |
| April | 3.03 | 0.14 | 1.16 | 4.33 |
| May | 3.48 | 0.09 | 2.36 | 5.94 |
| June | 0.78 | 0.14 | 1.15 | 2.07 |
| July | 1.55 | 0.12 | 2.47 | 4.15 |
| August | 3.99 | 0.19 | 1.20 | 5.39 |
| September | 2.09 | 0.13 | 3.78 | 6.00 |
| October | 3.93 | 0.16 | 1.11 | 5.20 |
| November | 2.33 | 0.21 | 1.03 | 3.57 |
| December | 2.89 | 0.12 | 1.29 | 4.31 |
| **2006 Total** | **33.49** | **2.05** | **21.64** | **57.18** |

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# Table 28

## LOUISIANA STATE MINERAL ROYALTY REVENUE
**Excluding OCS**
**(Million Dollars)**

| DATE | OIL | GAS | PLANT LIQUIDS | OTHER | TOTAL |
|---|---|---|---|---|---|
| 1985 | 201.14 | 174.45 | 9.55 | 2.62 | 387.76 |
| 1986 | 122.22 | 154.83 | 6.34 | 1.96 | 285.34 |
| 1987 | 125.72 | 120.54 | 4.90 | 1.60 | 252.76 |
| 1988 | 98.55 | 124.06 | 4.39 | 1.35 | 228.35 |
| 1989 | 112.30 | 116.18 | 3.92 | 1.42 | 233.82 |
| 1990 | 135.44 | 113.14 | 3.80 | 0.90 | 253.28 |
| 1991 | 120.49 | 91.43 | 4.51 | 0.34 | 216.76 |
| 1992 | 113.29 | 97.07 | 4.69 | 0.00 | 215.04 |
| 1993 | 99.20 | 125.01 | 4.53 | 0.00 | 228.74 |
| 1994 | 85.72 | 102.95 | 4.05 | 0.00 | 192.72 |
| 1995 | 95.82 | 146.60 | 4.60 | 0.00 | 247.02 |
| 1996 | 123.51 | 211.31 | 6.72 | 0.00 | 341.54 |
| 1997 | 112.76 | 154.62 | 5.93 | 0.00 | 273.31 |
| 1998 | 68.85 | 121.17 | 2.58 | 0.00 | 192.60 |
| 1999 | 91.52 | 115.10 | 2.05 | 0.00 | 208.66 |
| 2000 | 145.80 | 212.71 | 3.46 | 0.00 | 361.97 |
| 2001 | 122.16 | 252.68 | 6.33 | 0.00 | 381.17 |
| 2002 | 100.10 | 163.47 | 8.03 | 0.00 | 271.60 |
| 2003 | 127.61 | 288.91 | 9.31 | 0.00 | 425.83 |
| 2004 | 143.68 r | 274.52 r | 14.63 r | 0.00 | 432.83 r |
| January | 13.27 | 21.67 | 0.99 | 0.00 | 35.93 r |
| February | 12.95 | 20.00 | 0.91 | 0.00 | 33.86 r |
| March | 16.06 | 23.53 | 1.14 | 0.00 | 40.73 r |
| April | 15.53 | 24.93 | 1.04 | 0.00 | 41.50 r |
| May | 14.87 | 23.99 | 0.99 | 0.00 | 39.86 r |
| June | 15.76 | 22.10 | 0.97 | 0.00 | 38.84 r |
| July | 15.73 | 23.60 | 1.05 | 0.00 | 40.38 r |
| August | 16.58 | 25.00 | 1.10 | 0.00 | 42.68 r |
| September | 4.37 | 15.18 | 0.37 | 0.00 | 19.92 r |
| October | 5.65 | 20.40 | 0.34 | 0.00 | 26.40 r |
| November | 8.26 | 25.40 | 0.51 | 0.00 | 34.17 r |
| December | 9.88 | 32.14 | 0.94 | 0.00 | 42.95 r |
| **2005 Total** | **148.92** | **277.95** | **10.35** | **0.00** | **437.21 r** |
| January | 11.92 | 31.09 | 0.90 | 0.00 | 43.91 |
| February | 11.61 | 23.49 | 0.73 | 0.00 | 35.82 |
| March | 13.39 | 22.69 | 0.84 | 0.00 | 36.92 |
| April | 15.25 | 22.96 | 0.89 | 0.00 | 39.10 |
| May | 16.67 | 23.75 | 1.06 | 0.00 | 41.49 |
| June | 17.81 | 22.50 | 1.37 | 0.00 | 41.67 |
| July | 20.12 | 22.56 | 1.61 | 0.00 | 44.28 |
| August | 20.95 | 26.04 | 1.50 | 0.00 | 48.49 |
| September | 18.25 | 20.35 | 1.29 | 0.00 | 39.89 |
| October | N/A | N/A | N/A | N/A | N/A |
| November | N/A | N/A | N/A | N/A | N/A |
| December | N/A | N/A | N/A | N/A | N/A |
| **2006 Total** | **145.97** | **215.42** | **10.19** | **0.00** | **371.58** |

e Estimated r Revised p Preliminary

# Table 29

## LOUISIANA STATE MINERAL SEVERANCE TAX REVENUE[8]

**Excluding OCS**
**(Million Dollars)**

| DATE | OIL | GAS | OTHER MINERALS | SEVERANCE TOTAL |
|---|---|---|---|---|
| 1985 | 598.67 | 120.96 | 3.73 | 723.37 |
| 1986 | 389.87 | 125.14 | 3.42 | 518.42 |
| 1987 | 345.18 | 111.84 | 2.99 | 460.01 |
| 1988 | 296.45 | 106.29 | 2.65 | 405.39 |
| 1989 | 312.99 | 108.84 | 2.43 | 424.26 |
| 1990 | 373.21 | 124.61 | 2.75 | 500.58 |
| 1991 | 367.13 | 146.83 | 1.97 | 515.93 |
| 1992 | 326.07 | 126.24 | 1.63 | 453.94 |
| 1993 | 283.68 | 107.32 | 1.76 | 392.76 |
| 1994 | 229.40 | 114.58 | 2.02 | 346.00 |
| 1995 | 233.37 | 114.58 | 1.85 | 349.80 |
| 1996 | 270.36 | 98.60 | 1.88 | 370.84 |
| 1997 | 257.13 | 118.27 | 1.85 | 377.25 |
| 1998 | 148.96 | 120.98 | 1.40 | 271.34 |
| 1999 | 171.29 | 102.48 | 1.82 | 275.60 |
| 2000 | 337.51 | 104.33 | 1.50 | 443.34 |
| 2001 | 281.95 | 165.77 | 1.65 | 449.38 |
| 2002 | 235.84 | 173.51 | 1.33 | 410.67 |
| 2003 | 316.70 | 152.13 | 1.70 | 470.53 |
| 2004 | 359.77 | 216.73 | 1.73 | 578.23 |
| | | | | |
| January | 29.65 | 22.23 | 0.18 | 52.06 |
| February | 46.14 | 20.59 | 0.07 | 66.80 |
| March | 36.00 | 18.78 | 0.19 | 54.97 |
| April | 37.77 | 17.89 | 0.10 | 55.76 |
| May | 51.50 | 21.35 | 0.18 | 73.03 |
| June | 28.67 | 18.38 | 0.13 | 47.18 |
| July | 33.99 | 19.91 | 0.15 | 54.06 |
| August | 48.80 | 22.03 | 0.19 | 68.30 |
| September | 42.02 | 24.78 | 0.15 | 66.95 |
| October | 30.86 | 32.83 | 0.05 | 63.74 |
| November | 29.67 | 5.82 | 0.14 | 35.63 |
| December | 23.93 | 19.03 | 0.08 | 43.03 |
| **2005 Total** | **439.00** | **243.62** | **1.61** | **681.50** |
| | | | | |
| January | 20.96 | 27.02 | 0.12 | 48.10 |
| February | 33.02 | 19.18 | 0.06 | 52.26 |
| March | 36.37 | 20.53 | 0.15 | 57.05 |
| April | 49.16 | 26.53 | 0.16 | 75.85 |
| May | 51.90 | 26.01 | 0.19 | 78.10 |
| June | 39.63 | 26.45 | 0.12 | 66.20 |
| July | 51.02 | 23.63 | 0.18 | 74.83 |
| August | 46.98 | 23.57 | 0.16 | 70.71 |
| September | 56.62 | 36.61 | 0.21 | 93.44 |
| October | 37.65 | 30.17 | 0.06 | 67.88 |
| November | 44.55 | 37.35 | 0.17 | 82.08 |
| December | 38.44 | 34.34 | 0.13 | 72.91 |
| **2006 Total** | **506.31** | **331.40** | **1.69** | **839.41** |

e Estimated r Revised p Preliminary

# Table 30

## STATE SECTION 8(g) REVENUE FROM LOUISIANA'S OUTER CONTINENTAL SHELF [13]

**(Dollars)**

| YEAR | RENTALS | BONUSES | ROYALTIES | 8G ESCROW | SETTLE-MENT | TOTAL |
|---|---|---|---|---|---|---|
| 1989 | 175,817 | 2,890,298 | 7,163,105 | 0 | 2,520,000 | 12,749,220 |
| 1990 | 430,198 | 5,570,375 | 6,239,368 | 0 | 2,520,000 | 14,759,941 |
| 1991 | 303,824 | 2,220,094 | 8,461,261 | 0 | 2,520,000 | 13,505,179 |
| 1992 | 258,787 | 1,189,989 | 6,405,279 | 0 | 5,880,000 | 13,734,055 |
| 1993 | 235,250 | 965,504 | 7,373,550 | 0 | 5,880,000 | 14,454,304 |
| 1994 | 1,016,932 | 1,913,682 | 11,780,932 | 0 | 5,880,000 | 20,591,546 |
| 1995 | 255,213 | 890,002 | 8,012,718 | 0 | 5,880,000 | 15,037,933 |
| 1996 | 292,445 | 4,666,400 | 12,283,395 | 0 | 5,880,000 | 23,122,240 |
| 1997 | 686,051 | 5,689,689 | 11,855,454 | 0 | 8,400,000 | 26,631,194 |
| 1998 | 412,229 | 1,744,928 | 9,621,860 | 0 | 8,400,000 | 20,179,017 |
| 1999 | 357,379 | 241,659 | 6,284,879 | 0 | 8,400,000 | 15,283,917 |
| 2000 | 321,695 | 1,268,244 | 12,690,937 | 0 | 8,400,000 | 22,680,876 |
| 2001 | 303,675 | 2,148,111 | 30,454,058 | 0 | 8,400,000 | 41,305,844 |
| 2002 | 94,841 | N/A | 11,768,383 | 0 | 0 | 11,863,224 |
| 2003 | 284,563 | 2,842,662 | 26,447,045 | 0 | 0 | 29,574,271 |
| 2004 | 490,745 | 7,620,500 | 30,145,237 | 0 | 0 | 38,256,482 |
| 2005 | 374,717 | 2,521,931 | 27,995,948 | 0 | 0 | 30,892,596 |
| 2006 | 494,362 | 5,947,411 | 24,325,787 | 0 | 0 | 30,767,560 |

See footnotes on Appendix B

Royalty revenues from Federal offshore leases on the Outer Continental Shelf (OCS) are distributed to the Land and Water Conservation Fund, the Historic Preservation Fund, and the General Fund of the U.S. Treasury. Transfers are made in each fiscal year from OCS royalties, rentals and bonuses in order to maintain the Land and Water Conservation Fund's annual authorization of $900 million. Annually, $150 million is put into the Historic Preservation Fund. The balance of offshore revenue receipts is directed to the General Fund of the U.S. Treasury.

Section 8(g) of the Outer Continental Shelf Lands Act Amendments of 1978 provided that the states were to receive a "fair and equitable" division of revenues generated from the leasing of lands within 3 miles of the seaward boundary of a coastal state that contains one or more oil and gas pools or fields underlying both the OCS and lands subject to the jurisdiction of the state. The states and the federal government, however, were unable to reach agreement concerning the meaning of the term "fair and equitable". Revenues generated in the 3-mile boundary zone were subsequently placed into an escrow fund in August 1979.

Congress resolved the dispute over the meaning of "fair and equitable" in the Outer Continental Shelf Lands Act Amendments of 1985, Public Law 99-272. The law provided for the following distribution of revenues to the states under section 8(g):

Before 1986: Louisiana did not receive any shared revenue from OCS production prior to 1986.

1986: Louisiana received a payment of $68.7 million from royalties, rentals and bonuses collected in 1986 and prior years.

1998-2000: In 1987 Louisiana received an initial settlement payment of $572 million from the escrow funds. A series of annual settlement payments have been disbursed to the states over a 15-year period along with an annual disbursement of 27 percent of royalty, rental, and bonus revenues received within each affected state's 8(g) zone. The annual settlement payments are: From 1987 through 1991, Louisiana received an annual settlement payment of $2.52 million per year. From 1992 through 1996, the state received an annual settlement payment of $5.88 million per year. Beginning in 1997 until the last payment in 2001, Louisiana will receive an annual settlement payment of approximately $8.40 million per year.

2002 and After: No further settlement payments; states receive only a recurring annual disbursement of 27 percent of royalty, rental, and bonus revenues received within each affected state's 8(g) zone. Louisiana will receive an annual disbursement of 27 percent of royalty, rental, and bonus revenues received within Louisiana's affected 8(g) zone.

# TABLE 31

## LOUISIANA STATE TOTAL MINERAL REVENUE
**(Dollars)**

| YEAR | FEDERAL OCS (8g) | FEDERAL ONSHORE | STATE BOUNDARIES | TOTAL |
|---|---|---|---|---|
| 1981 | 0 | 612,000 | 1,653,883,820 | 1,654,495,820 |
| 1982 | 0 | 617,000 | 1,498,482,501 | 1,499,099,501 |
| 1983 | 0 | 637,000 | 1,328,700,057 | 1,329,337,057 |
| 1984 | 0 | 905,000 | 1,329,965,030 | 1,330,870,030 |
| 1985 | 0 | 795,000 | 1,164,969,360 | 1,165,764,360 |
| 1986 | 68,699,504 | 555,000 | 832,406,385 | 901,660,889 |
| 1987 | 588,862,212 | 517,000 | 746,675,897 | 1,336,055,109 |
| 1988 | 16,909,646 | 545,000 | 660,959,699 | 678,414,345 |
| 1989 | 12,749,220 | 452,000 | 678,301,987 | 691,503,207 |
| 1990 | 14,759,941 | 542,000 | 779,963,703 | 795,265,644 |
| 1991 | 13,505,179 | 328,000 | 751,117,246 | 764,950,425 |
| 1992 | 13,734,055 | 376,000 | 680,527,788 | 694,637,843 |
| 1993 | 14,454,304 | 782,000 | 639,182,812 | 654,412,032 |
| 1994 | 20,591,546 | 532,000 | 560,371,998 | 581,495,544 |
| 1995 | 15,037,933 | 728,000 | 638,942,698 | 605,347,517 |
| 1996 | 23,122,240 | 943,209 | 770,137,601 | 794,203,050 |
| 1997 | 26,631,194 | 817,329 | 714,672,685 | 742,121,208 |
| 1998 | 20,179,017 | 996,000 | 532,755,940 | 553,930,957 |
| 1999 | 15,283,917 | 1,276,465 | 519,144,200 | 535,704,582 |
| 2000 | 22,680,876 | 1,024,730 | 839,883,694 | 863,589,300 |
| 2001 | 41,305,844 | 1,481,176 | 877,286,806 | 920,073,826 |
| 2002 | 11,863,224 | 730,156 | 723,411,114 | 736,004,494 |
| 2003 | 29,574,271 | 1,182,451 | 931,633,625 | 962,390,346 |
| 2004 | 38,256,482 | 1,364,964 | 1,054,768,722 | 1,094,390,168 |
| 2005 | 30,892,596 | 1,569,882 | 1,170,278,073 r | 1,202,740,551 r |
| 2006 | 30,767,560 | 1,170,670 | 1,298,380,505 p | 1,330,318,736 p |

e Estimated r Revised p Preliminary
See footnote in Appendix B.

**Federal OCS:** See table 30.

**Federal Onshore:** Revenue distributed to the state under section 35 of the Mineral Leasing Act (MLA). MLA provides to the state 50% of mineral revenue from federal lands located within the state boundaries. Revenues came from royalties, rents and bonuses. It is fiscal year data.
Oil and gas produced on federal onshore pay severance tax to the state by the producer on the non-royalty share of the production, and the royalty share of the production is exempted.

**State Boundaries:** Revenue from mineral production such as bonuses, override royalties, rents, royalties and severance taxes within state boundaries.

# Table 32

## REVENUE TO FEDERAL GOVERNMENT COLLECTED FROM OIL AND GAS LEASES IN THE LOUISIANA OUTER CONTINENTAL SHELF [12]

**(Area beyond the state's 3-mile offshore boundary)**

**(Dollars)**

| YEAR | BONUS PAYMENTS | RENTAL PAYMENTS | MINIMUM ROYALTIES | PRODUCTION ROYALTIES | TOTAL[a] COLLECTION |
|---|---|---|---|---|---|
| 1968 | 149,868,789 | 5,275,979 | 2,140,858 | 190,907,982 | 348,193,608 |
| 1969 | 110,945,535 | 5,584,162 | 1,922,340 | 226,504,238 | 344,956,275 |
| 1970 | 945,064,773 | 6,243,362 | 1,692,274 | 262,709,833 | 1,215,710,242 |
| 1971 | 96,304,523 | 5,687,848 | 1,564,845 | 324,815,819 | 428,373,035 |
| 1972 | 2,251,347,556 | 6,396,291 | 1,725,573 | 342,476,302 | 2,601,945,722 |
| 1973 | 193,031,709 | 5,272,797 | 2,005,785 | 380,509,177 | 580,819,468 |
| 1974 | 3,528,744,084 | 8,350,760 | 1,739,159 | 535,836,029 | 4,074,670,032 |
| 1975 | 325,424,688 | 8,947,571 | 1,837,253 | 593,359,397 | 929,568,909 |
| 1976 | 482,592,035 | 12,974,770 | 1,879,704 | 682,922,971 | 1,180,369,480 |
| 1977 | 813,991,004 | 7,740,185 | 1,248,616 | 899,016,863 | 1,721,996,668 |
| 1978 | 1,015,873,944 | 8,616,027 | 1,502,963 | 1,086,517,424 | 2,112,510,358 |
| 1979 | 2,521,190,635 | 7,328,999 | 1,105,865 | 1,344,995,442 | 3,874,620,941 |
| 1980 | 2,676,927,673 | 7,361,904 | 1,277,987 | 1,866,737,837 | 4,552,305,401 |
| 1981 | 3,308,009,881 | 8,205,515 | 1,211,959 | 2,825,271,285 | 6,142,698,640 |
| 1982 | 1,110,172,751 | 7,288,316 | 1,349,850 | 3,166,294,042 | 4,285,104,959 |
| 1983 | 3,796,644,766 | 13,620,158 | 2,540,294 | 2,764,348,600 | 6,577,153,818 |
| 1984 | 1,154,495,009 | 16,323,567 | 2,010,462 | 3,195,995,282 | 4,368,824,320 |
| 1985 | 830,710,260 | 33,756,447 | 2,139,530 | 2,940,519,737 | 3,807,125,974 |
| 1986 | 113,731,609 | 34,110,029 | 3,199,547 | 2,006,205,199 | 2,157,246,384 |
| 1987 | 247,344,486 | 52,115,828 | 19,239,027 | 1,803,208,740 | 2,121,908,081 |
| 1988 | 388,730,457 | 35,752,757 | 8,727,373 | 1,571,981,500 | 2,005,192,087 |
| 1989 | 386,710,637 | 48,498,402 | 26,261,190 | 1,618,163,065 | 2,079,633,294 |
| 1990 | 421,375,632 | 55,568,777 | 16,028,740 | 2,068,487,831 | 2,561,460,980 |
| 1991 | 276,234,849 | 59,126,732 | 15,444,167 | 1,857,392,914 | 2,208,198,662 |
| 1992 | 53,716,797 | 49,087,621 | 33,533,897 | 1,848,599,157 | 1,984,937,472 |
| 1993 | 61,454,861 | 29,268,366 | 119,445,091 | 2,009,644,653 | 2,219,812,971 |
| 1994 | 256,271,643 | 30,003,884 | 141,190,812 | 1,888,953,102 | 2,316,419,441 |
| 1995 | 296,254,733 | 62,526,069 | 19,803,444 | 1,764,875,791 | 2,143,460,037 |
| 1996 | 24,330,068 | 53,231,380 | 40,394,227 | 2,549,759,516 | 3,154,940,691 |
| 1997 | 1,169,790 | 55,761,920 | 65,651,370 | 2,857,126,443 | 3,789,383,151 |
| 1998 | 9,207,972 | 51,518,286 | -14,452,431 | 2,267,502,514 | 2,313,776,341 |
| 1999 | 1,169,790 | 40,463,226 | 49,219,184 | 2,228,250,265 | 2,319,102,465 |
| 2000 | 83,630,219 | 32,710,256 | 167,647,231 | 3,045,847,943 | 3,329,835,649 |
| 2001 | 160,037,859 | 30,078,009 | 177,773,259 | 5,126,344,201 | 5,494,233,328 |
| **GULF OF MEXICO TOTAL** | | | | | |
| 2001 | 632,482,979 | 188,455,045 | 3,126,962 | 6,674,371,634 | 7,498,436,619 |
| 2002 | 138,423,162 | 153,303,576 | 3,252,702 | 3,841,164,517 | 4,136,143,958 |
| 2003 | 1,147,014,322 | 245,963,859 | 4,983,819 | 4,535,938,009 | 5,933,900,009 |
| 2004 | 523,416,154 | 214,303,045 | 2,570,343 | 4,607,776,092 | 5,348,065,634 |
| 2005 | 518,426,651 | 221,784,370 | 1,897,501 | 5,313,350,455 | 6,055,458,976 |
| 2006 | 865,262,735 p | 221,956,204 p | 2,711,114 p | 6,213,349,932 p | 7,303,279,984 p |

[a] Total collection, including state 8G shares.

[b] Negative due to overpayment's refunds

See footnote in Appendix B.

e Estimated r Revised p Preliminary

# Table 33

## LOUISIANA ESTIMATED CRUDE OIL PROVED RESERVES[9]
## EXCLUDING LEASE CONDENSATE

**As of December 31st of Each Year**
**(Million Barrels)**

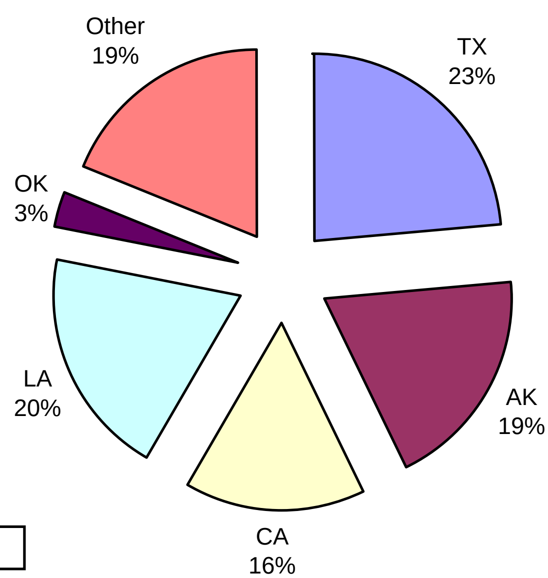
| YEAR | North | South Onshore | South Offshore | Federal OCS | Total Louisiana | TOTAL US |
|---|---|---|---|---|---|---|
| 1985 | 196 | 565 | 122 | 1,759 | 2,642 | 28,416 |
| 1986 | 160 | 547 | 119 | 1,640 | 2,466 | 26,889 |
| 1987 | 175 | 505 | 127 | 1,514 | 2,321 | 27,256 |
| 1988 | 154 | 511 | 135 | 1,527 | 2,327 | 26,825 |
| 1989 | 123 | 479 | 143 | 1,691 | 2,436 | 26,501 |
| 1990 | 120 | 435 | 150 | 1,772 | 2,477 | 26,254 |
| 1991 | 127 | 408 | 144 | 1,775 | 2,454 | 24,682 |
| 1992 | 125 | 417 | 126 | 1,643 | 2,311 | 23,745 |
| 1993 | 108 | 382 | 149 | 1,880 | 2,519 | 22,957 |
| 1994 | 108 | 391 | 150 | 1,922 | 2,571 | 22,457 |
| 1995 | 108 | 387 | 142 | 2,269 | 2,906 | 22,351 |
| 1996 | 128 | 382 | 148 | 2,357 | 3,015 | 22,017 |
| 1997 | 136 | 427 | 151 | 2,587 | 3,301 | 22,546 |
| 1998 | 101 | 357 | 97 | 2,483 | 3,038 | 21,034 |
| 1999 | 108 | 384 | 108 | 2,442 | 3,042 | 21,765 |
| 2000 | 97 | 310 | 122 | 2,751 | 3,280 | 22,045 |
| 2001 | 87 | 341 | 136 | 3,877 | 4,441 | 22,446 |
| 2002 | 75 | 335 | 91 | 4,088 | 4,589 | 22,677 |
| 2003 | 66 | 314 | 72 | 4,251 | 4,703 | 21,891 |
| 2004 | 58 | 304 | 65 | 3,919 | 4,346 | 21,371 |
| 2005 | 68 | 299 | 65 | 3,852 | 4,284 | 21,757 |

See footnotes on Appendix B

## Figure 15

**UNITED STATES CRUDE OIL RESERVES**
**December 31, 2005**
**Excluding Lease Condensate**
(Million Barrels)

| STATE | VOLUME |
|---|---|
| Texas | 5,109 |
| Alaska | 4,171 |
| California | 3,435 |
| Louisiana | 4,284 |
| Oklahoma | 630 |
| Other | 4,128 |
| **TOTAL** | **21,757** |




**LA DNR Technology Assessment Division**

# Table 34

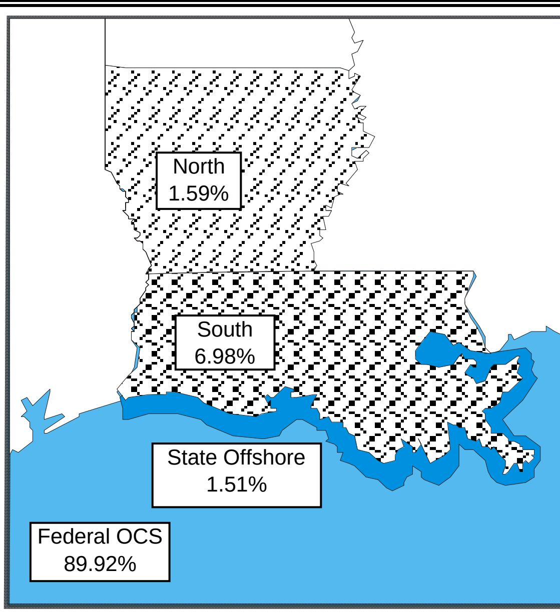
## LOUISIANA ESTIMATED LEASE CONDENSATE PROVED RESERVES[9]

**As of December 31st of Each Year**
**(Million Barrels)**

| YEAR | North | South Onshore | South Offshore | Federal OCS | Total Louisiana | TOTAL US |
|---|---|---|---|---|---|---|
| 1985 | 18 | 220 | 257 | b | 495 | 1,453 |
| 1986 | 18 | 208 | 11 | 230 | 467 | 1,436 |
| 1987 | 17 | 194 | 13 | 223 | 447 | 1,402 |
| 1988 | 17 | 193 | 13 | 223 | 446 | 1,389 |
| 1989 | 20 | 196 | 12 | 278 | 506 | 1,389 |
| 1990 | 20 | 182 | 12 | 258 | 472 | 1,302 |
| 1991 | 21 | 175 | 9 | 253 | 458 | 1,244 |
| 1992 | 19 | 151 | 8 | 226 | 404 | 1,226 |
| 1993 | 19 | 133 | 9 | 235 | 396 | 1,192 |
| 1994 | 21 | 123 | 9 | 233 | 386 | 1,147 |
| 1995 | 24 | 136 | 11 | 305 | 476 | 1,197 |
| 1996 | 24 | 127 | 11 | 422 | 584 | 1,307 |
| 1997 | 30 | 134 | 12 | 433 | 609 | 1,341 |
| 1998 | 23 | 138 | 16 | 435 | 612 | 1,336 |
| 1999 | 25 | 134 | 15 | 435 | 609 | 1,295 |
| 2000 | 22 | 130 | 17 | 437 | 606 | 1,333 |
| 2001 | 27 | 141 | 19 | 325 | 512 | 1,398 |
| 2002 | 19 | 104 | 11 | 300 | 434 | 1,346 |
| 2003 | 19 | 82 | 11 | 251 | 363 | 1,215 |
| 2004 | 21 | 66 | 9 | 205 | 301 | 1,221 |
| 2005 | 23 [e] | 72 [e] | 9 [e] | 228 [e] | 332 [e] | 1,218 [e] |

NOTE: 1985 Federal OCS includes the south offshore figure.
See footnotes on Appendix B

**Figure 16**




**LOUISIANA CRUDE OIL RESERVES**

**December 31, 2005**
(Million Barrels )

| | |
|---|---|
| North | 68 |
| South | 299 |
| Offshore | |
| State | 65 |
| Fed. OCS | 3,852 |
| **TOTAL** | **4,284** |

**LA DNR Technology Assessment Division**

# Table 35

## LOUISIANA ESTIMATED DRY NATURAL GAS PROVED RESERVES[9]

**As of December 31st of Each Year**

**(Billion Cubic Feet, at 14.73 psia and 60 degrees Fahrenheit)**

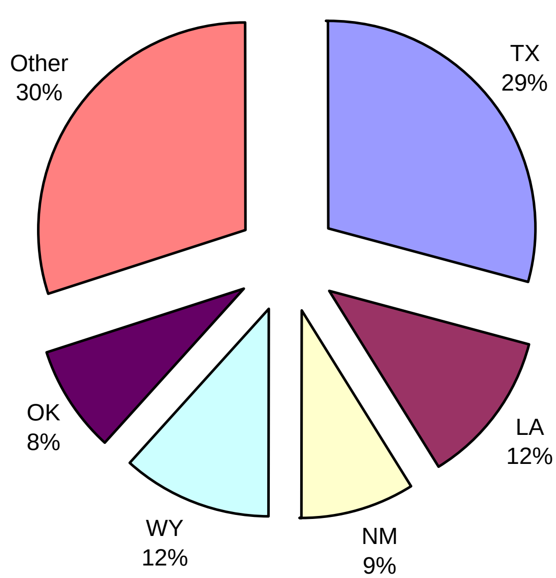
| YEAR | North | South Onshore | South Offshore | Federal OCS | Total Louisiana | TOTAL US |
|---|---|---|---|---|---|---|
| 1985 | 2,587 | 9,808 | 1,643 | 26,113 c | 40,151 c | 193,369 |
| 1986 | 2,515 | 9,103 | 1,312 | 25,454 c | 38,384 c | 191,586 |
| 1987 | 2,306 | 8,693 | 1,431 | 23,260 c | 35,690 c | 187,211 |
| 1988 | 2,398 | 8,654 | 1,172 | 23,471 c | 35,695 c | 168,024 |
| 1989 | 2,652 | 8,645 | 1,219 | 24,187 c | 36,703 c | 167,116 |
| 1990 | 2,588 | 8,171 | 969 | 22,679 c | 34,407 c | 169,346 |
| 1991 | 2,384 | 7,504 | 1,024 | 21,611 c | 32,523 c | 167,062 |
| 1992 | 2,311 | 6,693 | 776 | 19,653 c | 29,433 c | 165,015 |
| 1993 | 2,325 | 5,932 | 917 | 19,383 c | 28,557 c | 162,415 |
| 1994 | 2,537 | 6,251 | 960 | 20,835 c | 30,583 c | 163,837 |
| 1995 | 2,788 | 5,648 | 838 | 21,392 c | 30,666 c | 165,146 |
| 1996 | 3,105 | 5,704 | 734 | 21,856 c | 31,399 c | 166,474 |
| 1997 | 3,093 | 5,855 | 725 | 21,934 c | 31,607 c | 167,223 |
| 1998 | 2,898 | 5,698 | 551 | 20,774 c | 29,921 c | 164,041 |
| 1999 | 3,079 | 5,535 | 628 | 19,598 c | 28,840 c | 167,406 |
| 2000 | 3,298 | 5,245 | 696 | 19,788 c | 29,027 c | 177,427 |
| 2001 | 3,881 | 5,185 | 745 | 19,721 c | 29,532 c | 183,460 |
| 2002 | 4,245 | 4,224 | 491 | 18,500 c | 27,460 c | 186,946 |
| 2003 | 5,074 | 3,746 | 506 | 16,728 c | 26,054 c | 189,044 |
| 2004 | 5,770 | 3,436 | 382 | 14,685 c | 24,273 c | 192,513 |
| 2005 | 6,695 | 3,334 | 418 | 13,665 c | 24,112 c | 204,385 |

[c] Includes Federal Offshore Alabama

## Figure 17

**UNITED STATES NATURAL GAS RESERVES**
**December 31, 2005**
(Billion Cubic Feet)

| STATE | VOLUME |
|---|---|
| Texas | 59,849 |
| Louisiana | 24,112 |
| New Mexico | 18,201 |
| Wyoming | 23,774 |
| Oklahoma | 17,123 |
| Other | 61,326 |
| **TOTAL** | **204,385** |




**LA DNR Technology Assessment Division**

# Table 36

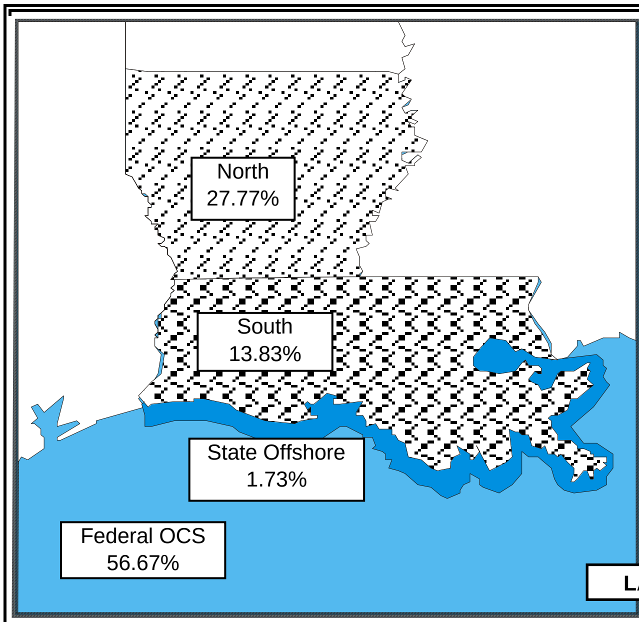
## LOUISIANA ESTIMATED NATURAL GAS LIQUIDS PROVED RESERVES[9]
## EXCLUDING LEASE CONDENSATE

**As of December 31st of Each Year**
**(Million Barrels)**

| YEAR | North | South Onshore | South Offshore | Federal OCS | Total Louisiana | TOTAL US |
|---|---|---|---|---|---|---|
| 1985 | 39 | 234 | 420 | b | 693 | 5,038 |
| 1986 | 39 | 220 | 28 | 336 | 623 | 5,293 |
| 1987 | 33 | 235 | 33 | 309 | 610 | 5,343 |
| 1988 | 39 | 228 | 27 | 289 | 583 | 5,460 |
| 1989 | 40 | 215 | 39 | 297 | 591 | 4,991 |
| 1990 | 38 | 249 | 37 | 261 | 585 | 4,982 |
| 1991 | 38 | 242 | 41 | 292 | 613 | 4,978 |
| 1992 | 41 | 229 | 47 | 246 | 563 | 4,999 |
| 1993 | 38 | 201 | 21 | 255 | 515 | 4,838 |
| 1994 | 48 | 214 | 19 | 267 | 548 | 4,876 |
| 1995 | 55 | 359 | 16 | 191 | 621 | 5,005 |
| 1996 | 61 | 284 | 36 | 199 | 580 | 5,209 |
| 1997 | 50 | 199 | 12 | 352 | 613 | 5,291 |
| 1998 | 34 | 187 | 13 | 341 | 575 | 4,852 |
| 1999 | 36 | 230 | 19 | 398 | 681 | 5,316 |
| 2000 | 39 | 207 | 21 | 315 | 582 | 7,012 |
| 2001 | 35 | 128 | 41 | 273 | 477 | 6,595 |
| 2002 | 30 | 119 | 37 | 483 | 669 | 6,648 |
| 2003 | 48 | 100 | 35 | 235 | 418 | 6,244 |
| 2004 | 53 | 87 | 27 | 410 | 577 | 6,707 |
| 2005 | 61 [e] | 94 [e] | 33 [e] | 375 [e] | 563 [e] | 6,947 [e] |

NOTE: 1985 Federal OCS includes the south offshore figure.
See footnotes on Appendix B

# Figure 18




**LOUISIANA NATURAL GAS RESERVES**
**December 31, 2005**
(Billion Cubic Feet)

| | |
|---|---|
| North | 6,695 |
| South | 3,334 |
| Offshore | |
| State | 418 |
| Fed. OCS | 13,665 |
| **TOTAL** | **24,112** |

**LA DNR Technology Assessment Division**

# Table 37

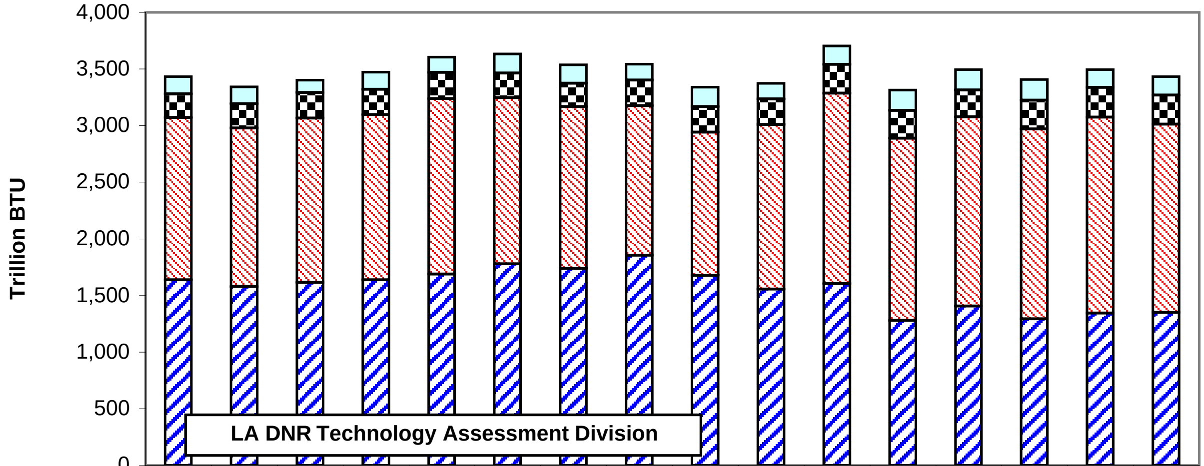
## LOUISIANA NONAGRICULTURAL EMPLOYMENT [1]

| DATE | OIL & GAS PRODUCTION | CHEMICAL INDUSTRY | PETROLEUM MANUFACTURING | ALL PIPELINE* | TOTAL EMPLOYMENT |
|---|---|---|---|---|---|
| 1984 | 78,032 | 29,104 | 13,053 | 1,247 | 1,568,064 |
| 1985 | 77,781 | 28,093 | 12,458 | 1,144 | 1,550,443 |
| 1986 | 58,888 | 25,998 | 12,233 | 1,168 | 1,475,318 |
| 1987 | 52,117 | 25,345 | 12,225 | 1,051 | 1,438,793 |
| 1988 | 54,565 | 26,957 | 11,258 | 1,039 | 1,468,508 |
| 1989 | 52,509 | 27,717 | 11,321 | 1,016 | 1,492,051 |
| 1990 | 54,063 | 29,083 | 11,535 | 1,041 | 1,546,820 |
| 1991 | 54,412 | 29,412 | 12,268 | 1,073 | 1,566,779 |
| 1992 | 45,869 | 30,349 | 12,543 | 1,095 | 1,583,423 |
| 1993 | 44,422 | 30,419 | 12,728 | 1,078 | 1,613,577 |
| 1994 | 44,885 | 30,014 | 13,037 | 1,014 | 1,671,087 |
| 1995 | 44,279 | 30,168 | 11,603 | 932 | 1,721,651 |
| 1996 | 46,885 | 30,096 | 11,262 | 789 | 1,757,619 |
| 1997 | 51,559 | 29,935 | 11,038 | 792 | 1,797,225 |
| 1998 | 54,875 | 30,196 | 10,984 | 702 | 1,837,505 |
| 1999 | 44,645 | 28,898 | 11,046 | 693 | 1,846,026 |
| 2000 | 45,714 | 28,335 | 10,345 | 724 | 1,872,494 |
| 2001 | 47,009 | 27,337 | 10,643 | 2,417 | 1,868,902 |
| 2002 | 43,839 | 25,694 | 10,566 | 2,306 | 1,848,656 |
| 2003 | 42,339 | 24,558 | 10,395 | 2,334 | 1,851,570 |
| January | 39,879 | 24,034 | 9,666 | 2,256 | 1,840,003 |
| February | 40,293 | 23,919 | 9,660 | 2,248 | 1,846,218 |
| March | 40,706 | 23,991 | 9,735 | 2,249 | 1,862,146 |
| April | 40,578 | 23,816 | 9,813 | 2,186 | 1,874,060 |
| May | 40,395 | 23,698 | 9,762 | 2,189 | 1,876,745 |
| June | 40,631 | 23,658 | 9,818 | 2,182 | 1,884,773 |
| July | 39,911 | 23,496 | 10,158 | 2,011 | 1,852,555 |
| August | 39,684 | 23,386 | 10,089 | 2,006 | 1,856,858 |
| September | 39,496 | 23,253 | 10,138 | 2,006 | 1,861,135 |
| October | 40,445 | 22,965 | 10,272 | 2,041 | 1,872,458 |
| November | 40,560 | 22,967 | 10,198 | 2,043 | 1,885,190 |
| December | 40,409 | 23,007 | 10,192 | 2,043 | 1,890,302 |
| **2004 Average** | **40,249** | **23,516** | **9,958** | **2,122** | **1,866,870** |
| January | 39,636 | 23,650 | 10,109 | 2,067 | 1,851,474 |
| February | 39,943 | 23,631 | 10,173 | 2,072 | 1,856,975 |
| March | 40,563 | 23,571 | 10,209 | 2,071 | 1,873,788 |
| April | 40,983 | 23,471 | 10,121 | 2,148 | 1,891,869 |
| May | 41,138 | 23,342 | 10,155 | 2,162 | 1,898,899 |
| June | 41,595 | 23,379 | 10,280 | 2,189 | 1,907,725 |
| July | 41,653 | 23,311 | 10,345 | 2,217 | 1,887,011 |
| August | 41,956 | 23,287 | 10,373 | 2,223 | 1,892,002 |
| September | 41,646 | 23,037 | 10,287 | 2,214 | 1,770,836 |
| October | 41,663 | 22,923 | 10,269 | 2,213 | 1,739,436 |
| November | 41,570 | 22,855 | 10,327 | 2,301 | 1,765,149 |
| December | 41,803 | 22,766 | 10,236 | 2,274 | 1,783,685 |
| **2005 Average** | **41,179** | **23,269** | **10,240** | **2,179** | **1,843,237** |

* Natural Gas Pipeline employment is included in 2001 forward but excluded in prior years.
See footnote in Appendix B.

## Figure 19

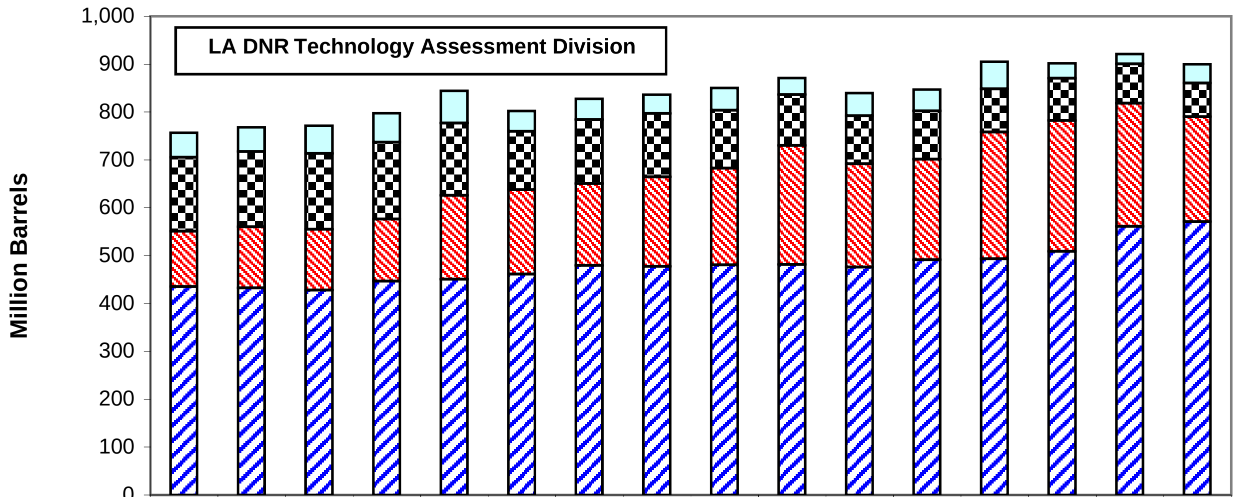
## LOUISIANA ENERGY CONSUMPTION BY SOURCE




| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nuclear | 152 | 150 | 111 | 154 | 136 | 167 | 166 | 142 | 172 | 137 | 165 | 182 | 181 | 183 | 158 | 165 |
| Coal | 209 | 214 | 224 | 223 | 231 | 218 | 206 | 225 | 225 | 228 | 253 | 243 | 238 | 254 | 262 | 258 |
| Petroleum | 1,436 | 1,398 | 1,453 | 1,460 | 1,550 | 1,469 | 1,430 | 1,320 | 1,266 | 1,452 | 1,681 | 1,611 | 1,669 | 1,677 | 1,732 | 1,663 |
| Natural Gas | 1,637 | 1,579 | 1,614 | 1,637 | 1,689 | 1,778 | 1,738 | 1,855 | 1,677 | 1,556 | 1,605 | 1,278 | 1,407 | 1,294 | 1,343 | 1,348 |
| Total | 3,433 | 3,341 | 3,401 | 3,473 | 3,606 | 3,632 | 3,538 | 3,542 | 3,340 | 3,373 | 3,703 | 3,314 | 3,495 | 3,408 | 3,496 | 3,433 |

## Figure 20

## LOUISIANA REFINERY CRUDE OIL INPUT BY SOURCE




| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other States | 52 | 51 | 58 | 61 | 68 | 43 | 44 | 40 | 47 | 35 | 47 | 45 | 57 | 32 | 20 | 40 |
| Louisiana | 154 | 157 | 159 | 160 | 151 | 122 | 134 | 132 | 121 | 106 | 100 | 101 | 90 | 88 | 82 | 70 |
| Federal OCS | 115 | 128 | 127 | 130 | 176 | 176 | 171 | 187 | 201 | 249 | 216 | 210 | 265 | 273 | 257 | 219 |
| Foreign | 435 | 433 | 428 | 446 | 450 | 461 | 479 | 477 | 481 | 481 | 476 | 491 | 493 | 509 | 561 | 571 |
| Total | 757 | 768 | 771 | 797 | 844 | 802 | 828 | 836 | 850 | 871 | 839 | 847 | 905 | 902 | 921 | 902 |

# Table 38

## LOUISIANA ENERGY CONSUMPTION ESTIMATES BY SOURCE [11]

| Year | Total Energy (TBTU) | Total Natural Gas (BCF) | Total Petroleum (MBBLS) | Total Coal (MST) | Total Nuclear (Million KWH) |
|---|---|---|---|---|---|
| 1965 | 1,766.8 | 1,110 | 109,158 | N/A | 0 |
| 1966 | 1,882.9 | 1,202 | 115,662 | N/A | 0 |
| 1967 | 2,124.1 | 1,394 | 122,475 | N/A | 0 |
| 1968 | 2,295.0 | 1,521 | 134,583 | N/A | 0 |
| 1969 | 2,572.3 | 1,763 | 147,947 | N/A | 0 |
| 1970 | 2,701.4 | 1,841 | 150,456 | 0 | 0 |
| 1971 | 2,809.3 | 1,884 | 162,470 | 0 | 0 |
| 1972 | 2,989.3 | 1,940 | 184,947 | 0 | 0 |
| 1973 | 3,225.9 | 2,010 | 209,641 | 0 | 0 |
| 1974 | 3,313.3 | 2,008 | 218,882 | 0 | 0 |
| 1975 | 3,028.8 | 1,789 | 210,174 | 0 | 0 |
| 1976 | 3,419.1 | 2,044 | 234,995 | 0 | 0 |
| 1977 | 3,794.6 | 2,191 | 268,572 | 79 | 0 |
| 1978 | 3,930.1 | 2,249 | 277,765 | 172 | 0 |
| 1979 | 3,805.3 | 1,978 | 304,884 | 118 | 0 |
| 1980 | 3,651.3 | 1,794 | 293,743 | 111 | 0 |
| 1981 | 3,688.6 | 1,782 | 295,191 | 1,363 | 0 |
| 1982 | 3,441.2 | 1,556 | 287,419 | 3,724 | 0 |
| 1983 | 3,284.5 | 1,413 | 275,058 | 6,154 | 0 |
| 1984 | 3,413.5 | 1,594 | 248,344 | 6,855 | 0 |
| 1985 | 3,192.5 | 1,386 | 240,776 | 9,217 | 2,457 |
| 1986 | 3,353.4 | 1,439 | 260,602 | 10,459 | 10,637 |
| 1987 | 3,435.5 | 1,501 | 257,313 | 10,391 | 12,324 |
| 1988 | 3,473.1 | 1,446 | 271,773 | 12,848 | 13,785 |
| 1989 | 3,592.6 | 1,538 | 266,193 | 12,471 | 12,391 |
| 1990 | 3,623.8 | 1,571 | 259,533 | 12,547 | 14,197 |
| 1991 | 3,545.9 | 1,508 | 256,789 | 12,965 | 13,956 |
| 1992 | 3,636.0 | 1,546 | 268,559 | 13,674 | 10,356 |
| 1993 | 3,688.6 | 1,578 | 273,580 | 13,676 | 14,398 |
| 1994 | 3,837.3 | 1,624 | 294,700 | 14,100 | 12,779 |
| 1995 | 3,837.2 | 1,718 | 288,998 | 13,357 | 15,686 |
| 1996 | 3,848.5 | 1,664 | 279,292 | 12,534 | 15,765 |
| 1997 | 3,828.0 | 1,659 | 258,290 | 13,874 | 13,511 |
| 1998 | 3,564.0 | 1,568 | 248,094 | 13,891 | 16,428 |
| 1999 | 3,608.6 | 1,495 | 278,926 | 13,953 | 13,112 |
| 2000 | 3,965.2 | 1,537 | 287,692 | 15,734 | 15,796 |
| 2001 | 3,712.6 | 1,219 | 288,776 | 14,969 | 17,336 |
| 2002 | 3,762.1 | 1,341 | 299,289 | 14,632 | 17,305 |
| 2003 | 3,693.0 | 1,234 | 300,697 | 15,592 | 17,499 |
| 2004 | 3,788.7 e | 1,281 e | 310,492 e | 16,116 e | 15,135 e |
| 2005 | 3,720.9 e | 1,286 e | 298,072 e | 15,856 e | 15,740 e |

e Estimated    r Revised    p Preliminary

TBTU = Trillion BTU    BCF = Billion Cubic Feet    KWH = Kilowatt-hours

MBBLS = Thousand Barrels    MST = Thousand Short Tons

See footnote in Appendix B.

# TABLE 39

## LOUISIANA REFINERY'S CRUDE OIL STATISTICS

| DATE | AVERAGE STOCK ON HAND (Barrels) | DAILY AVERAGE RUNS TO STILL (Barrels) | LICENSED REFINERIES |
|---|---|---|---|
| 1985 | 13,425,129 | 1,735,402 | 24 |
| 1986 | 13,391,258 | 1,901,450 | 23 |
| 1987 | 13,967,381 | 1,947,187 | 22 |
| 1988 | 14,295,591 | 1,946,861 | 21 |
| 1989 | 14,158,306 | 2,051,304 | 23 |
| 1990 | 13,783,012 | 2,045,697 | 23 |
| 1991 | 14,197,185 | 2,071,276 | 23 |
| 1992 | 14,331,412 | 2,090,248 | 22 |
| 1993 | 14,521,046 | 2,159,422 | 20 |
| 1994 | 15,126,534 | 2,150,403 | 19 |
| 1995 | 14,325,305 | 2,109,245 | 19 |
| 1996 | 14,462,108 | 2,252,573 | 19 |
| 1997 | 14,275,221 | 2,257,275 | 19 |
| 1998 | 14,965,117 | 2,312,239 | 19 |
| 1999 | 15,467,674 | 2,414,781 | 17 |
| 2000 | 14,818,774 | 2,334,842 | 16 |
| 2001 | 15,425,670 | 2,480,357 | 17 |
| 2002 | 16,335,210 | 2,470,556 | 18 |
| 2003 | 15,246,004 | 2,469,756 | 17 |
| 2004 | 15,938,390 | 2,543,087 | 18 |
| | | | |
| January | 15,278,705 | 2,587,904 | 18 |
| February | 16,204,919 | 2,675,514 | 18 |
| March | 14,110,811 | 2,759,961 | 18 |
| April | 16,062,964 | 2,685,319 | 18 |
| May | 18,907,234 | 2,645,097 | 18 |
| June | 17,475,610 | 2,821,557 | 18 |
| July | 17,564,152 | 2,527,613 | 18 |
| August | 15,456,574 | 2,302,323 | 18 |
| September | 15,226,279 | 1,798,991 | 17 |
| October | 16,391,508 | 1,616,290 | 17 |
| November | 15,614,966 | 1,734,579 | 17 |
| December | 16,320,550 | 1,739,915 | 17 |
| **2005 Total** | **16,217,856** | **2,324,589** | **18** |
| | | | |
| January | 16,803,496 | 2,142,669 | 17 |
| February | 17,299,604 | 2,254,280 | 17 |
| March | 14,810,293 | 2,382,599 | 17 |
| April | 15,780,681 | 2,215,823 | 17 |
| May | 15,480,561 | 2,477,902 | 17 |
| June | 15,057,261 | 2,515,939 | 17 |
| July | 17,102,416 | 2,695,858 | 17 |
| August | 17,207,051 | 2,741,098 | 17 |
| September | 17,060,037 | 2,711,362 | 17 |
| October | 16,692,212 | 2,185,544 | 17 |
| November | 16,207,681 p | 2,248,982 p | 17 |
| December | 16,810,681 p | 2,260,242 p | 17 |
| **2006 Total** | **16,359,331** p | **2,402,691** p | **17** |

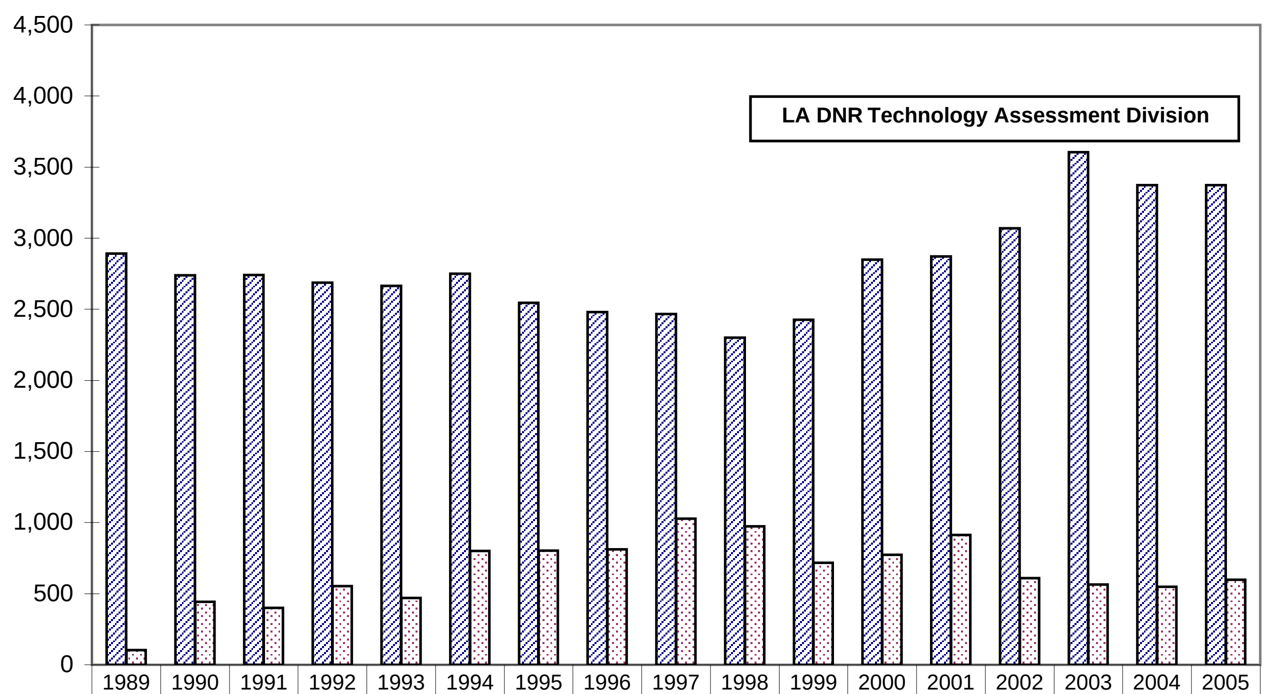
e Estimated r Revised p Preliminary

**Exxon-Mobil Refinery - Baton Rouge**

## Figure 21

## LOUISIANA LIGNITE PRODUCTION BY MINE SOURCE

(Thousand Tons Shipped)




| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dolet Hills | 2,892 | 2,738 | 2,742 | 2,688 | 2,665 | 2,750 | 2,546 | 2,480 | 2,466 | 2,301 | 2,426 | 2,850 | 2,872 | 3,069 | 3,604 | 3,373 | 3,374 |
| Oxbow | 103 | 444 | 401 | 554 | 470 | 800 | 804 | 812 | 1,029 | 974 | 717 | 773 | 912 | 609 | 564 | 548 | 599 |
| Total | 2,995 | 3,182 | 3,143 | 3,242 | 3,135 | 3,550 | 3,350 | 3,292 | 3,495 | 3,275 | 3,143 | 3,622 | 3,784 | 3,678 | 4,168 | 3,921 | 3,973 |

# Table 40

## LOUISIANA ELECTRIC UTILITIES NET ELECTRICITY GENERATION [14]
## BY FUEL TYPE
**(Million KWH)**

| YEAR | COAL | LIGNITE | OIL | GAS | NUCLEAR | TOTAL |
|---|---|---|---|---|---|---|
| 1965 | 0 | 0 | 26 | 17,819 | 0 | 17,845 |
| 1966 | 0 | 0 | 24 | 21,643 | 0 | 21,667 |
| 1967 | 0 | 0 | 20 | 23,132 | 0 | 23,152 |
| 1968 | 0 | 0 | 32 | 26,123 | 0 | 26,155 |
| 1969 | 0 | 0 | 26 | 32,301 | 0 | 32,327 |
| 1970 | 0 | 0 | 79 | 33,623 | 0 | 33,702 |
| 1971 | 0 | 0 | N/A | N/A | 0 | 37,118 |
| 1972 | 0 | 0 | N/A | N/A | 0 | 39,348 |
| 1973 | 0 | 0 | 14,353 | 36,351 | 0 | 40,704 |
| 1974 | 0 | 0 | 5,034 | 34,472 | 0 | 39,506 |
| 1975 | 0 | 0 | 3,257 | 35,967 | 0 | 39,224 |
| 1976 | 0 | 0 | 7,773 | 37,343 | 0 | 45,116 |
| 1977 | 0 | 0 | 13,255 | 35,196 | 0 | 48,451 |
| 1978 | 0 | 0 | 14,568 | 36,935 | 0 | 51,503 |
| 1979 | 0 | 0 | 8,259 | 38,396 | 0 | 46,655 |
| 1980 | 0 | 0 | 4,787 | 40,952 | 0 | 45,739 |
| 1981 | 1,529 | 0 | 2,634 | 39,947 | 0 | 44,110 |
| 1982 | 4,998 | 0 | 940 | 35,594 | 0 | 41,532 |
| 1983 | 8,377 | 0 | 356 | 28,311 | 0 | 37,044 |
| 1984 | 9,830 | 0 | 140 | 29,360 | 0 | 39,330 |
| 1985 | 13,968 | 0 | 100 | 27,736 | 2,457 | 44,261 |
| 1986 | 12,642 | 2,884 | 419 | 26,202 | 10,637 | 52,784 |
| 1987 | 12,176 | 2,926 | 60 | 23,823 | 12,324 | 51,309 |
| 1988 | 14,372 | 4,059 | 272 | 24,286 | 13,785 | 56,774 |
| 1989 | 14,227 | 3,854 | 298 | 21,900 | 12,391 | 52,670 |
| 1990 | 13,890 | 3,910 | 130 | 26,041 | 14,197 | 58,168 |
| 1991 | 14,786 | 4,126 | 45 | 24,245 | 13,956 | 57,158 |
| 1992 | 15,613 | 4,183 | 483 | 24,554 | 10,356 | 55,188 |
| 1993 | 15,794 | 3,572 | 1,838 | 23,751 | 14,398 | 59,353 |
| 1994 | 15,761 | 4,364 | 680 | 26,586 | 12,779 | 60,170 |
| 1995 | 14,632 | 4,321 | 49 | 30,867 | 15,686 | 65,555 |
| 1996 | 14,630 | 4,002 | 273 | 23,972 | 15,765 | 58,643 |
| 1997 | 16,453 | 4,499 | 646 | 26,010 | 13,511 | 61,120 |
| 1998 | 16,131 | 4,631 | 600 | 28,318 | 16,428 | 66,107 |
| 1999 | 16,386 | 4,780 | 397 | 30,162 | 13,112 | 64,837 |
| 2000 | 11,150 * | 3,335 * | 625 | 26,696 | 15,796 | 57,601 * |
| 2001 | 8,157 * | 2,760 * | 1,722 | 20,402 | 17,336 | 50,378 * |
| 2002 | 9,177 * | 3,081 * | 68 | 25,086 | 17,305 | 54,922 * |
| 2003 | 8,075 * | 2,946 * | 1,008 | 15,094 | 16,126 | 43,485 * |
| 2004 | 8,569 * | 2,755 * | 3,694 | 15,139 | 17,080 | 47,604 * |
| 2005 | 8,838 * | 2,578 * | 3,378 | 13,688 | 15,676 | 44,158 * |

* Cajun Electric Power Cooperative's purchase by Louisiana Generating LLC changed their classification from electric utility to independent power producer.

e Estimated  r Revised

See footnotes on Appendix B

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# APPENDICES



The Sol of New Orleans II
The University of New Orleans's solar powered car

## Appendix A

# Abbreviations

| | |
|---|---|
| BCF | Billion Cubic Feet |
| BTU | British Thermal Unit |
| DNR | Louisiana Department of Natural Resources |
| DOE | United States Department of Energy |
| DOI | United States Department of the Interior |
| EIA | Energy Information Administration, DOE |
| FOB | Free on Board |
| KWH | Kilowatt-hours |
| MBBLS | Thousand Barrels |
| MCF | Thousand Cubic Feet |
| MMS | Minerals Management Service, DOI |
| MST | Thousand Short Tons |
| NGC | Natural Gas Clearinghouse |
| OCS | Outer Continental Shelf |
| OPEC | Organization of Petroleum Exporting Countries |
| RAC | Refinery Acquisition Costs |
| SLS | South Louisiana Sweet Crude Oil |
| SPR | Strategic Petroleum Reserve |
| TBTU | Trillion BTU |
| TCF | Trillion Cubic Feet |

# State Abbreviations Used in the Louisiana Energy Facts Annual

| | |
|---|---|
| AL | Alabama |
| AK | Alaska |
| CA | California |
| CO | Colorado |
| IL | Illinois |
| KS | Kansas |
| LA | Louisiana |
| MI | Michigan |
| MS | Mississippi |
| ND | North Dakota |
| NM | New Mexico |
| OK | Oklahoma |
| TX | Texas |
| UT | Utah |
| WY | Wyoming |

Appendix B

# Data Sources*

1. EMPLOYMENT AND TOTAL WAGES PAID BY EMPLOYERS SUBJECT TO LOUISIANA EMPLOYMENT SECURITY LAW, Baton Rouge, LA: Louisiana Department of Labor, Office of Employment Security, Research and Statistics Unit.

2. MONTHLY ENERGY REVIEW and ANNUAL ENERGY REVIEW, Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

3. NATURAL GAS MONTHLY and NATURAL GAS ANNUAL, Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

4. Baker Hughes from OIL & GAS JOURNAL, Tulsa, OK: Penn Well Publishing Co.

5. October 2002 to Present, NATURAL GAS WEEK, Washington, D.C.: Energy Intelligence Group. Prior, SURVEY OF DOMESTIC SPOT MARKET PRICES, Houston, TX: Dynegy Inc. (Formerly Natural Gas Clearinghouse).

6. PETROLEUM MARKETING MONTHLY and PETROLEUM MARKETING ANNUAL, Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

7. PETROLEUM SUPPLY MONTHLY and PETROLEUM SUPPLY ANNUAL, Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

8. SEVERANCE TAX, Baton Rouge, LA: Louisiana Department of Revenue and Taxation, Severance Tax Section.

9. U.S. CRUDE OIL, NATURAL GAS and NATURAL GAS LIQUIDS RESERVES, Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

10. THE WALL STREET JOURNAL, Gulf Coast Edition, Beaumont, TX: Dow Jones and Company.

11. STATE ENERGY DATA REPORT, Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

12. FEDERAL OFFSHORE STATISTICS, Washington, D.C.: U.S. Department of the Interior, Minerals Management Service.

13. MINERAL REVENUE, Washington, D.C.: U.S. Department of the Interior, Minerals Management Service, Royalty Management Program.

14. ELECTRIC POWER MONTHLY, Washington, D.C.: U.S. Department of Energy, Energy Information Administration.

* Unless otherwise specified, data is from the Louisiana Department of Natural Resources.

Appendix C

# Glossary

**Bonus.** A cash payment by the lessee for the execution of a lease. A lease is a contract that gives a lessee the right: (a) to search for minerals, (b) to develop the surface for extraction, and (c) to produce minerals within the area covered by the contract.

**Casinghead Gas**. All natural gas released from oil during the production of oil from underground reservoirs.

**City-Gate**. A point or measuring station at which a gas distribution company receives gas from a pipeline company or transmission system.

**Commercial Consumption**. Gas used by non-manufacturing organizations such as hotels, restaurants, retail stores, laundries, and other service enterprises. This also includes gas used by local, state, and federal agencies engaged in non-manufacturing activities.

**Condensate**. (See Lease Condensate).

**Crude Oil**. A mixture of hydrocarbons that existed in the liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities.

## CRUDE OIL PRICES

**Domestic Wellhead**. The average price at which all domestic crude oil is first purchased.

**Imports FOB**. The price actually charged at the producing country's port of loading. It is the responsibility of the buyer to arrange for transportation and insurance.

**Imports Landed**. The dollar per barrel price of crude oil at the port of discharge. It includes crude oil landed in the U.S. and U.S. company-owned refineries in the Caribbean, but excludes crude oil from countries that export only small amounts to the United States. The landed price does not include charges incurred at the port of discharge.

**Imports OPEC FOB**. The average price actually charged by OPEC at their country's port of loading. This price does not include transportation or insurance.

**OCS Gulf**. The average price at which all offshore, Outer Continental Shelf, Central Gulf region crude oil is first purchased as reported by the U.S. Department of Energy, Energy Information Administration.

**Refinery Acquisition Costs** (RAC). The average price paid by refiners in the U.S. for crude oil booked into their refineries in accordance with accounting procedures generally accepted and consistently and historically applied by the refiners.

a) **Domestic**. The average price of crude oil produced in the United States or from the Outer Continental Shelf of the U.S.

b**) Imports**. The average price of any crude oil not reported as domestic.

**Refinery Posted**. The average price from a survey of selected refiners' postings for South Louisiana Sweet (SLS) crude, which is effective at the middle and at the end of the month.

**Severance Tax**. The average wellhead price calculated from oil severance taxes paid to the Louisiana Department of Revenue and Taxation.

**Spot Market**. The spot market crude oil price is the average of daily South Louisiana Sweet (SLS) crude price futures traded in the month and usually includes transportation from the producing field to the St. James, Louisiana terminal.

**State**. The average price at which all Louisiana crude oil, excluding Louisiana OCS, is first purchased as reported in a survey by the U.S. Department of Energy, Energy Information Administration.

**State Royalty**. The average wellhead price from its royalty share of oil produced in state lands or water bottoms. The price is calculated by the ratio of received oil royalty gross revenue divided by royalty volume share reported to the Louisiana Department of Natural Resources.

**Developmental Well**. Wells drilled within the proved area of an oil or gas reservoir to the depth of a stratigraphic horizon known to be productive.

**Dry Gas**. (See Natural Gas, "Dry").

**Dry Hole**. An exploratory or developmental well found to be incapable of producing either oil or gas in sufficient quantities to justify completion as an oil or gas well.

**Electric Utility Consumption**. Gas used as fuel in electric utility plants.

**Exploratory Well**. A well drilled to find and produce oil or gas in an unproved area, to find a new reservoir in an old field, or to extend the limits of a known oil or gas reservoir.

**Exports**.  Crude oil or natural gas delivered out of the Continental United States and Alaska to foreign countries.

**Extraction Loss**.  The  reduction in volume of natural gas resulting from the removal of natural gas liquid constituents at natural gas processing plants.

**Federal Offshore or Federal OCS**.  (See Louisiana OCS)

**FOB Price** (Free on board).  The price actually charged at the producing country's port of loading.  The reported price includes deductions for any rebates and discounts or additions of premiums where applicable and should be the actual price paid with no adjustment for credit terms.

**Gate**.  (See City-Gate)

**Gross Revenue**.  Amount of money received from a purchaser,  including charges for field gathering, transportation from wellhead to purchaser receiving terminal, and state production severance tax.

**Gross Withdrawals**.  (See Natural Gas, Gross Withdrawals)

**Imports**.  Crude oil or natural gas received in the Continental United States, Alaska, and Hawaii from foreign countries.

**Industrial Consumption**.  Natural gas used by manufacturing and mining establishments for heat, power, and chemical feedstock.

**Lease Condensate**.  A mixture consisting primarily of pentane and heavier hydrocarbons that is recovered as a liquid from natural gas in lease or field separation facilities, exclusive of products recovered at natural gas processing plants or facilities.

**Lease Separator**.  A facility installed at the surface for the purpose of: (a) separating gases from produced crude oil and water at the temperature and pressure conditions of the separator, and/or (b) separating gases from that portion of the produced natural gas stream which liquefies at the temperature and pressure conditions of the separator.

**Louisiana OCS**.  Submerged lands under federal regulatory jurisdiction that comprise the Continental Margin or Outer Continental Shelf adjacent to Louisiana and seaward of the Louisiana Offshore region.

**Louisiana Offshore**.  A 3-mile strip of submerged lands under state regulatory jurisdiction located between the State coast line and the OCS region.

**Louisiana Onshore**.  Region defined by the State boundary and the coast line.

**Major Pipeline Company**. A company whose combined sales for resale, and gas transported interstate or stored for a fee, exceeded 50 million thousand cubic feet in the previous year.

**Marketed Production**. (See Natural Gas, Marketed Production)

**Natural Gas**. A mixture of hydrocarbon compounds and small quantities of various non-hydrocarbons existing in the gaseous phase or in solution with crude oil in natural underground reservoirs at reservoir conditions. The principal hydrocarbons usually contained in the mixture are methane, ethane, propane, butanes and pentanes. Typical non-hydrocarbon gases that may be present in reservoir natural gas are carbon dioxide, helium, hydrogen sulfide and nitrogen. Under reservoir conditions, natural gas and the liquefiable portions occur either in a single gaseous phase in the reservoir or in solution with crude oil, and are not distinguishable at the time as separated substances.

**Natural Gas, "Dry"**. The actual or calculated volume of natural gas which remains after: (a) the liquefiable hydrocarbon portion has been removed from the gas stream, and (b) any volumes of non-hydrocarbon gases have been removed where they occur in sufficient quantity to render the gas unmarketable.

**Natural Gas, Gross Withdrawals**. Full well-stream volume, including all natural gas plant liquids and all non-hydrocarbon gases, but excluding lease condensate.

**Natural Gas Liquids**. Lease condensate plus natural gas plant liquids.

**Natural Gas, Marketed Production**. Gross withdrawals less gas used for repressurizing, quantities vented and flared, and non-hydrocarbon gases removed in treating or processing operations. It includes all quantities of gas used in field and processing operations.

**Natural Gas, OCS Gas**. OCS gas volume is as reported. Most is "dry" gas, though some is "wet" gas.

**Natural Gas Plant Liquids**. Those hydrocarbons remaining in a natural gas stream after field separation and later separated and recovered at a natural gas processing plant or cycling plant through the processes of absorption, adsorption, condensation, fractionation or other methods. Generally such liquids consist of propane and heavier hydrocarbons and are commonly referred to as condensate, natural gasoline, or liquefied petroleum gases. Where hydrocarbon components lighter than propane (e.g., ethane) are recovered as liquids, these components are included with natural gas liquids.

## NATURAL GAS PRICES

**Henry Hub Settled NYMEX** The last trading day price for the month before delivery posted in the New York Mercantile Exchange for natural gas at Henry Hub.

**Spot Market** The average price of natural gas paid at the regional spot market receipt points or zones as reported by the Energy Intelligence Group's NATURAL GAS WEEK. The data are a volume weighted average and reflect market activity information gathered during the entire month before the publication date, regardless of delivery date. The data are not an arbitrary weighting by production zone, but a true deal-by-deal volume weighting of prices gathered. Data prior to October 2002 were from Dynegy's survey of the domestic natural gas spot market receipt points or zones located in Louisiana. The new and old points or zones are as follows:

**NATURAL GAS PIPELINES AND SALES POINTS FOR PRICES**

| **Dynegy** | **Natural Gas Week** |
|---|---|
| ANR<br>Eunice, LA | ANR<br>Patterson, LA |
| COLUMBIA GULF<br>Average Louisiana onshore laterals | COLUMBIA GULF TRANSMISSION Co.<br>Average of Erath, Rayne, and Texaco Henry Plant in Louisiana |
| LOUISIANA INTRASTATES<br>Average of Faustina, LIG, Bridgeline, and Monterrey pipelines | LOUISIANA INTRASTATES<br>Average of LIG, Bridgeline, LRC, and Acadian pipelines |
| SOUTHERN NATURAL<br>South Louisiana | SONAT<br>Saint Mary Parish, LA |
| TENNESSEE GAS<br>Vinton, LA | TENNESSEE GAS<br>Average Zone 1 of 500 & 800 |
| TEXAS GAS TRANSMISSION<br>Zone 1 (North Louisiana) | TEXAS GAS TRANSMISSION<br>Zone 1 (North Louisiana) |
| GULF SOUTH PIPELINE | TRUNKLINE GAS Co. |

**OCS.** The average wellhead price calculated from sales and volumes from Louisiana OCS natural gas as reported by the U.S. Department of Interior, Minerals Management Service.

**State Royalty**. The average wellhead price calculated from revenue received and volumes reported to the Louisiana Department of Natural Resources.

**State Wells**. The average price of gas sold at Louisiana wellhead. This price includes: (a) value of natural gas plant liquids subsequently removed from the gas, (b) gathering and compression charges, and (c) State production, severance, and/or similar charges.

**Major Pipelines Purchases**.

a) **Domestic Producers**. The average price of natural gas produced in the United States or from the Outer Continental Shelf of the U.S.

b**) Foreign Imports**. The average price of any natural gas not reported as domestic.

**Wellhead**. The wellhead sales price including: (a) value of natural gas plant liquids subsequently removed from the gas, (b) gathering and compression charges, and (c) State production, severance, and/or similar charges.

**Natural Gas, Wet After Lease Separation**. The volume of natural gas, if any, remaining after: (a) removal of lease condensate in lease and/or field separation facilities, and (b) exclusion of non-hydrocarbon gases where they occur in sufficient quantities to render the gas unmarketable. Also excludes gas returned to formation in pressure maintenance and secondary recovery projects and gas returned to earth from cycling and/or gasoline plants. Natural gas liquids may be recovered from volumes of natural gas, wet after lease separation, at natural gas processing plants.

**Organization of Petroleum Exporting Countries (OPEC)**. Countries that have organized for the purpose of negotiating with oil companies on matters of oil production, prices, and future concession rights. Current members are Algeria, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

**Outer Continental Shelf (OCS).** All submerged lands that comprise the Continental Margin adjacent to the U.S. and seaward of the state offshore lands. Production in the OCS is under federal regulatory jurisdiction and ownership.

**Processing Plant**. A facility designed to recover natural gas liquids from a stream of natural gas which may or may not have passed through lease separators and/or field separation facilities. Another function of natural gas processing plants is to control the quality of the processed natural gas stream.

**Proved Reserves of Crude Oil**. As of December 31 of the report year, the estimated quantities of all liquids defined as crude oil which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions. Volumes of crude oil in underground storage are not considered proved reserves.

**Proved Reserves of Lease Condensate**. The volumes of lease condensate as of December 31 of the report year expected to be recovered in future years in conjunction with the production of proved reserves of natural gas as of December 31 of the report year.

**Proved Reserves of Natural Gas**. The estimated quantities of natural gas as of December 31 of the report year which analysis of geologic and engineering data demonstrates with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions. Volumes of natural gas in underground storage are not considered proved reserves.

**Proved Reserves of Natural Gas Liquids**. The volumes of natural gas liquids (including lease condensate) as of December 31 of the report year, which analysis of geologic and engineering data demonstrates with reasonable certainty to be separable in the future from proved natural gas reserves under existing economic and operating conditions.

**Rental**. Money paid by the lessee to maintain the lease after the first year if it is not producing. A lease is considered expired when rental is not paid on time on an unproductive lease.

**Reservoir**. A porous and permeable underground formation containing an individual and separate natural accumulation of producible hydrocarbons (oil and/or gas) which is confined by impermeable rock or water barriers and is characterized by a single natural pressure system. Reservoirs are considered proved if economic producibility is supported by actual production or conclusive formation tests (drill stem or wire line), or if economic producibility is supported by core analysis and/or electric or other log interpretations. The area of a gas or oil reservoir considered proved includes: (a) that portion delineated by drilling and defined by gas-oil and/or gas-water contacts, if any; and (b) the immediately adjoining portions not yet drilled, but which can be reasonably judged as economically productive on the basis of available geological and engineering data.

**Residential Consumption**. Gas used in private dwellings, including apartments, for heating, cooking, water heating, and other household uses.

**Royalty (Including Royalty Override) Interest**. Those interests which entitle their owner(s) to a share of the mineral production from a property or to a share of the proceeds from there. These interests do not contain the rights and obligations of operating the property and normally do not bear any of the costs of exploration, development, or operation of the property.

**Royalty Override (Or Overriding Royalty)**. An interest in oil and gas produced at the surface free of any cost of production. It is royalty in addition to the usual landowner's royalty reserved to the lessor. The Layman's Guide to Oil & Gas by Brown & Miller defines overriding royalty as a percentage of all revenue earned by a well and carrying no cost obligation.

**State Offshore. (**See Louisiana Offshore**).**

**Wet After Lease Separation**. (See Natural Gas, Wet After Lease Separation).

**Wildcat Well** . (See Developmental Well).

Appendix D

# Louisiana Gas Volume at 14.73 psia

**Page**



# Appendix D-1

## LOUISIANA STATE GAS PRODUCTION, WET AFTER LEASE SEPARATION

**Natural Gas and Casinghead Gas, Excluding OCS**

**(Thousand Cubic Feet (MCF) at 14.73 psia and 60 degrees Fahrenheit)***

| DATE | NORTH | SOUTH | OFFSHORE | TOTAL |
|---|---|---|---|---|
| 1985 | 358,032,963 | 1,274,608,554 | 255,072,018 | 1,887,713,536 |
| 1986 | 370,901,958 | 1,240,893,984 | 251,033,103 | 1,862,829,044 |
| 1987 | 363,802,599 | 1,175,490,485 | 232,692,536 | 1,771,985,620 |
| 1988 | 382,100,449 | 1,192,889,101 | 218,544,278 | 1,793,533,828 |
| 1989 | 386,783,455 | 1,153,294,096 | 207,381,469 | 1,747,459,020 |
| 1990 | 398,236,494 | 1,160,425,829 | 185,678,416 | 1,744,340,739 |
| 1991 | 389,623,599 | 1,139,243,110 | 152,895,972 | 1,681,762,681 |
| 1992 | 379,671,005 | 1,146,893,542 | 149,933,256 | 1,676,497,803 |
| 1993 | 360,897,088 | 1,126,950,007 | 156,919,403 | 1,644,766,497 |
| 1994 | 361,146,486 | 1,048,229,785 | 158,315,609 | 1,567,691,880 |
| 1995 | 370,709,558 | 1,028,500,599 | 167,742,330 | 1,566,952,486 |
| 1996 | 425,506,052 | 1,048,009,685 | 189,331,696 | 1,662,847,432 |
| 1997 | 450,873,442 | 995,341,920 | 189,565,415 | 1,635,780,777 |
| 1998 | 446,138,374 | 979,584,537 | 183,246,642 | 1,608,969,552 |
| 1999 | 402,085,989 | 928,879,872 | 152,594,840 | 1,483,560,702 |
| 2000 | 395,829,467 | 945,899,010 | 152,705,343 | 1,494,217,218 |
| 2001 | 397,384,648 | 974,037,120 | 153,165,161 | 1,525,523,333 |
| 2002 | 359,101,247 | 892,263,222 | 136,858,689 | 1,389,014,853 |
| 2003 | 350,349,532 | 889,219,893 | 132,612,609 | 1,372,586,386 |
| 2004 | 336,411,544 | 911,663,321 | 128,307,879 | 1,377,321,975 |
| | | | | |
| January | 33,470,038 | 70,637,666 | 8,985,767 | 113,926,588 |
| February | 30,981,461 | 64,535,496 | 10,259,760 | 104,502,725 |
| March | 35,209,838 | 71,898,764 | 10,008,172 | 117,368,363 |
| April | 34,774,762 | 69,916,033 | 10,393,100 | 114,698,967 |
| May | 36,287,569 | 71,800,024 | 10,142,528 | 118,480,693 |
| June | 35,455,741 | 68,949,974 | 10,383,436 | 114,548,244 |
| July | 36,555,393 | 69,855,012 | 10,030,296 | 116,793,841 r |
| August | 35,487,011 | 66,675,468 | 5,392,314 | 112,192,775 |
| September | 35,236,390 | 46,808,094 | 5,401,545 | 87,436,798 |
| October | 34,062,252 | 56,894,039 | 8,283,696 | 96,357,836 |
| November | 35,282,060 | 60,638,379 | 8,573,567 | 104,204,135 |
| December | 38,511,954 | 63,467,934 | 8,378,491 | 110,553,455 |
| **2005 Total** | **421,314,470** | **782,076,884** | **106,232,673** | **1,311,064,420** |
| | | | | |
| January | 34,664,136 | 70,295,885 | 7,524,464 | 113,338,513 |
| February | 30,214,257 | 65,906,322 | 9,107,948 | 103,645,043 |
| March | 31,684,333 | 76,709,799 | 8,827,137 | 117,502,080 |
| April | 29,876,621 | 75,031,292 | 9,301,689 | 113,735,050 |
| May | 30,690,327 | 79,120,285 | 8,768,655 | 119,112,301 |
| June | 29,657,697 | 77,169,134 | 9,414,668 | 115,595,486 |
| July | 30,256,791 | 77,783,710 | 7,483,190 | 117,455,169 |
| August | 30,085,312 | 79,568,421 | 7,249,027 | 117,136,923 |
| September | 29,167,208 | 77,315,492 | 7,439,247 | 113,731,727 |
| October | 29,977,713 | 79,707,041 | 6,987,187 | 117,124,001 |
| November | 28,204,272 e | 77,586,454 e | 6,901,314 e | 112,777,914 e |
| December | 28,057,218 e | 79,908,954 e | 7,300,324 e | 114,867,485 e |
| **2006 Total** | **362,535,885 e** | **916,102,789 e** | **96,304,851 e** | **1,376,021,692 e** |

e Estimated r Revised p Preliminary

* See Table 11 corresponding volumes at 15.025 psia and footnote in Appendix B.

# Appendix D-2

## LOUISIANA STATE GAS PRODUCTION, WET AFTER LEASE SEPARATION

### Natural Gas and Casinghead Gas

### (Thousand Cubic Feet (MCF) at 14.73 psia and 60 degrees Fahrenheit)*

| DATE | ONSHORE | OFFSHORE State | OFFSHORE Federal OCS[12] | TOTAL |
|---|---|---|---|---|
| 1985 | 1,632,641,518 | 255,072,018 | 3,116,884,507 | 5,004,598,042 |
| 1986 | 1,611,795,941 | 251,033,103 | 2,927,832,280 | 4,790,661,324 |
| 1987 | 1,539,293,084 | 232,692,536 | 3,180,107,212 | 4,952,092,832 |
| 1988 | 1,574,989,550 | 218,544,278 | 3,096,881,645 | 4,890,415,472 |
| 1989 | 1,540,077,551 | 207,381,469 | 3,006,576,077 | 4,754,035,097 |
| 1990 | 1,558,662,324 | 185,678,416 | 3,706,324,064 | 5,450,664,803 |
| 1991 | 1,528,866,709 | 152,895,972 | 3,289,968,620 | 4,971,731,301 |
| 1992 | 1,526,564,547 | 149,933,256 | 3,338,101,465 | 5,014,599,268 |
| 1993 | 1,487,847,094 | 156,919,403 | 3,386,808,671 | 5,031,575,169 |
| 1994 | 1,409,376,270 | 158,315,609 | 3,492,406,781 | 5,060,098,660 |
| 1995 | 1,399,210,157 | 167,742,330 | 3,636,068,016 | 5,203,020,503 |
| 1996 | 1,473,515,737 | 189,331,696 | 3,783,483,306 | 5,446,330,739 |
| 1997 | 1,446,215,363 | 189,565,415 | 3,901,964,998 | 5,537,745,775 |
| 1998 | 1,425,722,911 | 183,246,642 | 3,890,978,799 | 5,499,948,351 |
| 1999 | 1,330,965,862 | 152,594,840 | 3,913,456,139 | 5,397,016,841 |
| 2000 | 1,341,728,477 | 152,705,343 | 3,837,150,457 | 5,331,584,277 |
| 2001 | 1,371,421,768 | 153,165,161 | 3,895,134,261 | 5,419,721,191 |
| 2002 | 1,251,364,470 | 136,858,689 r | 3,527,116,066 | 4,915,339,224 |
| 2003 | 1,239,569,425 | 132,612,609 r | 3,342,004,232 | 4,714,186,267 |
| 2004 | 1,248,074,865 | 128,307,879 r | 2,897,440,676 e r | 4,273,823,419 e r |
| January | 104,107,704 | 8,985,767 r | 223,980,078 e r | 337,073,549 e r |
| February | 95,516,958 | 10,259,760 r | 208,696,558 e r | 314,473,276 e r |
| March | 107,108,603 | 10,008,172 r | 236,135,830 e r | 353,252,605 e r |
| April | 104,690,795 | 10,393,100 r | 228,180,068 e r | 343,263,963 e r |
| May | 108,087,593 | 10,142,528 r | 241,878,058 e r | 360,108,179 e r |
| June | 104,405,716 | 10,383,436 r | 228,540,803 e r | 343,329,954 e r |
| July | 106,410,405 | 10,030,296 r | 211,544,672 e r | 327,985,373 e r |
| August | 102,162,478 | 5,392,314 | 195,660,360 e r | 303,215,153 e r |
| September | 82,044,484 | 5,401,545 | 79,116,265 e r | 166,562,295 e r |
| October | 90,956,291 | 8,283,696 | 90,520,004 e r | 189,759,991 e r |
| November | 95,920,439 | 8,573,567 | 129,487,936 e r | 233,981,943 e r |
| December | 101,979,888 | 8,378,491 | 155,622,193 e r | 265,980,573 e r |
| **2005 Total** | **1,203,391,353** | **106,232,673** | **2,229,362,826 e r** | **3,538,986,853 e r** |
| January | 104,960,022 | 7,524,464 | 169,308,218 e | 281,792,704 e |
| February | 96,120,579 | 9,107,948 | 148,402,500 e | 253,631,027 e |
| March | 108,394,132 | 8,827,137 | 168,341,240 e | 285,562,509 e |
| April | 104,907,913 | 9,301,689 | 171,458,306 e | 285,667,907 e |
| May | 109,810,612 | 8,768,655 | 183,867,970 e | 302,447,238 e |
| June | 106,826,831 | 9,414,668 | 175,124,254 e | 291,365,753 e |
| July | 108,040,501 | 7,483,190 | 179,429,142 e | 117,311,861 e |
| August | 109,653,732 | 7,249,027 | 164,867,500 e | 117,080,127 e |
| September | 106,482,700 | 7,439,247 | 166,013,571 e | 98,553,583 e |
| October | 109,684,754 | 6,987,187 | 176,833,623 e | 112,961,788 e |
| November | 105,790,726 | 6,901,314 | 169,238,231 e | 110,528,300 e |
| December | 107,966,172 | 7,300,324 | N/A | 110,181,564 |
| **2006 Total** | **1,278,638,674** | **96,304,851** | **1,872,884,555 p** | **3,247,828,080 p** |

e Estimated r Revised p Preliminary

* See Table 12 corresponding volumes at 15.025 psia and footnote in Appendix B.

**NOTE**: The 2003 Federal OCS production is estimated from the marketed production

# Appendix D-3

## LOUISIANA MARKETED AND DRY GAS PRODUCTION

**(Billion Cubic Feet (BCF) at 14.73 psia and 60 degrees Fahrenheit)***

| | MARKETED | | | EXTRACTION | |
|---|---|---|---|---|---|
| DATE | State | OCS | Total[3] | LOSS[3] | DRY[3] |
| 1964 | 3,520 e | 616 [12] | 4,136 e | N/A | N/A |
| 1965 | 3,731 e | 639 [12] | 4,370 e | N/A | N/A |
| 1966 | 4,145 e | 956 [12] | 5,101 e | N/A | N/A |
| 1967 | 4,640 e | 1,076 [12] | 5,717 e | N/A | N/A |
| 1968 | 5,017 e | 1,399 [12] | 6,416 e | 140 | 6,276 |
| 1969 | 5,424 e | 1,804 [12] | 7,228 e | 179 | 7,049 |
| 1970 | 5,538 | 2,250 [12] | 7,788 | 193 | 7,595 |
| 1971 | 5,474 | 2,608 [12] | 8,082 | 195 | 7,887 |
| 1972 | 5,120 | 2,853 [12] | 7,973 | 198 | 7,775 |
| 1973 | 5,217 | 3,025 [12] | 8,242 | 207 | 8,036 |
| 1974 | 4,438 | 3,316 [12] | 7,754 | 194 | 7,559 |
| 1975 | 3,792 | 3,299 [12] | 7,091 | 190 | 6,901 |
| 1976 | 3,542 | 3,465 [12] | 7,007 | 173 | 6,834 |
| 1977 | 3,604 | 3,611 [12] | 7,215 | 166 | 7,049 |
| 1978 | 3,368 | 4,108 [12] | 7,476 | 162 | 7,315 |
| 1979 | 3,149 | 4,117 [12] | 7,266 | 166 | 7,101 |
| 1980 | 2,966 | 3,974 [12] | 6,940 | 142 | 6,798 |
| 1981 | 2,715 | 4,065 [12] | 6,780 | 142 | 6,638 |
| 1982 | 2,406 | 3,766 [12] | 6,172 | 129 | 6,043 |
| 1983 | 2,190 | 3,142 [12] | 5,332 | 124 | 5,208 |
| 1984 | 2,282 | 3,543 [12] | 5,825 | 133 | 5,693 |
| 1985 | 1,928 | 3,086 [12] | 5,014 | 118 | 4,896 |
| 1986 | 1,997 | 2,899 [12] | 4,895 | 116 | 4,780 |
| 1987 | 1,974 | 3,148 [12] | 5,123 | 125 | 4,998 |
| 1988 | 2,114 | 3,066 [12] | 5,180 | 120 | 5,060 |
| 1989 | 2,102 | 2,977 [12] | 5,078 | 121 | 4,957 |
| 1990 | 1,573 | 3,669 [12] | 5,242 | 119 | 5,123 |
| 1991 | 1,777 | 3,257 [12] | 5,034 | 129 | 4,905 |
| 1992 | 1,649 | 3,265 [12] | 4,914 | 133 | 4,782 |
| 1993 | 1,674 | 3,317 [12] | 4,991 | 130 | 4,861 |
| 1994 | 1,691 | 3,479 [12] | 5,170 | 129 | 5,041 |
| 1995 | 1,683 | 3,425 [3] | 5,108 | 146 | 4,962 |
| 1996 | 1,628 | 3,662 [3] | 5,290 | 140 | 5,150 |
| 1997 | 1,535 | 3,652 [3] | 5,187 | 147 | 4,980 |
| 1998 | 1,583 | 3,652 [3] | 5,235 | 142 | 5,032 |
| 1999 | 1,598 | 3,636 [3] | 5,234 | 162 | 5,011 |
| 2000 | 1,484 [3] | 3,664 [3] | 5,148 | 162 | 4,957 |
| 2001 | 1,532 [3] | 3,673 [3] | 5,205 | 150 | 5,025 |
| 2002 | 1,389 [3] | 3,421 [3] | 4,810 | 160 | 4,623 |
| 2003 | 1,377 [3] | 3,364 [3] | 4,741 | 158 | 4,556 |
| 2004 | 1,385 [3] | 3,103 [3] | 4,487 | 154 | 4,334 |
| 2005 | 1,321 [3] | 2,158 [3] | 3,480 | 132 | 3,338 |

e Estimated   r Revised   p Preliminary

* See Table 13 corresponding volumes at 15.025 psia and footnote in Appendix B.

# Appendix D-4

## UNITED STATES OCS GAS PRODUCTION[12]

**Natural Gas and Casinghead Gas**

**(Thousand Cubic Feet (MCF) at 14.73 psia and 60 degrees Fahrenheit)***

| YEAR | LOUISIANA | TEXAS | CALIFORNIA | TOTAL |
|---|---|---|---|---|
| 1961 | 318,280,097 | 0 | 0 | 318,280,097 |
| 1962 | 451,952,661 | 0 | 0 | 451,952,661 |
| 1963 | 564,352,609 | 0 | 0 | 564,352,609 |
| 1964 | 621,731,441 | 0 | 0 | 621,731,441 |
| 1965 | 645,589,472 | 0 | 0 | 645,589,472 |
| 1966 | 965,387,854 | 42,059,386 | 0 | 1,007,447,240 |
| 1967 | 1,087,262,810 | 99,952,947 | 0 | 1,187,215,756 |
| 1968 | 1,413,467,614 | 109,910,788 | 799,685 | 1,524,178,086 |
| 1969 | 1,822,544,152 | 127,096,983 | 4,845,851 | 1,954,486,985 |
| 1970 | 2,273,147,052 | 133,300,405 | 12,229,147 | 2,418,676,604 |
| 1971 | 2,634,014,045 | 127,357,909 | 15,671,479 | 2,777,043,433 |
| 1972 | 2,881,364,748 | 147,156,460 | 10,033,581 | 3,038,554,789 |
| 1973 | 3,055,628,252 | 148,673,638 | 7,286,549 | 3,211,588,439 |
| 1974 | 3,349,170,882 | 159,979,402 | 5,573,642 | 3,514,723,926 |
| 1975 | 3,332,169,075 | 122,572,765 | 3,951,633 | 3,458,693,473 |
| 1976 | 3,499,865,919 | 92,582,425 | 3,475,201 | 3,595,923,545 |
| 1977 | 3,647,513,694 | 86,943,285 | 3,289,963 | 3,737,746,942 |
| 1978 | 4,149,731,158 | 231,857,451 | 3,472,292 | 4,385,060,901 |
| 1979 | 4,158,521,732 | 511,590,610 | 2,866,822 | 4,672,979,164 |
| 1980 | 4,013,707,456 | 624,642,529 | 3,107,023 | 4,641,457,008 |
| 1981 | 4,106,494,612 | 730,275,835 | 12,766,307 | 4,849,536,754 |
| 1982 | 3,803,740,070 | 858,020,303 | 17,750,924 | 4,679,511,297 |
| 1983 | 3,173,892,371 | 850,817,216 | 16,024,292 | 4,040,733,879 |
| 1984 | 3,578,740,589 | 931,293,587 | 27,806,899 | 4,537,841,075 |
| 1985 | 3,116,884,507 | 834,926,527 | 49,164,213 | 4,000,975,247 |
| 1986 | 2,927,832,280 | 978,370,557 | 42,689,021 | 3,948,891,858 |
| 1987 | 3,180,107,212 | 1,204,488,343 | 40,986,158 | 4,425,581,714 |
| 1988 | 3,096,881,645 | 1,178,422,567 | 34,570,638 | 4,309,874,850 |
| 1989 | 3,006,576,077 | 1,165,112,959 | 28,574,912 | 4,200,263,949 |
| 1990 | 3,706,324,064 | 1,348,075,368 | 38,531,764 | 5,092,931,196 |
| 1991 | 3,289,968,620 | 1,184,936,500 | 40,626,577 | 4,515,531,697 |
| 1992 | 3,338,101,465 | 1,239,389,554 | 40,873,660 | 4,685,644,750 |
| 1993 | 3,386,808,671 | 1,027,937,761 | 42,082,090 | 4,533,389,755 |
| 1994 | 3,492,406,781 | 1,014,204,140 | 41,679,064 | 4,657,017,854 |
| 1995 | 3,636,068,016 | 908,520,055 | 36,425,501 | 4,692,270,850 |
| 1996 | 3,783,483,306 | 972,873,764 | 37,822,941 | 5,024,420,834 |
| 1997 | 3,901,964,998 | 965,334,787 | 40,722,084 | 5,076,996,337 |
| 1998 | 3,890,978,799 | 867,606,779 | 26,431,191 | 4,835,387,697 |
| 1999 | 3,913,456,139 | 814,124,878 | 37,261,450 | 4,992,363,948 |
| 2000 | 3,837,150,457 | 886,473,041 | 36,855,271 | 4,977,690,726 |
| 2001 | 3,895,134,261 | 916,020,487 | 40,447,991 | 5,217,043,720 |

| | GULF OF MEXICO | | PACIFIC | TOTAL |
|---|---|---|---|---|
| | CENTRAL | WESTERN | | |
| 2002 | 3,580,828,493 | 1,019,741,703 | 35,954,912 | 4,666,699,034 |
| 2003 | 3,392,897,697 | 1,087,114,884 | 38,203,507 | 4,572,326,896 |
| 2004 | 2,941,564,138 | 1,121,137,433 | 38,252,462 | 4,169,538,999 |
| 2005 | 1,973,860,605 | 788,940,947 | 37,470,294 | 2,801,764,847 |

NOTE: Starting in 2002 MMS has not formaly published production by state adjacente areas

e Estimated r Revised p Preliminary

* See Table 15 corresponding volumes at 15.025 psia and footnote in Appendix B.

# Appendix D-5

## UNITED STATES NATURAL GAS AND CASINGHEAD GAS PRODUCTION[3]

**(Billion Cubic Feet (BCF) at 14.73 psia and 60 degrees Fahrenheit)***

| DATE | GROSS | WET AFTER LEASE SEPARATION | MARKETED | DRY | GROSS IMPORTS |
|---|---|---|---|---|---|
| 1985 | 19,607 | 17,365 | 17,270 | 16,454 | 950 |
| 1986 | 19,131 | 16,956 | 16,859 | 16,059 | 750 |
| 1987 | 20,140 | 17,557 | 17,433 | 16,621 | 993 |
| 1988 | 20,999 | 18,061 | 17,918 | 17,103 | 1,294 |
| 1989 | 21,074 | 18,237 | 18,095 | 17,311 | 1,382 |
| 1990 | 21,523 | 18,744 | 18,594 | 17,810 | 1,532 |
| 1991 | 21,749 | 18,703 | 18,532 | 17,698 | 1,773 |
| 1992 | 22,132 | 18,879 | 18,712 | 17,840 | 2,138 |
| 1993 | 22,725 | 19,209 | 18,982 | 18,095 | 2,350 |
| 1994 | 23,581 | 19,938 | 19,710 | 18,821 | 2,624 |
| 1995 | 23,743 | 19,790 | 19,506 | 18,598 | 2,841 |
| 1996 | 24,114 | 20,084 | 19,812 | 18,854 | 2,937 |
| 1997 | 24,213 | 20,122 | 19,865 | 18,902 | 2,994 |
| 1998 | 24,108 | 20,064 | 19,961 | 19,024 | 3,152 |
| 1999 | 23,823 | 19,915 | 19,805 | 18,832 | 3,586 |
| 2000 | 24,174 | 20,289 | 20,198 | 19,182 | 3,782 |
| 2001 | 24,501 | 20,667 | 20,570 | 19,616 | 3,977 |
| 2002 | 23,941 | 20,020 | 19,921 | 18,964 | 4,015 |
| 2003 | 24,119 | 20,072 | 19,974 | 19,099 | 3,944 |
| 2004 | 24,055 | 19,782 | 19,684 | 18,757 | 4,259 |
| January | 2,070 | 1,686 | 1,678 | 1,599 | 403 |
| February | 1,890 | 1,540 | 1,532 | 1,460 | 354 |
| March | 2,080 | 1,692 | 1,684 | 1,605 | 378 |
| April | 1,982 | 1,629 | 1,621 | 1,544 | 325 |
| May | 2,024 | 1,660 | 1,651 | 1,574 | 332 |
| June | 1,958 | 1,630 | 1,621 | 1,545 | 320 |
| July | 1,973 | 1,644 | 1,636 | 1,559 | 384 |
| August | 1,992 | 1,651 | 1,643 | 1,565 | 350 |
| September | 1,763 | 1,429 | 1,421 | 1,354 | 345 |
| October | 1,873 | 1,510 | 1,503 | 1,432 | 367 |
| November | 1,928 | 1,551 | 1,543 | 1,470 | 359 |
| December | 1,985 | 1,621 | 1,613 | 1,537 | 410 |
| **2005 Total** | **23,518** | **19,242** | **19,145** | **18,244** | **4,327** |
| January | 2,012 | 1,636 | 1,628 | 1,557 | 362 |
| February | 1,815 | 1,473 | 1,465 | 1,402 | 323 |
| March | 2,033 | 1,652 | 1,642 | 1,572 | 350 |
| April | 1,961 | 1,590 | 1,582 | 1,512 | 336 |
| May | 2,003 | 1,633 | 1,624 | 1,551 | 353 |
| June | 1,927 | 1,590 | 1,580 | 1,510 | 350 |
| July | 1,959 | 1,629 | 1,619 | 1,546 | 362 |
| August | 1,928 | 1,679 | 1,670 | 1,598 | 357 |
| September | 1,930 | 1,625 | 1,616 | 1,544 | 318 |
| October | 1,963 | 1,665 | 1,655 | 1,586 | 320 |
| November | N/A | N/A | N/A | N/A | N/A |
| December | N/A | N/A | N/A | N/A | N/A |
| **2006 Total** | **19,531** | **16,171** | **16,081** | **15,378** | **3,433** |

e Estimated r Revised p Preliminary

* See Table 16 corresponding volumes at 15.025 psia and footnote in Appendix B.

## Appendix E

# Louisiana Energy Topics



Calumet Refinery 1996

# IMPACTS OF '05 HURRICANES ON LOUISIANA'S ENERGY INDUSTRY

by
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February 2006

The 2005 Atlantic hurricane season was the most active on record, shattering many long standing records. A total of 27 named storms during the season surpassed the old record of 21 set in 1933. Fifteen of those storms produced hurricanes and broke 1969's record high of twelve. Three of the hurricanes, Katrina, Rita, and Wilma, reached Category 5 strength. The 107 billion plus dollars in damage costs that resulted from four major hurricanes making landfall in the U.S. was also a record breaker. Louisiana's coast was impacted by Hurricanes Cindy, Katrina and Rita.

Tropical Storm Cindy formed July 3, 2005 in the extreme western Caribbean Sea, then moved northward. July 6, Cindy made landfall as a Category 1 hurricane over the southwest portion of Grand Isle, Louisiana. Cindy produced locally heavy rainfall and wind, and downed tree limbs which created extensive power outages, but caused minimal damage.

Hurricane Katrina first struck southern Florida August 25, 2005 as a Category 1 hurricane. After passing over Florida, it moved into the Gulf of Mexico where it quickly re-intensified over the warm Gulf water. Its maximum wind speed reached 175 mph (Category 5) and the minimum central pressure dropped as low as 902 millibars (a measure of a hurricane's strength). Katrina's intensity dropped slightly to a Category 4 as it approached the central Gulf Coast. August 29, Katrina made landfall along the Louisiana and Mississippi coasts as a strong Category 3 hurricane. Hurricane force winds, covering 120 miles from its center, caused widespread destruction. The associated storm surge reached as far east as Mobile, AL. A 20 - 30 ft. plus storm surge swept across Biloxi and Gulfport, Mississippi, and Plaquemines and St. Bernard Parishes in Louisiana reaching far inland and decimating everything in its path. A combination of strong winds, heavy rainfall and storm surge caused breaks in the eastern levee system which separates New Orleans from surrounding lakes and canals leaving 80% of New Orleans flooded; some areas had 20 ft. of water at some point in the flooding.

A few weeks after Katrina's devastation in southeast Louisiana, Hurricane Rita entered the Gulf of Mexico. Its steady wind speed peaked at 175 mph. Hurricane Rita is on record as the strongest measured hurricane to ever have entered the Gulf of Mexico and the fourth most intense hurricane ever in the Atlantic Basin. Rita first struck Florida after making an approach near Cuba and went on to make landfall between Sabine Pass, TX and Johnson's Bayou, Louisiana on September 24, 2005 as a Category 3 hurricane with wind speeds of 120 mph and a storm surge of 10 ft. A day prior to landfall, Rita caused a storm surge on Louisiana's coast which reopened some of the levee breaches caused by Hurricane Katrina a month earlier and re-flooded parts of New Orleans. Post-landfall damage was extensive in the coastal areas in southwestern Louisiana and extreme southeastern Texas.

Hurricane Katrina was not the strongest hurricane to ever strike the U.S., but it was the most destructive and most costly U.S. hurricane on record. Katrina's strength was lower than Camille's which destroyed Mississippi's coast in August 1969, but with hurricane force winds emanating 120 miles from its center it caused more widespread destruction and will likely cost more than 80 billion dollars.

Hurricanes in the Gulf of Mexico have always impacted Louisiana’s energy industry, but never to the degree that the hurricanes of 2005 did, particularly Hurricanes Katrina and Rita. Three main areas affected were oil and gas production and transportation, refineries, and electricity generation and transmission. The impacts to each are discussed below.

## Oil and Gas Production and Transportation

The Gulf of Mexico is a major center for crude oil and gas production in the U.S. It produces 29% of the U.S. domestic oil production and 20% of the natural gas production. The effect of any tropical storm or hurricane that enters the Gulf of Mexico is noticeable when it comes to oil and gas production. When tropical storms or hurricanes enter the Gulf’s production areas there is a mandatory evacuation of production platforms which disrupts the business of supplying energy.

**The 2002** hurricane season had two strong hurricanes that went through the Gulf oil and gas producing areas. The U.S. Department of the Interior’s Minerals Management Service (MMS) reported the oil and gas cumulative shut-in production volume in the Gulf of Mexico due to Hurricanes Lili and Isidore was more than 14.4 million barrels (MMB) of oil and 88.9 billion cubic feet (BCF) of natural gas. Hurricane Lili forced the evacuation of 769 platforms and 100 active rigs in the Gulf of Mexico. Of the 800 facilities subjected to the full force of the hurricane, only six older platforms and four exploration rigs received substantial damage.

**The 2003** hurricane season’s damage was very light even though two hurricanes, Claudette and Erica, touched the Gulf’s production areas. Both were Category 1 hurricanes which produced a lot of rain and disrupted production, but the offshore platforms, drilling rigs, pipelines and other structures sustained minimal damage.

**In 2004**, the Gulf of Mexico experienced two named tropical storms, Bonnie and Matthew, one Category 3 hurricane, Jeanne, two Category 4 hurricanes, Charles and Frances, and one Category 5 hurricane, Ivan. The 2004 hurricane season was the second most expensive ever for the Gulf of Mexico oil and gas industry. Hurricane Ivan left 140 BCF of gas (4.4% of annual production) and 35.34 MMB of oil (5.8% of annual production) cumulative production volume shut-in. MMS reported that Ivan forced the evacuation of 574 platforms and 69 rigs. Of the 4,000 platforms working in the Gulf, seven were destroyed and six sustained major damage. Six of 117 drilling rigs working in the Gulf sustained major damage. Hurricane Ivan caused major infrastructure damage. Ten thousand miles of pipeline were in the direct path of the hurricane. It was reported that some pipelines in the mouth of the Mississippi River were moved 3,000 feet while others were buried under 30 feet of mud. These pipelines took a significant effort to locate and repairs took seven months to accomplish. The Louisiana state regulated and the southern parishes’ production losses from the hurricane and damages to the infrastructure are not available.

**The 2005** hurricane season is the most expensive ever for the Gulf of Mexico oil and gas industry. Four hurricanes, Cindy, Dennis, Katrina and Rita, crossed the Gulf oil and gas producing areas.

MMS reported the damage caused by Hurricane Dennis to oil and gas operations in the Gulf of Mexico was extremely light. The eye of the hurricane was about 120 miles farther east than Hurricane Ivan’s landing, and it was in the deeper water sections of the Gulf so the impact to the platforms and rigs was minimal. The path of the hurricane carried it mostly over open water with no oil and gas operations. Most of the damage was small amounts of missing handrails and steel grating from the lower levels of the platforms. There was no reported damage to the transportation pipelines and a very small number of damage reports to infield flow lines. The cumulative oil shut-in production volume was 5.29 MMB, the equivalent of 0.968% of the yearly production of oil in the Gulf of Mexico, approximately 547.5 MMB. The cumulative gas shut-in production volume was 23.246 BCF, the equivalent of 0.637% of the yearly production of gas in the Gulf of Mexico, approximately 3.65 trillion cubic feet (TCF). Hurricane Dennis forced the evacuation of 359 of 819 manned platforms and 86 of the 134 active rigs in the Gulf. Hurricane Cindy had little impact.

Hurricane Katrina forced the evacuation of 482 of 819 manned platforms and 79 of the 137 active rigs in the Gulf. MMS reported that hurricane Katrina reduced Gulf of Mexico oil by over 1.37 MMB per day or 90.43% of daily Gulf of Mexico oil production and that gas production was reduced 7.866 BCF per day or 78.66% of daily Gulf of Mexico natural gas production. Before other statistics could be compiled, Hurricane Rita appeared and added more damage to the oil and gas production infrastructure. Louisiana onshore and state offshore had 1,401 wells shut-in in the 38 southern parishes region. Cumulative production losses for the storms in these areas is not known. There are roughly 4,000 Outer Continental Shelf (OCS) production facilities; Hurricane Katrina destroyed 46 platforms and 4 rigs, and damaged 20 platforms and 9 rigs. Hurricane Rita destroyed 63 platforms and 1 rig and damaged 30 platforms and 10 rigs. Most of the destroyed platforms were in shallow water. Four large, deep water platforms suffered extensive damage and could take 3-6 months to bring back on line. Nineteen rigs were set adrift.

As of February 22, 2006, the cumulative oil shut-in production volume was 129.59 billion barrels (23.67% of the yearly production in the Gulf of Mexico) and the cumulative shut-in gas production volume was 652.63 BCF (17.88% of the yearly production in the Gulf of Mexico). There is still 363 thousand barrels per day and 1.50 billion cubic feet per day shut-in.

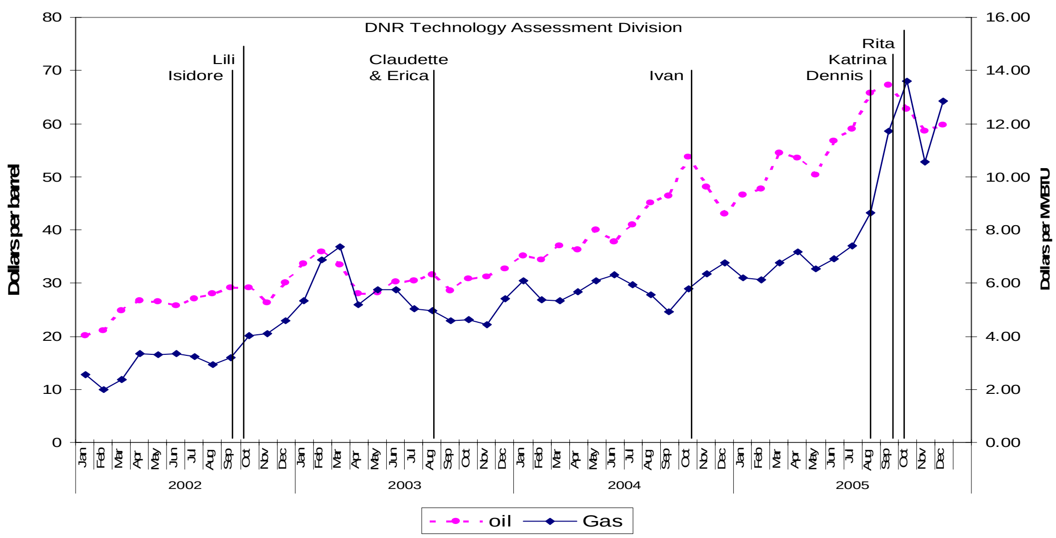
More than 10 percent of the nation's imported crude oil typically enters at the Louisiana Offshore Oil Port (LOOP). Currently, LOOP is providing crude oil for the Capline pipeline which delivers to many refineries in the Midwest. Typically about 1 MMB per day go through LOOP. August 28, 2005 LOOP stopped all operations in order to give employees time to evacuate from Hurricane Katrina. According to a LOOP port official, the facility suffered "no apparent catastrophic damage." The biggest hurdle the LOOP facility had in restarting operations was getting power restored. LOOP resumed operation September 2 and was running at full capacity by September 11$^{th}$.

Damage to pipelines that transport crude oil, oil products and natural gas was minimal. Most of the pipelines were taken out of service due to personnel evacuations and safety precautions and were restored to full operation as soon as electrical service was restored. The exception was the Sabine Pipeline, operator of the Henry Hub. The Sabine pipeline sustained wind damage in the vicinity of the Port Neches compressor station and water damage at the Henry Hub facilities. There was also no electric service in most areas of the system and the Sabine Pipeline was out of service for several weeks.

Hurricane Katrina, apparently, had little impact on receipts of liquefied natural gas (LNG) shipments at the Southern Union's Trunkline LNG terminal in Lake Charles, Louisiana. As Hurricane Rita approached, Excelerate Energy's Gulf Gateway Energy Bridge offshore Louisiana LNG facility and Southern Union's Trunkline onshore facility were off line due to evacuations, lack of supplies, an inability to move stored liquids, and safety precautions. The facilities' infrastructure are intact and expected to be fully operational as soon as supplies and shipping pipelines are available. After the hurricanes passed, the following gasplants closed due to flooding, lack of supplies, an inablility to move stored liquids, or as a safety precaution (the parish of each location is in partentheses): Barracuda (Cameron), Bluewater (Acadia), Burns Point (St. Mary), Cameron (Cameron), Gillis (Calcasieu), Lake Charles (Calcasieu), Lowry (Cameron), Paradis (St. Charles), Tebone (Ascension), Sabine Pass (Cameron), St. Landry (Evangeline), Stingray (Cameron), Venice (Plaquemine), and Yscloskey (St. Bernard). The processing plants known to be not operating have a combined capacity of more than 10 BCF per day, however, this number does not reflect actual flows before Hurricanes Katrina and Rita. In December, Duke Energy Field Services (DEFS) noted that refineries and fractionators along the Gulf Coast affected by the hurricane are discontinuing their operations, resulting in a lack of natural gas liquids take-away capacity. The loss has delayed, and will continue to delay, the recovery of natural gas production in the area. Even if platforms and pipelines are either unaffected or readily restored to service, the gas often can not flow to market without treatment. In 2003 (the latest year with complete data), almost three-fourths of total U.S. marketed gas production was processed prior to delivery to market. On December 27, 2005, EIA reported that most of the inactive plants are expected to be operating by January 2006.

Figure 1 shows the effects that the 2005 hurricanes, as well as several previous hurricanes, have had on oil and gas prices.

Figure 1. Louisiana Oil and Gas Spot Prices, 2002 – 2005




## Refineries

Two characteristics of the U.S. refining industry were highlighted when Hurricanes Katrina and Rita struck; the concentration of refineries along the Gulf Coast, and the low surplus refining capacity.

Operable refinery utilization rates increased dramatically from the early 1980s to the late 1990s and have remained high since then. High operable utilization rates translate into low spare capacity which reduces the industry's ability to maintain adequate fuel supplies should a loss of capacity occur. Basic economics teaches us that when supply decreases relative to demand, prices increase. That was precisely the scenario that played out in the summer of 2005 when Hurricanes Katrina and Rita blew ashore into areas of Louisiana and Texas that are home to 38% of the U.S. refinery capacity.

Prior to Hurricanes Katrina and Rita, the U.S. refinery operable capacity was 17,124,870 million barrels per calendar day (bcd) (with an operating utilization rate of 93.2%), and idle capacity stood at 118,580 bcd. The combined refinery capacity that was in the paths of hurricane Katrina and Rita totaled approximately 6.5 MMB per day, or 38% of the total U.S. refining capacity.

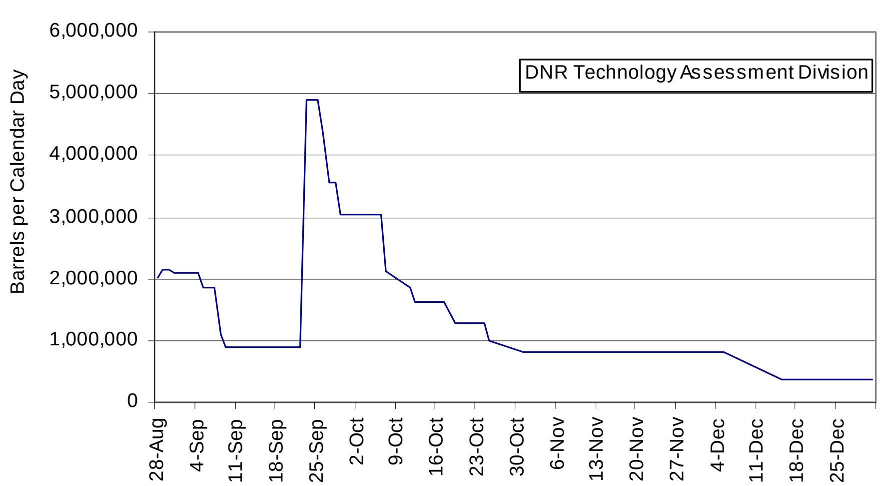
On August 28, in preparation for the storm, approximately 2.1 million bcd (325,000 bcd from one refinery in Mississippi and the rest from ten refineries in Louisiana) went off line. After Katrina blew through and power began to be restored, refineries that sustained minor or no damage began to come back online. Then, on September 24, with 879,000 bcd of refinery capacity in Louisiana and Mississippi still shut down due to Hurricane Katrina, Hurricane Rita came ashore and reduced refinery capacity by an additional 4 million bcd (594,000 bcd from three Louisiana refineries and 3.4 million bcd from thirteen Texas refineries). Table 1 lists the 13 Louisiana refineries affected by Hurricanes Katrina and Rita.

Table 1. Louisiana Refineries Affected by '05 Hurricanes

| Hurricane | Refinery | Location | Capacity (bcd) | (Note) |
|---|---|---|---|---|
| Katrina | ConocoPhillips | Belle Chase | 247,000 | (major damage) |
| | Chalmette Refining | Chalmette | 187,200 | (major damage) |
| | ExxonMobil | Baton Rouge | 493,500 | |
| | Marathon Petroleum | Garyville | 245,000 | |
| | Murphy Oil | Meraux | 120,000 | (major damage, still shutdown) |
| | Motiva | Convent | 235,000 | |
| | Motiva | Norco | 226,500 | |
| | Placid | Port Allen | 48,500 | |
| | Valero | Krotz Springs | 80,000 | |
| | Valero | Norco | 185,000 | |
| Rita | Citgo | Lake Charles | 324,300 | |
| | ConocoPhillips | West Lake | 239,400 | |
| | Calcasieu | Lake Charles | 30,000 | |

In the wake of the storms, several refineries sustained significant damage. Three refineries in Louisiana (see Table 1) and Chevron's Pascagoula refinery sustained major damage. All of the affected refineries are currently back on-line and operating at or near full capacity, except Murphy Oil in Meraux which expects to return to operation by April. Figure 2 shows shut down refinery capacity versus time.

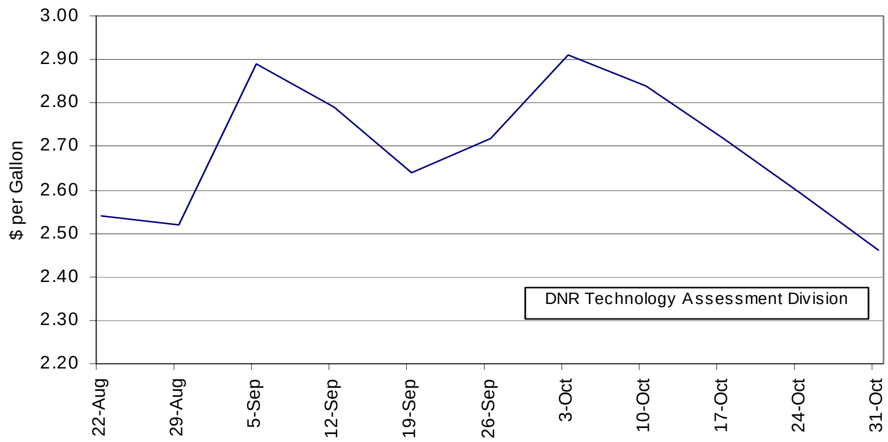
Figure 2. Shut Down Refinery Capacity from Hurricanes Katrina and Rita



In addition to the capacity reductions shown in the chart on the preceding page, several refineries that were not directly affected by the hurricanes had to reduce output due to a shortage of crude oil that resulted from wells being shut in and pipelines being without electricity.

As expected, the sudden reduction in refinery capacity resulted in fuel shortages and price spikes. Gasoline prices increased nearly $0.40 per gallon, but were back down to pre-hurricane levels by mid-October (see Figure 3). Diesel prices experienced a similar jump.

Figure 3. Gulf Coast Regular Gasoline Prices




## Electricity Generation and Transmission

Hurricane Katrina was an unprecedented event for electricity in Louisiana. Katrina was a large storm which impacted many utilities and caused major damage to property. Both the generating plants and the transmission infrastructure were affected. In addition, the flooding that accompanied the storm further worsened conditions by impeding access needed for recovery and restoration and damaging equipment that was sitting in the water. Difficulty in getting gasoline, as well as the logistics of feeding and housing restoration crews in areas that were evacuated, compounded the problems.

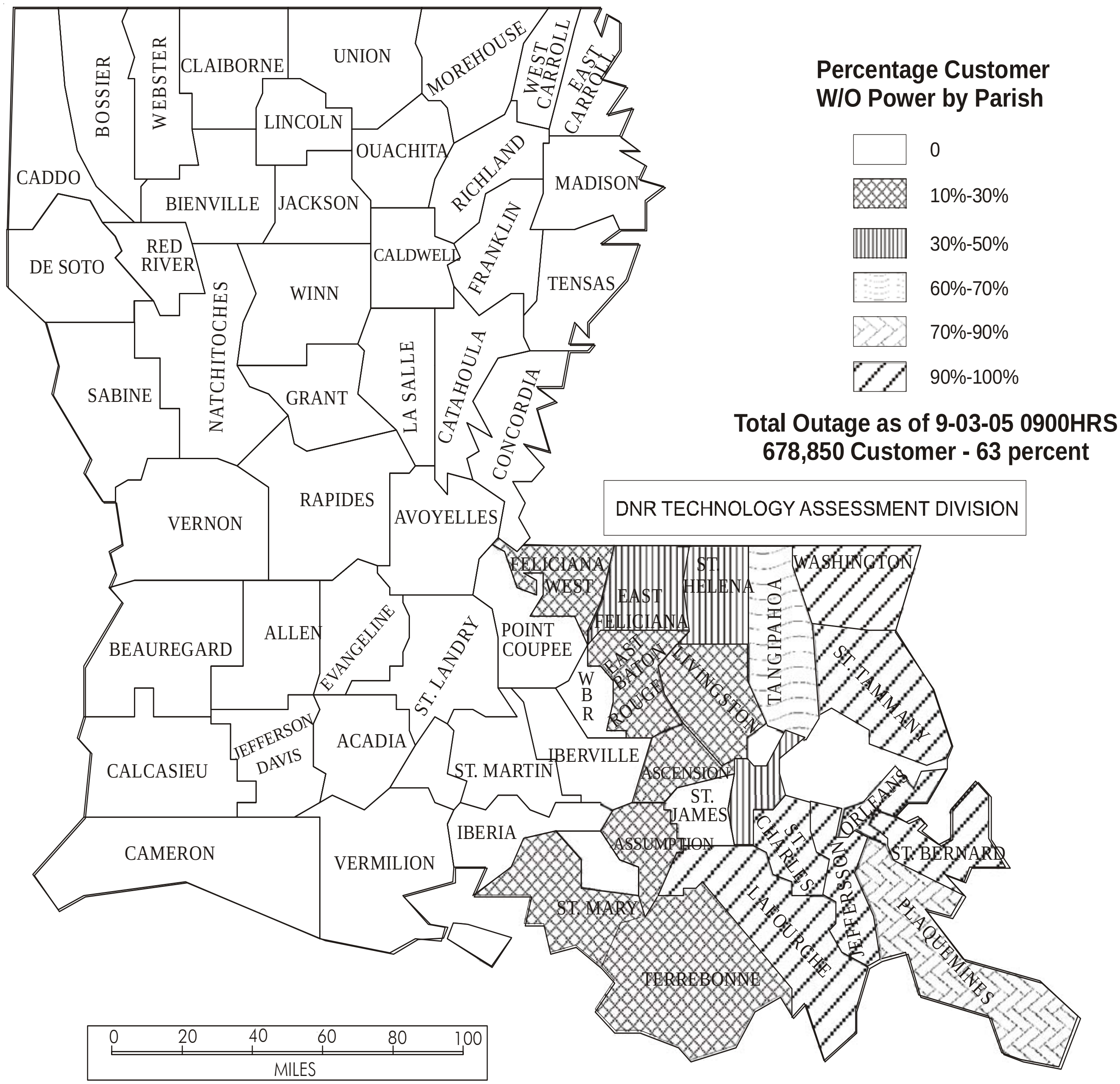
According to the situation reports from the Office of Electricity Delivery and Energy Reliability U.S. Department of Energy (August 29, 2005 (10:00 PM EDT)) Louisiana had 966,085 or 42% of customers without power. Table 2 lists the utilities included in the report.

Table 2. Customers Without Power

| Company | No. of Customers without Power |
|---|---|
| Entergy Louisiana | 409,399 |
| Entergy Gulf States | 166,000 |
| Cleco | 71,399 |
| Entergy New Orleans | 215,163 |
| Dixie Electric Membership Corp. | 69,050 |
| Washington-St. Tammany E C | 20,000 |
| South Louisiana Electric Coop Association | 13,874 |
| City of Morgan City | 1,200 |

Figure 4 shows by parish the percentage of customers without power as of September 3, 2005.

Figure 4. Hurricane Katrina Electricity Outage



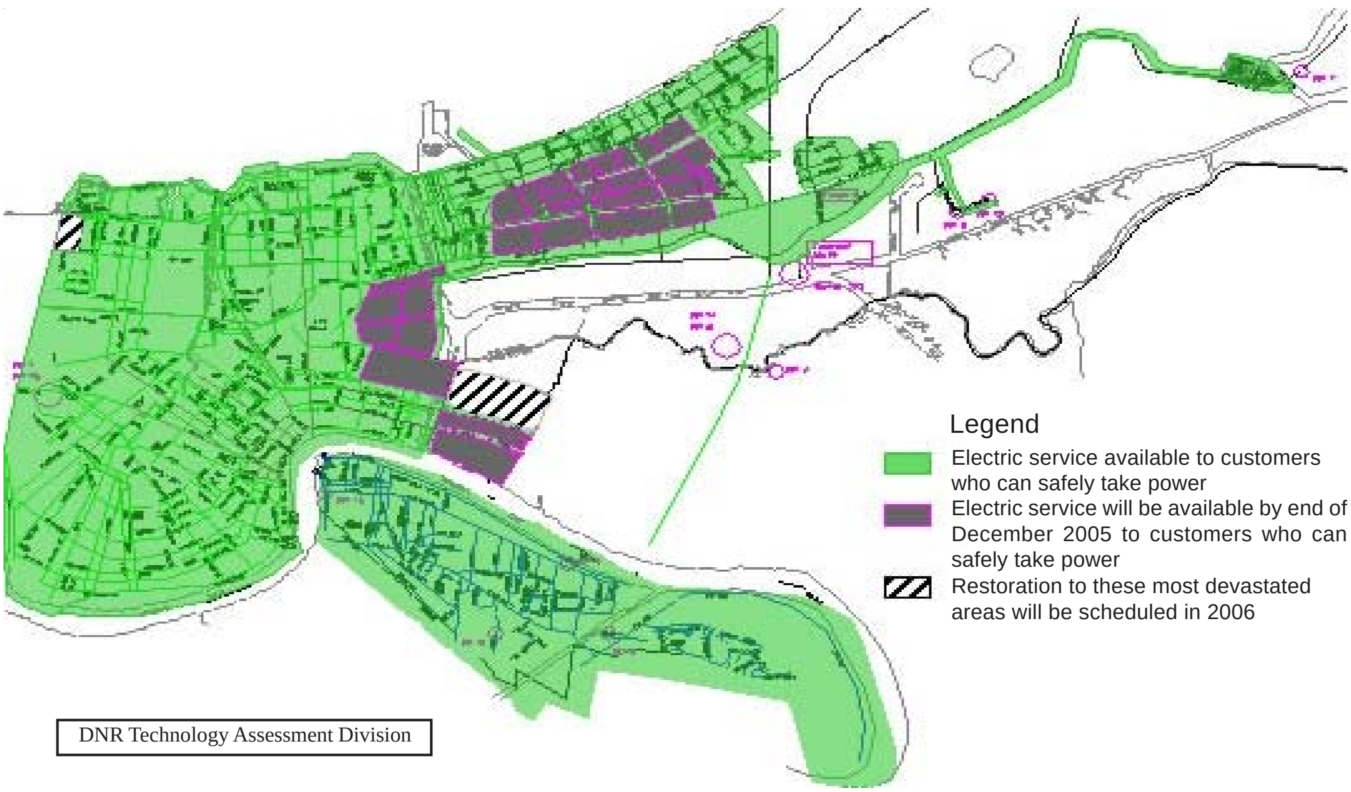

Source: Louisiana Public Service Commission

*Entergy Transmission* reported 181 lines and 263 substations out of service following Katrina's hit. More than 1.1 million Entergy customers lost power in Louisiana and Mississippi. The outage total more than quadrupled the previous Entergy record of 270,000 set by Hurricane Cindy. Then 26 days later, with restoration still underway from Katrina, Hurricane Rita knocked out 800,000 Entergy customers and damaged transmission lines from Lafayette to Conroe, Texas. Some portions of the Entergy system had to be restored more than once.

Power has been restored to all customers capable of receiving it except the 123,000 houses and businesses in and around New Orleans that need to be rebuilt (Figure 5). At this time, no one knows when, or even if, the population will return to all of these areas. Entergy New Orleans (ENO), the utility that provides electric and natural gas service to the City of New Orleans, now becomes the focus. The company noted in the situation reports from the Office of Electricity Delivery and Energy Reliability U.S. Department of Energy (December 5, 2005, 3:00 PM EST) that "Hurricane Katrina not only caused catastrophic and unprecedented damage to ENO's electric and gas facilities, but also resulted in the loss of most of ENO's customers, an unprecedented occurrence in the U.S. Utility Industry."

Entergy New Orleans filed for bankruptcy protection under Chapter 11 of the U.S. Bankruptcy code on September 23, 2005. Entergy and the City of New Orleans are requesting federal aid for the bankrupt New Orleans utility. Usually utility customers pay the costs of storm restoration. They fear that, without federal aid, increased utility costs in New Orleans will slow down the city's recovery.

Figure 5. New Orleans Area Electricity Restoration




Source: http://www.entergy-neworleans.com/content/your_home/storm_center/ENOI_Electric_map.ppt

# PROPOSED LNG TERMINALS MASK A CLOUDY NEAR TERM SUPPLY OUTLOOK

by
Bob Sprehe, Energy Economist
March 2006

The U. S. relies on imports of natural gas to meet annual natural gas demand, both pipeline imports (principally from Canada) and LNG imports through 4 regasification terminals located in the contiguous lower 48 states (Figures 1 & 2). As a result of the anticipated growing international trade in liquefied natural gas, the U. S. has experienced a large number of filings for new regasification terminals. This brief overview addresses a few of the key geopolitical and economic issues that may diminish the nation's ability to fully utilize these proposed terminals.

Figure 1. U. S. Natural Gas Demand Outstrips Domestic Supply

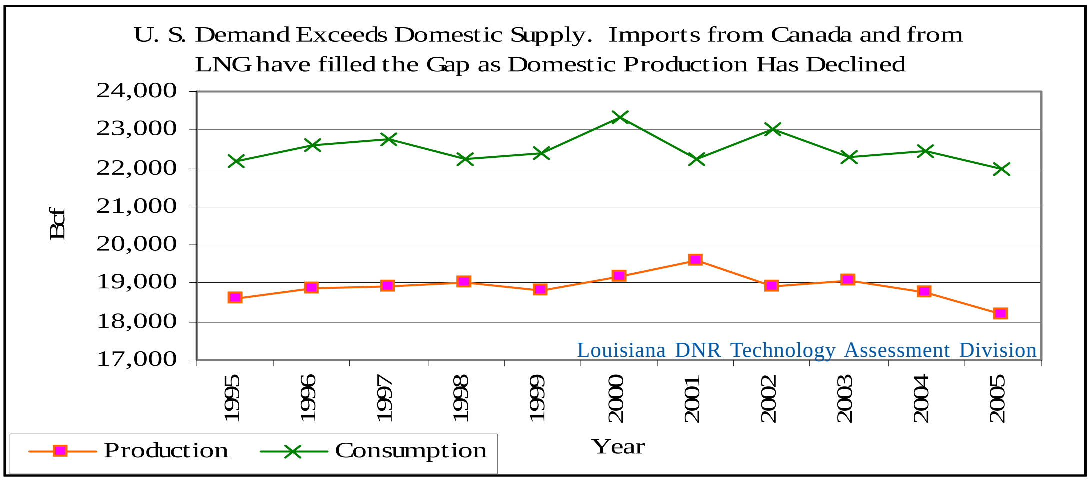
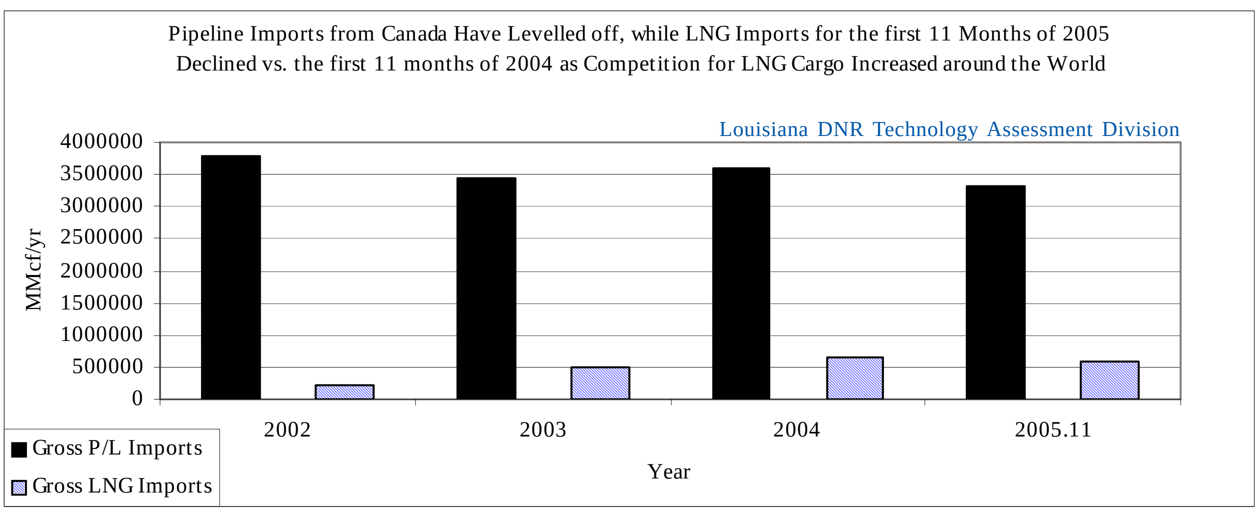
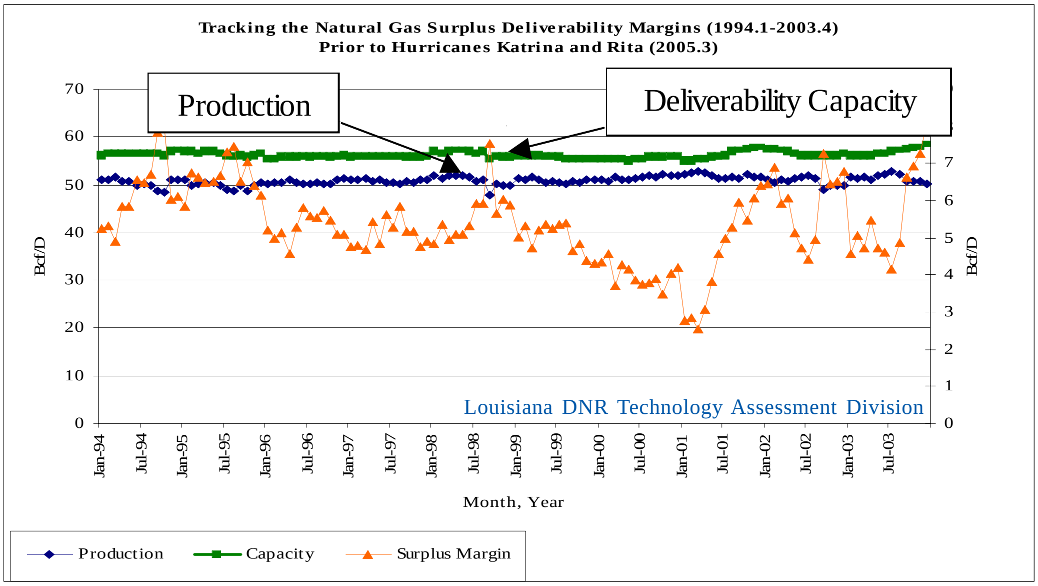



Figure 2. Pipeline Exports from Canada are Slowing as Internal Canadian Consumption Grows and Global Competition is Escalating for LNG Imports, Increasing U. S. Competition for Gas Supply



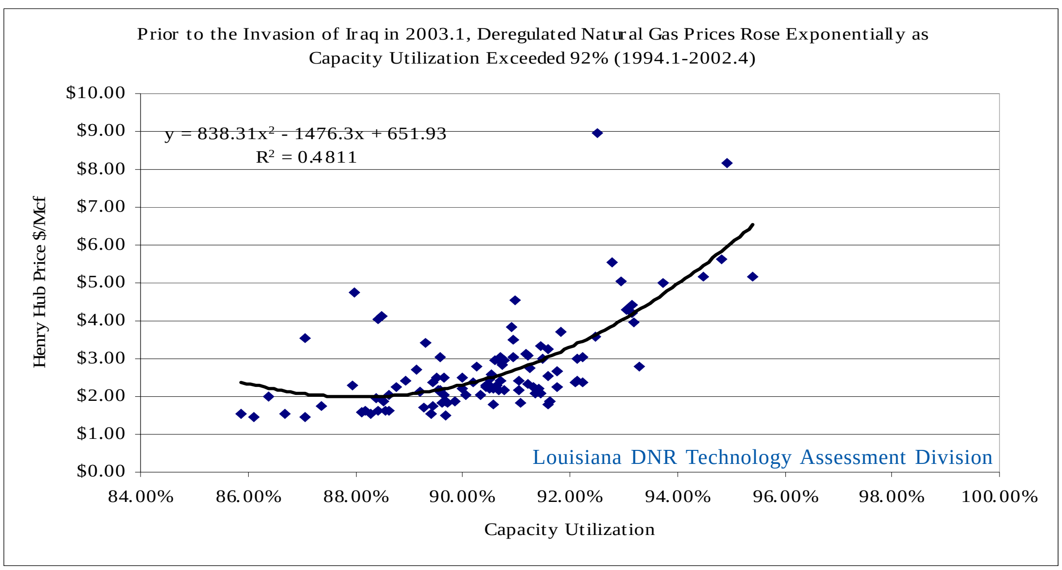
U. S. production of natural gas has remained almost constant over the past 11 years, and deliverability capacity is estimated to have remained steady. Therefore, the surplus deliverability margins have remained quite small in relation to demand (Figure 3).

Figure 3. Time Series of Natural Gas Production, Productive Capacity, Surplus Margins




Taken together, the escalating competition for imports and the failure to increase domestic natural gas deliverability capacity, the nation's gas supply is operating at close to capacity utilization; so close that prices have become much more volatile than is healthy for any market and business investment planning (Figure 4).

Figure 4. As in Any Sector of the Economy, as Capacity Utilization Increases, Prices Rise




Source: Energy Information Administration (EIA) natural gas data series

Including Alaska and Puerto Rico in the pictuer, the U. S. has 7 LNG terminals as of 2006. One is a liquefication terminal in Alaska. Alaskan LNG is shipped to Japan. A second terminal, a regasification terminal, is located in Puerto Rico where imports serve as the source for power generation and water desalinization for the island residents. In the lower 48 states, a 5th regasification terminal called "Energy Bridge" became operational in the Gulf of Mexico during 2005. The other 4 have been operational for several years (Figure 5 & Table 1).

Figure 5. There Were 4 Main Regasification Terminals Serving the Lower 48 States in 2004

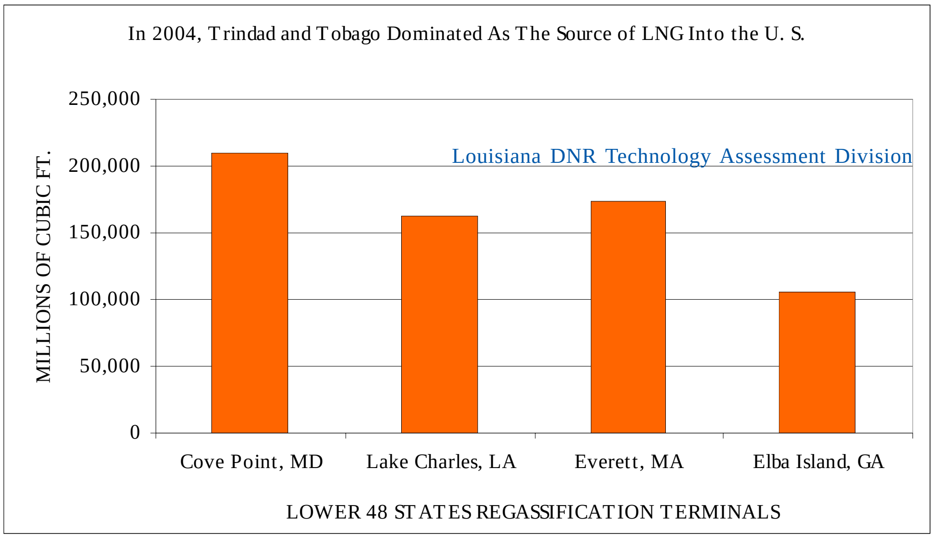



Table 1. Trindad & Tobago Has Become the primary source of LNG for the U. S.

| Country of Origin | Cove Point, MD | Lake Charles, LA | Everett, MA | Elba Island, GA | Totals MMcf | Country % |
|---|---|---|---|---|---|---|
| Algeria | 33,554 | 86,789 | 0 | 0 | 120,343 | 18.50% |
| Australia | 0 | 14,990 | 0 | 0 | 14,990 | 2.30% |
| Brunei | 0 | 0 | 0 | 0 | 0 | 0.00% |
| Indonesia | 0 | 0 | 0 | 0 | 0 | 0.00% |
| Malaysia | 0 | 19,999 | 0 | 0 | 19,999 | 3.07% |
| Nigeria | 2,986 | 8,831 | 0 | 0 | 11,817 | 1.82% |
| Oman | 0 | 9,412 | 0 | 0 | 9,412 | 1.45% |
| Qatar | 0 | 11,854 | 0 | 0 | 11,854 | 1.82% |
| Trinidad & Tobago | 172,753 | 10,364 | 173,780 | 105,203 | 462,100 | 71.04% |
| UAE | 0 | 0 | 0 | 0 | 0 | 0.00% |
| **2004 Totals** | 209,293 | 162,239 | 173,780 | 105,203 | 650,515 | 100.00% |
| **2004 %** | 32.17% | 24.94% | 26.71% | 16.17% | 100.00% | |

Source: Natural Gas Annual 2004 Energy Information Administration (EIA)

The Federal Energy Regulatory Commission (FERC) and U. S. Dept. of Transportation Maritime Administration (MARAD) have approved 13 new regasification terminals totaling 16.870 billion cubic feet per day (Bcf/D) deliverability capacity as of March 8, 2006 (Table 2). Will these all be built? As of this writing only Pelican Point has been canceled. Many approved terminals are under construction. Proposed capacity expansion approaches 30% of existing deliverability capacity. This is a significant expansion that, if completed, would provide substantial surplus deliverability margin to the nation's natural gas capacity. (Note: In addition, Mexico has approved 3.1 Bcf/D of new capacity and Canada has approved 2.0 Bcf/D.)

Table 2. From the Federal Energy Regulatory Commission as of March 8, 2006

**Constructed LNG Terminals**

| Location | Regasification Capacity - Bcf/D | Owner |
|---|---|---|
| Everett, MA | 1.035 | SUEZ/Tractebel-DOMAC |
| Cove Point, MD | 1 | Dominion-Cove Point LNG |
| Elba Island. GA | 1.2 | El Paso-Southern LNG |
| Lake Charles, LA | 1.5 | Southern Union-Trunkline LNG |
| Gulf of Mexico | 0.5 | Gulf Gateway Energy Bridge-Excelarate Energy |
| **Total Constructed** | **5.235** | |
| **Approved by FERC** | | |
| **Location** | **Regasification Capacity - Bcf/D** | **Owner** |
| Lake Charles, LA | 0.6 | Southern Union-Trunkline LNG |
| Hackberry, LA | 1.5 | Cameron LNG-Sempra Energy |
| Bahamas | 0.84 | AES Ocean Express1/ |
| Bahamas | 0.83 | Calypso Tractebel1/ |
| Freeport, TX | 1.5 | Cheniere/Freeport LNG Development |
| Sabine, LA | 2.6 | Cheniere LNG |
| Corpus Christi, TX | 2.6 | Cheniere LNG |
| Corpus Christi, TX | 1 | Vista Del Sol-ExxonMobil |
| Fall River, MA | 0.8 | Weaver's Cove Energy/Hess LNG |
| Sabine, TX | 1 | Golden Pass-ExxonMobil |
| Corpus Christi, TX | 1 | Ingleside Energy-Occidental Energy Ventures |
| **Total Approved FERC** | **14.27** | |
| **Approved by MARAD/Coast Guard** | | |
| **Location** | **Regasification Capacity - Bcf/D** | **Owner** |
| Port Pelican | 1.6 | ChevronTexaco |
| Louisiana Offshore | 1 | Gulf Landing-Shell |
| **Total MARAD** | **2.6** | |
| | | |
| **Grand Total Approved** | **16.87** | |
| **Current Estimated Deliverability Capacity = 57 Bcf/D** | | |
| **Approved LNG Construction % of Current Capacity= 30%** | | |

It is well known that natural gas burns with the lowest carbon emissions of the fossil fuels. One hundred fifty-five (155) nations were signatories to the Kyoto Protocol, agreeing to reduce carbon emissions over a predetermined time period. Using the best available sources for global natural gas production and international trade, it seems that internal consumption in many nations, particularly those who are natural gas exporters, is reducing the quantity of natural gas available for export. Two major pipeline exporters, Canada and Russia, have reduced exports over the past 5 years (Table 3).

Table 3. Growth of Global Production has Exceeded Growth in International Exports. The Proportion of Natural Gas Dedicated to International Trade has Declined.

| Year | Production1/ | Pipeline Exports2 | LNG Exports3 | P/L & LNG % Production |
|---|---|---|---|---|
| 2000 | 235.3 | 49.9 | 13.2 | 26.84% |
| 2001 | 240.9 | 51.8 | 13.9 | 27.28% |
| 2002 | 244.8 | 54.2 | 14.6 | 28.09% |
| 2003 | 253.1 | 57.3 | 16.3 | 29.10% |
| 2004 | 260.3 | 48.6 | 17.2 | 25.25% |
| | Units are billions of cubic feet per day (Bcf/D) | | | |
| 1/ | from BP Statistical Review of World Energy June 2005 | | | |
| 2/ | from Cedigaz Statistical Data Files | | | |
| | 2003 is estimate | | | |
| | 2004 is Provisional as provided to BP | | | |
| 3/ | from Cedigaz Statistical Data Files | | | |
| | 2003 is estimate | | | |
| | 2004 is Provisional as provided to BP | | | |

Japan and South Korea are the two largest importers of LNG (2004). Both nations are recognized as major industrial powers with limited natural resources. The U. S. is the third largest. But the U. S. is a small component of the global LNG trade. Several European nations are also noteworthy importers of LNG.

Table 4. U. S. Imports Represent Only 10.4% of Global LNG Trade

**Gas: Trade Movements 2004 - LNG ***

| Billion cubic meters | From | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **To** | USA | Trinidad & Tobago | Oman | Qatar | UAE | Algeria | Libya | Nigeria | Australia | Brunei | Indonesia | Malaysia | **Total Imports** |
| **North America** | | | | | | | | | | | | | |
| USA | - | 13.13 | 0.27 | 0.34 | - | 3.41 | - | 0.33 | 0.42 | - | - | 0.57 | **18.47** |
| **South & Central America** | | | | | | | | | | | | | |
| Dominican Republic | - | 0.18 | - | - | - | - | - | - | - | - | - | - | **0.18** |
| Puerto Rico | - | 0.68 | - | - | - | - | - | - | - | - | - | - | **0.68** |
| **Europe** | | | | | | | | | | | | | |
| Belgium | - | - | - | - | - | 2.85 | - | - | - | - | - | - | **2.85** |
| France | - | - | 0.08 | - | - | 6.72 | - | 0.83 | - | - | - | - | **7.63** |
| Greece | - | - | - | - | - | 0.55 | - | - | - | - | - | - | **0.55** |
| Italy | - | - | - | - | - | 2.02 | - | 3.5 | - | - | - | - | **5.9** |
| Portugal | - | - | - | - | - | - | - | 0.85 | - | - | - | - | **1.31** |
| Spain | - | 0.08 | 0.32 | 1.87 | 0.24 | 7.48 | 0.75 | 4.22 | 0.08 | - | - | - | **17.51** |
| Turkey | - | - | - | - | - | 3.86 | - | 1.13 | - | - | - | - | **4.27** |
| **Asia Pacific** | | | | | | | | | | | | | |
| India | - | - | - | 2.63 | - | - | - | - | - | - | - | - | **2.63** |
| Japan | 1.68 | - | 1.48 | 9.22 | 7.1 | - | - | 0.16 | 11.2 | 8.29 | 21.19 | 16.63 | **76.95** |
| South Korea | - | - | 6 | 7.96 | 0.08 | 0.3 | - | 0.24 | 0.55 | 1.21 | 7.3 | 6.25 | **29.89** |
| Taiwan | - | - | - | - | - | - | - | 0.08 | - | - | 5 | 4.05 | **9.13** |
| **TOTAL EXPORTS** | **1.68** | **13.99** | **9.03** | **24.06** | **##** | **25.75** | **0.63** | **12.59** | **12.17** | **9.5** | **33.49** | **27.68** | **177.95** |
| * LNG (Liquefied Natural Gas) | | | | | | | | | | | | | |
| Note: Flows are on a contractual basis and may not correspond to physical gas flows in all cases | | | | | | | | | | | | | |

Source: Cedigaz (provisional)

If there is a significant underinvestment in new natural gas productive capacity around the globe where would the U. S. look for LNG investment that might be made competitively available to the U. S. market?

Table 5. Top 30 Reserve Countries and Their Exports

| Country | Reserves Tcf 1-1-05 1/ | Consumption 2004 Bcf/day 2/ | Production 2004 Bcf/day 2/ | LNG Plant Capacity 2002 Bcf/day 3/ | LNG Plant( Bcf/day) Proposed 2010 3/ |
|---|---|---|---|---|---|
| Russia | 1,694.40 | **38.9** | **57** | 0 | 1.2 |
| Iran | 970.8 | **8.4** | **8.3** | 0 | 1 |
| Qatar | 910.1 | **1.5** | **3.8** | 2.9 | 2.4 |
| Saudi Arabia | 238.4 | **6.2** | **6.2** | 0 | |
| UAE | 213.9 | **3.8** | **4.4** | 0.7 | |
| US | 186.9 | **62.5** | **52.5** | 0.2 | |
| Algeria | 160.4 | **2.1** | **7.9** | 1.7 | 0.4 |
| Venezuela | 148.9 | **2.7** | **2.7** | 0 | 0.6 |
| Nigeria | 176.4 | N/R | **2** | 1.2 | 2.3 |
| Iraq | 111.9 | N/R | N/R | 0 | |
| Indonesia | 90.3 | **3.3** | **7.1** | 3.6 | 1.4 |
| Australia | 86.9 | **2.4** | **3.4** | 1.5 | 2.4 |
| Norway | 84.2 | **0.4** | **7.6** | 0.5 | |
| Malaysia | 87 | **3.2** | **5.2** | 3 | |
| Turkmenistan | 102.4 | **1.5** | **5.3** | 0 | |
| Uzbekistan | 65.7 | **4.8** | **5.4** | 0 | |
| Kazakhstan | 105.9 | **1.5** | **1.8** | 0 | |
| Netherlands | 52.7 | **4.2** | **6.7** | 0 | |
| Canada | 56.6 | **8.7** | **17.7** | 0 | |
| Egypt | 65.5 | **2.5** | **2.6** | 0.9 | |
| China | 78.7 | **3.8** | **3.9** | 0 | |
| Libya | 52.6 | N/R | **0.7** | 0.2 | |
| Oman | 35.1 | N/R | **1.7** | 0.4 | 0.4 |
| Bolivia | 31.4 | N/R | **0.8** | 0 | 0.9 |
| Trinidad/Tobago | 18.8 | N/R | **2.7** | 0.4 | |
| Yemen | 16.9 | N/R | N/R | 0 | 0.4 |
| Brunei | 12.1 | N/R | **1.2** | 0.9 | |
| Peru | 8.7 | **0.1** | N/R | 0 | 0.6 |
| Equatorial Guinea | 1.3 | N/R | N/R | 0 | 0.5 |
| Angola | 0 | N/R | N/R | 0 | 0.5 |
| sub-total | 5,864.90 | | | 18.1 | 15 |
| Rest of World | 472.5 | | | | |
| Total world | 6,337.40 | | | | |

N/R = not reported
1/ is from BP's World Energy Review, 2005
2/ is from BP's World Energy Review, 2005
3/ is from NPC Study, 2003

Tables 4 & 5 illustrate one key problem area. Most of the existing, known natural gas reserves are located in areas that are geographically closer to other markets, such as Europe or Asia Pacific. Only Venezuela, Trinidad & Tobago, Bolivia and Peru are in the Western Hemisphere, and they represent only 3.5% of the existing known natural gas reserves of the top 30 reserve holding nations.

With the exception of Trinidad & Tobago, in these other South American countries there has developed some significant anti-American sentiment. These attitudes inhibit the role American private sector companies can play in developing these potential LNG resources. The current state of relations with Venezuela is well publicized so geographic distance and foreign policy are 2 key issues that may reduce the quantity of LNG available to the U. S. market.

If natural gas in the form of LNG is a fungible commodity as it is, "other investors" may develop these resources thereby making available some of the existing capacity to the U. S. But who might these "other investors" be? So far the national oil companies have not shown a willingness to develop and make available for international export their global natural gas reserves. China and India, two rapidly growing economies, are interested in securing supplies to sustain their own internal growth consumption.

This leads to a third key issue: the enormous investment cost of a complete LNG delivery system, from reservoir(s) through liquefication, shipping, domestic liquefied storage and regasification (Table 6). First given the fixed investment cost in liquefication and regasification terminals, a supply of natural gas for a 20 year life will be a requirement for long term financing. A 1 Bcf/D liquefication terminal would require nearly 7 Tcf (trillion cubic feet) of reserves dedicated to the supply. Such an investment in reserves and deliverability couild easily approach $7 billion dollars (@ $1.00/Mcf exploration and development costs).

Table 6. The Total System Cost Approaches $10 Billion (U. S.) for a 1 Bcf/d System
($7 billion for Reserves, $2 Billion for Terminals, $1 Billion for 4 LNG Ships)

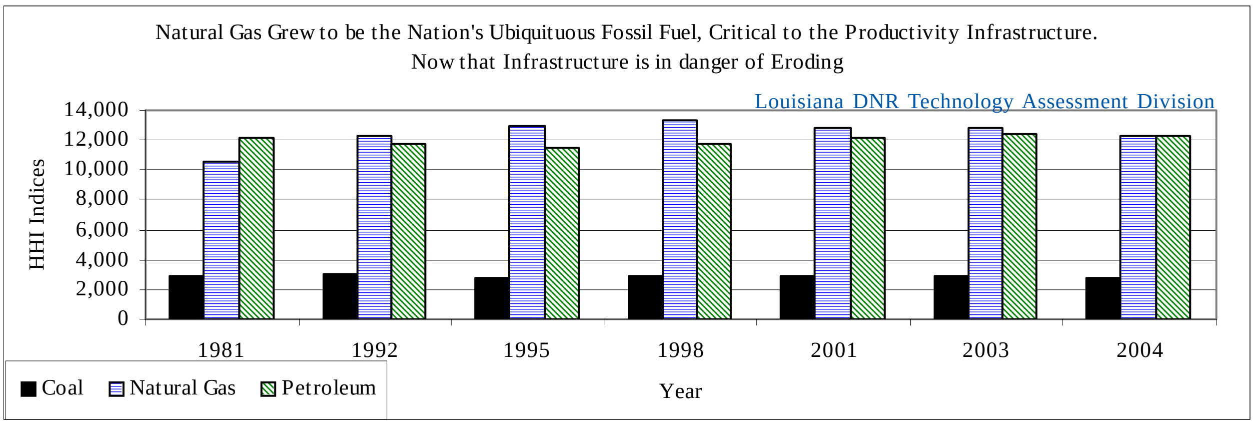
| **Liquefication Train** | **Description** | **Capex** | **IRF** | **$MM/yr** | **$/mmbtus** | **Component $** |
|---|---|---|---|---|---|---|
| Capex | $1.5-$1.7 billion per 1 Bcf/day | $1.5 billion | 0.18548 | $278.22 | $0.83 | .83/mmbtu |
| Opex | 1.5-2.5%%/year of Capex | $30 MM/yr | 335 Bcf/yr | $0.09 | | $0.09/mmbtu |
| **Total Projected Costs, Capex and Opex, for Liquefication Terminal** | | | | | | $0.92 |
| where Capex is capital expenditure / Opex is operating expenses | | | | | | |
| **Regassification** | | | | | | |
| Capex | $500 MM per 1 Bcf/day | $500 MM | 0.179 | $89.50 | $0.27 | |
| Opex | 21.76-27.34cents/mmbtus fixed | | $0.27 | | | |
| | 2.7-2.99 cents/mmbtus variable | | $0.03 | | | |
| | 1.66% fuel loss | $3.50/mmbtu | $0.06 | | | |
| **Total Projected Costs, Capex and Opex, for Regasification Terminal** | | | $0.36 | | | $0.36 |
| **Combined Total Projected Terminal Costs** | | | | | | $1.28 |

Just as the liquefication terminal requires a 20 year supply of natural gas, so is there a requirement for long term contracts (20 years) from customers. This has been a problem for Local Distribution Companies (LDCs) in the U. S. Regulatory agencies in the U. S. have been reluctant to approve such lengthy contracts to this point in time, although those attitudes may now be changing.

How critical might these impediments be to U. S. strategic and economic security? Natural gas is the most ubiquitous of the energy sources. It is used in every sector of the economy: residential; commercial; industrial; utility; transportation. When the market shares of each sector are squared (an Herfindahl-

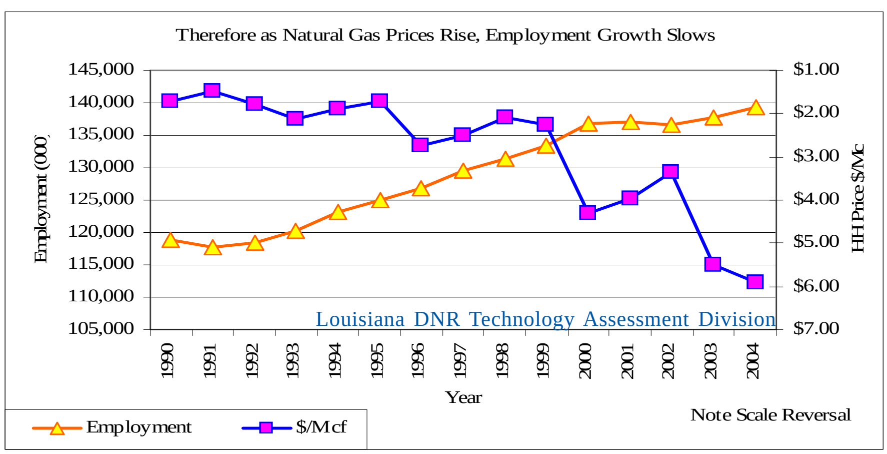
Hirschman (HHI) index), then added together, natural gas is the most pervasive energy source of all. But in 2001, following the run-up in prices in 2000, its role began to decline as measured by the HHI index (Figure 6).

Figure 6. Crude Oil Commands the Largest Market Share, but Natural Gas is More Pervasive in the Economy




The importance of a stable and dependable source of natural gas to the economy is further illuminated by the change in the rate of growth in civilian employment in 2001. Since the rise in natural gas prices beginning in 2000, the rate of growth of employment has been about half that of the previous economic expansion of the 1990s (Figure 7).

Figure 7. Because of the Pervasive Role of Natural Gas in the Economy, Price Volatility Reduces Employment Growth




By all economic and physical measures, a stable and dependable supply of natural gas is critical for the security of the U. S. economy. Energy security is closely integrated with the nation's domestic, foreign, and environmental policies. Unless all policy issues can be aligned, it may not be possible to build the proposed regasification capacity currently planned, further exacerbating natural gas price volatility and domestic business investment uncertainty.

# COGENERATION: ITS PLACE IN THE FUTURE OF ELECTRICITY IN LOUISIANA

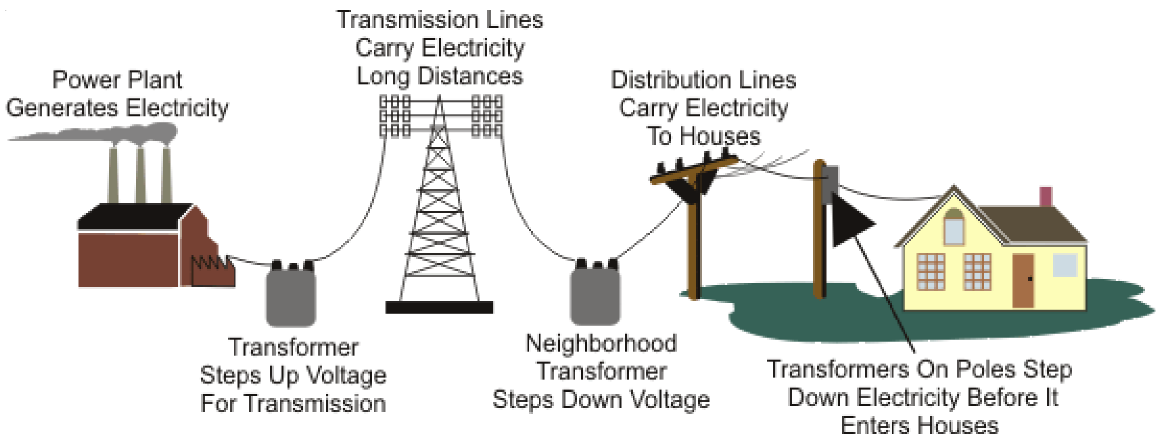
**by**
**David McGee, Engineer**
**Patricia Nussbaum, Engineer**
**April 2006**

In the early days of electricity the generation and distribution were located close to each other. This is the concept called distributed generation, putting generators close to the loads they serve. As this new phenomenon of electricity grew into a business, transmission was born to take advantage of the economies of scale in the power generation industry. Electricity was generated in large, centrally located facilities and transmitted over miles of high voltage transmission lines to its final destination, the homes and businesses that consume it.

The U.S.-Canada Power System Outage Task Force had this to say about the electrical infrastructure:

> The North American electricity system is one of the great engineering achievements of the past 100 years. This electricity infrastructure represents more than $1 Trillion (U.S.) in asset value, more than 200,000 miles—or 320,000 kilometers (km) of transmission lines operating at 230,000 volts and greater, 950,000 megawatts of generating capability, and nearly 3,500 utility organizations serving well over 100 million customers and 283 million people.

Figure 1. Electric Power System Components




Source: http://www.eia.doe.gov/basics/electricity_basics.html/28 March 2006

Today we use electricity in every facet of life, business as well as personal, and we expect reliable electricity. Power is essential to our way of life – reliability has become paramount in the delivery of electricity. When the power goes out every class of customer is affected. The American view of electricity reliability has been shaped by recent events. Since September 11, 2001, securing the electric power infrastructure against terrorism has become a focus. Then, on August 14, 2003, a massive outage occurred on a calm, warm day. Portions of the Midwest and Northeast United States and Ontario, Canada lost power. The blackout brought attention to the country's ageing transmission grid. Louisiana was forever changed on August 29, 2005 when Hurricane Katrina impacted many utilities and caused major damage to both the generating plants and the transmission infrastructure. When the power went out, basic services for health, communications, finance, cooling and water supply were no longer available. In addition, the flooding that accompanied the storm further worsened conditions by impeding access needed for recovery and restoration, and damaging equipment that was sitting in water. According to the situation reports from the Office of Electricity Delivery and Energy Reliability, U. S. Department of Energy (DOE), August 29, 2005 (10:00 PM EDT), Louisiana had 966,085 (42%) customers without power. The final gulf coast hurricanes situation report dated January 26, 2006 stated that power had not been restored to the Lake Catherine area, the Lower Ninth Ward and portions of Lakeview "due to severe destruction to delivery systems."

Figure 2. Classification of Electricity Consumers

| | |
|---|---|
| The **residential sector** includes private households and apartment buildings where energy is consumed primarily for:<br>• space heating,<br>• water heating,<br>• air conditioning,<br>• lighting,<br>• refrigeration,<br>• cooking, and<br>• clothes drying. | The **commercial sector** includes non-manufacturing business establishments such as:<br>• hotels,<br>• motels,<br>• restaurants,<br>• wholesale businesses,<br>• retail stores, and<br>• health, social, and educational institutions.<br>Sometimes the commercial sector includes small manufacturing facilities as well. |
| The **industrial sector** includes:<br>• manufacturing,<br>• construction,<br>• mining,<br>• agriculture,<br>• fishing, and<br>• forestry establishments.<br>An electric utility may classify commercial and industrial consumers based on either NAICS (North American Industry Classification System) codes or demand and/or usage falling within specified limits, set by the electric utility based on different rate schedules. | The **other sector** includes:<br>• public street and highway lighting,<br>• railroads and railways,<br>• municipalities,<br>• divisions or agencies of State and Federal Governments under special contracts or agreements, and other utility departments, as defined by the pertinent regulatory agency and/or electric utility |

Source: http://www.eia.doe.gov/cneaf/electricity/page/prim2/toc2.html/28 March 2006

Distributed generation is now being looked at as a hedge against power outages. Traditional users of distributed generation were operations which required absolute reliability of service. Today's dependency on electricity for our "way of life" broadens the scope of distributed generation.

Cogeneration, or combined heat and power (CHP), is a type of distributed generation that uses the waste heat produced by electricity generation for industrial processes or heating/cooling applications. Cogeneration, unlike some of the other distributed generation technologies, is not experimental. Cogeneration in the form of turbines, micro-turbines, reciprocating engines, and steam-turbine systems has operated successfully for decades. Combined heat and power is not the quick fix for high energy costs, but it can lower energy costs and increase electric reliability. One of the reasons for installing combined heat and power is independence from the grid; another is reliability. Some of the systems are connected to the utility's power grid and others are used only for internal use and are stand alone systems.

The ideal co-generation application uses the same ratio of electricity and heat all the time. Many plants only 'co-gen' enough electricity to produce the required heat for their process and buy the rest. Quite often they can not start the plant with their own power, but they provide a very stable base load for the utility as they generate most of the varying load for the process.

Other plants require much more heat than electricity. If the local laws permit, they can generate extra power and sell it into the grid. This provides the lowest heat value electricity available – sometimes below 4,000 British thermal units (Btu)/kilowatt hour (kWh) (1 kWh = 3,412 Btu). They must be prepared to do something else with the extra heat if the grid does not need the power. This adds capital cost to their operation.

Some utilities invite industry to locate near their generation station so they can sell heat to them. Generally, this is mutually beneficial, but the utility has to consider that the plant may close temporarily or permanently. If it is a merchant power plant then it is obligated to supply heat at times it may not be able to sell the power. This has given rise to the concept of 'power parks' – industrial parks that solicit industries on the basis of keeping their heat and electricity in balance and not being dependent on a utility. Generally speaking, all the businesses will have lower energy costs than if they were out on their own supplying their own steam and buying electricity. Specialization and economies of scale can be had in smaller packages than ever before from a few dozen kilowatts up.

In Louisiana, cogeneration has been largely confined to industrial users who needed process heat. Any time fuel is converted to electricity, extra heat will be left for disposal. The new reality created by the recent hurricane season opens the door for more applications of cogeneration at the agricultural, industrial and commercial customer levels. CHP systems may just be the mechanism to allow continued safe operations when the utility is out of service at hospitals, nursing homes, multifamily housing, and food storage or preparation businesses. All projects have to be justified technically and financially, but in some applications reliability, which was an elusive quality in the past, may have become a quantifiable service.

Hospitals are excellent candidates for CHP systems because they have high electrical and thermal energy needs that generally follow each other and have significant energy demands 24 hours per day/7 days per week/365 days per year. More than 200 hospitals and healthcare facilities nationwide are using CHP to lower energy costs by up to 50% and decrease power outages and interruptions by up to 95%.

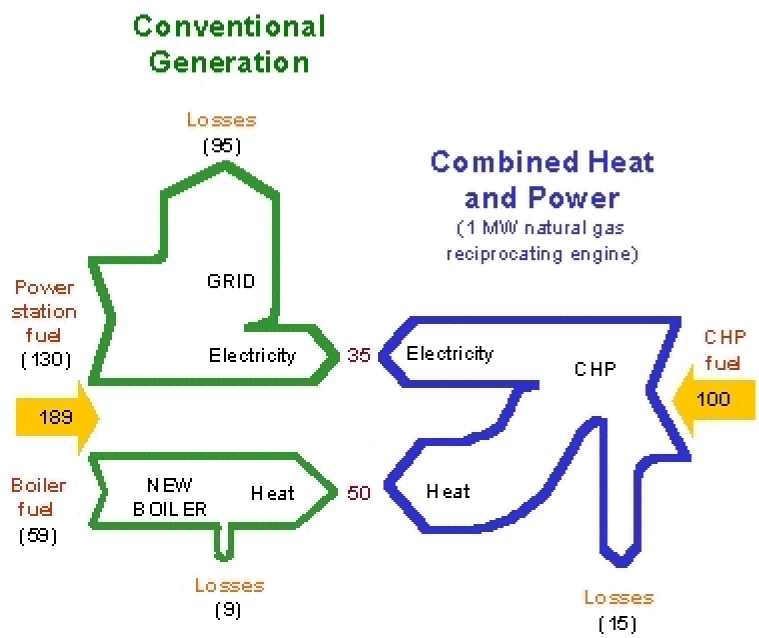
CHP can provide clean power and improved comfort for buildings from a single reliable source of both power and heat. Systems can provide winter space heating and utilize proven absorption chiller technology for summer cooling, while reducing overall electrical consumption and reducing NOx (nitrogen oxide (air quality)) emissions. The overall efficiency of CHP can easily be related to the reduction of total energy use and can be correlated to reduced operating costs for the building owner. Using energy more efficiently always has a positive effect on the air and water. Figure 3 compares the typical fuel input needed to produce 35 units of electricity and 50 units of heat using conventional separate heat and power. Centralized generation of electricity is, approximately, 30% thermally efficient. Typical installed boilers are about 80% to 85% efficient. CHP technologies range from 70% to 90% efficient, depending on the technology and degree of heat energy utilization.

The agricultural sector has significant CHP opportunities through waste management and opportunity fuels. Crop wastes, or "energy crops," can be co-fired in existing generators. Animal and agricultural wastes can be converted to biogas through the process of anaerobic digestion. The biogas can then be used in conventional engines or micro-turbines to produce electricity and heat for the farm. The following agricultural sites could make excellent hosts for CHP installations: diary farms and feedlots; pulp mills, paper mills, sawmills, timber harvest operations; rice, cotton and sugar cane processing operations.

The U.S. DOE has established and funded regional centers to encourage adoption of Combined Heat and Power. Louisiana is affiliated with the **Gulf Coast CHP Application Center** (http://www.gulfcoastchp.org) located in Houston. Over 214 CHP installations are operating in Texas, Louisiana, and Oklahoma, providing over 23 GW (gigawatts) of electrical capacity. The center's purpose is to help companies evaluate whether CHP would enhance their operations.

Figure 3. Comparison of Conventional Generation and Combined Heat and Power

Figure 3. and Power




Source: http://uschpa.admgt.com/CHPbasics.htm /28 March 2006

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# GEOTHERMAL RESOURCES IN LOUISIANA

by

David McGee, P.E.

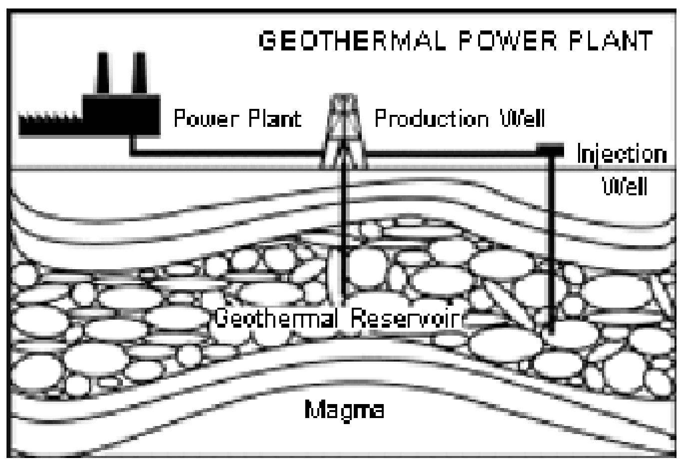
May 2006

The Earth's temperature increases with depth, reaching more than 4200° C (7600° F) at its core. At great depths, temperatures become high enough to melt rock, forming magma. Some magma rises to the surface through fractures as lava, but most magma remains below the earth's crust and heats the surrounding rocks and subterranean water. Some of this water makes its way to the surface as hot springs or geysers. When this hot water and steam is trapped under a layer of impermeable rocks, it is called a *geothermal reservoir*. These reservoirs can potentially be tapped for electricity generation or direct use by release through a steam turbine. Figure 1 is a diagram of this process. In Louisiana, dissolved hydrocarbon gases commonly increase the energy available from this resource.

Louisiana has some geothermal potential. The temperatures, at 4 km (13,123 ft.), ranges from less than 158° F to over 300° F in North America. Louisiana has some areas along the Arkansas and Texas borders at the high end. Well logs from the coastal plain show temperatures around 160° F, at depths of 4.6 km (15,000 ft.), along most of Louisiana's coast. This is hot enough for energy production, but there are two problems: drilling cost and ground subsidence.

If the drilling has already been done for hydrocarbon production, then one problem has been eliminated. Table 1 shows the potential power production just for "produced" water from oil and gas wells in the south. Additional power could be produced by injecting water into the earth at one point (injection well) and removing the

Figure 1. Schematic of Geothermal Power Plant Production and Injection Wells




Source: U. S. Department of Energy (http://www.eia.doe.gov/kids/energyfacts/sources/renewable/geothermal.html/22 March 2005)

Table 1. Geothermal Power from Existing Gulf Coast Hydrocarbon Production

| State | Yearly total processed water, bbl | Processed water cut, % | Water production 1000 gpm | Statewide power at 210?F MWs | Statewide power at 400?F MWs |
|---|---|---|---|---|---|
| Alabama | 203,223,404 | 95.1 | 15.4 | 7.0 | 37.8 |
| Arkansas | 258,095,372 | 97.2 | 20.0 | 9.1 | 49.1 |
| Florida | 160,412,148 | 97.2 | 12.5 | 5.6 | 30.5 |
| Louisiana | 2,136,572,640 | 95.2 | 162.5 | 73.6 | 398.0 |
| Mississippi | 592,517,602 | 96.7 | 45.8 | 20.7 | 112.1 |
| Oklahoma | 12,423,264,300 | 99.5 | 986.6 | 446.7 | 2,416.4 |
| Texas | 12,097,990,120 | 96.8 | 935.1 | 423.3 | 2,290.2 |
| **Total** | | | 2,177.8 | 986.0 | 5,334.1 |

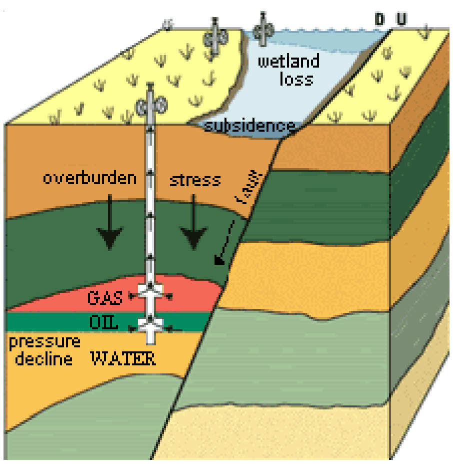
Source: "Geothermal Electric Power Supply Possible from Gulf Coast, Midcontinent Oil Field Waters," *Oil & Gas Journal*, Jason McKenna, U. S. Army Engineer research Center, Vicksburg, MS; David Blackwell, Southern Methodist University, Dallas, TX; and Christopher Moyes & P. Dee Patterson, Moyes & Co. Inc., Dallas, TX; September 5, 2005, Pg., 39.

heated water at another point. Production companies could use it to supply power for pumping and re-injection of the produced water.

Produced water may contain natural gases that can be separated if the fluid is depressurized. These gases can be used separately or to add heat energy to the liquid. If the geothermal fluid is depressurized to release the gases, then it must be re-pressurized to the original level to re-inject it back into the ground. Some, but not all, of the energy can be extracted from the expanding gases for the re-pressurization. Releasing the gases from the fluid will also remove some of the heat energy (cool) from the liquid remaining. The hydrocarbons can be removed by chemical means which add cost, but do not have these penalties. The world's first hybrid (organic Rankine/gas engine) geopressure-geothermal power plant was operated at Pleasant Bayou, Louisiana, using both the heat and the hydrocarbons of a geopressured resource.

As illustrated in Figure 2, if geothermal fluids are withdrawn from a reservoir and not re-injected, it permits soil formations at the site to compact, leading to ground subsidence at the surface. Ground subsidence can affect the stability of pipelines, drains, and well casings. It can also cause the formation of ponds and cracks in the ground and, if close to a populated area, it can lead to instability of buildings.

Figure 2. Graphic of How Extraction May Induce Subsidence




Graphic courtesy of *U. S. Geological Survey*

Oil and gas deposits lie in underground cavities along with formation water, so when the deposits are sucked out through wells, the land sinks to fill the now-empty hole. This is especially noticeable where there are nearby faults.

The liquids exist in the voids of the sand and gravel beds that underlie much of the Gulf coast. When the liquids are removed the rocks shift and compact due to the weight of the soil above. The lowering of land surface elevation from this process is permanent. Pressurizing water sufficiently to "lift" thousands of feet of earth is not economically feasible. This effect is local in nature, generally affecting only a small geographical area.

Little is currently known about how to prevent or mitigate subsidence effects. Fluid re-injection can help, but its effectiveness depends on where the fluid is re-injected and the permeability conditions in the field. Typically, re-injection is done at some distance from the production well to avoid cooling the production fluid and may not help prevent subsidence.

The Mississippi River delta plain is subject to the highest rate of relative sea-level rise (>3 ft per century) of any region in the Nation largely due to rapid geologic subsidence. Subsidence impacts the socio-economic infrastructure of south Louisiana placing the communities and infrastructure at risk of being inundated by the rising sea.

Compounding the subsidence problem is the forecast that the world's oceans will rise over the next century due to global atmospheric warming. Together the rising sea and subsidence accelerate coastal erosion and wetland loss, increase flooding, and increase the extent and severity of storm impacts.

**Impacts of Subsidence and Sea-Level Rise**

The effect of subsidence on coastal environments of Louisiana varies from direct lowering of roads and levees to rapid degradation of marsh vegetation and soils. Land subsidence causes many problems including: (1) changes in elevation and slope of streams, canals, and drains; (2) damage to bridges, roads, railroads, storm drains, sanitary sewers, and levees; (3) damage to buildings; and (4) failure of well casings.

As the land subsides and the rate of sea-level rise increases, coastal marshes submerge and are transformed to open water exposing the more populated part of the state to the full effect of hurricanes. Levees are necessary to protect the developed areas from flooding, as in New Orleans.

**Risk Assessment**

Current pressures for balanced energy, land and water management, concerns about natural disasters, and protection of environmental quality demand scientific information. However, there are often no clear, unequivocal answers to land-use and environmental issues due to the uncertainties in the scientific information and the need to consider economic, political, social, and aesthetic values[1].

Geothermal resources can be over-produced as reported from *Renewable Energy Trends 2003 With Preliminary Data For 2003*, July 2004 (Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels, U.S. Department of Energy, Washington, DC 20585).

> "Geothermal generation dropped 9 percent between 2002 and 2003. The majority of geothermal generation comes from 21 plants at The Geysers field in California, one of the largest geothermal fields in the world. Production at The Geysers fell sharply about 10 years ago because of a decline in underground pressure to produce steam. As a result, The Geysers, which have a total rated capacity of 1,650 megawatts (mw), are currently achieving (according to industry measurements) an average annual net capacity of only 862 mw.
>
> The Santa Rosa Geysers Recharge Project, which became operative in December 2003, is designed to enhance steam production and produce 85 mw of additional generating capacity from this field by pumping about 11 million gallons of tertiary-treated wastewater daily into The Geysers geothermal reservoir. The wastewater comes from the Santa Rosa regional sewage treatment plant and other cities through a 41-mile underground pipeline. The project also mitigates a major wastewater disposal problem. The project's final cost was just over $200 million or $2,400 per kilowatt."

Many areas of the world are using geopressured water for energy today, notably the Philippines, New Zealand, and Iceland. New Zealand has had significant problems with subsidence. California and Nevada utilize it extensively, but their resource is totally different being relatively shallow and mostly steam driven. They have had little problem with subsidence.

The above reference points out that extracting fluid from the earth has its consequences. Geothermal energy may not be as finite as oil and gas, but it has limits. The question is, "how much is it worth compared to the alternatives?"

We could produce a substantial quantity of energy, but the process accelerates the loss of coastal marshes. We could attempt to mitigate that loss by re-injecting the spent brine, but that will reduce the energy produced, and will eventually degrade the temperature of the resource. We could divert the Mississippi river to build up replacement soil in the marsh at a very high cost, both in money and in the ecology of the marsh.

In his master's thesis, Jeremy Griggs undertakes to evaluate the economics of geopressured reservoirs that exist in coastal Louisiana. With reasonable values for electricity and natural gas he presents a case for some locations to be good prospects, but he doesn't take subsidence into account over the long term. He also outlines areas that still need much work to make the investment more commercially viable. In general, if the site doesn't produce sufficient petroleum products to pay for the work, adding geothermal energy will not make the project economical[2].

Mr. Griggs states that areas needing more work include:

> **"5.4 The Future of Geothermal/Geopressured Brine Energy**
>
> The economic and technical constraints posed in this study delineate a potential range of conditions

where the development of geopressured aquifers may have commercial application. However, these factors also indicate that challenges remain before field development of geopressured aquifers can begin. Five groups emerge that warrant further investigation and could greatly enhance the value of the geopressured/geothermal resource:

1. Reservoir characterization and resource estimation. By refining estimates of rock compaction, shale-water influx, and diagenic (sic) history a more detailed analysis of aquifer drive mechanisms could be determined. The reactivation of the Wells of Opportunity program could refine estimates expected aquifer volumes and aid in quantitatively determining the effects of carbon dioxide and heavier hydrocarbons on methane solubility in brine.
2. Facility optimization and systems analysis. Detailed system analysis and facility optimization could decrease capital cost and operating expense while providing for more efficient extraction of methane. Accurate temperature, flow rate, and facility coupling could provide "fit-for purpose" equipment and significantly reduce expense.
3. High efficiency binary-cycle power plants. Further investigation of Kalina-cycle power plants could provide for a cheap, yet highly efficient, means of extracting thermal energy from geopressured brine….
4. Detailed economic analysis. Accurate estimation of facility and power plant expense, along with more detailed estimates of drilling cost may provide a more economic opportunity. Commercial potential of geopressured aquifers could increase with the inclusion of dry-hole risk, well replacement cost, and the likely-hood of different development.
5. Legal and political difficulties. The aerial (sic) extent of potentially commercial geopressured aquifers is likely to be in excess of 10 sq. mi. and small acreage landowners could derail the development of this energy source. Mineral law case history is vague concerning the ownership of sub-surface brine [86]. The renewal of federal tax credits and the implementation of severance tax relief and federal loan guarantees could provide significant economic incentive to develop geopressured aquifers ([86] Harrell, T.A.: *Legal Impediments to Geopressured Development – Current Concerns*, in Proceedings, 5th Geopressured-Geothermal Energy Conference, held in Baton Rouge, LA. October 13-15, 1981)."

If energy becomes valuable enough, it is certain that this resource will be exploited. The repercussions of such use will have to be weighed against the need and a decision made. Many east coast states have resources that are less expensive to tap into and have less drastic consequences, but they refuse to tap into them at this time.

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Additional information on Geothermal energy and how it works can be found at the Renewable Energy Policy Project (REPP) website (URL: http://www.repp.org/geothermal/index.html), Chapter 1- Introduction, *Geothermal Energy for Electric Power: A REPP Issue Brief*, December 2003, by Masashi Shibaki, Fredric Beck, Executive Editor, Renewable Energy Policy Project; 1612 K St. NW, Suite 202; Washington, DC 20006.

Additional information on the Kalina Cycle Power Plant can be found at URL: http://www.exergy.se/ftp/kalina.pdf *Exergy Study of the Kalina Cycle*, presented at the 1989 American Society of Mechanical Engineers (ASME), Winter Annual Meeting, San Francisco, California December 10-15, 1989.

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# THE TRANSMISSION SYSTEM - ELECTRICITY'S HIGHWAY

**by**
**Patricia Nussbaum, Engineer**
**June 2006**

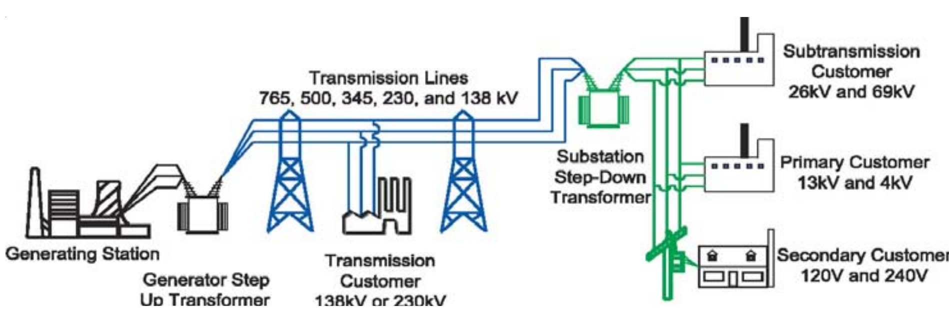
Electricity is not a commodity that can be stored easily. The transmission system acts as an interstate highway that takes electricity to market. The result of a problem on the transmission grid is the loss of the commodity, not just a delay in its delivery.

Our economy relies on electricity and that reliance grows as we become more and more information based. The transmission lines are owned and operated by the larger utilities, but the move toward deregulating the generation sector has opened the transmission lines to greater use. The existing transmission system was not designed to meet today's growing demand for electricity. The reliability of the system is no longer a certainty.

> "On August 14, 2003, large portions of the Midwest and Northeast United States and Ontario, Canada, experienced an electric power blackout. The outage affected an area with an estimated 50 million people and 61,800 megawatts (MW) of electric load in the states of Ohio, Michigan, Pennsylvania, New York, Vermont, Massachusetts, Connecticut, New Jersey and the Canadian province of Ontario. The blackout began a few minutes after 4:00 pm Eastern Daylight Time (16:00 EDT) and power was not restored for 4 days in some parts of the United States. Parts of Ontario suffered rolling blackouts for more than a week before full power was restored. Estimates of total costs in the United States range between \$4 billion and \$10 billion (U.S. dollars)."
> (U.S.-Canada Power System Outage Task Force, "*Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations,*" April 2004.)

The transmission system was built by vertically integrated utilities that owned the generation and transmission infrastructure. The utilities produced electricity at large generation stations and used the transmission infrastructure to move the electricity to customers. The 1920s were a period of consolidation for the electric utility industry as larger and more efficient steam turbines were developed. Electric utility ownership consolidated into large utility holding companies. The 16 largest holding companies controlled 75 percent of the generation capacity. The growth of the industry beyond city limits brought with it state regulation. The states expanded the roles of the railroad commissions to include electricity. However, the growth continued beyond state lines and Federal regulation soon followed as the electricity industry was recognized as a natural monopoly in interstate commerce.

Figure 1. Key Elements of the Electric Power Grid




Source: U.S.-Canada Power System Outage Task Force, *Final Report on the August 14, 2003, Blackout in the United States and Canada: Causes and Recommendations*, August 2004.

Assuming there is a local interest in local utilities, the Public Utilities Holding Company Act of 1935 (PUHCA) limits the size of utility holding companies by limiting their geographic region. PUHCA requires utility parent companies to incorporate in the same state as the utility it owns. This would place it under state regulation. A company that owns utilities in more than one state is subject to federal regulation by the Securities and Exchange Commission (SEC). The SEC requires the utility holding companies to divest their holdings leaving them with only those businesses consistent with being a single integrated utility.

In 1978, in response to the Arab oil-producing nations ban on oil exports to the United States the Public Utility Regulatory Polices Act (PURPA) was adopted. PURPA requires electric utilities to allow a qualifying facility (QF) to connect to the transmission system and to purchase whatever capacity they produce at the utility's avoided cost (what it would have cost the utility to generate the power). The qualifying facilities are co-generators and the small power producers that use renewable resources. Most QFs are exempt from regulation by the SEC under PUHCA.

Table 1. Federal Legislation Prior to EPACT 2005

| |
|---|
| **Public Utility Holding Company Act of 1935 (PUHCA)**<br>PUHCA was enacted to break up the large and powerful trusts that controlled the Nation's electric and gas distribution networks. PUHCA gave the Securities and Exchange Commission the authority to break up the trusts and to regulate the reorganized industry in order to prevent their return.<br><br>**Federal Power Act of 1935 (Title II of PUHCA)**<br>This Act was passed to provide for a Federal mechanism, as required by the Commerce Clause of the Constitution, for interstate electricity regulation. |
| **Public Utility Regulatory Policies Act of 1978 (PURPA)**<br>PURPA was passed in response to the unstable energy climate of the late 1970s. PURPA sought to promote conservation of electric energy. Additionally, PURPA created a new class of non-utility generators, small power producers, from which, along with qualified cogenerators, utilities are required to buy power. |
| **Energy Policy Act of 1992 (EPACT)**<br>This Act created a new category of electricity producer, the exempt wholesale generator, which narrowed PUHCA's restrictions on the development of non-utility electricity generation. The law also mandated that FERC (Federal Energy Regulatory Commission) open up the national electricity transmission system to wholesale suppliers on a case-by-case basis. |

Source: EIA (http://tonto.eia.doe.gov/FTPROOT/electricity/056296.pdf/April 4, 2006).

The Energy Policy Act of 1992 reformed PUHCA by creating a new category of non-utility generators called exempt wholesale generators (EWG) that were exempt form PUHCA requirements. FERC was given the mandate to open the transmission grid for wholesale power transactions on a case-by-case basis. This meant that FERC could order the utility that owned the transmission infrastructure to provide transmission service at a rate that FERC determined was reasonable.

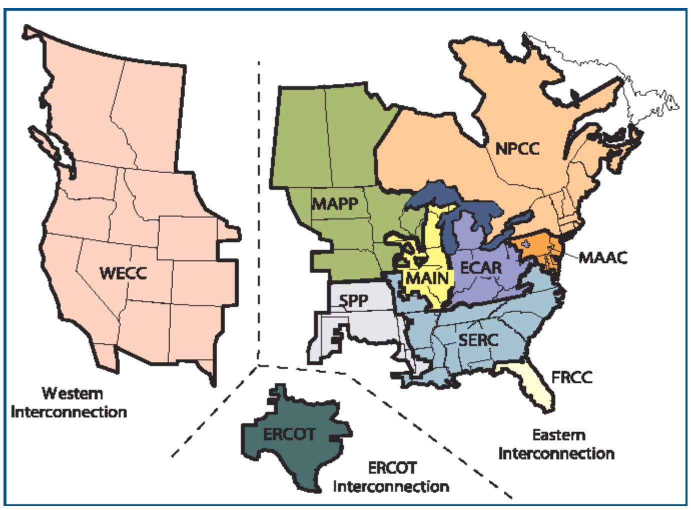
Table 2. Public Utility Regulatory Polices Act (PURPA) Qualifying Facilities

| PURPA was designed to encourage the efficient use of fossil fuels in electric power production through cogenerators and the use of renewable resources through small power producers. Because of amendments to PURPA in 1990, the term "small power producer" is now a misnomer. The amendments eliminated the original size criterion for all energy sources except hydroelectric, while maintaining the criterion for the type of energy used. (Under PURPA provisions, both cogenerators and small power producers cannot have more than 50 percent of their equity interest held by an electric utility. | |
|---|---|
| **Cogenerators** | **Renewables** |
| Cogenerators are generators that sequentially or simultaneously produce electric energy and another form of energy (such as heat or steam) using the same fuel source. Cogeneration technologies are classified as "topping-cycle system, high-temperature, high-pressure steam from a boiler is used to drive a turbine to generate electricity. The waste heat or steam exhausted from the turbine is then used as a source of heat for an industrial or commercial process. In a typical bottoming-cycle system, high-temperature thermal energy is produced first for applications such as reheat furnaces, glass kilns, or aluminum metal furnaces, and heat is then extracted from the hot exhaust stream of the primary application and used to drive a turbine. Bottoming-cycle systems are generally used in industrial processes that require very high-temperature heat. | A renewable resource is an energy source that is regenerative or virtually inexhaustible. Renewable energy includes solar, wind, biomass, waste, geothermal, and water (hydroelectric). Solar thermal technology coverts solar energy through high concentration and heat absorption into electricity or process energy. Wind generators produce mechanical energy directly through shaft power. Biomass energy is derived from hundreds of plant species, various agricultural and industrial residues, and processing wastes. Industrial wood and wood waste are the most prevalent form of biomass energy used by non-utilities. Geothermal technologies convert heat naturally present in the earth into heat energy and electricity. Hydroelectric power is derived by converting the potential energy of water to electrical energy using a hydraulic turbine connected to a generator. |
| For a non-utility to be classified as a cogenerator qualified under PURPA, it must meet certain ownership, operating, and efficiency criteria established by FERC. The operating requirements stipulate the proportion (applicable to oil-fired facilities) of output energy that must be thermal energy, and the efficiency requirements stipulate the maximum ratio of input energy to output energy. | For a non-utility to be classified as a small power producer under PURPA, it also must meet certain ownership and operating criteria established by FERC. In addition, renewable resources must provide at least 75 percent of the total energy input. PURPA provisions enabled non-utility renewable electricity production to grow significantly, and the industry responded by improving technologies, decreasing costs, and increasing efficiency and reliability. |

Source: EIA (http://tonto.eia.doe.gov/FTPROOT/electricity/056296.pdf/April 4, 2006).

The grid is an alternating current network that is divided into major interconnections – the eastern interconnect (the eastern two-thirds of the continental United States and Canada from Saskatchewan east to the Maritime Provinces), the western interconnect (the western third of the continental United States (excluding Alaska), the Canadian provinces of Alberta and British Columbia, and a portion of Baja California Norte, Mexico) and the ERCOT (Electric Reliability Council of Texas) interconnect that covers most of Texas. Very little power exchange occurs between the major interconnections. The problem of moving power between the interconnections is usually some combination of physical constraints and electrical bottlenecks.

Figure 2. North American Electricity Transmission Systems




Source: NERC (http://www.pi.energy.gov/pdf/library/TransmissionGrid.pdf/May 1, 2006).

FERC, as the regulator of the wholesale electric power markets, had no authority to enforce the North American Electric Reliability Council (NERC) transmission reliability standards. NERC is a not-for-profit company formed by the electric utility industry to promote the reliability of the electricity supply in North America. NERC consists of nine Regional Reliability Councils and one affiliate whose members are from all segments of the electricity supply industry. NERC is a voluntary organization that relies on a voluntary system of compliance with reliability standards.

This is not adequate for the needs of the current transmission system. One of the recommendations from the August 24, 2003 Blackout task force is to "make reliability standards mandatory and enforceable with penalties for noncompliance."

The Energy Policy Act of 2005 (EPACT-2005) is the first major energy legislation in 13 years. EPACT-2005 repeals PUHCA to encourage investment in the grid and establishes mandatory reliability rules for the transmission system. EPACT-2005 also requires DOE to issue a national transmission congestion study for comment by August 2006 and every three years thereafter. Based on the study and public comments, DOE may designate selected geographic areas as "National Interest Electric Transmission Corridors" (NIETCs). If the Secretary of the Department of Energy designates an area experiencing congestion as an NIETC FERC is authorized to issue permits for the construction and modification of electric transmission in the NIETC.

Historically, politics surrounds all aspects of electricity production and delivery and the Act increases the power of the federal government over electricity's interstate highway.

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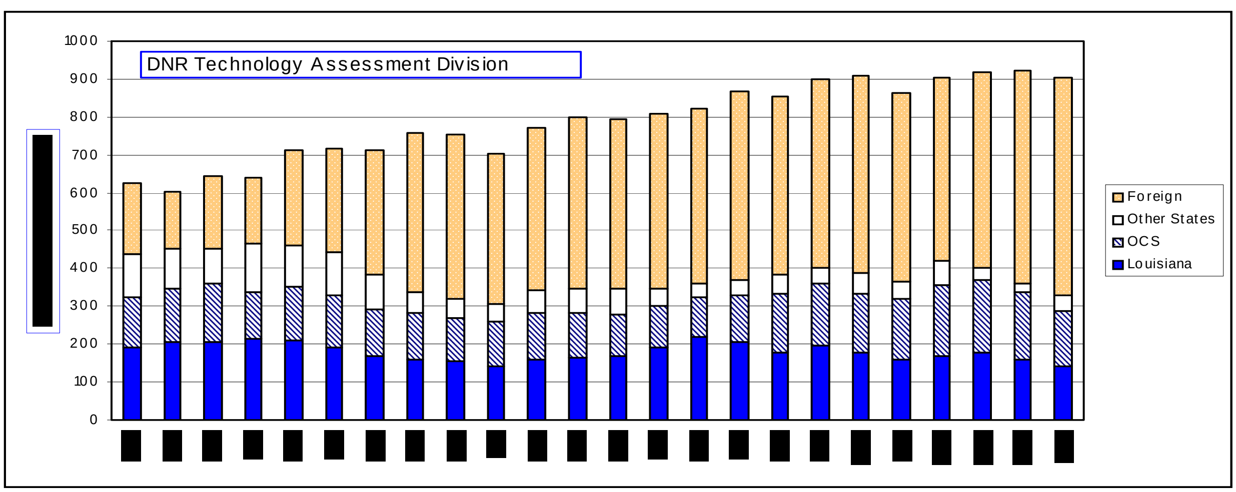
# HIGHLIGHTS OF THE 14th EDITION OF THE LOUISIANA CRUDE OIL REFINERY SURVEY REPORT

by
J. Bryan Crouch, P. E.
July 2006

The 14th edition of DNR's Louisiana Crude Oil Refinery Survey Report covers the 12-month period from July 1, 2004 to June 30, 2005. The survey results show that operating capacity for Louisiana refineries is up by almost 180,000 bcd (barrels per calendar day), led by large gains at Citgo Petroleum's Lake Charles refinery and Valero Refining's Norco refinery. Table 1 shows the current operating capacities and throughputs and the percent changes from the last DNR survey for individual refineries. Table 2 shows the top products, by percentage of total product slate, from all Louisiana refineries. The overall operating rate for Louisiana refineries during this survey period was 93.3%

Crude oil inputs were slightly down in 2005 due to refinery shutdowns resulting from Hurricanes Katrina and Rita. Total crude oil input to Louisiana refineries for the 2005 calendar year was 902 million barrels. Of that total, 63.4% was from foreign sources, 16.2% from the Outer Continental Shelf waters, 15.9% from Louisiana, and 4.5% from other states (see figure below).

Crude Oil Sources for Louisiana Refineries




Source: DNR Database, from Refiner's Monthly Report, Form R-3

The *Louisiana Crude Oil Refinery Survey Report, 14th Edition: 2005 Survey* was recently published online in PDF format on the DNR Technology Assessment Division website (http://dnr.louisiana.gov/sec/execdiv/techasmt/oil_gas/refineries/refinsurvey_2005.pdf). If you are currently on our mailing list as a subscriber to this publication, a hard copy will automatically be mailed to you. If you are not a current subscriber and would like to receive a free copy of the *2005 Survey*, as well as future editions, please submit an email request to techasmt@la.gov (include your name and address, and specify which publication you are requesting), or contact Jan Janney at 225-342-1270.

Table 1. Louisiana Refinery Current and Previous Operating Capacities

| Refinery Name | Location | Current Operating Capacity [1] (bcd) | Capacity Change [2] (%) | Throughput [1] 7/1/04 - 6/30/05 (barrels) | Throughput Change [2] (%) |
|---|---|---|---|---|---|
| Calcasieu Refining Company | Lake Charles | 31,000 | 0.00 | 10,959,254 | -1.38 |
| Calumet Lubricants Company LP | Cotton Valley | 12,158 | -10.71 | 2,940,587 | -14.10 |
| Calumet Lubricants Company LP | Princeton | 8,505 | 3.67 | 3,061,800 | 4,708.48 |
| Calumet Shreveport LLC | Shreveport | 40,000 | 391.76 | 2,969,018 | 0.00 |
| Chalmette Refining LLC | Chalmette | 195,000 | 2.52 | 65,188,426 | 8.81 |
| Citgo Petroleum Corporation | Lake Charles | 438,000 | 24.43 | 139,431,481 | 22.37 |
| ConocoPhillips | Belle Chasse | 247,000 | -5.00 | 86,647,396 | -6.43 |
| ConocoPhillips | West Lake | 239,000 | -4.40 | 82,270,405 | -0.67 |
| ExxonMobil Refining & Supply Company | Baton Rouge | 493,500 | 0.10 | 179,397,500 | -0.51 |
| Marathon Petroleum Company LLC | Garyville | 255,000 | 0.00 | 95,241,074 | 9.91 |
| Motiva Enterprises LLC | Convent | 225,000 | 0.00 | 82,125,000 | 0.00 |
| Motiva Enterprises LLC | Norco | 240,000 | 0.00 | 76,458,154 | 2.08 |
| Murphy Oil USA Inc [3] | Meraux | 120,000 | 14.29 | n/a | n/a |
| Placid Refining Company | Port Allen | 49,500 | 0.00 | 18,013,377 | 7.82 |
| Shell Chemical Company | St. Rose | 54,000 | 0.00 | 15,808,333 | -5.32 |
| Valero Refining Company | Krotz Springs | 80,000 | 2.56 | 28,907,333 | 15.66 |
| Valero Refining Company | Norco | 185,000 | 52.37 | 61,478,687 | 311.67 |
| Totals [3] | | 2,912,663 | 6.53 | 950,897,825 | 4.65 |

1. Data from current 12-month DNR survey ending June 30, 2005.
2. Percent change from previous 12-month DNR survey ending Oct. 31, 2003 (published in June, 2004).
3. Murphy was not able to respond to current survey due to outage resulting from Hurricane Katrina. Current operating capacity figure from EIA. Throughput change totals do not include Murphy.

Table 2. Top Products from LA Refineries by % of Product Slate

| Product | Percent of Total Product Slate |
|---|---|
| Regular gasoline | 30.7 |
| Diesel | 18.2 |
| Jet fuel/Kerosene | 11 |
| Fuel oil | 6.2 |
| Residual/Coke | 5.7 |
| Premium gasoline | 4.8 |

# SELECTED LOUISIANA ENERGY STATISTICS

July 2006

Among the 50 states, Louisiana's rankings in 2005 (unless otherwise indicated) were:

*PRIMARY ENERGY PRODUCTION*

(Including Louisiana OCS)

1st in crude oil
1st in OCS crude oil
1st in OCS natural gas
1st in OCS revenue generated for federal government
1st in mineral revenues from any source to the federal government
1st in LNG terminal capacity
1st in foreign oil import volume
2nd in natural gas
2nd in total energy from all sources
2nd in dry natural gas proved reserves
2nd in crude oil proved reserves

*REFINING AND PETROCHEMICALS*

1st in natural gas processing capacity
2nd in petroleum refining capacity
2nd in primary petrochemical production

*PRIMARY ENERGY PRODUCTION*

(Excluding Louisiana OCS)

4th in crude oil
6th in natural gas
6th in dry natural gas proved reserves
7th in crude oil proved reserves
8th in total energy

*ENERGY CONSUMPTION (2004)*

3rd in industrial energy
3rd in per capita energy
3rd in natural gas
5th in petroleum
8th in total energy
22nd in residential energy

## Production

State controlled (i.e., excluding OCS) natural gas production peaked at 5.6 trillion cubic feet (TCF) per year in 1970, declined to 1.5 TCF in 1995, and rebounded 4.5% to 1.6 TCF in 1996. Gas production was approximately 1.36 TCF in 2002, around 1.35 TCF in 2003 and 2004 and 1.28 TCF in 2005.

State controlled gas production is on a long term decline rate of 3.4% per year, though the current short term (2006-2011) forecast decline is around 3.5% per year.

State controlled crude oil and condensate production peaked at 566 million barrels per year in 1970, declined to 127 million barrels in 1994, recovered to 129 million barrels in 1996, and declined to 76.1 million barrels in 2005.

State controlled crude oil production is on a long term decline rate of 4.2% per year, though the current short term (2006-2011) forecast decline is around 3.6% per year. If oil stays above $50.00 per barrel, the decline will remain as predicted. If the price drops below $45.00 per barrel, the decline rate may be higher.

Louisiana OCS* (federal) territory is the most extensively developed and matured OCS territory in the US.

Louisiana OCS territory has produced 85.4% of the 15.9 billion barrels of crude oil and condensate and 81.1% of the 162 TCF of natural gas extracted from all federal OCS territories from the beginning of time through the end of 2005. Currently, Louisiana OCS territory produces 85.4% of the oil and 69.5% of the natural gas produced in the entire U.S. OCS and 89% of the oil and 70% of the natural gas produced in the Gulf of Mexico OCS.

Louisiana OCS gas production peaked at 4.16 TCF per year in 1979, declined to 3.01 TCF in 1989, then recovered to 3.98 TCF in 1999 and fell to 3.30 TCF in 2003. The estimated production for 2004 was 2.84 TCF.

Louisiana OCS crude oil and condensate production first peaked at 388 million barrels per year in 1972 and declined to 246 million barrels in 1989. In this decade, the production has steadily risen from 264 million barrels in 1990 to 508 million barrels in 2002 due to the development of deep water drilling. In 2003, 505 million barrels were produced. The estimated production for 2004 was 477 million barrels.

## Revenue

At the peak of Fiscal Year (FY) 1981/82, oil and gas revenues from severance, royalties, and bonuses amounted to $1.6 billion, or 41% of total state taxes, licenses and fees. For FY 2005/06, these revenues are estimated to be in the vicinity of $1.188 billion, or about 12.9% of total estimated taxes, licenses, and fees.

At constant production, the State Treasury gains or loses about $7 million of direct revenue from oil severance taxes and royalty payments for every $1 per barrel change in oil prices.

For every $1 per MCF change in gas prices, at constant production, the State Treasury gains or loses $34 million in royalty payments, and increases or decreases gas full rate severance tax by 3.8 cents per MCF or about $38.22 million dollars for the following fiscal year. (There is a 7 cent floor on gas severance tax.)

There are no studies available on indirect revenue to state from changes on gas and oil prices.

## Drilling Activity

Drilling permits issued on state controlled territory peaked at 7,631 permits in 1984 and declined to a low of 1,017 permits in 1999. In 2003 drilling permits issued fell to 1,264 permits, rebounded to 1,633 permits in 2004, and increased to 1,996 permits in 2005.

The average active rotary rig count for Louisiana, excluding OCS, reached a high of 386 rigs in 1981 and fell to 76 active rigs in 2002. In 2003 the average remained at 76 active rigs, in 2004 the average swung back to 91 active rigs, and in 2005 the average rose to 108 active rigs. The lowest year average between 1981 and 2005 was 64 active rigs in 1993.

The 2005 average active rotary rig count for Louisiana OCS was 74 active rigs, 2 rigs or 3.7% lower than the 2004 average, and the highest active rotary rig count was 109 rigs recorded in 2001.

* Note: Louisiana OCS or Outer Continental Shelf is federal offshore territory adjacent to Louisiana's coast beyond the three mile limit of the state's offshore boundary.

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TCF= trillion cubic feet

# *NOW IS THE TIME*: ENERGY STAR APPLIANCES MAKE MORE SENSE NOW THAN EVER BEFORE

by
James E. Davidson, Architect
August 2006

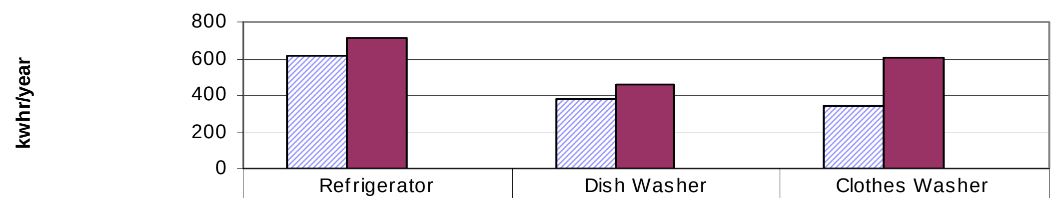
Are you replacing appliances or rebuilding your home after last year's hurricanes? Homes that were not damaged by the storms and flooding, that have the Energy Star label on the breaker box and Energy Star appliances serving their owners, have become rewarding investments. Due to the extent of new construction and flooded home refurbishments required across South Louisiana, and newly imposed structural code restrictions, including new elevation restrictions for homes in those areas, construction costs have escalated. In addition, the cost of natural gas has risen, causing utility rates to increase. These situations are boosting the cost of living for South Louisianians. Now is the time to own Energy Star appliances.

The Environmental Protection Agency (EPA), in concert with the drive to decrease the country's demand for energy produced from foreign oil and gas sources, is steadily improving the performance specifications for appliances. The latest improvements are in air conditioners, battery chargers (for cell phones and cordless drills, etc.), and clothes washers. The minimum required Seasonal Energy Efficiency Rating (SEER) for air conditioners before January 1, 2006 was 10, and an Energy Star model had a SEER of 12. After that date, the minimum requirement increased to SEER 13, and Energy Star models increased to SEER 14. The new Energy Star specifications include a minimum required Energy Efficiency Rating (EER) of 11.5. Each point increase in SEER is an approximate 10% improvement in efficiency. Thus, the minimum required efficiency has been improved 30% and is 10% better than the former threshold for an Energy Star model. Energy Star battery chargers are now 35% more efficient than the previous typical model. Energy Star clothes washers, on January 1, 2007, will be a minimum 37% more energy efficient than the current, minimally efficient model, and water usage efficiency will be specified. More information can be obtained from the Energy Star website (URL: http://www.energystar.gov). Information specific to the air conditioners, battery chargers and clothes washers is accessible under the *News Room* link.

Improvements are being stimulated by tax credits to manufacturers, established through the Energy Policy Act of 2005. The Act provides tax credits to homeowners that install Energy Star labeled air conditioners, windows, and tankless water heaters. It is limited to $500 for the next two years, but there is a bill in Congress to extend it. Builders are able to obtain up to $2,000 in federal tax credits for all houses and condominiums built and sold between August 8, 2005 and January 1, 2008, that are built to meet the International Energy Conservation Council (IECC) 2006 Code, and have a Heating, Ventilating, and Air Conditioning (HVAC) system that is 50% more efficient than the minimum requirement of the new code. Each home or condominium must be tested by a Certified Energy Rater.

Energy Star labeled appliances often cost more than non-Energy Star models with the same features of operation. How much more depends on the manufacturer, the type of appliance, market demand, supply, and competition. This means that the consumer needs to shop for the best models that will meet his budget and provide the necessary functionality at the same time. Economic analysis of the energy savings over the expected life of the product is not something that most consumers do, but should in order to take the guess work out of purchases. Figure 1 compares Energy Star appliances with similar non-Energy Star applicances in 3 categories based on energy usage in kilowatt hours (kwhr) per year.

Figure 1. Average Power Consumption (kwhr/year)

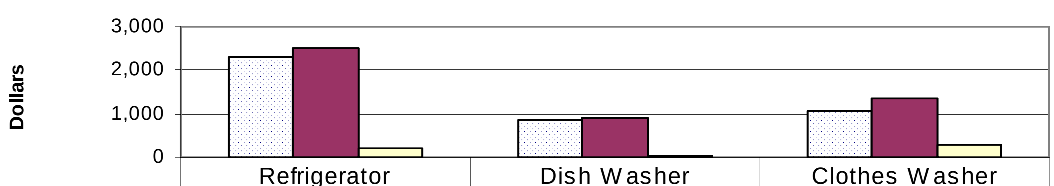



| | Refrigerator | Dish Washer | Clothes Washer |
|---|---|---|---|
| Energy Star | 611 | 384 | 346 |
| Standard | 715 | 462 | 601 |
| Efficient Improvement | 14.5% | 17.0% | 42.0% |

Source URL: http://www.ge.com, August 3, 2006

In Figure 2, the cost of ownership of these appliances is graphed over the expected life of the model. The Energy Star models perform better and conserve significant energy, especially when you realize that they can all be in use, in the same house, at the same time.

Figure 2. Cost of Ownership over Life of Applicance
Purchase Cost plus Cost of Energy to Operate
Based on present average energy rates and the manufacturer's suggested retail price




| | Refrigerator | Dish Washer | Clothes Washer |
|---|---|---|---|
| Energy Star | $2,313.46 | $863.49 | $1,077.00 |
| Standard | $2,498.60 | $907.84 | $1,367.17 |
| Net Savings | $185.14 | $44.35 | $290.17 |

Source URL: http://www.ge.com, August 3, 2006

Energy Star models often cost more, initially, and their individual energy savings are sometimes small, but if every appliance purchased for a home is an Energy Star appliance, then the cost of operating that home will be significantly less than one with cheaper appliances, and will pay increased dividends with every future rate increase.

# NEW ORLEANS CONTINUES TO EXPERIENCE POWER OUTAGES

by
Patty Nussbaum, Engineer
August 2006

New Orleans continues to experience random electrical power outages almost a year after Hurricane Katrina devastated the city. The recent random outages are generally due to mechanical malfunctions. The fear is that the rebuilding process will be adversely affected if the city cannot provide reliable electricity.

Entergy New Orleans (ENO), the utility that provides electric and natural gas service to the City of New Orleans, has restored power to all customers capable of receiving it, except for a severely damaged area in the Lower Ninth Ward (figure below). Hurricane Katrina caused catastrophic damage to ENO's electric and gas facilities and resulted in the loss of most of ENO's customers.

Electrical System Restoration to the Most Devastated Areas in New Orleans
will be Scheduled in 2006


Source: Entergy New Orleans (http://www.entergy-neworleans.com/content/your_home/storm_center/ENOI_Electric_map.pdf/July 26, 2006)

ENO filed for bankruptcy protection under Chapter 11 of the U. S. Bankruptcy Code on September 23, 2005. Entergy New Orleans is still operating, but it does not have enough cash to make the repairs necessary to return the system to the pre-Katrina level of reliability.

On Tuesday, June 27, 2006, about 8,600 customers lost power in Westwego in the morning, and that evening 15,000 customers from Gentilly to the Lakefront lost power for more than four hours. Classes were cancelled at the University of New Orleans as a result of the outage. On Tuesday, July 6, 2006, 800 homes and businesses lost power in the City Park area for approximately 45 minutes. These are recent examples, but the outages are likely to continue, and the length of the outages is likely to be longer than similar outages pre-Katrina.

The repairs that were made to the electrical system's infrastructure after the storm are considered temporary. The system no longer has redundancy which would give them the option of switching to another source while the repairs are being made. Lack of redundancy means that, when there is a problem on a transmission line, or if a piece of equipment fails, power is out until it can be repaired.

Entergy New Orleans has applied for federal financing through Community Development Block Grants, but they are competing with other infrastructure and housing needs for the federal money. Governor Kathleen Blanco and the Louisiana Recovery Authority (LRA) will determine how much of the money ENO receives. Entergy Louisiana, Entergy Gulf States and Cleco Corporation have also applied to the LRA for aid.

ENO filed a plan for a 25% rate increase with the New Orleans City Council. The company can legally ask customers to pay for storm losses and losses of revenue. The proposed rate increase is adjusted for a much smaller customer base (about 40% of its previous customers) and seeks to recover storm costs and build up a storm reserve for future storms. Entergy feels that the rate increase is a major step in allowing the company to emerge from bankruptcy. The City Council has until November 1, 2006 to review and act on the filing.

On June15, 2006, President Bush signed the latest spending package of which $4.2 billion is for Louisiana to implement the "Road Home" program. Bringing people back to New Orleans depends on reliable electric service. Reliable electric service is a quality of life issue and it must be addressed by both the public and private sector. Some combination of federal funding, rate increases and "other sources of funding" will be required to provide reliable electric service for the City of New Orleans.

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# LOUISIANA, AN ENERGY CONSUMING STATE: AN UPDATE USING 2002 DATA

by
Bryan Crouch, P.E.
September 2006

In 2002, Louisiana consumed 3,689.1 trillion BTUs (TBTUs) of energy, ranking it 8th among the states in total energy consumption. Figures 1 & 2 show the total energy consumption as percentages attributable to sector and source, respectively.

Figure 1. Louisiana Energy Consumption Percentage by Sector - 2002

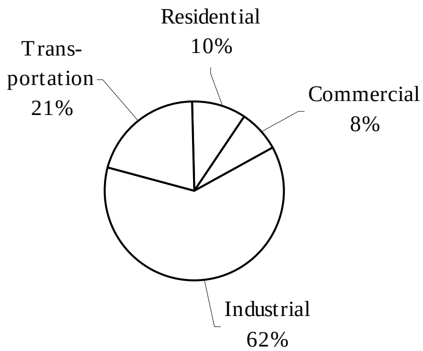
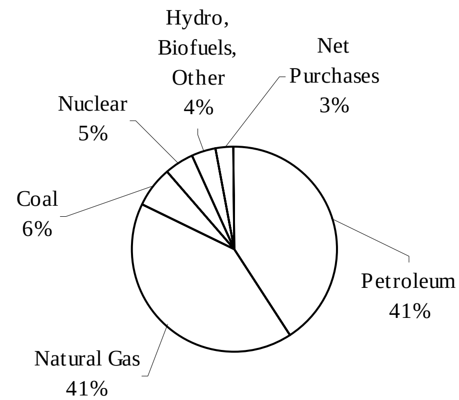



Figure 2. Louisiana Energy Consumption Percentage by Source - 2002




The industrial sector is, by far, the largest energy consumer in Louisiana. The abundance of Louisiana's natural resources has, historically, meant low energy prices, which have attracted a large cluster of energy intensive industries to the State. The large industrial sector consumption is also reflected in Louisiana's high natural gas consumption, which is used both as an energy source and a feedstock.

Table 1 shows where Louisiana ranks among the states in various energy consumption categories, and lists the top energy consuming state for each category. Louisiana's high ranking for per capita energy consumption is a reflection of high industrial energy consumption.

Louisiana also produced large quantities of energy. Table 2, on the following page, compares Louisiana's energy consumption to its energy production. It shows that, in 2002, Louisiana consumed 1,315 TBTUs moer energy than it produced if Louisiana OCS oil and gas production is not included.

Table 1. Louisiana Energy Consumption Rankings Among the States - 2002

| Category | Rank | TBTU | #1 State (TBTU) |
|---|---|---|---|
| Residential | 22 | 372.5 | Texas (1,632.8) |
| Commercial | 23 | 272.6 | California (1,472.8) |
| Industrial | 2 * | 2,265.7 | Texas (6,721.1) |
| Transportation | 11 | 778.2 | California (3,134.1) |
| Coal | 31 | 232.1 | Texas (1,550.3) |
| Natural Gas | 3 | 1,526.2 | Texas (4,721.9) |
| Petroleum | 5 | 1,506.5 | Texas (5,666.7) |
| Electricity | 16 | 270.4 | Texas (1,094.7) |
| Total | 8 | 3,689.1 | Texas (12,489.3) |
| Per Capita (MBTU) | 3 | 824.2 | Alaska (1,149.1) |

* For this item, we have updated data showing a 2004 ranking of 3rd

# Table 2. Louisiana Energy Balance - 2002[1]

| ENERGY SOURCE | | PRODUCTION | CONSUMPTION | NET STATE ENERGY PRODUCTION | |
|---|---|---|---|---|---|
| | | | | Excluding OCS | Including OCS |
| PETROLEUM: | STATE OIL[2] | 543.4 TBTU[4] (93.7 MMBBL) | 1,506.5 TBTU (293.7 MMBBL) | -963.1 TBTU | 1,987.0 TBTU |
| | LOUISIANA OCS OIL[2] | 2,950.1 TBTU[4] (508.6 MMBBL) | | | |
| NATURAL GAS: | STATE GAS[3] | 1,457.4 TBTU[4] (1.362 TCF) | 1,526.2 TBTU (1.426 TCF) | -68.8 TBTU | 3,632.0 TBTU |
| | LOUISIANA OCS GAS[3] | 3,700.8 TBTU[4] (3.458 TCF) | | | |
| COAL: | LIGNITE | 51.1 TBTU (3.503 MMSTON) | 232.1 TBTU (14.676 MMSTON) | -181.0 TBTU | -181.0 TBTU |
| NUCLEAR ELECTRIC POWER | | 180.7 TBTU (17.305 Billion KWHR | 180.7 TBTU (17.305 Billion KWHR) | 0.0 TBTU | 0.0 TBTU |
| HYDROELECTRIC, BIOFUELS & OTHER | | 141.5 TBTU | 141.5 TBTU | 0.0 TBTU | 0.0 TBTU |
| NET INTERSTATE PURCHASES OF ELECTRICITY INCLUDING ASSOCIATED LOSSES | | | 102.1 TBTU (32.097 Billion KWHR) | -102.1 TBTU | -102.1 TBTU |
| TOTALS: | EXCLUDING LOUISIANA OCS | 2,374.1 TBTU | 3,689.1 TBTU | -1,315.0 TBTU | |
| | INCLUDING LOUISIANA OCS | 9,025.0 TBTU | 3,689.1 TBTU | | 5,335.9 TBTU |

The Louisiana energy balance for 2002 shows that the state consumed 1,315 more TBTUs of energy than it produced if Louisiana OCS production is not included. If Louisiana OCS production is included, the state is a net producer of energy by 5,335 TBTUs.

TCF = Trillion Cubic Feet
TBTU = Trillion BTU's
MMBBL = Million Barrels
OCS = Outer Continental Shelf (federal waters seaward of the state's 3-mile offshore boundary)
KWHR = Kilowatt hour
MMSTON = Million Short Tons

1. Unless otherwise noted, data is obtained from the Energy Information Administration's latest published figures for state energy consumption.
2. Includes condensate
3. Includes gas plant liquids
4. Louisiana Department of Natural Resources data

# HOW HOMEBUILDERS AND HOMEOWNERS CAN SAVE MONEY WITH EPACT 2005

by
Howard Hershberg, A.I.A., Architect Supervisor and ERHL Manager
September 2006

The Energy Policy Act of 2005 (EPACT 2005) is the first attempt to address national energy policy since the Energy Policy Act of 1992. It offers both residential homebuilders and homeowners tax incentives for a number of energy efficiency measures.

A tax deduction reduces the total income on which the total tax is computed. A tax credit is deducted directly from the total tax liability. A tax credit may be more advantageous to a taxpayer than a deduction. For example, a tax credit of $1,000 for someone in the 28% tax bracket is equivalent to a tax deduction of $3,571.

EPACT 2005 also provides tax credits of 10% of the amount expended by the taxpayer for qualified energy efficiency improvements to existing homes**,** and up to $300 for qualified energy property. The maximum tax credit for either category, or a combination of the two, is $500. These incentives apply to improvements placed in service during 2006-2007.

EPACT 2005 provides tax credits on "energy improvements" or "energy property" as follows:

Qualified energy improvements are insulation material, exterior windows and doors, and metal roofs with pigmented coatings designed to reduce heat gain. All of the above must meet ENERGYSTAR requirements.

Qualified energy property is defined as:

- Electric heat pump water heaters with an Efficiency Factor (EF) of 2.0 or greater
- Electric air source heat pumps with a Heating Season Performance Factor (HSPF) of 9.0 or better
- Geothermal heat pumps:
  a. Closed loop products with an Energy Efficiency Ratio (EER) of 16.2, and a Coefficient of Performance (COP) of 3.3 or greater.
  b. Open loop products with an EER of 14.1 and a COP of 3.3 or greater.
  c. Direct Expansion (DX) products with an EER of 15 and a COP of 3.5 or greater.
- Heating Ventilating and Air Conditioning (HVAC) system that receives the highest efficiency tier established by the Consortium of Energy Efficiency as of January 1, 2006
- Natural gas, propane, or oil water heater with an EF of .80 or greater
- Natural gas, propane, or oil furnace or hot water boiler with Annual Fuel Utilization Efficiency (AFUE) of 95% or greater
- Advanced main air circulating fan used in natural gas, propane, or oil furnace that uses no more than 2%of the total energy use of the furnace

Tax credit limitations on qualified energy property are as follows:

- $50 on any advanced main air circulating fan

- $150 on any qualified natural gas, propane, or oil furnace or hot water boiler
- $300 for a high efficiency air conditioner

Summarized in Tables 1 & 2 below are the potential tax credit items for residential homebuilders and homeowners. The incentives apply to equipment placed in service during 2006-2007.

Table 1. Tax Credit Items for a Homebuilder or Homeowner for New or Existing Homes

| |
|---|
| • Tax credits for solar hot water systems - the potential tax credit is 30% of the qualified solar system expenditures up to a maximum of $2000.<br>• To be eligible for the solar hot water system tax credit, the overall system must be certified by the Solar Rating and Certification Corporation (SRCC) and must produce 50% (or more) of the hot water required by the residence. |
| • Tax credits for Residential Solar Photovoltaic (PV) systems - the potential allowable tax credit is 30% of the qualified PV system expenditures up to a maximum of $2000.<br>• There is no certification required for PV systems. |
| • Homeowners may claim tax credits for either or both types of solar systems. |
| • Tax credit for residential fuel cells: Providing a residential fuel cell offers the owner a 30% tax credit (up to a maximum credit limitation of $500 for each 500 watts of installed capacity). |

Table 2. Tax Credit Items for a Homebuilder or Homeowner for New Homes

| |
|---|
| EPACT 2005 offers homebuilders a tax credit of $2,000 for homes that reduce energy for heating and cooling by 50% compared to the 2006 International Energy Conservation Code (IECC) Supplement. |
| • Eligible homes have to demonstrate energy savings through the use of software approved by the U.S. Department of Energy (DOE), and builders must demonstrate compliance through the use of third party inspectors such as Residential Energy Services Network (RESNET) Certified Energy Raters. |
| Manufactured home producers may qualify for a tax credit of $1,000 for new manufactured homes that reduce energy consumption by 30%. |
| • To qualify, the new manufactured home must be in compliance with the Housing and Urban Development Code (HUD), Section 3280, Title 24, must be 30% more efficient than IECC 2006 for qualified energy improvements, or meet the ENERGYSTAR labeled homes program. |
| These tax incentives apply to site built homes and manufactured homes placed in service and sold prior to January 1, 2008. However, there is the possibility that they may be extended through 2009. |

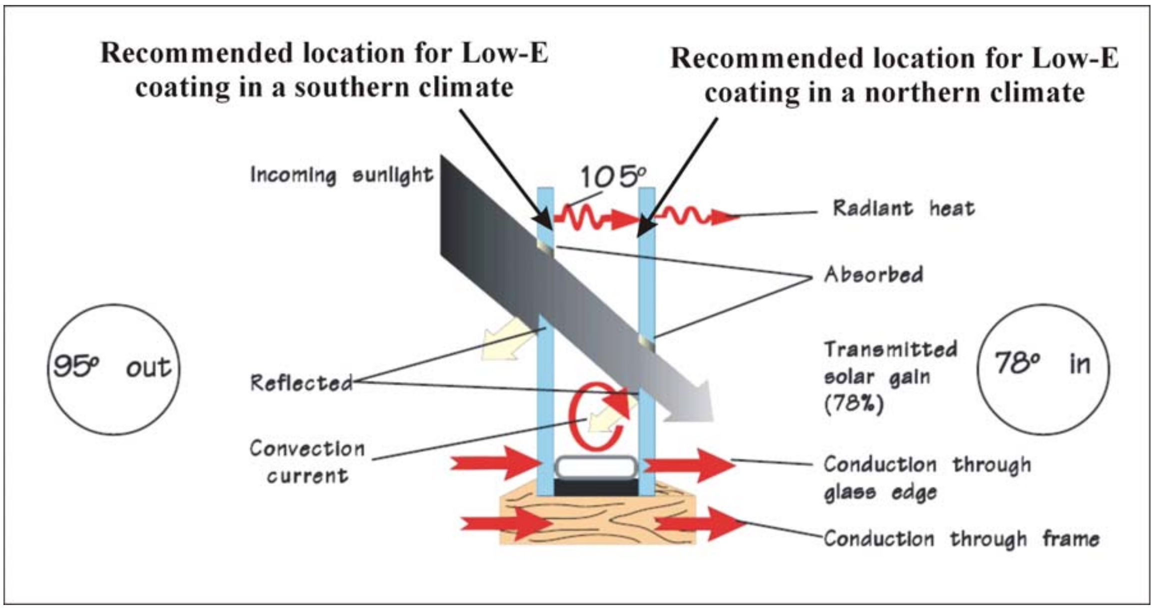
Further information on EPACT 2005 (including commercial applications, etc.) can be found at the following links: http://dnr.louisiana.gov/tad, http://www.aceee.org, or http://www.fsec.ucf.edu.

# CONFUSED ABOUT WINDOWS?

by
Buddy Justice
Environmental Consultant
September 2006

In Louisiana, many home owners are confused by window manufacturer's claims that their windows will save the homeowner a lot of money on their utility bills. The important thing to remember is that, in order for windows to provide energy efficiency, they need to perform differently in the northern U. S. than they do in the southern U. S. Heat always tries to move from the hotter side of the window to the colder side. In the southern U. S., the main concern is to keep the heat outside during the summer, and in the northern U. S., the main concern is to keep the heat inside during the winter.

Summer Heat Gain in a Typical Double-Glazed Window




Source: Builders Guide to Energy Efficient Homes in Louisiana, Department of Natural Resources, October 2002

Heat moves through windows in three ways: 1) conduction – heat moving through the window's solid materials (like heat traveling from a pot of boiling water through a metal spoon placed in it), 2) convection – heat moving through leaks and by the movement of hot air rising and replacing the colder air that was there, and 3) radiation – on a cold day when the sun is shining and you sit in the sunlight and feel the warmth of the sun, that warmth is due to radiation. You can guess that radiant heat is also present during the summer. Radiant heat travels through glass, away from the source, and not back toward the source. Once radiant heat gets inside the home, it stays there until it can be removed by the air conditioning system.

In order to control convective heat, tightly constructed windows that meet industry standards for acceptable infiltration rates should be used. Insuring that windows are properly fitted into and caulked around the outside perimeter of the window opening and frame is also needed in window installations to control convective heat.

Well insulated windows are desirable to control conductive heat. The ability of a window to control conductive heat is rated by the windows U-factor**.** The lower (numerically) the U-factor rating of the window, the better it performs at controlling conductive heat. A good U-factor rating is what is referred to when window manufacturers boast of high-quality insulated windows. The U-factor rating of windows used in the northern U. S. is more critical than for the southern U. S. During northern U. S. winters, outside temperatures can fall to -10° or -20° Fahrenheit (F). A typical temperature inside the home would be around 70°F, resulting in a difference in temperature of up to 90°F. During southern U. S. summers, outside temperatures can reach 100°F to 110°F. A typical temperature inside the home would also be around 70°F resulting in a difference in temperature of only 40°F. This difference in temperature, or conductive heat flow, is what U-factor controls. In the northern U. S., conductive heat flow through windows (90°F temperature difference) is more than twice as high as in the South (40°F temperature difference).

Radiant heat is the heat that is radiated away from the heat source through open space. It passes straight through glass, unless it is acted upon by the glass in some way. In the southern U. S., this type of heat gain is the greatest heat gain attributed to windows. The ability of a window to control radiant heat is rated by the windows Solar Heat Gain Coefficient (SHGC). SHGC gives no indication of how well the window controls conductive heat. The lower (numerically) the SHGC rating of the window, the better it performs at controlling radiant heat. A window with a good SHGC will reflect the radiant heat back toward the source of the radiant heat. During northern U. S. winters, the desire is that the radiant heat be reflected back toward the heat source inside of the home (the furnace). During southern U. S. summers, the desire is that the radiant heat be reflected back toward the heat source outside the home (the sun). A good SHGC rating on a window is accomplished be applying a Low-E coating to one surface of the glass. Whatever glass surface that this Low-E coating is applied to determines in which climate the window performs the best. In a Southern climate, to insure that the Low-E coating is installed on the proper glass surface, specify Soft Coat Low-E. This tells the window manufacturer that the Low-E coating is applied to the inside surface of the outermost glass, and will reflect radiant heat back toward the outside of the home.

Windows that are gas filled have an inert gas, usually argon, installed between the glass panes to further control conductive, and convective heat flow. Gas filled windows are usually much more expensive than non-gas filled windows. It is a matter of personal choice weather a home owner chooses to purchase gas filled windows, but, again, conductive heat flow is much more critical in the northern U. S. than it is in the southern U. S., so why pay more for windows that are better suited for a northern climate. The recommended windows for installation in Louisiana are windows with a U-factor of .65 or below that also have a SHGC of .40 or below. Specify Soft coat Low-E to insure that the Low-E coating is on the correct surface of glass for a southern U. S. climate. Windows with these specifications will perform best in Louisiana’s climate.

# NATIONAL ELECTRIC TRANSMISSION CONGESTION STUDY WAS RELEASED ON AUGUST 8, 2006

by
Patty Nussbaum, Engineer
October 2006

The U.S. Department of Energy (DOE) issued the *National Electric Transmission Study* (the Study) on August 8, 2006. The Study was issued with a 60-day comment period which closes on October 10, 2006. The Study, authorized under the Energy Policy Act of 2005, analyzes electrical generation and transmission capacity across the United States and identifies areas that need attention to meet growing demand. DOE may designate areas as National Interest Electric Transmission Corridors (NIETC) based on the study. Designation of a NIETC will enable the Federal Energy Regulatory Commission (FERC) to exercise federal "backstop" siting authority in the corridor.

Congestion, for purposes of the Study, is defined as the condition that occurs when transmission capacity is not sufficient to enable safe delivery of all scheduled or desired wholesale electricity transfers simultaneously. The Study identified transmission areas that need federal attention and groups them into three classes:

**Critical Congestion Areas:** Areas where it is critically important to remedy existing or growing congestion problems because the current and/or projected effects of the congestion are severe.

- The Atlantic coastal area from Metropolitan New York southward through northern Virginia,
  and
- Southern California

**Congestion Areas of Concern:** Areas where this study and other information suggests that a large-scale congestion problem exists or may be emerging, but more information and analysis appear to be needed to determine the magnitude of the problem and the likely relevance of transmission and other solutions.

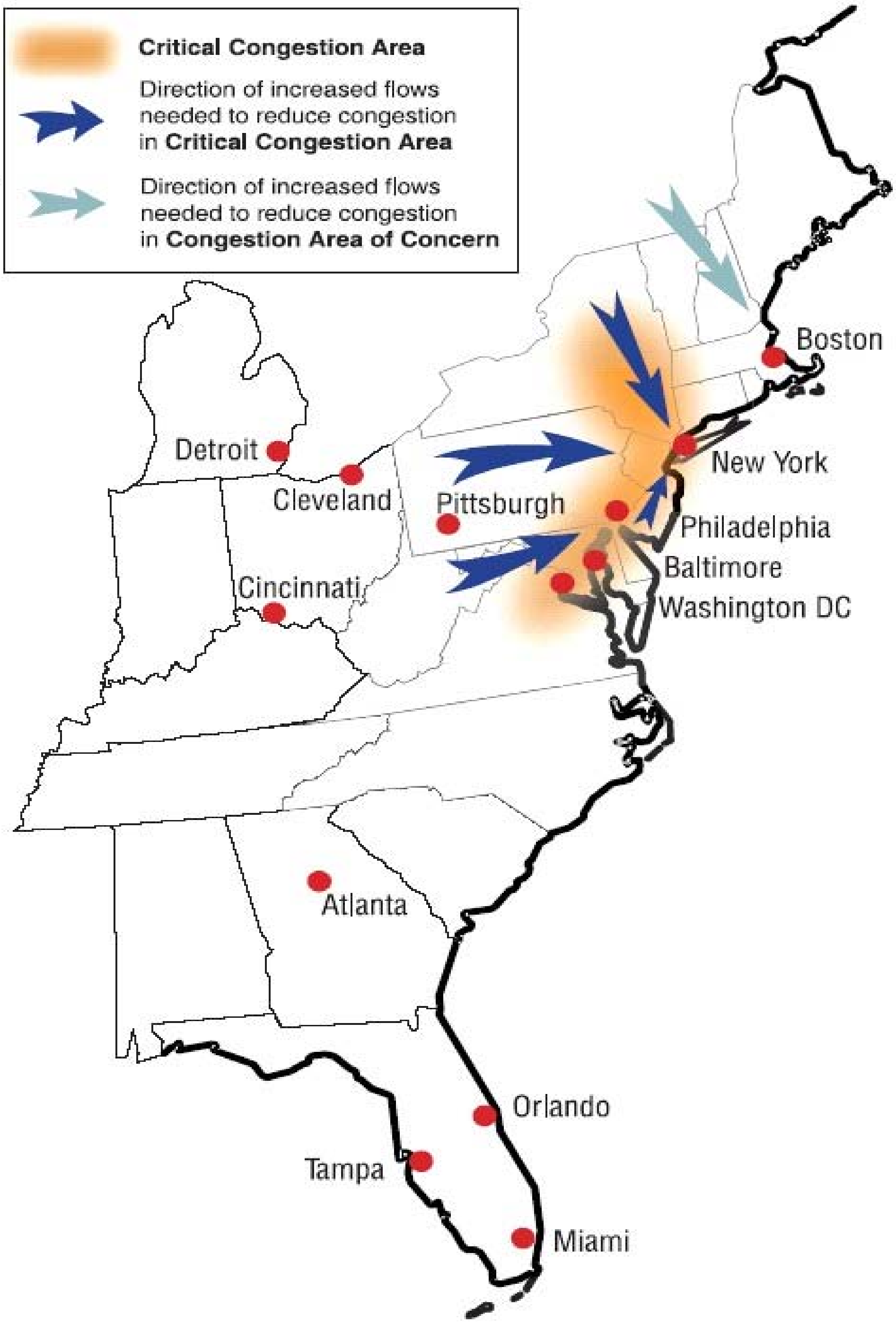
- New England
- The Phoenix-Tucson area
- The San Francisco Bay area
- The Seattle-Portland area

**Conditional Congestion Areas:** Areas where future congestion would result if large amounts of new generation resources were to be developed without simultaneous development of associated transmission capacity.

- Montana-Wyoming (coal and wind)
- Dakotas-Minnesota (wind)
- Kansas-Oklahoma (wind)

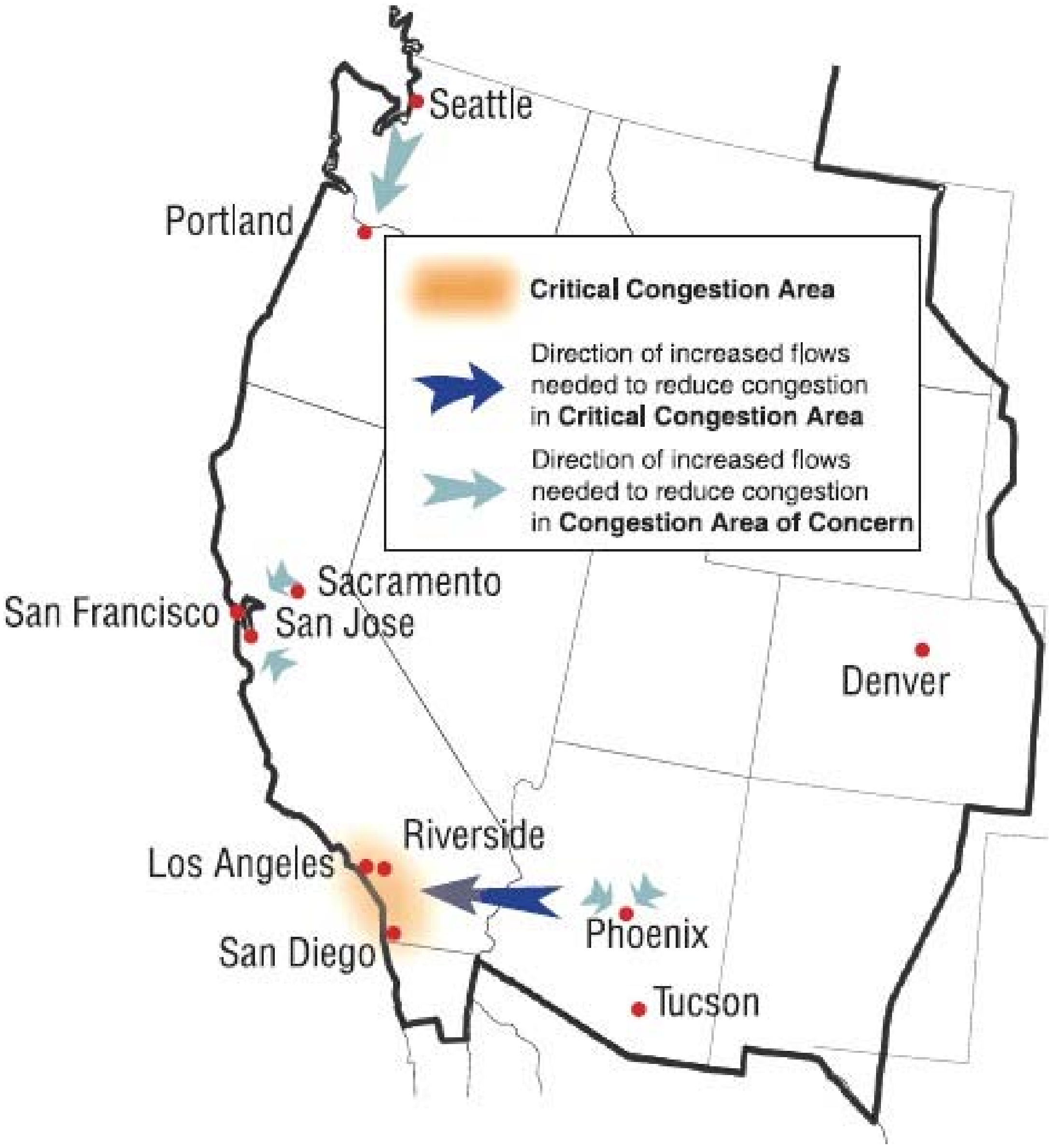
- Illinois, Indiana and Upper Appalachia (coal)
- The Southeast (nuclear)

Figure 1. Critical Congestion Area and Congestion Area of Concern in the Eastern Interconnection




Source: URL: http://www.oe.energy.gov/DocumentsandMedia/Congestion_Study_2006-9MB.pdf, September 2006

Figure 2. One Critical Congestion Area and Three Congestion Areas of Concern in the Western Interconnection

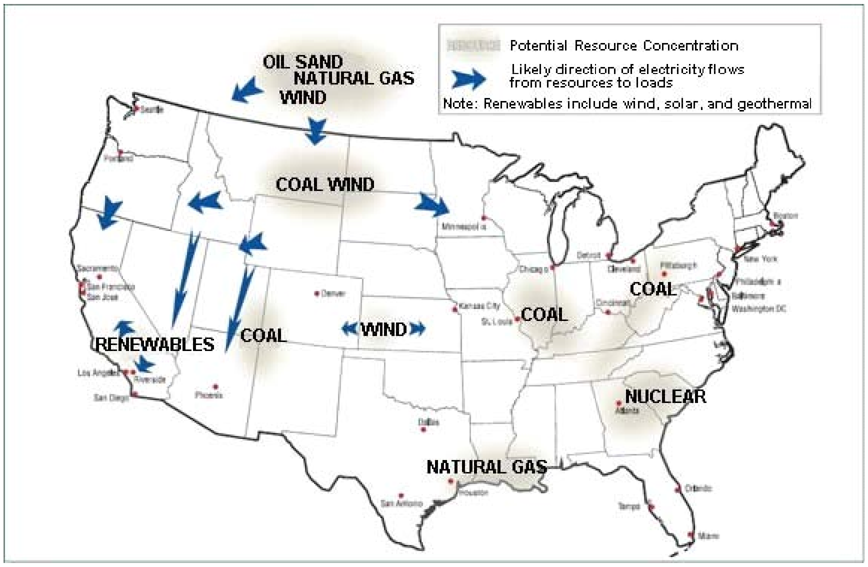



Source: URL: http://www.oe.energy.gov/DocumentsandMedia/Congestion_Study_2006-9MB.pdf, September 2006

DOE is considering designating NIETCs in the critical congestion areas and is inviting comments to respond to the following three questions.

- Would designation of one or more National Corridors in these areas be appropriate and in the public interest?
- How and where should DOE establish the geographic boundaries for a National Corridor?
- How would the costs of a proposed transmission facility be allocated?

Figure 3. Conditional Congestion Areas




Source: URL: http://www.oe.energy.gov/DocumentsandMedia/Congestion_Study_2006-9MB.pdf, September 2006

Transmission congestion prevents delivery of electricity from a less expensive source and forces a more expensive source to be used instead, resulting in a higher cost. It is not always cost effective, however, to make the investments necessary to relieve congestion because generally some combination of the following is needed.

- Build new generation
- Build or upgrade transmission capacity
- Reduce electricity demand through some combination of energy efficiency, demand response, and distributed generation

Generation and transmission are costly and take time to build and often face opposition to their proposed location. The options to reduce demand are also sometimes costly with results that are hard to control. DOE published the Study with the intention of opening a dialogue with stakeholders in areas where congestion is a problem in order to focus on relieving the congestion.

DOE intends to issue annual reports that monitor progress on relieving transmission congestion. The first progress report is scheduled for August 8, 2007. The full national congestion study is scheduled to be updated every three years.

The full text of the Study report can be found on the Department of Energy website (URL: http://www.oe.energy.gov/DocumentsandMedia/Congestion_Study_2006-9MB.pdf). A DNR overview report on National Electric Power Transmission will soon be printed. It is curently available on the DNR Technology Assessment Division website (URL: http://dnr.louisiana.gov/sec/execdiv/techasmt/electricity/nept_overview.pdf).

# 2006 CHANGES TO THE INTERNATIONAL ENERGY CONSERVATION CODE

by
Darrell K. Winters, P.E., C.E.M.
October 2006

During the First Extraordinary Session of 2005, the Louisiana Legislature passed Act 12, thereby adopting the 2006 Edition of the International Codes as a mandatory statewide uniform construction code. This new code will cover the construction and energy efficiency for buildings of all types except commercial and multi-family residential structures. These are addressed by the existing Commercial Building Energy Conservation Code (CBECC), which was not effected by Act 12. Since the CBECC is based on ASHRAE 90.1-2001, the changes to chapter 5 of the International Energy Conservation Code (IECC) that relate to commercial buildings will not be discussed in this paper.

The 2006 edition of the IECC contains major changes from the 2003 edition. Chapters 1 – 4 have been totally revised. Many of the terms used in the code have been redefined. This paper describes the changes in each chapter of the energy code published by the International Code Council.

Chapter 1 contains the administrative and enforcement provisions. The scope now states that this code is applicable to one and two family residences and townhouses and commercial buildings. The applicability to existing buildings and renovations to them was also restated. Four exemptions are contained in the additions, alterations, renovations or repairs section. These exemptions pertain to the installation of storm windows, glass only replacements, the exposure of existing ceiling, wall or floor cavities and construction where the ceiling, wall or floor cavity is not exposed. Code officials are now permitted to approve computer software, worksheets, compliance manuals and other materials that meet the intent of the code. The solar heat gain and U-factor properties of glazed windows, doors and skylights have been revised. The tables and the format presenting these factors have been condensed. A totally new section has been included which allows the local authority to deem a national, state or local energy efficiency program to exceed the energy efficiency required by the IECC. This approval is considered to show compliance with the IECC.

All definitions pertinent to the energy code are contained in chapter 2. Nine terms now have new definitions, and eight others were revised.

In chapter 3 the number of climate zones has been reduced from 19 to 8. A moisture regime has been added dividing the country into moist, dry or marine subcategories. A national map is included in the code which shows all the above divisions. (A copy of the map is shown at the end of this paper.) Table 301.1 is a climate zone list by state and county / parish. The major climate types and international climate zones are defined in tables 301.3(1) and 301.3(2), respectively.

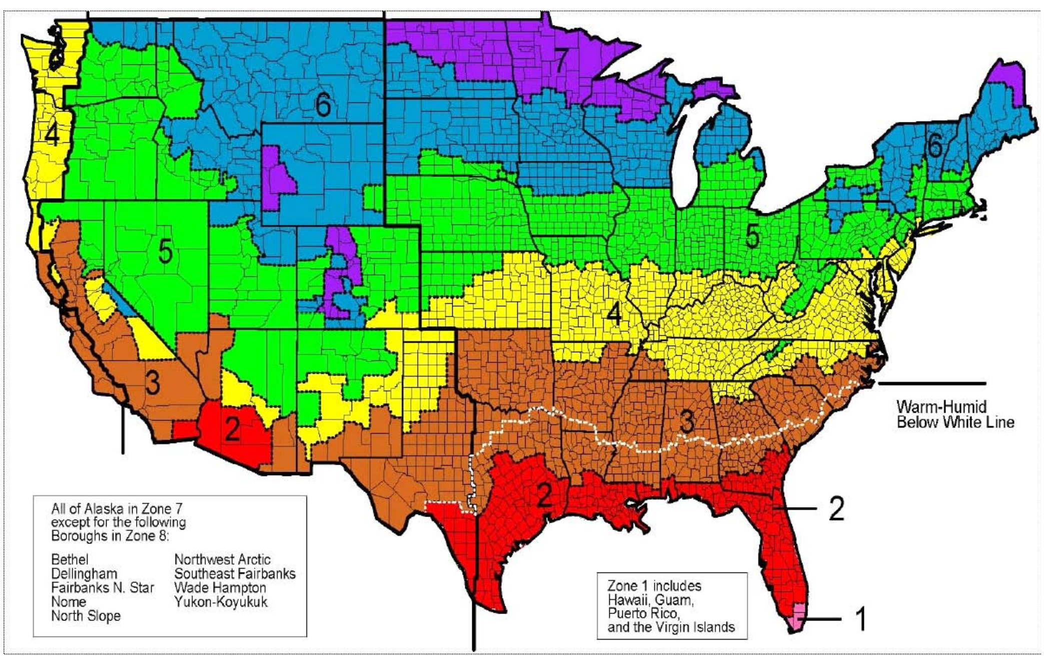
Chapter 4 covers residential energy efficiency. Section 401.2 lists the provisions that must be followed in mandatory, prescriptive or performance methods of compliance with the code. A permanent certificate, completed by the builder or registered design professional, must be posted in must be posted in or on the electrical distribution panel. This certificate shall list insulation R-values and fenestration U-factors and solar heat gain coefficients of the installed components. It must also list the type and efficiency of the mechanical equipment. The prescriptive requirements for insulation and fenestration, mandatory requirements for air leakage and moisture control and climate zone specific insulation and fenestration requirements are shown in section 402. Section 403 covers duct insulation, mechanical system piping insulation and the sizing of the mechanical system. Compliance using the simulated energy performance method is shown in section 404. The following table lists the insulation and fenestration requirements in each of the two climate zones of Louisiana. This table provides answers to the most frequently asked questions about the energy requirements of the new code.

Insulation and Fenestration Requirements in Louisiana

| **Climate Zone** | **2** | **3** |
|---|---|---|
| Fenestration U-Factor | 0.75 | 0.65 |
| Skylight U-Factor | 0.75 | 0.65 |
| Glazed Fenestration SHGC | 0.40 | 0.40 |
| Ceiling R-Value | 30 | 30 |
| Wood Frame Wall R-Value | 13 | 13 |
| Mass Wall R-Value | 4 | 5 |
| Floor R-Value | 13 | 19 |
| Crawl Space Wall R-Value | 0 | 5/13[a] |

[a] The 1st R-Value applies to continuous insulation; the 2nd to cavity insulation. Either meets the requirement of the code.

Climate Zone Map




Source: URL: http://www.energycodes.gov, October 2006

# INSULATION AND THE BUILDING ENVELOPE

by
Jerry Heinberg, AIA, NCARB, Architect
October 2006

The thermal "envelope" of your house is a barrier between conditioned and non-conditioned space. It is here that insulation must be concentrated in combination with an air barrier. Without these two elements there is no envelope. Insulation helps to maintain a uniform temperature throughout the house, keeping it warmer in winter and cooler in summer.

Heat flows from warmer to cooler spaces. In winter, heat moves from the heated spaces to the unheated attics, garages, basements and outdoors, whenever there is a temperature difference. In summer the heat moves from outdoors to the interior cooled spaces. Heat lost in winter is replaced by the heating system and heat gained in summer is removed by the air conditioning system. Insulation decreases the flow by providing resistance to the flow of heat.

There are many forms of building insulation: boards, batts, rolls, blown, sprayed, poured and loose fill. Insulators are poor transmitters of heat, and they tend to be low in density, lightweight, and entrap millions of minute pockets of air and other gasses. Insulation is rated in terms of thermal resistance called R-value (the resistance to heat flow); the higher the R-value, the greater the effectiveness of the insulation. How and where the insulation is installed, however, also determines its effectiveness. Insulation which is compressed during installation will not give its full R-value. Also, note that heat flows around the insulation through the wall studs and joists so the R-value of the wall will be less than the R-value of the insulation.

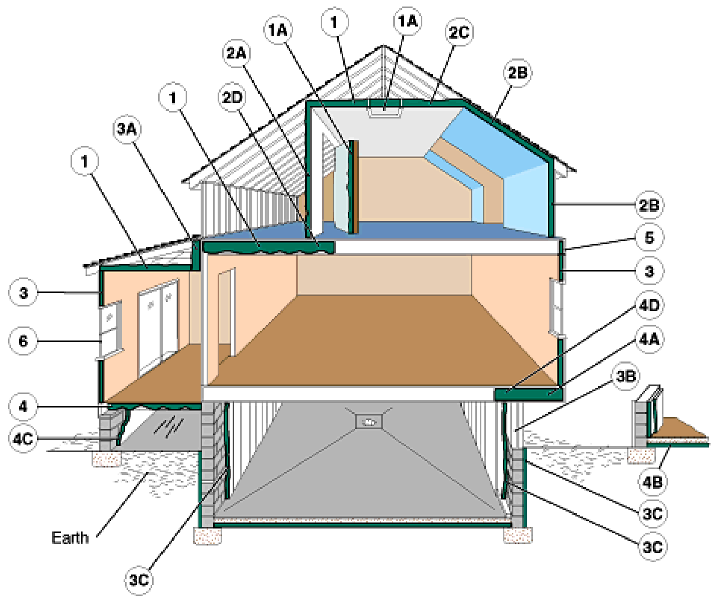
The amount of insulation needed depends on the climate, whether the heating system uses gas, electricity or oil, and the section of the house being insulated. Louisiana falls into two separate insulation zones. South Louisiana falls into Climate Zone 2 and north Louisiana falls into Climate Zone 3.

The insulation required by the 2006 International Residential Code (IRC) for new construction of a wood-framed house with a natural gas heating system and an electric air conditioning system located in Shreveport is R-30 in the attic and R-13 in the wall cavity. The insulation required for the same wood-framed house located in New Orleans is also R-30 in the attic and R-13 in the wall cavity. Owners, however, may want to go beyond the minimum requirements of the code. R-Value recommendations by zip code can be found in the DOE Insulation Fact Sheet (URL: http://www.ornl.gov/sci/ roofs+walls/insulation/ins_01.html).

In addition to placing the right amount of the right type and form of insulation, there are many other elements of design which are critical to energy efficiency. Factors such as overhangs from awnings or the roof extension over glass areas, SHGC (Solar Heat Gain Coefficient) for the glass under 0.4, low e (emissive) coatings on double glazed (insulating) glass, proper solar orientation of the structure (elongated on the east-west axis), keeping fenestration (window-area) to wall ratio under 10%, and light reflective roof finishes, are all very important considerations combined with insulation.

More information about the requirements for insulating new and existing homes can be found inIRC 2006, Chapter 11. A detailed discussion of insulation can be found on the DNR website (URL: http://dnr.louisiana.gov/sec/execdiv/techasmt/programs/residential/insulation/index.htm).

Examples of Where to Insulate




1. In unfinished attic spaces, insulate between and over the floor joists to seal off living spaces below.*
    A. attic access door
2. In finished attic rooms with or without dormer, insulate ...
    A. between the studs of "knee" walls;
    B. between the studs and rafters of exterior walls and roof;
    C. ceilings with cold spaces above;
    D. extend insulation into joist space to reduce air flows.
3. All exterior walls, including ...
    A. walls between living spaces and unheated garages, shed roofs, or storage areas;
    B. foundation walls above ground level;
    C. full wall, either interior or exterior, and foundation walls in heated basements.
4. Floors above cold spaces, such as vented craw spaces and unheated garages. Also insulate ...
    A. any portion of the floor in a room that is cantilevered beyond the exterior wall below;
    B. slab floors built directly on the ground;**
    C. as an alternative to floor insulation, foundation walls of un-vented crawl spaces;
    D. extend insulation into joist space to reduce air flows.
5. Band joists.
6. Replacement or storm windows and caulk and seal around all windows and doors.

* Well-insulated attics, crawl spaces, storage areas, and other enclosed cavities should be ventilated to prevent excess moisture build-up.
** For new construction, slab on grade insulation should be installed to the extent required by building codes, or greater.

Source: DOE Insulation Fact Sheet (DOE/CE-0180/with Addendum 1) October 2002

Table 1. Types of Insulation—Basic Forms

| Form | Method of Installation | Where Applicable | Advantages |
|---|---|---|---|
| Blankets: Batts or Rolls<br>• Fiber glass<br>• Rock wool | Fitted between studs, joists and beams | All unfinished walls, floors and ceilings | Do-it-yourself<br>Suited for standard stud and joist spacing, which is relatively free from obstructions |
| Loose-Fill (blown-in) or Spray-applied<br>• Rock wool<br>• Fiber glass<br>• Cellulose<br>• Polyurethane foam | Blown into place or spray applied by special equipment | Enclosed existing wall cavities or open new wall cavities<br>Unfinished attic floors and hard to reach places | Commonly used insulation for retrofits (adding insulation to existing finished areas)<br>Good for irregularly shaped areas and around obstructions |
| Rigid Insulation<br>• Extruded polystyrene foam (XPS)<br>• Expanded polystyrene foam (EPS or beadboard)<br>• Polyurethane foam<br>• Polyisocyanurate foam | Interior applications: Must be covered with 1/2-inch gypsum board or other building-code approved material for fire safety<br>Exterior applications: Must be covered with weather-proof facing | Basement walls<br>Exterior walls under finishing (Some foam boards include a foil facing which will act as a vapor retarder and radiant barrier. Please read the discussion about where to place, or not to place, a vapor retarder)<br>Unvented low slope roofs | High insulating value for relatively little thickness<br>Can block thermal short circuits when installed continu-ously over frames or joists. |
| Reflective Systems<br>• Foil-faced paper<br>• Foil-faced polyethylene bubbles<br>• Foil-faced plastic film<br>• Foil-faced cardboard | Foils, films, or papers: Fitted between wood-frame studs joists, and beams | Unfinished ceilings, walls, and floors | Do-it-yourself<br>All suitable for framing at standard spacing. Bubble-form suitable if framing is irregular or if obstructions are present<br>Effectiveness depends on spacing and heat flow direction<br>Provides radiant barrier |
| Loose-Fill (poured in)<br>Vermiculite or Perlite | Not currently used for home insulation, but may be found in older homes | | |

Source: DOE Insulation Fact Sheet (DOE/CE-0180/with Addendum 1) October 2002

Table 2. Evaluating the R-value of Insulation Previously Installed in Existing Homes (Includes Effects of Aging and Settling)

| Insulation type | R-value per inch of thickness |
|---|---|
| Fiber glass blanket or batt | 2.9 to 3.8 (use 3.2) |
| High performance fiber glass blanket or batt | 3.7 to 4.3 (use 3.8) |
| Loose-fill fiber glass | 2.3 to 2.7 (use 2.5) |
| Loose-fill rock wool | 2.7 to 3.0 (use 2.8) |
| Loose-fill cellulose | 3.4 to 3.7 (use 3.5) |
| Perlite or vermiculite | 2.4 to 3.7 (use 2.7) |
| Expanded polystyrene board | 3.6 to 4 (use 3.8) |
| Extruded polystyrene board | 4.5 to 5 (use 4.8) |
| Polyisocyanurate board, unfaced | 5.6 to 6.3 (use 5.8) |
| Polyisocyanurate board, foil-faced | 7 |
| Spray polyurethane foam | 5.6 to 6.3 (use 5.9) |

Use this formula to determine the R-value of your **existing** insulation:

| | | | | |
|---|---|---|---|---|
| Thickness (inches) | × | R-value per inch | = | Total R-value |

Use this formula to determine how much insulation you need to **add**:

| | | | | |
|---|---|---|---|---|
| Recommended R-value | - | Existing insulation R-value | = | R-value needed |

Do you want to know if you have the space available to add the insulation you need? Then use this formula to determine the *approximate* thickness you need to add:

| | | | | |
|---|---|---|---|---|
| R-value needed | ÷ | R-value per inch | = | Approximate thickness needed |

However, remember to use the product information on the insulation packaging to determine the actual thickness for any new insulation.

Source: DOE Insulation Fact Sheet (DOE/CE-0180/with Addendum 1) October 2002

# BIOFUELS – PART 1: ETHANOL BASICS

by
Bryan Crouch, Engineer
November 2006

This article is the first of a series that will present an overview of the facts and issues regarding the manufacture and use of ethanol and biodiesel as alternative motor vehicle fuels. Ethanol and biodiesel are biofuels that provide alternatives to gasoline and diesel, respectively. Biofuels can be defined as fuels that are derived from recently-living biological resources. The "recently-living" part of the definition is what differentiates biofuels from traditional fuels, that is – fossil fuels. Traditional fuels, such as gasoline and diesel, are derived from very old biological resources – crude oil. Biofuels are generally more environmentally benign than traditional fuels and are further defined as being renewable, meaning that the feedstock used to make a particular biofuel can be replenished at a rate equal to or faster than the rate at which the biofuel is consumed.

### What Is Ethanol?

Ethanol, also known as grain alcohol and ethyl alcohol ($CH_3CH_2OH$), is a flammable, colorless liquid. It is in widespread use as a fuel, a solvent, an intermediate for many other chemicals, and a beverage. It is toxic, but less so than other alcohols. In the context of a motor vehicle fuel, ethanol can be used neat (straight) or mixed with gasoline in any ratio; however, gasoline engines and fuel systems have to be modified to use blends of more than 10% ethanol.

### How Is Ethanol Made?

Ethanol can be produced by synthesis from the chemical compound ethylene, which is derived from crude oil or natural gas, or by the fermentation of carbohydrates. In the U.S., virtually all fuel ethanol is produced by fermentation. Fermentation is the process whereby sugar is broken down into alcohol and carbon dioxide by the action of a microorganism. It has been utilized by humans for thousands of years. Any substance that contains a substantial amount of sugar, or can be converted into sugar, can be utilized to produce ethanol. When considering fuel ethanol, three categories of substances are of interest: sugar, starch, and cellulose.

The direct fermentation of sugar can utilize substances such as molasses, sugar cane juice, and sugar beet juice. After fermentation, a multiple step distillation process separates and collects the alcohol. The alcohol is then denatured to render it undrinkable and thereby not subject to beverage alcohol taxes.

Starches such as corn, barley, sorghum, and wheat must be converted into sugar before fermentation can take place. This is accomplished by the action of enzymes on the starch and is called hydrolysis. There are two main processes that are encompassed in the production of ethanol from starches, dry milling and wet milling. The difference is primarily in the treatment of the grain before it is converted to sugar. In the dry milling process, the grain is ground up and mixed with water. In the wet milling process, the grain is soaked in water and acid to facilitate the mechanical separation into its components. At this point in either process, the starch is hydrolyzed into sugar and then fermented and distilled in the same manner as described above.

Cellulose is a structural component in biomass (material derived from plants). Like starch, it can be hydrolyzed into sugar (but not as easily) and then fermented into ethanol. There is also gasification technology that oxidizes the carbon contained in cellulose into carbon monoxide. There is also a new technology being developed that gasifies cellulose into carbon monoxide, carbon dioxide, and hydrogen, and then employs a special microorganism that ferments the carbon monoxide, carbon dioxide, and hydrogen into ethanol and water. When ethanol is made from biomass it is commonly referred to as bioethanol.

## How Does Ethanol Compare To Gasoline?

Before ethanol can be compared to gasoline, it must first be understood how ethanol is used as an alternative motor vehicle fuel. As stated earlier, ethanol can be used neat or mixed with gasoline in any ratio, but in order to meet the definition of an alternative fuel, the percentage of ethanol in an ethanol/gasoline mixture must be 85% (referred to as E85) or greater. Due to poor cold weather starting and performance, ethanol content is practically limited to 85%; therefore, the comparison should be between gasoline and E85. Three important points of comparison are emissions, fuel economy, and octane quality.

Ethanol contains 35% oxygen by weight; gasoline contains none. Oxygen promotes more complete combustion which results in fewer tailpipe emissions. Compared to the combustion of gasoline, the combustion of ethanol substantially reduces the emission of carbon monoxide, volatile organic compounds, particulate matter and green house gasses. The caveat is that the only vehicles that are currently available and able to use ethanol in high concentrations are flex fuel vehicles (FFVs). FFVs are vehicles that can operate on any mixture of gasoline and ethanol (up to E85), and as a result, are not optimized to run on ethanol. In reality, FFVs have nearly equal EPA air pollution ratings when operating on either 100% gasoline or E85. FFVs reduce greenhouse gas emissions by approximately 20% when operating on E85.

A gallon of ethanol contains about 32% less energy than a gallon of gasoline. Less energy per gallon translates into fewer miles per gallon, a standard measure of fuel economy. E85 contains about 27% less energy than gasoline. The actual loss in fuel economy when using E85 depends on the particular vehicle/engine design, and driving conditions, but ranges from 10% to the full 27%.

One of the best qualities of ethanol is its octane rating. Octane rating is a measure of a fuel's ability to resist engine knock, a potentially destructive phenomenon. Unleaded gasoline octane ratings range from 85 to 95; E85 has an octane rating of 105. A higher octane rating allows certain engine design parameters, such as compression ratio, and valve timing, to be altered in such ways that fuel economy and power are increased.

Ethanol is one of the simplest to implement alternatives to gasoline (although when utilized as E85, it should be kept in mind that it does not completely displace gasoline); however, there are issues that must be considered. Some of these issues will be the focus of the next article in this series.

## Sources

"Ethanol," *Kirk-Othmer Encyclopedia of Chemical Technology,* 5th ed.
Owen, Keith and Coley, Trevor, *Automotive Fuels Reference Book*, 2nd ed.
U.S. Dept. of Energy and Environmental Protection Agency's fuel economy website (URL: http://www.fueleconomy.gov).
Renewable Fuels Association website (URL: http://www.ethanolrfaorg).

# LOUISIANA ENERGY AND POWER AUTHORITY AND THE LAFAYETTE UTILITIES SYSTEM REQUESTED EARLY DESIGNATION AS A NATIONAL INTEREST ELECTRIC TRANSMISSION CORRIDOR

by
Patty Nussbaum, Engineer
November 2006

The U.S. Department of Energy (DOE) issued a Federal Register notice of inquiry on February 2, 2006 (71 Fed. Reg. 5660), entitled, "Consideration for Transmission Congestion Study and Designation of National Interest Electric Transmission Corridors," the purpose of which was "to learn stakeholders' views concerning transmission bottlenecks, identify how designation of such bottlenecks may benefit users of the grid and electricity consumers, and recognize key bottlenecks." In the notice of inquiry, DOE stated that they would consider making an early NIETC designation if a compelling case was presented. The Louisiana Energy and Power Authority (LEPA) and the Lafayette Utilities System (LUS) requested early designation as a National Interest Electric Transmission Corridor (NIETC).

Five considerations (as stated in the Notice of Inquiry) are considered relevant to evaluate an area for NIETC designation:

1. The economic vitality and development of the corridor, or the end markets served by the corridor, may be constrained by lack of adequate or reasonably priced electricity;
2. The economic growth in the corridor, or the end markets served by the corridor, may be jeopardized by reliance on limited sources of energy and a diversification of supply is warranted;
3. The energy independence of the United States would be served by the designation;
4. The designation would be in the interest of national energy policy; and
5. The designation would enhance national defense and homeland security.

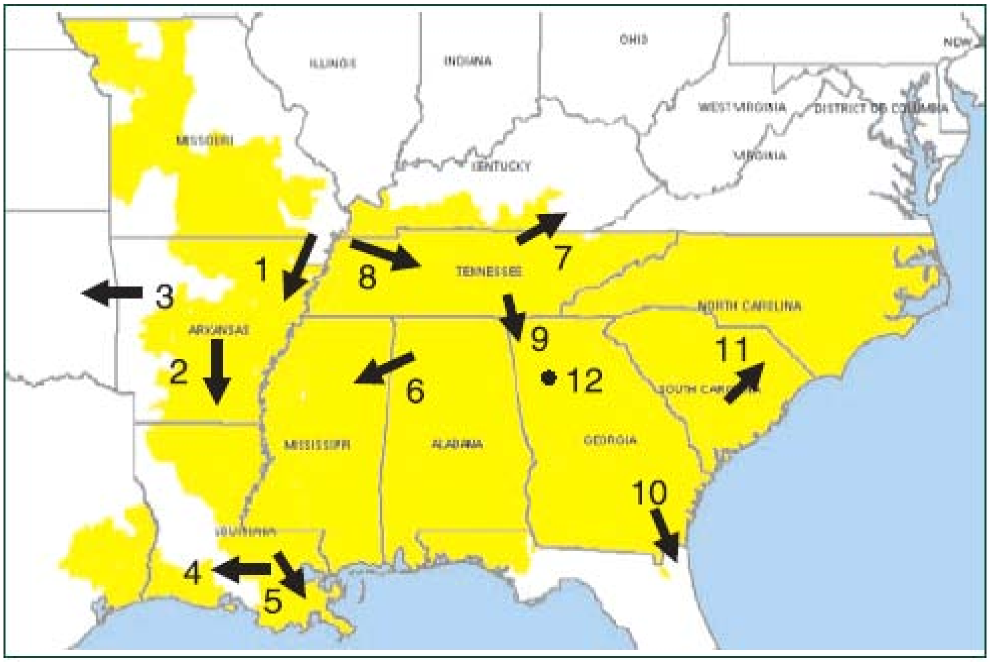
LEPA, a joint action agency created by the Louisiana Legislature in 1979, consists of eighteen cities and towns which each have their own municipal power systems. LEPA is dependent upon the transmission system operated by two regulated public utilities - Entergy and Cleco. The LUS is a member of LEPA, however, it owns and operates all transmission, distribution and generation resources within Lafayette.

LEPA and LUS state that they are dependent on Entergy and Cleco for transmission assets and that those assets are not available for long term planning to minimize costs. LUS has had difficulty with transmission service for its generation resources. Entergy and Cleco transmission systems apparently have little excess capacity. LEPA and LUS have been asked to pay for transmission upgrades. Those upgrades would continue to be owned by the utilities. They also note that the congested transmission service to LEPA member Morgan City serves the Louisiana Offshore Oil Port (LOOP) which handles about 15% of U.S. oil imports.

DOE deferred action on all early requests for designation of NIETC until after it completed its national transmission congestion study.[1] This study, completed in August 2006, contains the first interconnection-wide study of eastern congestion.

The study identified constraints in the SERC Reliability Corporation (SERC)[2] region. Constraints in the Entergy portion (1-6, see below) are limiting flows from Missouri to Arkansas, Central to South Arkansas, Arkansas to Oklahoma, Alabama to Mississippi, Southeast Louisiana to Western Louisiana, and (pre-Katrina) into New Orleans.

Constraints in the SERC Reliability Corporation Region




Source: U.S. Department of Energy, National Electric Transmission Congestion Study, 2006

The goal of the congestion study was to identify areas where congestion is now, or is likely to become, especially severe. The LEPA/LUS area constraint was not one of the areas identified as needing immediate federal attention. However, the study is scheduled to be updated every three years and annual progress reports are planned to monitor progress on relieving transmission congestion.

The full text of the LEPA and LUS comments and request for early designation can be found on the DOE website (URL: http://www.oe.energy.gov/epa_1221_NIETC.htm).

The full text of the National Interest Electric Transmission Corridor Study report can be found on the DOE website (URL: http://www.oe.energy.gov/DocumentsandMedia/Congestion_Study_2006-9MB.pdf).

[1] Eleven organizations requested early NIETC designation: Allegheny Power; American Electric Power; Bay Area Municipal Transmission Group; City of Fayetteville, North Carolina, Public Works Commission; City of New York; Louisiana Energy and Power Authority; New York Regional Interconnection Inc.; Oklahoma Municipal Power Authority; PJM Interconnection; San Diego Gas & Electric; and Pepco Holdings, Inc.

[2] SERC is the Regional Reliability Organization responsible for ensuring the reliability of the bulk power supply systems in the Southeast, excluding Florida.

# BUILDING ENERGY CODES
# AUTHORITY / RESPONSIBILITY PROVISIONS

by
Darrell Winters, P.E., C.E.M.
December 2006

## Commercial

R.S. 40:1730.45 (*ACT 91*) Adoption of Commercial Building Energy Conservation Code; enforcement; rules

C. With the exception of state-owned facilities, statewide enforcement of the provisions of this Part shall be the responsibility of the Office of the State Fire Marshal, Code Enforcement and Building Safety.

D(1). For state-owned facilities, statewide enforcement of the provisions of this Part shall be the responsibility of the Facility Planning and Control Section of the Division of Administration.

R.S. 40:1730.46 Amendments and revisions to the Commercial Building Energy Conservation Code

The Office of the State Fire Marshal, Code Enforcement and Building Safety, in consultation with the Facility Planning and Control Section of the Division of Administration and the Technology Assessment Division of the Department of Natural Resources, shall have the authority to promulgate amendments and revisions for the Commercial Building Energy Conservation Code, pursuant to the provisions of the Administrative Procedure Act.

R.S. 40:1730.48 Training and technical assistance

A. Training and technical assistance in the implementation of the Commercial Building Energy Conservation Code shall be the responsibility of the Technology Assessment Division of the Department of Natural Resources.

B. The Technology Assessment Division of the Department of Natural Resources shall continue training and technical assistance as funding allows.

## Residential

R.S. 40:1730.22.C (*ACT 12*) The primary function of the council (Louisiana State Uniform Construction Code Council) is to review and adopt the state uniform construction code, provide for training and education of code officials, and accept all requests for amendments of the code, except the Louisiana State Plumbing Code (Part XIV (Plumbing) of the State Sanitary Code). Specifically, the council shall establish the requirements and process for the certification and continuing education of code enforcement officers, code enforcement inspectors, and building officials and determine if any amendments to the state uniform construction code are justified.

R.S. 40:1730.22.C. (*ACT 12 of the first extraordinary session of 2005*) is the first implementation of a statewide residential energy code and goes into effect in January of 2007.

# UPCOMING EVENTS ON ENERGY EFFICIENCY

by
Paula Ridgeway
Energy Section Manager
December 2006

The Department's Technology Assessment Division promotes and supports the efficient, environmentally responsible, and economically feasible use of energy. The following programs and upcoming conferences represent some of the Division's efforts to serve these programs.

From January 24 – 26, 2007, the Division will be conducting the annual statewide Clean Cities Conference to be held in New Orleans at the Astor Crowne Plaza Hotel. Clean Cities is a U.S. Department of Energy program that promotes the usage of alternative fuels. Included on the agenda will be information on tax incentives, new state vehicle specification updates, available funding including EPA's Blue Skyway initiative, Barksdale AFB CNG fueling and LEED certification (invited), and updates from each of the Clean Cities Coordinators from Baton Rouge, New Orleans and Shreveport.

In an effort to provide assistance to those homeowners rebuilding in hurricane ravaged areas, DNR continues to offer the various residential programs. One such project is working with the Preservation Resource Center in New Orleans (PRC) providing expertise utilizing best practices and materials for energy efficiency for those historical properties to be renovated. The PRC's Operation Comeback buys and restores blighted historical homes in the Holy Cross Neighborhood. The mission is not only to place energy efficiency measures in the homes, but to ensure appropriate training on installation and availability for homeowners. DNR has facilitated five workshops for homeowners and contractors on appliances, lighting, heating and cooling, windows and doors, water heating (tankless and solar water heating) and various types of insulation. The next workshop on January 24th will be on solar equipment and be a media kickoff for the remodeling events.

The second phase will be to provide a training exercise at the actual homes being renovated while installation is taking place. The sessions will be video taped and available from DNR and PRC. The series concludes with utilizing on-going PRC events, such as Shotgun House Month Tours, to educate consumers on measures being implemented, as well as a parade of energy efficient historical homes event planned for April, 2007.

In 2007, DNR will once again host the Industrial Energy Technology Conference (IETC) in New Orleans. The IETC was created to meet the needs of the industrial energy community with focus on industrial energy and waste reduction. The conference provides the latest in various state and federal programs affecting industry as well as industrial innovations and case studies on waste reduction practices from industrial partners. The conference is May 8-11, 2007, at the Royal Sonesta Hotel.

Energy Code Compliance Training is offered from the DNR Technology Assessment Division for both commercial (ASHRAE 90.1-2001) and residential building (2006 IRC effective January 1, 2007). This training can be provided upon request, or interested parties can check the website under *Calendar of Events* for upcoming sessions being provided statewide.

For all more information on workshops, conferences and other classes, check our *Calendar of Events* at URL: http://dnr.louisiana.gov/sec/execdiv/techasmt/about_us/division_calendar.htm.

# THE UPS AND DOWNS OF A RENEWABLE PORTFOLIO STANDARD

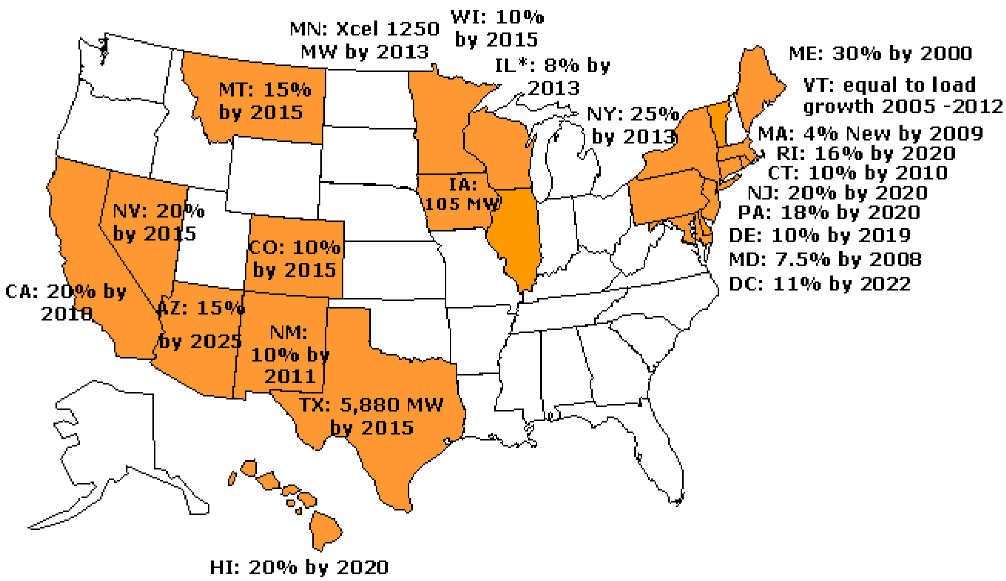
by
David McGee, P.E.
December 2006

A Renewable Portfolio Standard (RPS) is a requirement that a certain portion of the electricity sold by utilities be generated from a renewable resource by a certain date. The standards as well as the definitions of renewable energy vary. Twenty-two states and the District of Columbia have set standards (see Figure).

A renewable energy technology does not rely on fossil fuels. It relies on an energy source that is naturally regenerated such as: sun light (solar), wind, elevated water (hydro), plants that will grow in a sustainable manner (biomass), or hot water trapped in the earth's crust that is or can be supplied continuously (geothermal).

Two other resources that are sometimes included as renewable resources are landfill methane and Municipal Solid Waste (MSW). Land fill methane is not strictly renewable as it is captured from old landfills that will eventually cease production. Most jurisdictions do not allow the combustion of MSW to count as a renewable resource, but will count gasification used to power a generation station or fuel cell.

States with Renewable Portfolio Standards Enacted




* IL implements its RPS through voluntary utility commitments

Source: Pew Center for Global Climate Change[1]

Hydrogen ($H_2$) is sometimes included if it is produced using other renewable resources. Gasification

[1] URL: http://www.pewclimate.org/what_s_being_done/in_the_states/rps.cfm, accessed 11/2/2006.

of biomass by certain processes can yield a "synthetic natural gas" (syngas) that is over 50% hydrogen. Excess electricity generated by any of these means can be used to electrolyze water to $H_2$ and oxygen ($O_2$).

Some states allow utilities to comply with the RPS through Renewable Energy Certificates (REC). A REC represents one megawatt hour of renewable energy that is metered and verified from the generator.[2] RECs are created when the renewable energy project begins producing electricity. The electricity (green-power) is sold into the local electric grid and the RECs are sold as a commodity. The environmental attributes are unbundled from the physical electricity and the two products—the attributes embodied in the certificates and the commodity electricity—may be sold or traded separately. Even though REC definitions are not uniform, RECs are quickly becoming the currency of renewable energy markets because of their flexibility. RECs are not subject to the geographic and physical limitations of commodity electricity.[3]

There is no national renewable portfolio standard so the states are free to establish their own RPS standards, and the requirements are different. Each state typically features renewable energy sources that are plentiful in that state or region. "Northeast states uniformly include wood-fired and small hydro projects. Some northern and upper Midwestern states allow larger hydro projects. Midwestern states explicitly include agricultural-related biomass. Coastal states include tidal or wave power projects."[4]

At the present time Louisiana does not have a Renewable Portfolio Standard (RPS). The Louisiana Public Service Commission (PSC) studied the feasibility of implementing a RPS, but concluded that it would increase electricity costs and decided against it. The PSC commissioned a study of "green pricing" as an alternative.

The difference between a RPS and "green pricing" is that under an RPS the utility would have to supply a certain percentage of their power from renewable sources no matter what it cost, and the extra cost would be passed on to all customers in the fuel adjustment portion of the bill. Under the green pricing alternative the customer can elect to buy renewable energy, for a premium. The utility then contracts for only the amount of green power subscribed by those who have chosen it. It can be purchased as RECs or actual green power depending on the governing law. Most "green" residential electricity is sold in blocks of 100 or 150 kWhs each month. A home or business might contract for 6 "blocks" of renewables (900 kwhs) which they would pay for whether they used it or not. 100% renewable power is available in some jurisdictions. Most jurisdictions require a one year commitment by the consumer so that the utility can contract in advance. Longer term contracts at a fixed price are available in some areas. The premium charge varies from 1¢ to 6¢ per kWh and can either be applied in place of the fuel adjustment charge or in addition to the fuel adjustment and any other charges. Consumers in several areas with long term contracts are actually paying less for wind power than for electricity from conventional sources.

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[2] Charles G. Willing Jr. Esq., "Renewable Portfolio Standards Programs," *Distributed Energy*, May/June 2005.
[3] URL: http://www.eere.energy.gov/greenpower/resources/pdfs/37388.pdf, accessed 11/3/2006.
[4] Charles G. Willing Jr. Esq., "Renewable Portfolio Standards Programs."