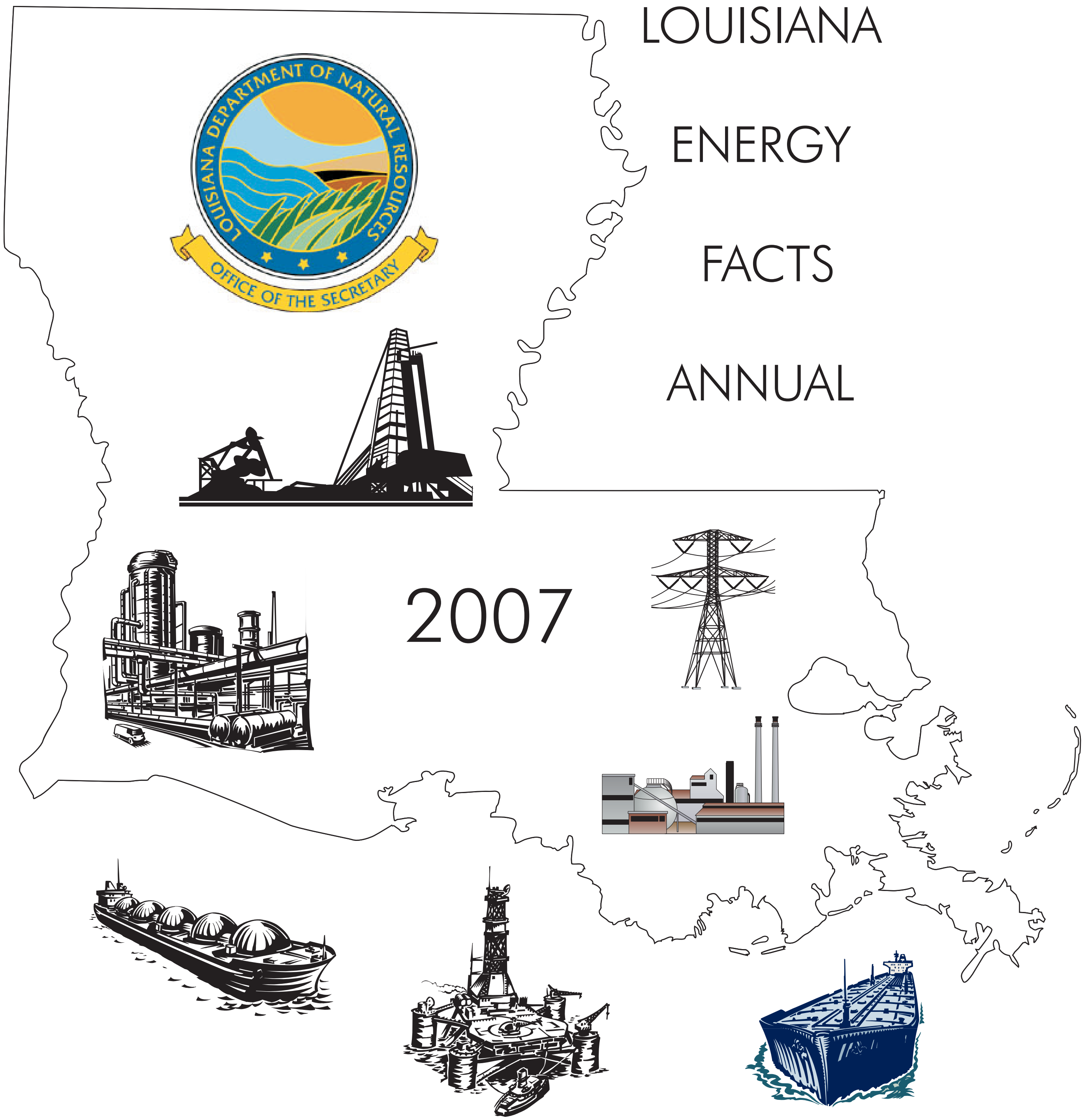
LOUISIANA ENERGY FACTS ANNUAL



2007

DEPARTMENT OF NATURAL RESOURCES
Technology Assessment Division
January 17, 2008

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LOUISIANA ENERGY FACTS

ANNUAL 2007

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January 17, 2008

General Questions and Comments

The **Louisiana Energy Facts Annual - 2007** (**Annual**) 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., is 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** (**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:

http://www.dnr.louisiana.gov/tad

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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.

2007 HIGHLIGHTS

The data in the 2007 **Louisiana Energy Facts Annual** contains some recent trends.

Crude oil prices and natural gas prices increased
Gas spot price average was $7.08 per MCF in 2006, and it was $7.17 per MCF in 2007; which is 1.3% higher than in 2006. 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 2008 average price for gas is expected to be around $7 per MCF.

South Louisiana average spot crude oil price was $74.60 per barrel in 2007 and it was $67.44 per barrel in 2006, a 10.6% increase compared to 2006. The 2008 average is expected to be around $80 per barrel.

Oil and gas production increased
Louisiana state crude oil and condensate production, excluding federal Outer Continental Shelf (OCS), was 76 million barrels in 2007, a 3% increase from 2006. Oil production is expected to be stable in 2008. Louisiana state natural gas and casinghead, excluding federal OCS production was 1.35 TCF in 2007, a slight increase over 2006. It is expected to be stable in 2008. The increase in oil and gas production in 2007 was related to 2005 hurricane recovery, high prices, and strong 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, decreased 6% from an average of 188 rigs operating each month in 2006 to 177 in 2007. Looking at where the activity was, though, shows drilling activity dropped 15% in federal waters, dropped 33% in state offshore waters, rose 26% in state inland waters, dropped 11% in South Louisiana on land, and rose 2% in North Louisiana. The effects of Hurricanes Katrina and Rita were still felt in drilling activities over the offshore areas in Louisiana; inland areas are showing a recovery.

Other significant items
Louisiana's proved oil reserves and proved gas reserves were lower in 2006 than in 2005, despite strong drilling activities and high energy prices. The lower reserves was the reflection of high oil and gas withdrawal due to market conditions, the high cost in mature producing areas, and reserves loss caused by Hurricanes Katrina and Rita.

Louisiana refineries' 2007 daily crude oil average runs to stills was 2.69 million barrels per day, 6% higher than the 2006 average.

Average employment in the oil and gas extraction industries was 44,394 in 2006, an 8% increase over 2005.

SUBDIVISIONS OF LOUISIANA

Table 1

LOUISIANA STATE CRUDE OIL PRODUCTION

Excluding OCS
(Barrels)

DATE	NORTH	SOUTH	OFFSHORE	TOTAL
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	11,740,980 r	53,090,500 r	11,131,564 r	75,963,044 r
2001	10,723,518 r	50,690,472 r	10,166,568 r	71,580,558 r
2002	8,934,876 r	43,931,982 r	8,139,036 r	61,005,894 r
2003	8,958,304 r	42,984,673 r	8,205,118 r	60,148,095 r
2004	8,422,901 r	42,226,686 r	6,942,556 r	57,592,143 r
2005	8,808,344 r	36,588,185 r	6,151,784 r	51,548,312 r
January	782,840 r	2,667,360 r	455,199 r	3,905,399 r
February	652,573 r	2,507,858 r	418,733 r	3,579,165 r
March	582,178 r	3,030,197 r	529,289 r	4,141,664 r
April	563,120 r	2,956,870 r	514,898 r	4,034,887 r
May	586,122 r	3,056,564 r	537,963 r	4,180,649 r
June	573,105 r	3,026,276 r	526,588 r	4,125,969 r
July	600,755 r	3,205,762 r	554,247 r	4,360,764 r
August	615,395 r	3,174,108 r	573,392 r	4,362,894 r
September	595,144 r	3,065,062 r	539,925 r	4,200,131 r
October	602,511 r	3,110,837 r	569,692 r	4,283,040 r
November	588,844 r	3,121,119 r	565,259 r	4,275,223 r
December	619,455 r	3,304,313 r	578,473 r	4,502,241 r
2006 Total	**7,362,043 r**	**36,226,325 r**	**6,363,658 r**	**49,952,026 r**
January	642,159	3,324,501	527,484	4,494,143
February	594,568	2,910,737	555,797	4,061,102
March	668,351	3,281,888	643,938	4,594,177
April	646,227	3,227,203	613,290	4,486,720
May	676,727	3,289,344	622,564	4,588,635
June	623,387	3,147,235	573,645	4,344,267
July	634,101	3,210,130	583,707	4,427,937
August	632,129	3,194,806	581,988	4,408,923
September	608,650	3,190,213	522,933	4,321,796
October	625,927 p	3,143,402 p	547,710 p	4,317,040 p
November	579,889 p	3,181,108 p	534,227 p	4,295,223 p
December	622,004 p	3,095,854 p	554,383 p	4,272,241 p
2007 Total	**7,554,118 p**	**38,196,420 p**	**6,861,666 p**	**52,612,204 p**

e Estimated r Revised p Preliminary

Table 2

LOUISIANA STATE CONDENSATE PRODUCTION

Excluding OCS
(Barrels)

DATE	NORTH	SOUTH	OFFSHORE	TOTAL
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	3,670,053 r	25,212,928 r	2,339,594 r	31,222,575 r
2001	3,848,826 r	26,913,618 r	2,527,900 r	33,290,343 r
2002	3,771,112 r	26,452,434 r	2,445,060 r	32,668,607 r
2003	3,300,274 r	24,554,490 r	2,402,148 r	30,256,912 r
2004	2,680,844 r	22,097,844 r	1,300,488 r	26,079,176 r
2005	2,978,671 r	19,981,412 r	1,171,451 r	24,131,534 r
January	318,705 r	1,606,578 r	104,214 r	2,029,497 r
February	246,626 r	1,506,570 r	98,836 r	1,852,032 r
March	207,887 r	1,724,181 r	110,909 r	2,042,978 r
April	194,412 r	1,630,096 r	104,744 r	1,929,252 r
May	206,580 r	1,734,200 r	107,088 r	2,047,868 r
June	200,556 r	1,707,540 r	113,184 r	2,021,280 r
July	199,551 r	1,708,865 r	109,721 r	2,018,137 r
August	200,079 r	1,692,135 r	108,682 r	2,000,896 r
September	193,334 r	1,633,184 r	100,909 r	1,927,427 r
October	210,297 r	1,721,259 r	111,005 r	2,042,561 r
November	203,859 r	1,720,749 r	110,536 r	2,035,144 r
December	210,777 r	1,761,474 r	112,971 r	2,085,222 r
2006 Total	**2,592,665 r**	**20,146,831 r**	**1,292,798 r**	**24,032,294 r**
January	230,005	1,713,475	114,664	2,058,145
February	196,621	1,583,638	99,457	1,879,716
March	210,249	1,795,339	105,621	2,111,208
April	197,372	1,692,740	99,541	1,989,652
May	217,702	1,770,629	110,231	2,098,562
June	202,474	1,752,081	102,935	2,057,490
July	204,119	1,774,455	104,198	2,082,772
August	193,595	1,690,577	99,227	1,983,400
September	185,316	1,625,668	95,373	1,906,357
October	185,152 p	1,631,725 p	95,684 p	1,912,561 p
November	176,198 p	1,665,508 p	91,438 p	1,933,144 p
December	167,747 p	1,587,055 p	87,420 p	1,842,222 p
2007 Total	**2,366,551 p**	**20,282,889 p**	**1,205,789 p**	**23,855,229 p**

e Estimated r Revised p Preliminary

Table 3

LOUISIANA STATE CRUDE OIL and CONDENSATE PRODUCTION

Excluding OCS
(Barrels)

DATE	NORTH	SOUTH	OFFSHORE	TOTAL
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	15,411,033 r	78,303,428 r	13,471,159 r	107,185,619 r
2001	14,572,344 r	77,604,090 r	12,694,467 r	104,870,901 r
2002	12,705,988 r	70,384,416 r	10,584,096 r	93,674,501 r
2003	12,258,578 r	67,539,163 r	10,607,266 r	90,405,007 r
2004	11,103,745 r	64,324,530 r	8,243,044 r	83,671,319 r
2005	11,787,014 r	56,569,597 r	7,323,235 r	75,679,846 r
January	1,101,546 r	4,273,937 r	559,413 r	5,934,896 r
February	899,199 r	4,014,429 r	517,569 r	5,431,197 r
March	790,066 r	4,754,378 r	640,199 r	6,184,642 r
April	757,532 r	4,586,966 r	619,641 r	5,964,139 r
May	792,702 r	4,790,763 r	645,051 r	6,228,517 r
June	773,661 r	4,733,816 r	639,772 r	6,147,249 r
July	800,306 r	4,914,627 r	663,968 r	6,378,901 r
August	815,473 r	4,866,243 r	682,074 r	6,363,790 r
September	788,478 r	4,698,246 r	640,834 r	6,127,558 r
October	812,808 r	4,832,096 r	680,697 r	6,325,601 r
November	792,703 r	4,841,869 r	675,795 r	6,310,367 r
December	830,233 r	5,065,787 r	691,443 r	6,587,463 r
2006 Total	**9,954,708 r**	**56,373,156 r**	**7,656,457 r**	**73,984,320 r**
January	872,164	5,037,976	642,148	6,552,288
February	791,189	4,494,375	655,254	5,940,818
March	878,600	5,077,227	749,558	6,705,385
April	843,598	4,919,942	712,831	6,476,372
May	894,429	5,059,973	732,795	6,687,197
June	825,861	4,899,316	676,580	6,401,757
July	838,220	4,984,584	687,905	6,510,709
August	825,725	4,885,383	681,215	6,392,323
September	793,965	4,815,882	618,306	6,228,153
October	811,079 p	4,775,127 p	643,395 p	6,229,601 p
November	756,087 p	4,846,616 p	625,664 p	6,228,367 p
December	789,751 p	4,682,909 p	641,803 p	6,114,463 p
2007 Total	**9,920,669 p**	**58,479,310 p**	**8,067,454 p**	**76,467,433 p**

e Estimated r Revised p Preliminary

Figure 1

LOUISIANA STATE OIL PRODUCTION
Actual and Forecasted Through Year 2030

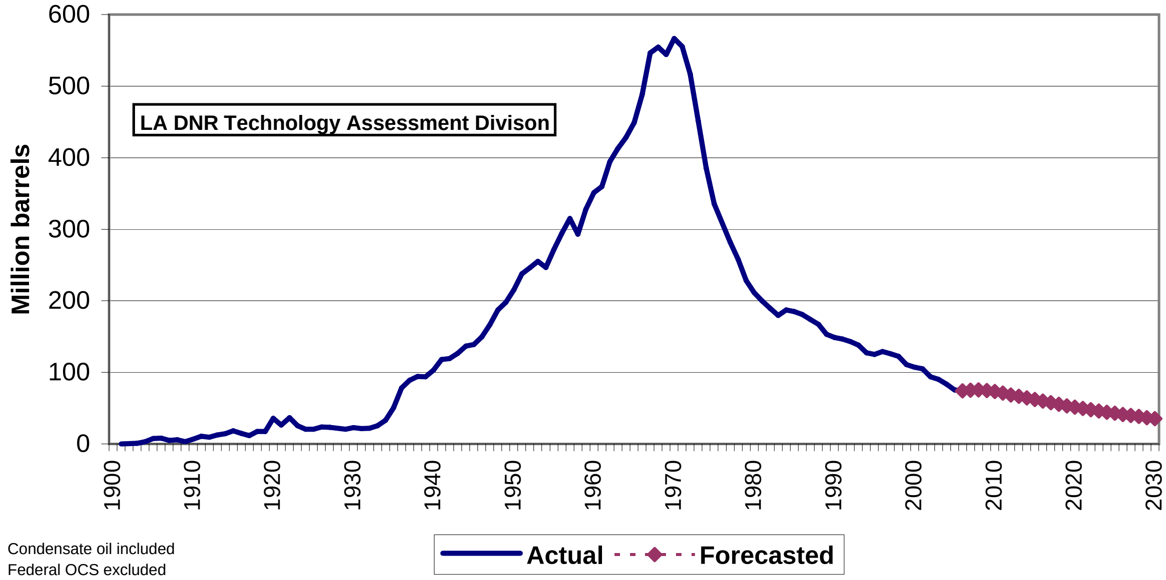
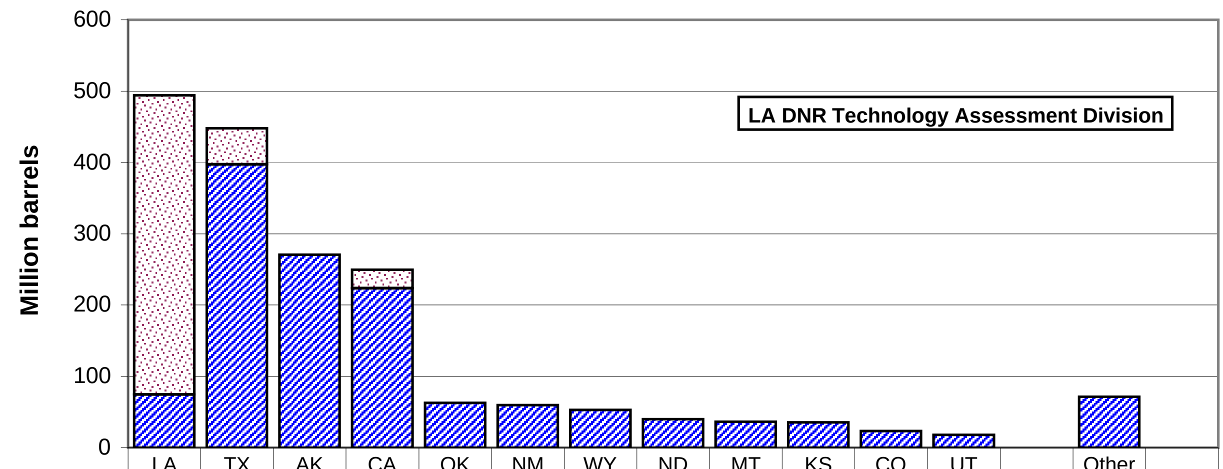


Figure 2

2006 UNITED STATES OIL PRODUCTION BY STATE



	LA	TX	AK	CA	OK	NM	WY	ND	MT	KS	CO	UT		Other	
Fed. OCS	420	51		26											
State	75	397	270	223	63	60	53	40	36	36	23	18		71	

Table 4

LOUISIANA TOTAL CRUDE OIL and CONDENSATE PRODUCTION

(Barrels)

DATE	ONSHORE	OFFSHORE		TOTAL
		State	Federal OCS	
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	93,686,412 r	13,468,756 r	477,645,662	584,800,830 r
2001	92,176,434 r	12,694,467 r	502,115,031	606,985,932 r
2002	83,090,405 r	10,584,096 r	508,630,349	602,304,850 r
2003	79,797,741 r	10,607,266 r	505,203,116 e	595,608,123 e r
2004	75,428,275 r	8,243,044 r	477,182,586 e	560,853,905 e r
2005	68,356,611 r	7,323,235 r	407,154,253 e	482,834,099 e r
January	5,375,483 r	559,413 r	32,025,905 e	37,960,801 e r
February	4,913,628 r	517,569 r	28,218,676 e	33,649,873 e r
March	5,544,443 r	640,199 r	32,379,839 e	38,564,481 e r
April	5,344,498 r	619,641 r	32,278,785 e	38,242,924 e r
May	5,583,466 r	645,051 r	35,272,490 e	41,501,007 e r
June	5,507,477 r	639,772 r	35,335,500 e	41,482,749 e r
July	5,714,933 r	663,968 r	38,196,828 e	44,575,729 e r
August	5,681,716 r	682,074 r	38,834,784 e	45,198,574 e r
September	5,486,724 r	640,834 r	35,517,201 e	41,644,759 e r
October	5,644,904 r	680,697 r	37,563,815 e	43,889,416 e r
November	5,634,572 r	675,795 r	36,448,505 e	42,758,872 e r
December	5,896,020 r	691,443 r	37,483,064 e	44,070,527 e r
2006 Total	**66,327,863 r**	**7,656,457 r**	**419,555,392 e**	**493,539,712** e r
January	5,910,140	642,148	37,983,692 e	44,535,980 e
February	5,285,564	655,254	33,620,319 e	39,561,137 e
March	5,955,827	749,558	35,883,581 e	42,588,966 e
April	5,763,541	712,831	36,357,824 e	42,834,196 e
May	5,954,402	732,795	38,146,183 e	44,833,380 e
June	5,725,177	676,580	34,270,429 e	40,672,186 e
July	5,822,804	687,905	34,478,826 e	40,989,535 e
August	5,711,108	681,215	32,355,914 e	38,748,237 e
September	5,609,847	618,306	28,608,861 e	34,837,014 e
October	5,586,206 p	643,395 p	26,476,950 e	32,706,551 e
November	5,602,703 p	625,664 p		6,228,367 p
December	5,472,660 p	641,803 p		6,114,463 p
2007 Total	**68,399,979 p**	**8,067,454 p**	**338,182,578 e**	**414,650,011 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
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
2005	61,356,971	2,754,911	4,784,530	68,896,412
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** r
January	5,763,025	244,528	413,008	6,420,561
February	4,880,474	209,914	438,751	5,529,139
March	4,562,688	178,309	324,043	5,065,040
April	6,074,834	170,158	378,266	6,623,257
May	5,581,901	279,168	454,952	6,316,021
June	4,372,531	255,812	327,192	4,955,535
July	7,369,947	272,132	433,594	8,075,673
August	5,301,248	205,006	376,054	5,882,308
September	5,071,598	96,231	176,212	5,344,041
October	5,408,842	248,138	415,448	6,072,428
November	N/A	N/A	N/A	N/A
December	N/A	N/A	N/A	N/A
2007 Total	**54,387,086**	**2,159,396**	**3,737,520**	**60,284,003**

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

Figure 3

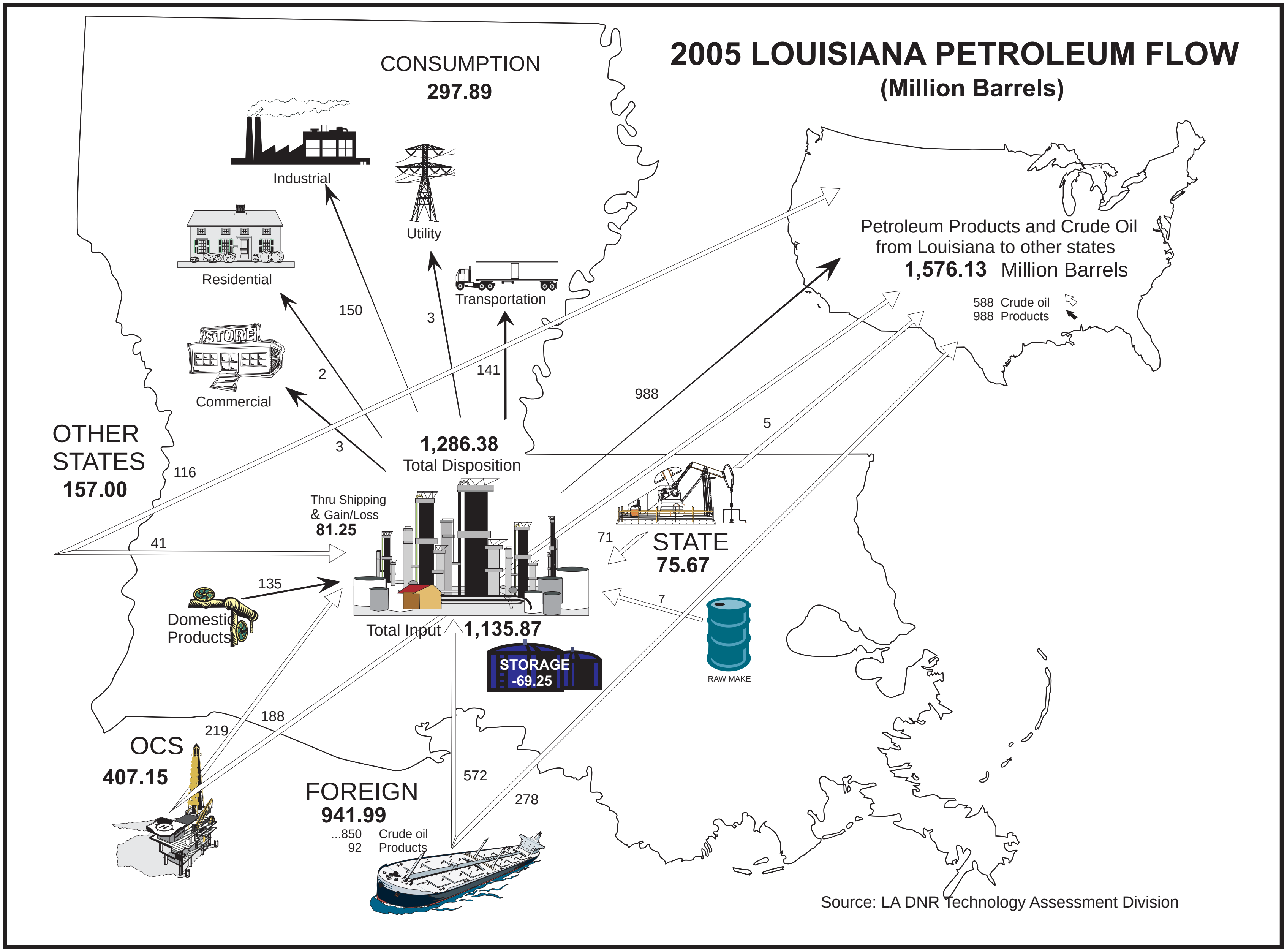
2005 LOUISIANA PETROLEUM FLOW
(Million Barrels)
CONSUMPTION
297.89
Industrial
Utility
Residential
Transportation
Commercial
150
3
2
141
3
1,286.38
Total Disposition
988
5
OTHER
STATES
157.00
116
41
Thru Shipping
& Gain/Loss
81.25
Petroleum Products and Crude Oil
from Louisiana to other states
1,576.13 Million Barrels
588 Crude oil
988 Products
71
STATE
75.67
7
RAW MAKE
135
Domestic
Products
Total Input
1,135.87
STORAGE
-69.25
188
219
OCS
407.15
572
278
FOREIGN
941.99
...850 Crude oil
92 Products
Source: LA DNR Technology Assessment Division

Table 6

UNITED STATES OCS CRUDE OIL AND CONDENSATE PRODUCTION[12]

(Barrels)

YEAR	LOUISIANA	TEXAS	CALIFORNIA	TOTAL
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	26,554,000	593,377,889
2006	393,445,174	76,794,758	26,113,000	592,936,889

NOTE: Starting in 2002 MMS has not formally published production by state adjacent 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]
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
2005	494,332	1,890,107	3,647,484	14,746
January	39,565	156,450	302,761	0
February	36,570	141,357	279,152	378
March	41,102	155,481	301,243	998
April	40,176	152,012	294,777	997
May	42,375	158,115	318,687	716
June	44,185	156,576	321,369	0
July	47,369	160,307	317,114	0
August	48,384	159,808	327,476	0
September	46,664	155,632	321,298	0
October	47,171	161,035	313,272	0
November	45,711	154,457	296,627	0
December	47,365	163,523	296,219	0
2006 Total	**526,637**	**1,874,753**	**3,689,995**	**3,089**
January	45,566	161,072	315,967	0
February	40,456	144,125	253,372	0
March	44,952	160,530	320,247	546
April	44,442	156,546	305,431	0
May	46,092	162,452	319,040	0
June	43,443	154,183	299,477	0
July	44,241	158,711	306,950	0
August	42,999	154,266	318,808	0
September	N/A	146,970	309,442	0
October	N/A	156,188	303,052	0
November	N/A	N/A	N/A	N/A
December	N/A	N/A	N/A	N/A
2007 Total	**352,191**	**1,555,043**	**3,051,786**	**546**

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Table 8

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

DATE	OIL (Barrels)	GAS (MCF)	PLANT LIQUIDS (Barrels)
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
2005	3,337,902	34,431,220	1,098,219
January	230,529	2,886,985	93,658 r
February	221,226	2,890,000	78,787 r
March	249,203	3,189,979	58,816 r
April	283,259	3,177,608	59,259 r
May	275,567	3,437,300	75,649 r
June	300,524	3,670,607	216,953 r
July	316,991	3,679,153	174,892 r
August	336,049	3,607,375	143,552 r
September	309,606	3,538,640	127,523 r
October	358,901	3,569,878	132,590 r
November	348,342	3,390,994	143,407 r
December	372,923	3,460,938	121,028 r
2006 Total	**3,603,122**	**40,499,457**	**1,426,113 r**
January	355,083.53	3,342,792.11	144,458.22
February	334,474.86	3,143,421.82	169,790.84
March	378,159.98	3,656,208.62	172,928.49
April	374,241.07	3,464,119.05	131,353.95
May	377,766.36	3,776,600.40	102,079.94
June	368,833.87	3,703,408.12	90,036.75
July	371,090.52	3,699,779.44	91,055.07
August	434,178.49	3,368,486.29	125,760.35
September	354,406.67	3,381,600.68	81,075.25
October	375,237.27	N/A	N/A
November	N/A	N/A	N/A
December	N/A	N/A	N/A
2007 Total	**3,723,472.61**	**31,536,416.52**	**1,108,538.87**

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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
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	357,189,761 r	837,258,899 r	135,260,467 r	1,329,709,126 r
2001	353,377,620 r	852,065,248 r	134,462,013 r	1,339,904,880 r
2002	320,769,341 r	793,717,154 r	120,466,249 r	1,234,952,744 r
2003	312,104,013 r	797,103,212 r	118,553,029 r	1,227,760,254 r
2004	298,595,776 r	822,972,021 r	115,591,994 r	1,237,159,791 r
2005	387,975,069 r	704,587,104 r	97,454,622 r	1,190,016,795 r
January	31,266,224 r	64,519,691 r	7,565,223 r	103,351,137 r
February	27,344,320 r	60,496,366 r	6,755,178 r	94,595,864 r
March	28,626,539 r	70,316,324 r	8,221,105 r	107,163,969 r
April	26,831,351 r	68,611,354 r	7,939,327 r	103,382,032 r
May	27,573,858 r	72,471,918 r	8,372,819 r	108,418,595 r
June	26,843,749 r	71,141,847 r	7,934,669 r	105,920,265 r
July	27,275,817 r	71,434,056 r	8,525,806 r	107,235,678 r
August	27,002,378 r	73,352,457 r	6,560,359 r	106,915,194 r
September	26,234,333 r	71,483,364 r	6,365,528 r	104,083,225 r
October	27,120,919 r	74,124,444 r	6,571,882 r	107,817,244 r
November	25,293,220 r	71,645,148 r	6,120,745 r	103,059,113 r
December	25,337,009 r	74,290,868 r	6,056,342 r	105,684,219 r
2006 Total	**326,749,716 r**	**843,887,838 r**	**86,988,982 r**	**1,257,626,535 r**
January	25,387,969	72,561,029	6,249,367	104,198,364
February	22,789,374	64,704,369	5,621,159	93,114,902
March	25,800,125	73,447,679	6,276,745	105,524,549
April	25,198,607	71,738,256	6,209,569	103,146,432
May	25,944,994	76,241,680	6,593,524	108,780,198
June	25,085,676	73,740,126	6,344,629	105,170,432
July	25,931,935	76,252,400	6,526,878	108,711,214
August	23,986,980	73,886,331	6,783,592	104,656,903
September	23,629,368	72,918,543	6,670,646	103,218,557
October	24,025,725 p	74,891,049 p	6,844,739 p	105,761,514 p
November	23,655,304 p	73,792,320 p	6,717,417 p	104,165,042 p
December	23,869,023 p	74,515,681 p	6,755,960 p	105,140,664 p
2007 Total	**295,305,082 p**	**878,689,463 p**	**77,594,226 p**	**1,251,588,771 p**

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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
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	30,719,192 r	89,676,008 r	14,171,691 r	134,566,892 r
2001	36,132,040 r	102,647,460 r	16,582,573 r	155,362,073 r
2002	31,310,773 r	81,103,638 r	14,494,925 r	126,909,336 r
2003	31,296,272 r	74,469,504 r	11,825,368 r	117,591,144 r
2004	31,121,057 r	70,537,507 r	11,082,690 r	112,741,254 r
2005	25,103,708 r	62,207,890 r	8,118,984 r	95,430,582 r
January	2,705,733 r	4,404,148 r	646,193 r	7,756,074 r
February	2,274,532 r	4,083,735 r	622,771 r	6,981,037 r
March	2,465,694 r	4,904,192 r	717,072 r	8,086,958 r
April	2,359,834 r	4,694,774 r	685,259 r	7,739,867 r
May	2,373,084 r	4,836,731 r	704,749 r	7,914,564 r
June	2,300,126 r	4,689,275 r	682,070 r	7,671,471 r
July	2,418,086 r	4,921,579 r	714,274 r	8,053,938 r
August	2,549,513 r	4,812,687 r	789,549 r	8,151,750 r
September	2,505,848 r	4,731,311 r	774,891 r	8,012,050 r
October	2,380,688 r	4,495,996 r	735,106 r	7,611,790 r
November	2,434,967 r	4,599,526 r	750,758 r	7,785,251 r
December	2,590,960 r	5,093,132 r	826,135 r	8,510,227 r
2006 Total	**29,359,064 r**	**56,267,086 r**	**8,648,827 r**	**94,274,977 r**
January	2,729,939	4,904,487	773,830	8,408,256
February	2,498,599	4,381,522	697,010	7,577,131
March	2,751,787	4,750,512	773,652	8,275,951
April	2,796,849	4,731,285	776,371	8,304,505
May	2,929,564	4,855,137	808,756	8,593,457
June	2,898,162	4,704,446	799,516	8,402,124
July	2,980,250	4,737,055	816,377	8,533,683
August	2,998,565	5,000,271	820,052	8,818,887
September	3,015,058	4,935,646	793,618	8,744,322
October	2,923,775 p	4,755,065 p	771,232 p	8,450,073 p
November	2,895,378 p	4,613,982 p	746,258 p	8,255,618 p
December	3,012,688 p	4,703,126 p	766,822 p	8,482,635 p
2007 Total	**34,430,614 p**	**57,072,534 p**	**9,343,494 p**	**100,846,642 p**

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Figure 4

LOUISIANA STATE GAS PRODUCTION
Actual and Forecasted Through Year 2030

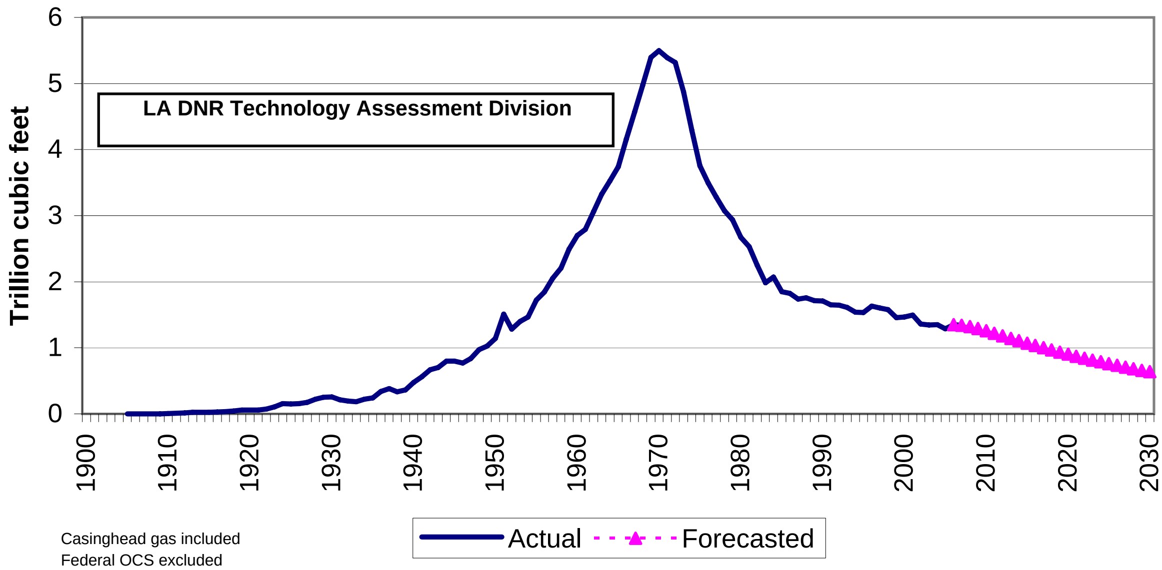
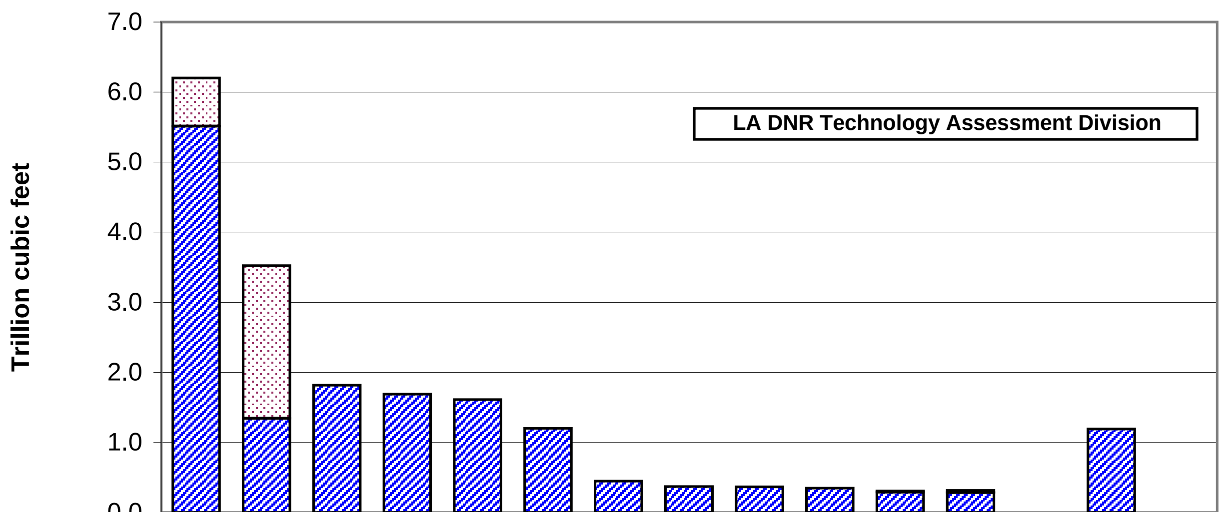


Figure 5

2006 UNITED STATES MARKETED GAS PRODUCTION BY STATE



	TX	LA	WY	OK	NM	CO	AK	KS	MI	UT	AL	CA		Other	
Fed. OCS	0.7	2.2					0.0				0.0	0.0			
State	5.5	1.3	1.8	1.7	1.6	1.2	0.4	0.4	0.4	0.3	0.3	0.3		1.2	

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
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	387,908,953 r	926,934,907 r	149,432,158 r	1,464,276,018 r
2001	389,509,659 r	954,712,708 r	151,044,585 r	1,495,266,953 r
2002	352,080,114 r	874,820,792 r	134,961,175 r	1,361,862,080 r
2003	343,400,285 r	871,572,716 r	130,378,397 r	1,345,351,398 r
2004	329,716,833 r	893,509,528 r	126,674,684 r	1,349,901,045 r
2005	413,078,777 r	766,794,994 r	105,573,606 r	1,285,447,377 r
January	33,971,956 r	68,923,839 r	7,377,948 r	111,107,211 r
February	29,618,852 r	64,580,101 r	8,938,177 r	101,576,901 r
March	31,092,234 r	75,220,516 r	8,624,586 r	115,250,927 r
April	29,191,185 r	73,306,128 r	9,077,568 r	111,121,899 r
May	29,946,942 r	77,308,649 r	8,616,739 r	116,333,159 r
June	29,143,874 r	75,831,122 r	9,240,080 r	113,591,736 r
July	29,693,902 r	76,355,634 r	7,349,908 r	115,289,616 r
August	29,551,891 r	78,165,145 r	7,140,419 r	115,066,944 r
September	28,740,181 r	76,214,675 r	7,306,987 r	112,095,275 r
October	29,501,607 r	78,620,440 r	6,871,503 r	115,429,034 r
November	27,728,187 r	76,244,674 r	6,882,477 r	110,844,364 r
December	27,927,969 r	79,384,000 r	7,023,197 r	114,194,446 r
2006 Total	**356,108,780 r**	**900,154,924 r**	**94,449,589 r**	**1,351,901,512 r**
January	28,117,907	77,465,516	6,318,169	112,606,620
February	25,287,973	69,085,890	7,050,397	100,692,033
March	28,551,912	78,198,191	6,985,940	113,800,500
April	27,995,456	76,469,541	7,402,280	111,450,937
May	28,874,558	81,096,818	7,144,146	117,373,655
June	27,983,838	78,444,573	7,343,256	113,572,556
July	28,912,186	80,989,455	7,603,644	117,244,897
August	26,985,545	78,886,602	7,464,264	113,475,790
September	26,644,427	77,854,189	7,615,972	111,962,879
October	26,949,500 p	79,646,115 p	7,463,675 p	114,211,587 p
November	26,550,682 p	78,406,302 p	7,522,781 p	112,420,660 p
December	26,881,711 p	79,218,807 p	7,485,381 p	113,623,299 p
2007 Total	**329,735,695 p**	**935,761,997 p**	**87,399,905 p**	**1,352,435,413 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]	
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	1,314,843,860 r	149,432,158 r	3,761,812,062	5,226,088,080
2001	1,344,222,368 r	151,044,585 r	3,818,657,416	5,313,924,369
2002	1,226,900,905 r	134,961,175 r	3,457,864,868	4,819,726,948
2003	1,214,973,001 r	130,378,397 r	3,276,387,510 e	4,621,738,908 e r
2004	1,223,226,361 r	126,674,684 r	2,840,552,489 e	4,190,453,534 e r
2005	1,179,873,771 r	105,573,606 r	2,185,591,643 e	3,471,039,020 e r
January	102,895,795 r	8,211,416 r	166,360,843 e	277,468,054 e r
February	94,198,953 r	7,377,948 r	146,309,800 e	247,886,701 e r
March	106,312,750 r	8,938,177 r	166,430,657 e	281,681,584 e r
April	102,497,313 r	8,624,586 r	168,461,830 e	279,583,729 e r
May	107,255,591 r	9,077,568 r	181,600,992 e	297,934,151 e r
June	104,974,997 r	8,616,739 r	176,669,750 e	290,261,486 e r
July	106,049,536 r	9,240,080 r	187,591,648 e	302,881,264 e r
August	107,717,036 r	7,349,908 r	185,366,340 e	300,433,284 e r
September	104,954,856 r	7,140,419 r	170,454,258 e	282,549,533 e r
October	108,122,047 r	7,306,987 r	177,176,264 e	292,605,298 e r
November	103,972,861 r	6,871,503 r	171,281,320 e	282,125,684 e r
December	107,311,969 r	6,882,477 r	171,961,510 e	286,155,956 e r
2006 Total	**1,256,263,704 r**	**95,637,808 r**	**2,069,665,212** e	**3,421,566,724 e r**
January	105,583,423	7,023,197	172,487,118 e	285,093,738 e
February	94,373,864	6,318,169	155,930,967 e	256,623,000 e
March	106,750,103	7,050,397	175,071,374 e	288,871,874 e
April	104,464,997	6,985,940	171,426,256 e	282,877,193 e
May	109,971,375	7,402,280	180,060,969 e	297,434,624 e
June	106,428,410	7,144,146	162,955,262 e	276,527,818 e
July	109,901,641	7,343,256	164,442,739 e	281,687,636 e
August	105,872,146	7,603,644	147,206,795 e	260,682,585 e
September	104,498,615	7,464,264	136,726,374 e	248,689,253 e
October	106,595,615 p	7,615,972 p	142,183,190 e	256,394,777 p
November	104,956,985 p	7,463,675 p	N/A	112,420,660 p
December	106,100,518 p	7,522,781 p	N/A	113,623,299 p
2007 Total	**1,265,497,693 p**	**86,937,720 p**	**1,608,491,044 e**	**2,960,926,457 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

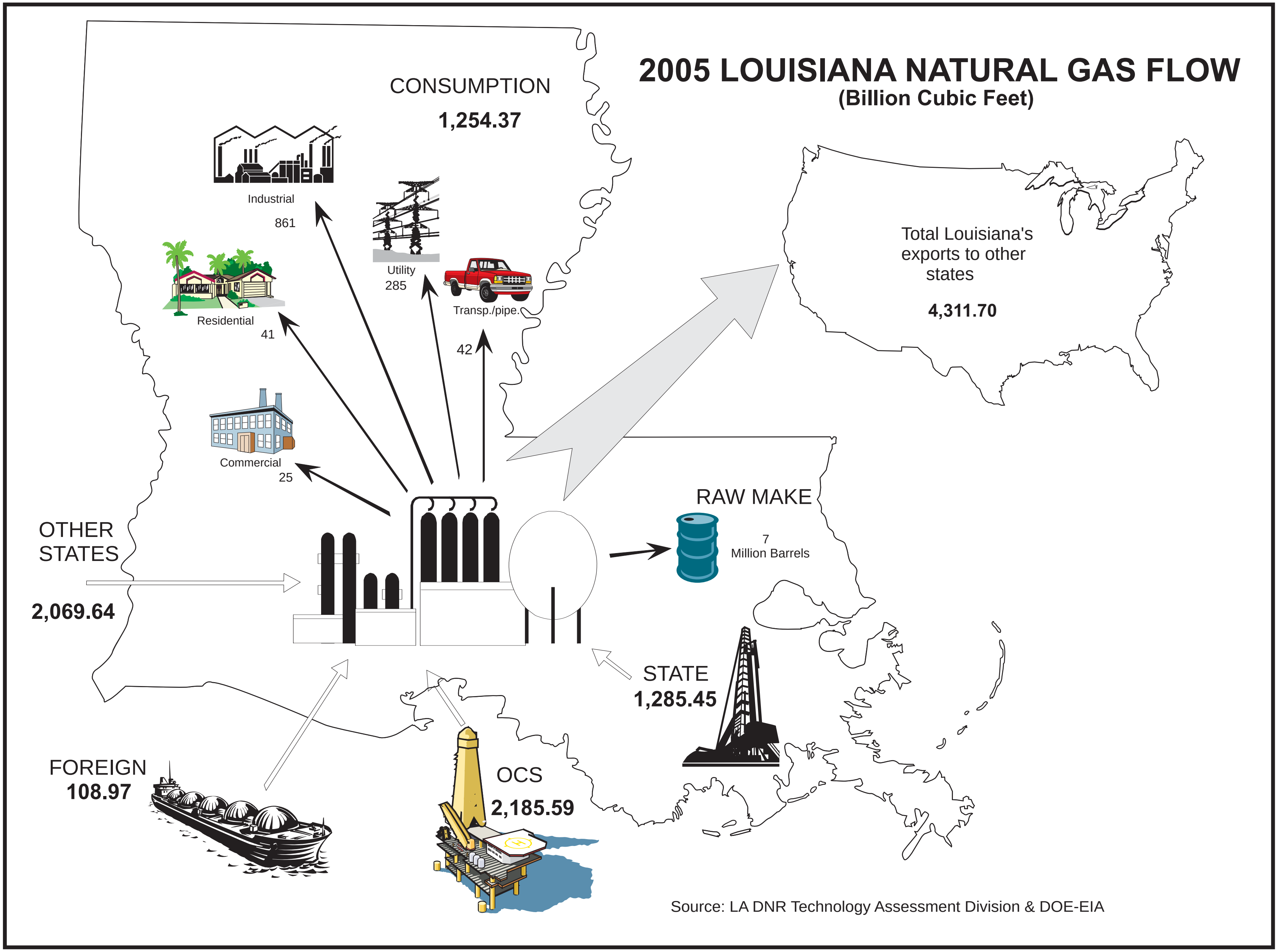
(Billion Cubic Feet (BCF) at 15.025 psia and 60 degrees Fahrenheit)*

	MARKETED			EXTRACTION	
DATE	State	OCS[12]	Total[3]	LOSS[3]	DRY[3]
1965	3,658 e	627	4,285 e	N/A	N/A
1966	4,063 e	937	5,000 e	N/A	N/A
1967	4,549 e	1,055	5,605	113	5,492
1968	4,918 e	1,372	6,290	138	6,153
1969	5,317 e	1,769	7,086	176	6,910
1970	5,429 e	2,206	7,635	189	7,446
1971	5,367 e	2,556	7,923	191	7,732
1972	5,020 e	2,797	7,816	194	7,622
1973	5,115 e	2,966	8,081	203	7,878
1974	4,351 e	3,251	7,601	191	7,411
1975	3,717 e	3,234	6,951	186	6,766
1976	3,472 e	3,397	6,869	169	6,700
1977	3,533 e	3,540	7,073	163	6,910
1978	3,302 e	4,028	7,330	158	7,171
1979	3,087 e	4,036	7,124	162	6,961
1980	2,908 e	3,896	6,804	139	6,664
1981	2,661 e	3,986	6,647	140	6,507
1982	2,359 e	3,692	6,050	126	5,924
1983	2,147 e	3,080	5,227	122	5,106
1984	2,237 e	3,473	5,711	130	5,581
1985	1,890 e	3,025	4,915	115	4,800
1986	1,958 e	2,842	4,799	113	4,686
1987	1,935 e	3,086	5,022	122	4,899
1988	2,073 e	3,006	5,079	118	4,961
1989	2,060 e	2,918	4,978	119	4,859
1990	1,542 e	3,597	5,139	117	5,022
1991	1,742 e	3,193	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	3,580	5,085	144	4,882
1998	1,552	3,580	5,132	139	4,933
1999	1,567	3,565	5,132	158	4,912
2000	1,455	3,592	5,047	165	4,928 r
2001	1,502	3,601	5,103	153 e	4,926 e
2002	1,362	3,351 e	4,713 r	157 e	4,532 e
2003	1,350	3,172 e	4,522 r	125 e	4,467 e
2004	1,357	2,754 e	4,111 r	133 e	4,249 e
2005	1,296 r	2,116 e	3,412 r	130 e	3,273 e
2006	1,380	2,052 e	3,432	129 e	3,293 e

e Estimated   r Revised   p Preliminary

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

Figure 6



2005 LOUISIANA NATURAL GAS FLOW
(Billion Cubic Feet)
CONSUMPTION
1,254.37
Industrial
861
Utility
285
Transp./pipe.
42
Residential
41
Commercial
25
Total Louisiana's exports to other states
4,311.70
OTHER STATES
2,069.64
RAW MAKE
7
Million Barrels
STATE
1,285.45
FOREIGN
108.97
OCS
2,185.59
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
1986	1,849,689,870	61,394,328	22,460,870	1,933,548,068
1987	1,710,600,175	56,471,054	22,020,986	1,789,092,195
1988	1,748,310,878	56,729,077	22,829,692	1,827,869,647
1989	1,577,841,418	56,316,278	20,374,445	1,654,532,141
1990	1,487,438,834	54,709,819	22,370,768	1,564,519,421
1991	1,529,057,929	54,419,642	31,800,386	1,615,277,957
1992	1,525,451,737	53,547,797	19,438,902	1,598,438,436
1993	1,492,986,396	52,500,178	35,820,609	1,581,307,183
1994	1,499,489,622	55,146,661	25,466,874	1,580,103,157
1995	1,463,723,027	46,017,071	13,839,450	1,523,579,548
1996	1,410,035,722	52,417,334	13,688,870	1,476,141,926
1997	1,334,980,887	53,491,942	13,759,192	1,402,232,021
1998	1,354,105,430	52,368,159	11,191,715	1,417,665,304
1999	1,343,182,922	57,663,413	9,951,387	1,410,797,722
2000	1,191,471,607	60,242,544	11,733,098	1,263,447,249
2001	1,151,493,116	57,308,865	10,617,631	1,219,419,612
2002	1,217,171,149	53,797,867	8,198,104	1,279,167,120
2003	1,068,512,639	75,724,074	7,748,258	1,151,984,971
2004	1,091,483,424	80,659,914	7,963,553	1,180,106,891
2005	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**
January	94,914,940	9,051,086	542,187	104,508,213
February	81,451,825	8,406,131	602,148	90,460,104
March	79,685,460	10,245,994	673,386	90,604,840
April	92,383,059	9,065,815	810,947	102,259,821
May	94,872,491	10,166,354	621,877	105,660,722
June	78,161,634	10,720,017	519,750	89,401,401
July	124,449,626	12,737,772	869,069	138,056,467
August	92,338,062	11,174,892	526,814	104,039,768
September	81,378,577	8,592,290	527,020	90,497,887
October	91,289,876	12,293,765	327,958	103,911,599
November	N/A	N/A	N/A	N/A
December	N/A	N/A	N/A	N/A
2007 Total	**910,925,550**	**102,454,116**	**6,021,156**	**1,019,400,822**

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
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
2006	2,122,733,551	779,987,637	37,229,814	2,940,229,138

NOTE: Starting in 2002 MMS has not formally published production by state adjacent 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

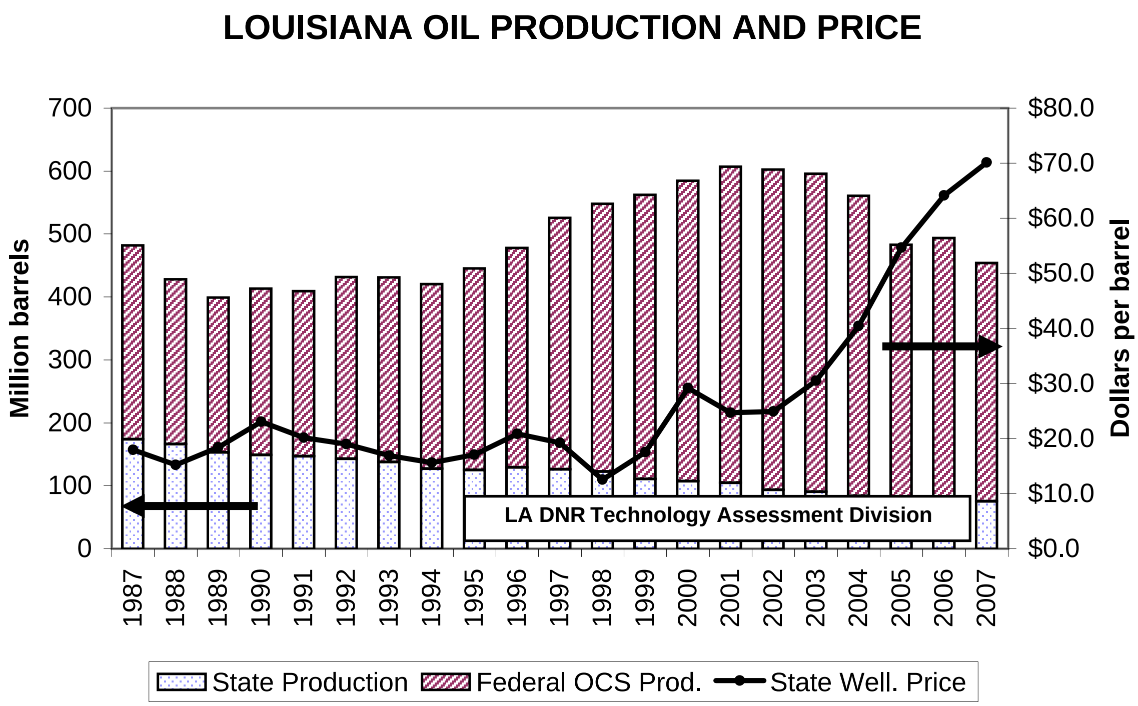


Figure 8

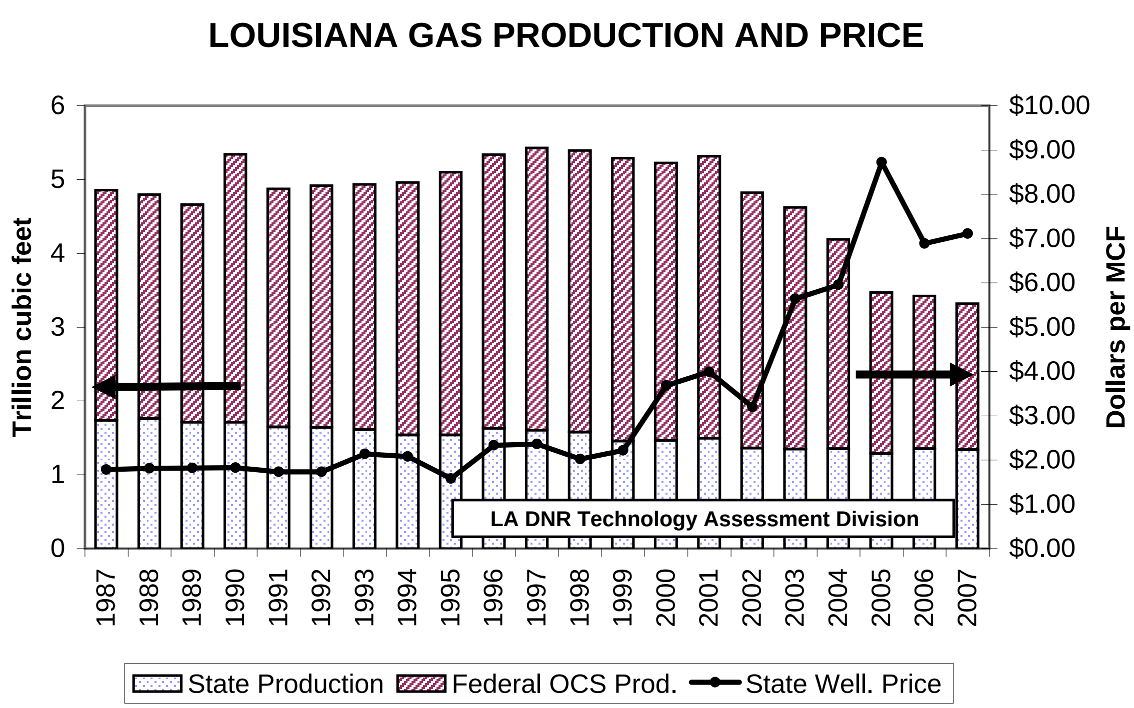


Table 16

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
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	23,499 r	19,230 r	19,134 r	18,226 r	4,175
2005	22,996 r	18,672 r	18,555 r	17,696 r	4,256 r
January	1,943 r	1,594 r	1,586 r	1,512 r	353 r
February	1,766 r	1,437 r	1,429 r	1,362 r	315 r
March	1,954 r	1,607 r	1,598 r	1,523 r	341 r
April	1,882 r	1,559 r	1,550 r	1,478 r	326 r
May	1,928 r	1,619 r	1,610 r	1,535 r	344 r
June	1,896 r	1,587 r	1,577 r	1,503 r	341 r
July	1,942 r	1,632 r	1,623 r	1,547 r	364 r
August	1,950 r	1,632 r	1,623 r	1,547 r	358 r
September	1,902 r	1,590 r	1,580 r	1,506 r	327 r
October	1,976 r	1,642 r	1,632 r	1,556 r	327 r
November	1,927	1,585	1,575	1,501	332
December	1,980	1,628	1,617	1,541	376
2006 Total	**23,046 r**	**19,112 r**	**19,001 r**	**18,113 r**	**4,104 r**
January	2,003	1,620	1,612	1,544	388
February	1,805	1,460	1,451	1,388	366
March	2,037	1,649	1,641	1,569	394
April	1,960	1,597	1,589	1,519	382
May	2,036	1,628	1,619	1,546	373
June	1,939	1,616	1,607	1,537	372
July	2,015	1,676	1,666	1,594	406
August	2,019	1,675	1,666	1,594	413
September	1,969	1,632	1,623	1,552	345
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
2007 Total	**17,784**	**14,553**	**14,474**	**13,842**	**3,438**

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**
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
2005	56.86	52.75	54.68	50.97	54.62	52.20 r
January	66.01	61.38	62.92	56.91	58.61	61.64 r
February	62.22	58.29	60.11	57.00	58.70	59.22 r
March	64.33	59.02	60.67	57.99	61.79	60.87 r
April	71.43	66.27	67.89	62.01	60.26	60.82 r
May	72.51	67.08	68.72	64.58	62.64	68.65 r
June	71.84	67.27	69.58	63.34	66.56	67.65 r
July	76.27	70.69	70.96	67.48	64.68	72.62 r
August	75.05	69.40	71.79	68.52	70.16	71.10 r
September	63.91	60.66	63.40	62.96	71.34	67.09 r
October	59.52	55.41	57.03	55.45	67.20	54.51 r
November	61.53	55.11	56.57	53.71	63.37	55.70 r
December	64.67	58.36	60.16	56.19	57.35	57.29 r
2006 Total	**67.44**	**62.41**	**64.15 r**	**60.51 r**	**63.55**	**63.10 r**
January	56.72	51.14	53.96	52.98	58.55	54.76
February	62.56	55.92	58.43	53.59	56.60	57.50
March	64.62	57.25	60.13	56.15	53.79	61.08
April	69.19	60.69	63.52	59.49	56.98	62.98
May	69.09	59.76	64.14	62.35	58.08	63.93
June	73.20	64.15	68.13	64.32	59.88	68.14
July	69.14	72.11	75.76	69.83	62.38	74.90
August	73.33	69.36	74.07	68.79	63.51	59.31
September	79.86	75.56	78.30	72.83	70.90	77.24
October	86.25	82.06	84.53	77.75	71.31	82.24
November	95.97	91.51	90.21	85.21	89.70	90.18
December	95.32	N/A	N/A	N/A	N/A	N/A
2007 Total	**74.60**	**67.23**	**70.11**	**65.75**	**63.79**	**68.39**

e Estimated   r Revised   p Preliminary

See footnote in Appendix B.

Figure 9

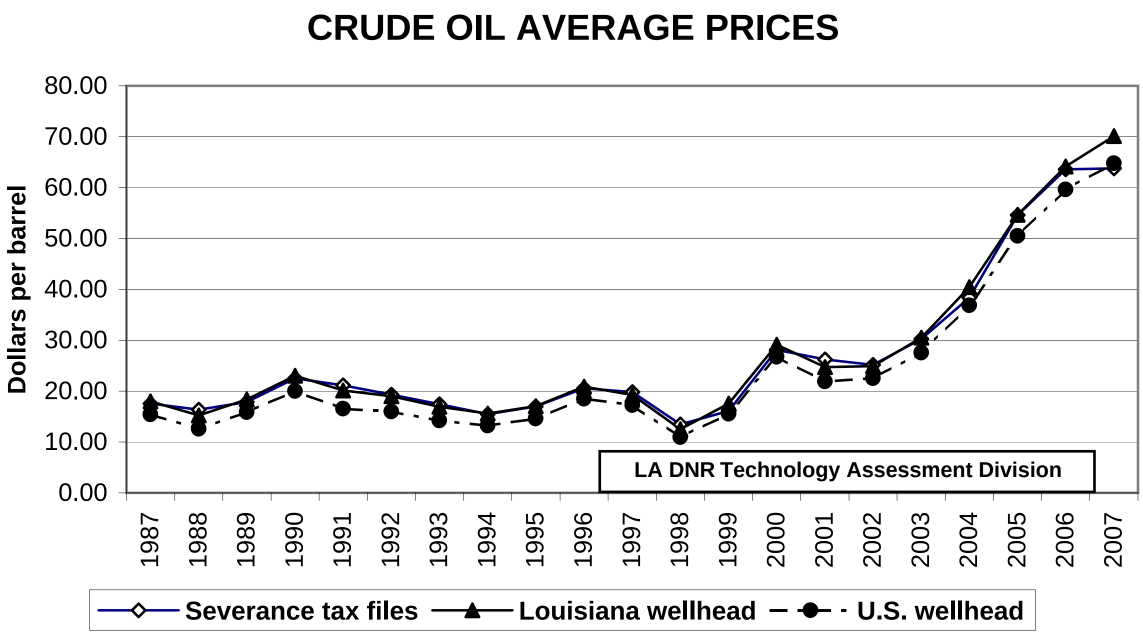


Figure 10

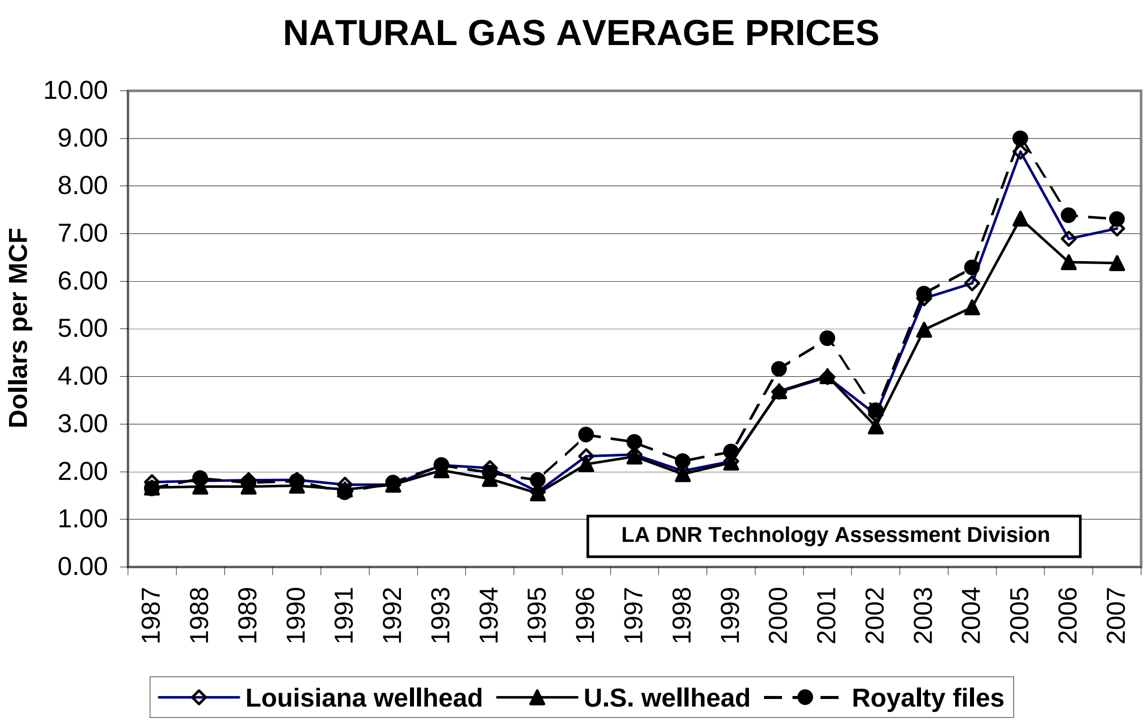


TABLE 18

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
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
2005	53.05	48.93	50.53	49.41	47.74	49.75
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	57.20	54.66 r	55.93 r
October	56.80	52.71	53.26	52.82	50.63 r	52.71 r
November	55.44 r	52.52 r	52.42	53.01	51.52	53.08
December	57.81	54.99	55.03	54.53	52.84	54.30
2006 Total	**62.51 r**	**58.87 r**	**59.61 r**	**59.01 r**	**57.06 r**	**59.20 r**
January	53.10	49.51	49.32	50.40	48.00	50.82
February	55.75	53.70	52.94	53.95	51.96	53.75
March	57.86	56.26	54.95	57.38	55.46	57.79
April	61.13	60.40	58.20	60.93	59.47	62.26
May	62.04	61.44	58.90	62.81	60.73	63.82
June	64.95	65.14	62.35	66.19	64.38	66.98
July	72.03	70.72	69.23	70.46	69.23	71.93
August	71.57	68.28	67.78	69.01	66.60	68.71
September	75.84	72.22	73.16	73.49	72.23	75.42
October	82.14	78.61	79.32	77.36	77.20	81.07
November	90.30	86.38	86.31	86.40	85.64	87.27
December	N/A	N/A	N/A	N/A	N/A	N/A
2007 Total	**67.88**	**65.70**	**64.77**	**66.22**	**64.63**	**67.26**

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
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
2005	8.58	8.72	9.00	8.96	8.84	9.26	9.05
January	N/A	N/A	10.85	11.89	8.97	9.84	9.48
February	N/A	N/A	8.40	8.74	7.90	8.17	8.03
March	N/A	N/A	7.34	7.40	6.82	7.18	7.04
April	N/A	N/A	7.50	7.52	7.22	7.44	7.33
May	N/A	N/A	7.14	7.49	6.64	6.79	6.72
June	N/A	N/A	6.36	6.21	6.36	6.55	6.44
July	N/A	N/A	6.51	6.35	6.16	6.40	6.24
August	N/A	N/A	7.59	7.32	7.44	7.84	7.56
September	N/A	N/A	6.18	7.09	5.27	5.78	5.62
October	N/A	N/A	5.14	4.37	5.31	5.48	5.38
November	N/A	N/A	7.66	7.44	7.41	7.61	7.52
December	N/A	N/A	7.91	8.65	7.38	7.77	7.62
2006 Total	**6.77**	**6.89**	**7.38**	**7.54**	**6.91**	**7.24**	**7.08**
January	N/A	N/A	6.40	6.07	6.30	6.50	6.37
February	N/A	N/A	7.85	7.19	8.02	8.57	8.20
March	N/A	N/A	7.72	7.85	7.34	7.53	7.44
April	N/A	N/A	8.02	7.86	7.69	7.90	7.80
May	N/A	N/A	8.07	7.81	7.82	7.94	7.89
June	N/A	N/A	7.74	7.89	7.74	7.86	7.81
July	N/A	N/A	6.89	7.21	6.53	6.67	6.62
August	N/A	N/A	6.69	6.18	6.50	6.78	6.58
September	N/A	N/A	6.16	5.65	5.84	6.02	5.93
October	N/A	N/A	7.45	6.68	6.70	6.89	6.79
November	N/A	N/A	7.37	7.56	7.12	7.32	7.24
December	N/A	N/A	7.29	7.49	7.29	7.48	7.39
2007 Total	**7.03 p**	**7.11 p**	**7.30**	**7.12**	**7.08**	**7.29**	**7.17**

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	SPOT MARKET[5] High	SPOT MARKET[5] Average
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
2005	8.25	8.38	8.65	8.62	8.50	8.90	8.70
January	N/A	N/A	10.43	11.43	8.62	9.46	9.11
February	N/A	N/A	8.08	8.40	7.59	7.86	7.72
March	N/A	N/A	7.06	7.11	6.56	6.91	6.77
April	N/A	N/A	7.21	7.23	6.94	7.16	7.05
May	N/A	N/A	6.86	7.20	6.38	6.53	6.46
June	N/A	N/A	6.11	5.98	6.11	6.30	6.19
July	N/A	N/A	6.26	6.11	5.93	6.15	6.00
August	N/A	N/A	7.29	7.04	7.15	7.54	7.27
September	N/A	N/A	5.94	6.82	5.07	5.56	5.41
October	N/A	N/A	4.94	4.20	5.10	5.27	5.17
November	N/A	N/A	7.37	7.15	7.13	7.32	7.23
December	N/A	N/A	7.60	8.32	7.10	7.47	7.33
2006 Total	**6.51**	**6.63**	**7.10**	**7.25**	**6.64**	**6.96**	**6.81**
January	N/A	N/A	6.15	5.84	6.06	6.25	6.12
February	N/A	N/A	7.55	6.92	7.71	8.24	7.88
March	N/A	N/A	7.42	7.55	7.06	7.24	7.15
April	N/A	N/A	7.71	7.56	7.40	7.59	7.50
May	N/A	N/A	7.76	7.51	7.52	7.63	7.59
June	N/A	N/A	7.44	7.59	7.44	7.55	7.51
July	N/A	N/A	6.62	6.93	6.28	6.42	6.36
August	N/A	N/A	6.43	5.94	6.25	6.52	6.33
September	N/A	N/A	5.93	5.43	5.62	5.79	5.70
October	N/A	N/A	7.17	6.42	6.44	6.62	6.53
November	N/A	N/A	7.09	7.27	6.85	7.04	6.96
December	N/A	N/A	7.01	7.20	7.01	7.20	7.11
2007 Total	**6.76** p	**6.84** p	**7.02**	**6.85**	**6.80**	**7.01**	**6.89**

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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
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
2005	8.93	14.88	11.61 r	9.33	9.50
January	11.29	14.60 r	13.81 r	11.42 r	11.64 r
February	8.02	12.69 r	12.15 r	8.54 r	8.69 r
March	7.64	14.06 r	12.36 r	7.13 r	8.11 r
April	7.58	14.75 r	11.45 r	7.21 r	7.77 r
May	7.17	16.99 r	11.89 r	7.03 r	7.25 r
June	6.95	19.86 r	12.29 r	6.84 r	6.97 r
July	6.92	16.99 r	10.77 r	6.91 r	6.83 r
August	7.34	17.59 r	10.43 r	7.57 r	7.95 r
September	6.36 r	16.91 r	9.40 r	6.96 r	6.96
October	5.38 r	15.33 r	10.05 r	5.07 r	5.94
November	7.59	14.00	12.06	7.29	7.94
December	7.64	13.64	12.82	7.33	9.06
2006 Total	**7.49 r**	**15.62 r**	**11.62 r**	**7.44 r**	**7.93 r**
January	7.13	12.33	11.92	6.75	6.80
February	7.84	12.97	11.98	7.93	8.40
March	7.81	13.80	12.28	8.28	7.98
April	7.93	15.20	12.15	8.29	8.14
May	7.89	16.29	12.25	8.25	8.24
June	7.58	17.36	12.02	7.40	8.35
July	7.27	17.42	11.37	7.72	7.26
August	8.15	16.74	10.51	N/A	7.06
September	5.59	16.86	10.04	5.58	N/A
October	6.18	16.31	11.04	6.27	N/A
November	N/A	N/A	N/A	N/A	N/A
December	N/A	N/A	N/A	N/A	N/A
2007 Total	**7.34**	**15.53**	**11.56**	**7.39**	**7.78**

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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
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
2005	8.59	14.31 r	11.16 r	8.97	9.14
January	10.86	14.04 r	13.28 r	10.98 r	11.19 r
February	7.71	12.20 r	11.68 r	8.21 r	8.36 r
March	7.35	13.52 r	11.88 r	6.86 r	7.80 r
April	7.29	14.18 r	11.01 r	6.93 r	7.47 r
May	6.89	16.34 r	11.43 r	6.76 r	6.97 r
June	6.68	19.10 r	11.82 r	6.58 r	6.70 r
July	6.65	16.34 r	10.36 r	6.64 r	6.57 r
August	7.06	16.91 r	10.03 r	7.28 r	7.64 r
September	6.12 r	16.26 r	9.04 r	6.69 r	6.69
October	5.17 r	14.74 r	9.66 r	4.88 r	5.71
November	7.30	13.46	11.60	7.01	7.63
December	7.35	13.12	12.33	7.05	8.71
2006 Total	**7.20 r**	**15.02 r**	**11.18 r**	**7.16 r**	**7.62 r**
January	6.86	11.86	11.46	6.49	6.54
February	7.54	12.47	11.52	7.63	8.08
March	7.51	13.27	11.81	7.96	7.67
April	7.63	14.62	11.68	7.97	7.83
May	7.59	15.66	11.78	7.93	7.92
June	7.29	16.69	11.56	7.12	8.03
July	6.99	16.75	10.93	7.42	6.98
August	7.84	16.10	10.11	N/A	6.79
September	5.38	16.21	9.65	5.37	N/A
October	5.94	15.68	10.62	6.03	N/A
November	N/A	N/A	N/A	N/A	N/A
December	N/A	N/A	N/A	N/A	N/A
2007 Total	**7.05**	**14.93**	**11.11**	**7.10**	**7.48**

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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]
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
2005	7.32	8.67	8.09	8.72	13.72 r
January	8.02 r	9.02	10.11	10.80 r	14.94
February	6.86 r	7.76	7.96	9.34 r	14.00 r
March	6.44 r	6.72	7.00	8.81 r	13.19 r
April	6.38 r	6.90	6.73	8.29 r	13.29 r
May	6.24 r	6.37	6.53	7.99 r	14.43 r
June	5.78 r	6.19	5.83 r	7.39 r	15.09 r
July	5.92 r	6.11	5.95 r	7.40 r	15.73 r
August	6.56 r	7.28	6.74	8.10 r	16.19 r
September	6.06 r	5.53	5.83	7.68 r	15.73 r
October	5.09 r	5.25	4.88	6.42 r	12.52 r
November	6.72	7.15	7.24	8.47	12.47
December	6.76	7.43	7.60	8.66	12.54
2006 Total	**6.40 r**	**6.81 r**	**6.87 r**	**8.28 r**	**14.18 r**
January	5.92	6.41	6.49	7.89	12.09
February	6.66	8.07	7.39	8.59	12.12
March	6.56	7.21	7.46	8.81	12.86
April	6.84	7.38	7.23	8.19	13.27
May	6.98	7.50	7.45	8.36	14.61
June	6.86	7.32	7.34	8.38	16.20
July	6.19	6.35	7.16	7.94	16.65
August	5.90	6.25	N/A	7.46	16.64
September	5.61	5.56	N/A	6.89	15.94
October	6.25	6.43	N/A	7.36	14.51
November	N/A	6.73	N/A	N/A	N/A
December	N/A	7.51	N/A	N/A	N/A
2007 Total	**6.38**	**6.89**	**7.22**	**7.99**	**14.49**

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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]
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
2005	7.04	8.34	7.77	8.38	13.19 r
January	7.71 r	8.67	9.72	10.38 r	14.37
February	6.60 r	7.46	7.65	8.98 r	13.46 r
March	6.19 r	6.46	6.73	8.47 r	12.68 r
April	6.13 r	6.64	6.47	7.97 r	12.78 r
May	6.00 r	6.13	6.28	7.68 r	13.88 r
June	5.56 r	5.96	5.61 r	7.11 r	14.51 r
July	5.69 r	5.87	5.72 r	7.12 r	15.13 r
August	6.31 r	7.00	6.48	7.79 r	15.57 r
September	5.83 r	5.32	5.61	7.38 r	15.13 r
October	4.89 r	5.05	4.69	6.17 r	12.04 r
November	6.46	6.87	6.96	8.14	11.99
December	6.50	7.14	7.31	8.33	12.06
2006 Total	**6.16 r**	**6.55 r**	**6.60 r**	**7.96 r**	**13.63 r**
January	5.69	6.17	6.24	7.59	11.63
February	6.40	7.76	7.11	8.26	11.65
March	6.31	6.94	7.17	8.47	12.37
April	6.58	7.10	6.95	7.88	12.76
May	6.71	7.21	7.16	8.04	14.05
June	6.60	7.04	7.06	8.06	15.58
July	5.95	6.11	6.88	7.63	16.01
August	5.67	6.01	N/A	7.17	16.00
September	5.39	5.35	N/A	6.63	15.33
October	6.01	6.18	N/A	7.08	13.95
November	N/A	6.47	N/A	N/A	N/A
December	N/A	7.22	N/A	N/A	N/A
2007 Total	**6.13**	**6.63**	**6.94**	**7.68**	**13.93**

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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
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
2005	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**
January	161	4	165	4	161
February	136	8	144	3	141
March	200	8	208	6	202
April	150	7	157	2	155
May	227	5	232	3	229
June	180	4	184	5	179
July	187	8	195	2	193
August	190	5	195	3	192
September	159	5	164	0	164
October	170	4	174	2	172
November	172	8	180	4	176
December	150	2	152	0	152
2007 Total	**2,082**	**68**	**2,150**	**34**	**2,116**

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Figure 11

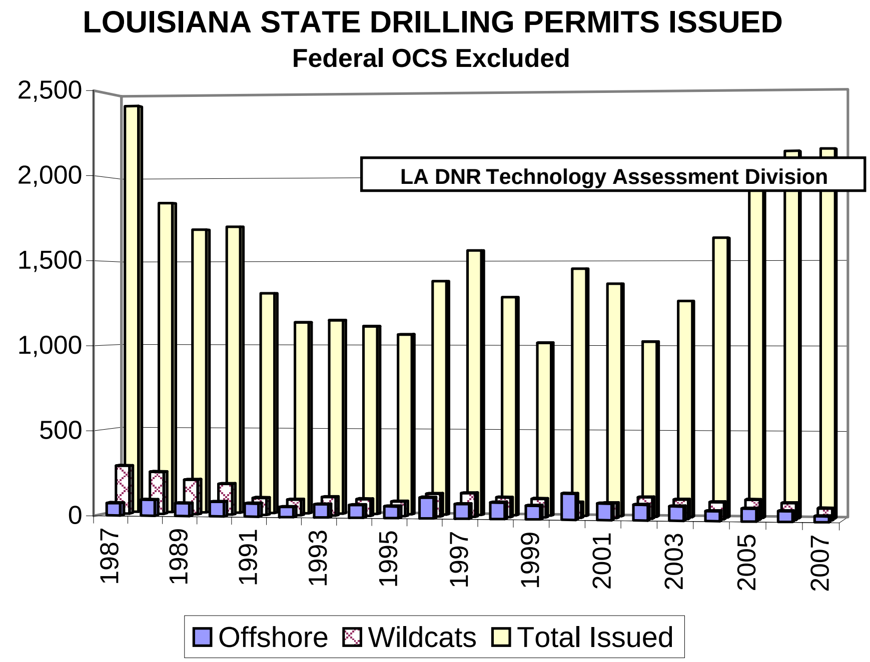

Figure 12

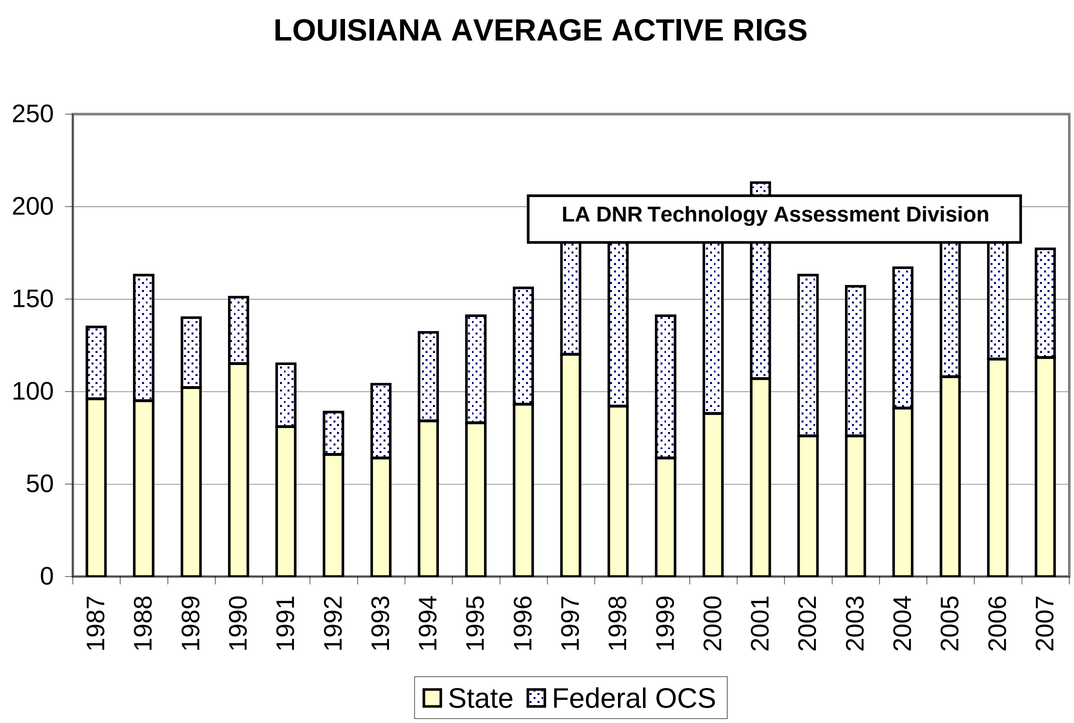

Table 23

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
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
2005	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**
January	53	19	46	2	119	66	68	185
February	56	23	46	1	126	69	71	195
March	57	26	41	2	126	69	70	195
April	60	28	36	2	125	63	64	188
May	58	26	32	3	118	61	64	180
June	55	22	32	3	113	63	66	175
July	59	21	35	3	118	65	68	183
August	60	24	31	4	119	59	63	178
September	62	25	25	3	115	56	59	171
October	56	26	28	2	112	40	42	152
November	61	26	29	1	117	48	49	165
December	58	27	27	3	114	48	50	159
2007 Total	**58**	**24**	**34**	**2**	**118**	**59**	**61**	**177**

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Table 24

LOUISIANA STATE PRODUCING CRUDE OIL WELLS

Excluding OCS

DATE	NORTH	SOUTH	OFFSHORE	TOTAL
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	3,914	408	21,117
2001	16,494	4,257	393	21,144
2002	16,531	4,071	423	21,026
2003	16,516	3,583	467	20,566
2004	16,148	3,485	462	20,095
2005	17,153	3,648	317	21,117
2006	17,072 r	3,615 r	241 r	20,928 r
2007	16,994 e	3,711 e	262 e	20,966 e

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Figure 13

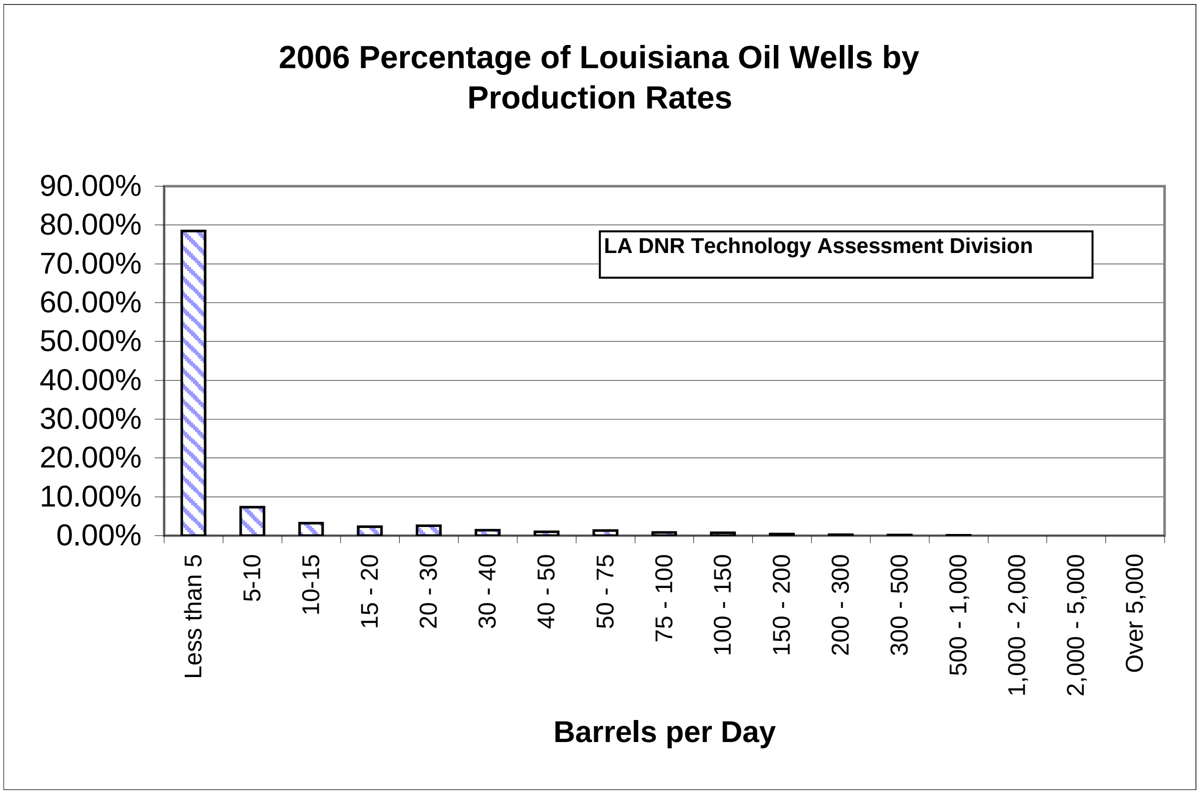

Figure 14

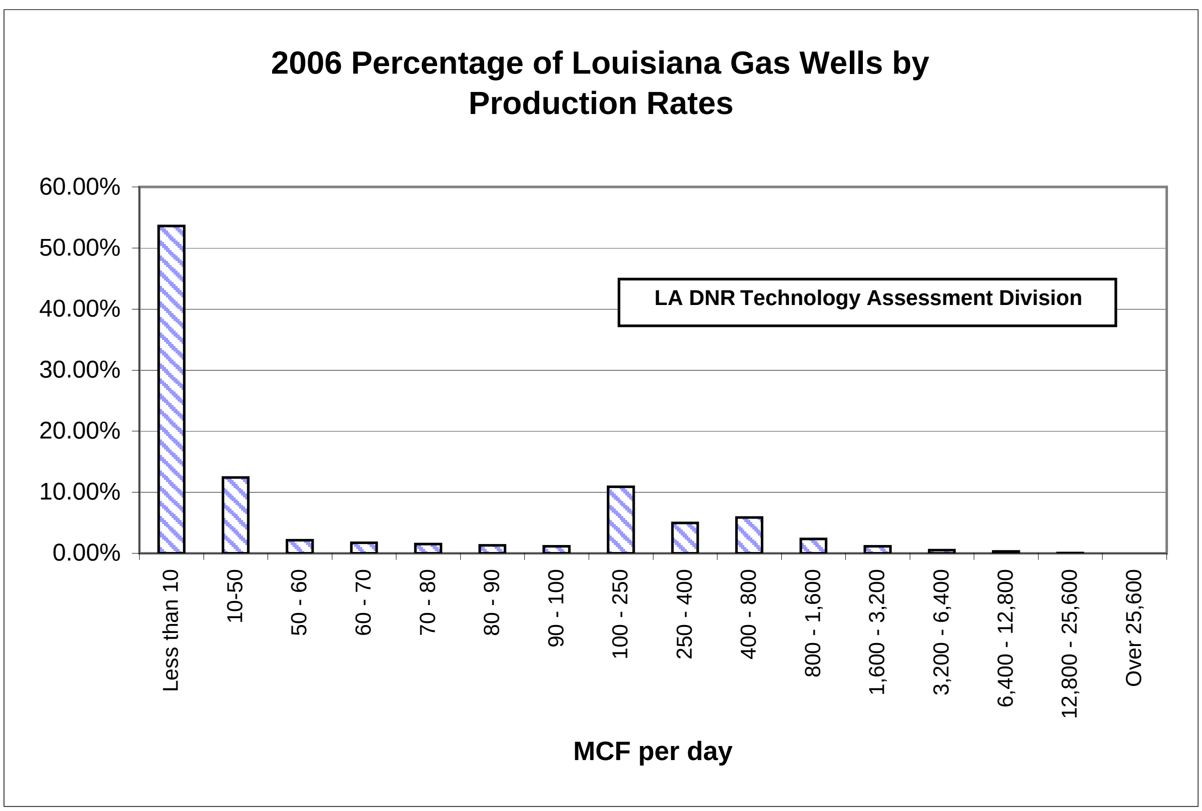

Table 25

LOUISIANA STATE PRODUCING NATURAL GAS WELLS
Excluding OCS

DATE	NORTH	SOUTH	OFFSHORE	TOTAL
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	1297	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	3,194	333	17,231
2001	13,054	3,369	311	16,734
2002	13,438	3,309	344	17,092
2003	13,607	2,952	384	16,944
2004	13,924	3,005	398	17,327
2005	13,996	2,977	258	17,231
2006	14,478 r	3,066 r	204 r	17,748 r
2007	14,707 e	3,211 e	227 e	18,145 e

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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
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
2005	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**
January	4.75	0.12	1.21	6.08
February	11.44	0.11	3.00	14.55
March	1.87	0.32	3.47	5.66
April	3.04	0.47	1.37	4.88
May	4.95	0.46	1.87	7.27
June	7.57	0.42	1.59	9.58
July	-1.11	0.22	2.21	1.31
August	2.53	0.02	2.05	4.60
September	1.93	0.28	1.48	3.69
October	5.59	0.30	1.81	7.70
November	1.22	0.30	1.47	2.99
December	2.16	0.33	1.07	3.55
2007 Total	**45.91**	**3.35**	**22.59**	**71.85**

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Table 28

LOUISIANA STATE MINERAL ROYALTY REVENUE
Excluding OCS
(Million Dollars)

DATE	OIL	GAS	PLANT LIQUIDS	OTHER	TOTAL
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	165.24 r	8.03	0.00	273.37 r
2003	127.61	288.91	9.31	0.00	425.83
2004	143.84 r	274.64 r	14.82 r	0.00	433.30 r
2005	149.55 r	278.58 r	10.41 r	0.00	438.55 r
January	12.63 r	30.66 r	0.90	0.00	44.19 r
February	11.71 r	23.67 r	0.72 r	0.00	36.10 r
March	13.45 r	22.80 r	0.84	0.00	37.09 r
April	15.32 r	23.12 r	0.89	0.00	39.32 r
May	16.79 r	23.78 r	1.06	0.00	41.63 r
June	18.09 r	22.53 r	1.37	0.00	41.99 r
July	20.44 r	22.43 r	1.66 r	0.00	44.52 r
August	21.12 r	26.13 r	1.55 r	0.00	48.81 r
September	18.64 r	20.63 r	1.36 r	0.00	40.63 r
October	17.06 r	17.09 r	1.28 r	0.00	35.43 r
November	17.14 r	24.80 r	1.22 r	0.00	43.15 r
December	18.91 r	26.20 r	1.17 r	0.00	46.28 r
2006 Total	**201.30 r**	**283.84 r**	**14.02 r**	**0.00**	**499.16 r**
January	17.18 e	20.30 e	1.13 e	0.00	38.62 e
February	17.01 e	23.64 e	1.18 e	0.00	41.84 e
March	20.48 e	26.04 e	1.37 e	0.00	47.89 e
April	20.85 e	26.71 e	1.13 e	0.00	48.68 e
May	21.39 e	27.12 e	1.26 e	0.00	49.77 e
June	22.22 e	26.49 e	1.30 e	0.00	50.01 e
July	24.67 e	24.63 e	1.25 e	0.00	50.54 e
August	22.80 e	21.78 e	1.02 e	0.00	45.60 e
September	24.20 e	20.05 e	1.51 e	0.00	45.76 e
October	22.00 e	19.70 e	0.17 e	0.00	41.87 e
November	21.35 e	18.99 e	0.11 e	0.00	40.45 e
December	21.30 e	16.80 e	0.30 e	0.00	38.40 e
2007 Total	**255.44 e**	**272.26 e**	**11.74 e**	**0.00**	**539.44 e**

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
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
2005	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**
January	43.76	35.45	0.15	79.36
February	35.67	29.95	0.07	65.69
March	31.83	29.72	0.14	61.69
April	44.42	32.70	0.09	77.22
May	42.30	33.80	0.07	76.17
June	34.27	23.45	0.15	57.88
July	59.26	46.08	0.18	105.52
August	43.51	33.93	0.24	77.68
September	45.65	22.21	0.08	67.94
October	50.14	23.54	0.19	73.87
November	48.19 e	21.90 e	0.09 e	70.18 e
December	47.36 e	21.78 e	0.11 e	69.25 e
2007 Total	**526.36 e**	**354.52 e**	**1.57 e**	**882.45 e**

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
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
2007	196,129	-2,695,489	25,498,932	0	0	22,999,572

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
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	654,708,631
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	1,202,740,551
2006	30,767,560	1,170,670	1,368,765,057	1,400,703,287
2007	22,999,572	940,888	1,493,470,000 e	1,517,410,460 e

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	OTHER REVENUES	PRODUCTION ROYALTIES	TOTAL[a] COLLECTION
1969	111,660,685	5,584,162	1,922,340	230,198,962	349,366,149
1970	945,064,773	6,243,362	1,692,274	265,953,798	1,218,954,207
1971	96,304,523	5,687,848	1,564,845	328,279,048	431,836,264
1972	2,251,347,556	6,396,291	1,725,573	345,925,581	2,605,395,001
1973	193,031,709	5,272,797	2,005,785	384,131,371	584,441,662
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	597,088,712	933,298,224
1976	482,592,035	12,974,770	1,879,704	681,297,769	1,178,744,278
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	1,086,512,776	2,112,505,710
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	403,879,784	35,752,757	8,727,373	1,571,999,431	2,020,359,345
1989	386,681,177	48,498,402	26,261,190	1,621,095,721	2,082,536,490
1990	421,375,632	55,568,777	16,028,740	2,073,095,303	2,566,068,452
1991	276,234,921	59,126,732	15,444,167	1,857,392,914	2,208,198,734
1992	53,716,787	49,087,621	33,533,897	1,848,599,157	1,984,937,462
1993	61,454,861	29,268,366	119,445,091	2,009,644,653	2,219,812,971
1994	256,271,635	30,003,884	141,190,812	1,888,953,102	2,316,419,433
1995	296,147,733	62,526,069	19,803,444	1,764,875,791	2,143,353,037
1996	24,330,068	53,231,380	40,394,227	2,549,759,516	2,667,715,191
1997	1,169,790	55,761,920	65,651,370	2,857,126,443	2,979,709,523
1998	9,207,972	51,518,286	12,688,603	2,267,502,514	2,340,917,375
1999	1,169,790	41,329,494	49,219,184	2,228,250,265	2,319,968,733
2000	83,630,219	33,093,601	249,743,784	3,482,977,885	3,849,445,489
2001	160,037,859 p	30,078,009 p	177,773,259 p	5,126,344,201 p	5,494,233,328 p
		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	224,006,816 r	2,839,550 r	6,514,658,836 r	7,606,767,938
2007	373,930,998	200,993,255	3,166,689	6,441,214,179	7,019,305,120 r

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

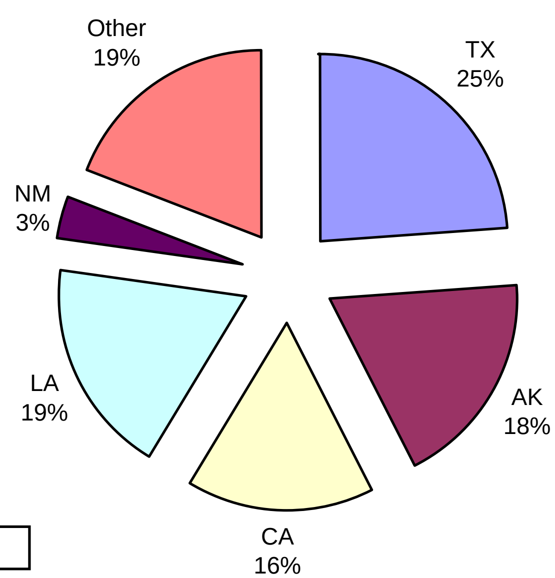
YEAR	North	South Onshore	South Offshore	Federal OCS	Total Louisiana	TOTAL US
1986	160	547	119	1,640	2,466	26,889
1987	175	505	127	1,514	2,321	27,256
1988	154	511	135	1,527	2,327	26,825
1989	123	479	143	1,691	2,436	26,501
1990	120	435	150	1,772	2,477	26,254
1991	127	408	144	1,775	2,454	24,682
1992	125	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
2006	68	312	48	3,500	3,928	20,972

See footnotes on Appendix B

Figure 15

UNITED STATES CRUDE OIL RESERVES
December 31, 2006
Excluding Lease Condensate
(Million Barrels)

STATE	VOLUME
Texas	5,026
Alaska	3,879
California	3,389
Louisiana	3,928
New Mexico	705
Other	4,045
TOTAL	**20,972**



LA DNR Technology Assessment Division

Table 34

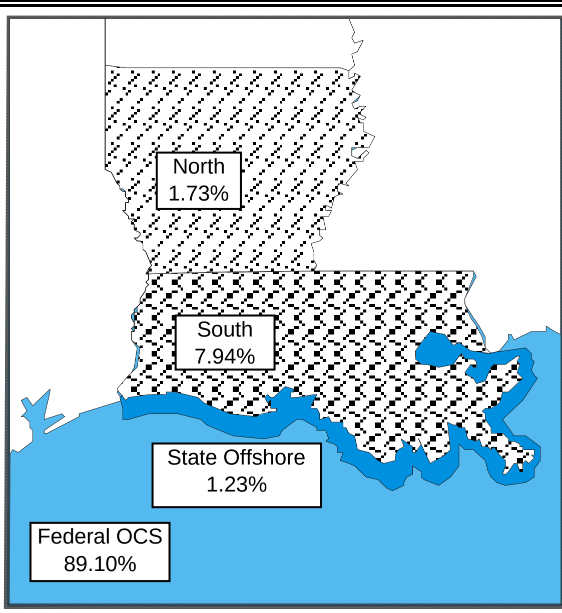
LOUISIANA ESTIMATED LEASE CONDENSATE PROVED RESERVES[9]

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

YEAR	North	South Onshore	South Offshore	Federal OCS	Total Louisiana	TOTAL US
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	107	11	300	437	1,346
2003	19	82	11	251	363	1,215
2004	21	66	9	205	301	1,221
2005	23	72	9	228	332	1,218
2006	29	65	10	185	289	1,339

See footnotes on Appendix B

Figure 16



LOUISIANA CRUDE OIL RESERVES

December 31, 2006
(Million Barrels)

North	68
South	312
Offshore	
State	48
Fed. OCS	3,500
TOTAL	**3,928**

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)

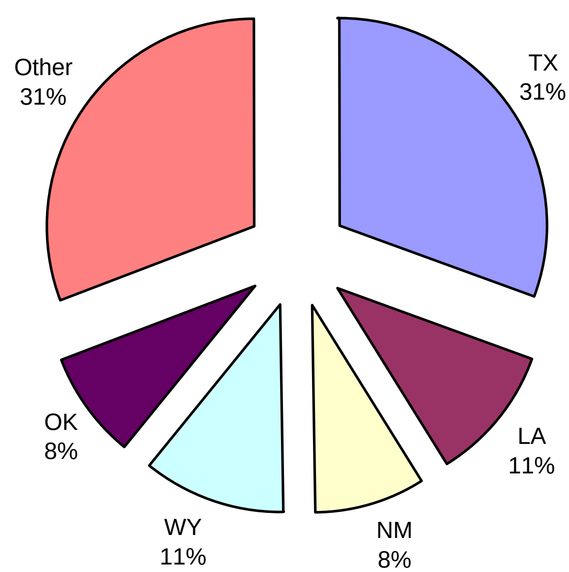
YEAR	North	South Onshore	South Offshore	Federal OCS	Total Louisiana	TOTAL US
1986	2,515	9,103	1,312	25,454 c	38,384 c	191,586
1987	2,306	8,693	1,431	23,260 c	35,690 c	187,211
1988	2,398	8,654	1,172	23,471 c	35,695 c	168,024
1989	2,652	8,645	1,219	24,187 c	36,703 c	167,116
1990	2,588	8,171	969	22,679 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
2006	6,715	3,335	424	11,824 c	22,298 c	211,085

[c] Includes Federal Offshore Alabama

Figure 17

UNITED STATES NATURAL GAS RESERVES
December 31, 2006
(Billion Cubic Feet)

STATE	VOLUME
Texas	64,561
Louisiana	22,298
New Mexico	17,934
Wyoming	23,549
Oklahoma	17,464
Other	65,279
TOTAL	**211,085**



LA DNR Technology Assessment Division

Table 36

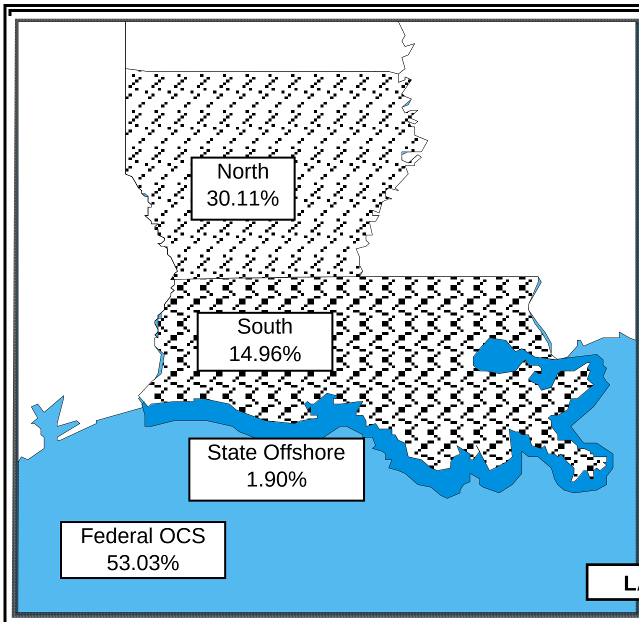
LOUISIANA ESTIMATED NATURAL GAS LIQUIDS PROVED RESERVES[9]
EXCLUDING LEASE CONDENSATE

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

YEAR	North	South Onshore	South Offshore	Federal OCS	Total Louisiana	TOTAL US
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	346	532	6,648
2003	48	100	35	235	418	6,244
2004	53	87	27	410	577	6,707
2005	61	96	32	375	563	6,947
2006	60	94	22	390	484	7,133

See footnotes on Appendix B

Figure 18



LOUISIANA NATURAL GAS RESERVES
December 31, 2006
(Billion Cubic Feet)

North	6,715
South	3,335
Offshore	
State	424
Fed. OCS	11,824
TOTAL	**22,298**

LA DNR Technology Assessment Division

Table 37

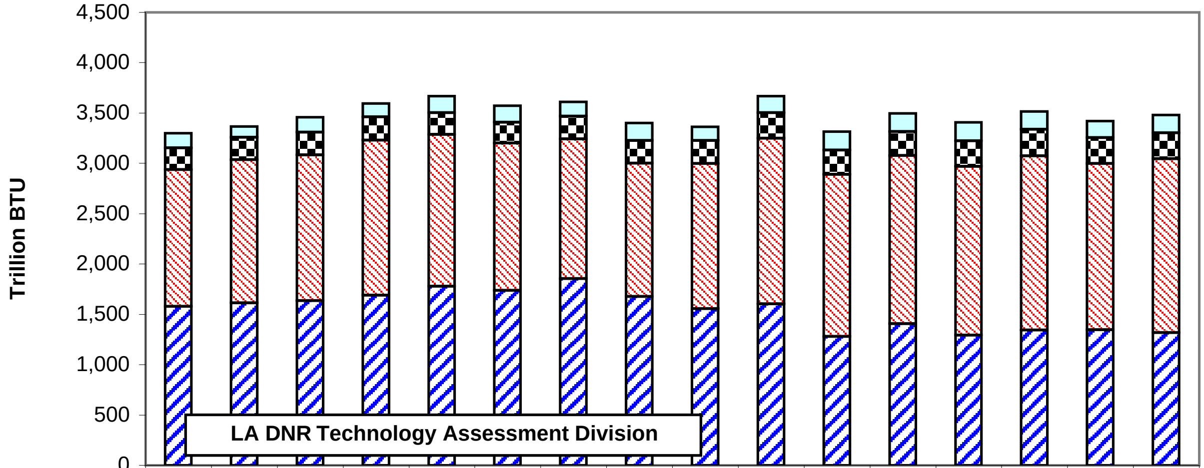
LOUISIANA NONAGRICULTURAL EMPLOYMENT [1]

DATE	OIL & GAS PRODUCTION	CHEMICAL INDUSTRY	PETROLEUM MANUFACTURING	ALL PIPELINE*	TOTAL EMPLOYMENT
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
2004	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**
January	41,799	22,449	10,132	2,274	1,747,593
February	42,154	22,441	10,228	2,266	1,765,886
March	42,550	22,391	10,254	2,379	1,793,167
April	43,037	22,248	10,207	2,325	1,799,727
May	43,361	22,273	10,223	2,332	1,814,871
June	44,373	22,333	10,325	2,362	1,831,664
July	44,914	21,431	10,354	2,369	1,794,314
August	45,474	21,505	10,386	2,380	1,812,496
September	46,288	22,271	10,309	2,361	1,836,951
October	46,278	22,199	10,421	2,356	1,832,341
November	46,120	22,288	10,464	2,372	1,843,923
December	46,381	22,430	10,416	2,384	1,855,074
2006 Average	**44,394**	**22,188**	**10,310**	**2,347**	**1,810,667**

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

Figure 19

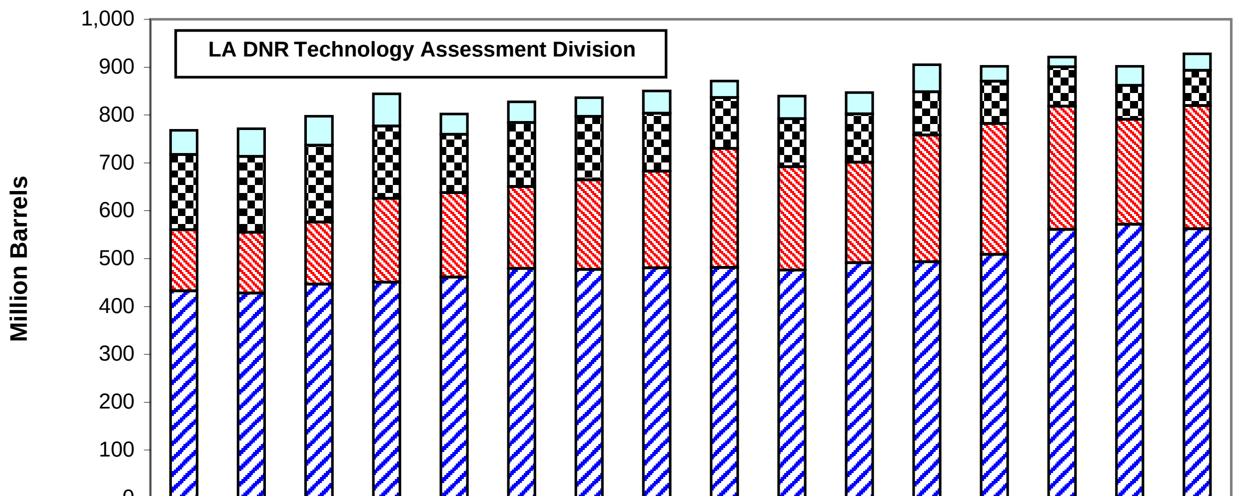
LOUISIANA ENERGY CONSUMPTION BY SOURCE



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Nuclear	146	108	151	134	165	166	142	172	137	165	182	181	183	179	164	175
Coal	214	224	223	231	218	206	225	225	228	253	243	238	254	261	258	258
Petroleum	1,359	1,422	1,448	1,542	1,508	1,464	1,387	1,325	1,441	1,645	1,611	1,669	1,677	1,732	1,650	1,727
Natural Gas	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	1,318
Total	3,546	3,636	3,689	3,837	3,837	3,849	3,828	3,564	3,609	3,965	3,713	3,762	3,693	3,816	3,816	3,767

Figure 20

LOUISIANA REFINERY CRUDE OIL INPUT BY SOURCE



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Other States	51	58	61	68	43	44	40	47	35	47	45	57	32	20	40	34
Louisiana	157	159	160	151	122	134	132	121	106	100	101	90	88	82	71	74
Federal OCS	128	127	130	176	176	171	187	201	249	216	210	265	273	257	219	257
Foreign	433	428	446	450	461	479	477	481	481	476	491	493	509	561	572	562
Total	768	771	797	844	802	828	836	850	871	839	847	905	902	921	902	928

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)
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	1363	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	2457
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	16,126 r
2004	3,816.3 r	1,281	310,492	16,059 r	17,079 r
2005	3,816.3 e	1,286	295,878 r	15,856	15,676 r
2006	3,767.3 e	1,257 e	309,698 e	15,896 e	16,735 r

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

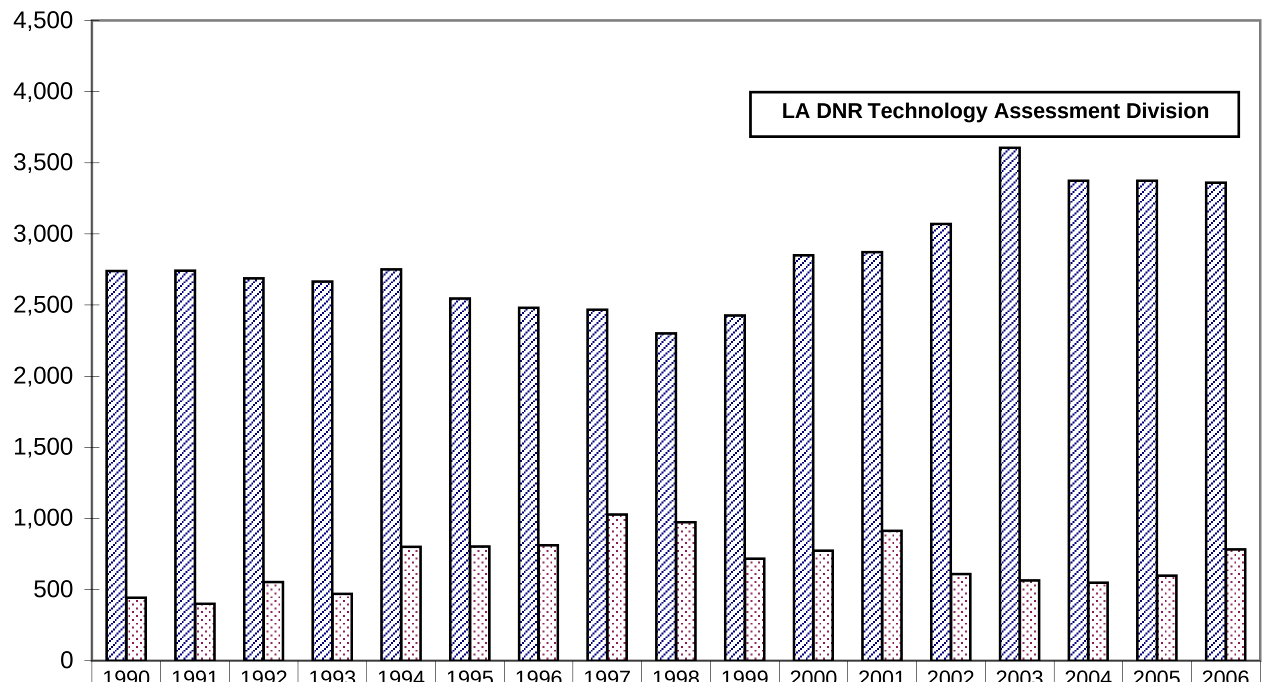
DATE	AVERAGE STOCK ON HAND (Barrels)	DAILY AVERAGE RUNS TO STILL (Barrels)	LICENSED REFINERIES
1986	13,391,258	1,901,450	23
1987	13,967,381	1,947,187	22
1988	14,295,591	1,946,861	21
1989	14,158,306	2,051,304	23
1990	13,783,012	2,045,697	23
1991	14,197,185	2,071,276	23
1992	14,331,412	2,090,248	22
1993	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
2005	16,217,856	2,458,189 r	18
January	17,372,316 r	2,180,754 r	17
February	18,163,882 r	2,302,115 r	17
March	15,466,309 r	2,423,980 r	17
April	16,362,890 r	2,262,910 r	17
May	16,082,853 r	2,531,219 r	17
June	15,534,347 r	2,567,902 r	17
July	17,757,760 r	2,746,637 r	17
August	17,756,635 r	2,793,037 r	17
September	18,185,651 r	2,782,782 r	17
October	17,295,214 r	2,430,451 r	17
November	17,144,272 r	2,521,711 r	17
December	13,776,404 r	2,796,328 r	17
2006 Total	**16,741,544 r**	**2,528,319 r**	**17**
January	15,577,718	2,556,499	17
February	15,669,361	2,652,650	17
March	16,743,885	2,820,918	17
April	15,816,461	2,704,776	17
May	16,574,090	2,729,638	17
June	17,212,594	2,719,927	17
July	16,344,201	2,816,069	17
August	14,821,349	2,666,484	17
September	17,756,078	2,675,334	17
October	17,316,382 p	2,636,550 p	17 p
November	17,132,272 p	2,696,845 p	17 p
December	16,762,390 p	2,622,763 p	17 p
2007 Total	**16,477,232 p**	**2,691,538 p**	**17 p**

e Estimated r Revised p Preliminary

Exxon-Mobil Refinery - Baton Rouge

Figure 21

LOUISIANA LIGNITE PRODUCTION BY MINE SOURCE
(Thousand Tons Shipped)



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Dolet Hills	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	3,361
Oxbow	444	401	554	470	800	804	812	1,029	974	717	773	912	609	564	548	599	783
Total	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	4,144

Table 40

LOUISIANA ELECTRIC UTILITIES NET ELECTRICITY GENERATION [14] BY FUEL TYPE

(Million KWH)

YEAR	COAL	LIGNITE	OIL	GAS	NUCLEAR	TOTAL
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 *
2006	8,659 *	2,886 *	1,759	10,742	16,735	40,781 *

* 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

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	MS	Mississippi
AK	Alaska	MT	Montana
CA	California	ND	North Dakota
CO	Colorado	NM	New Mexico
IL	Illinois	OK	Oklahoma
KS	Kansas	TX	Texas
LA	Louisiana	UT	Utah
MI	Michigan	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: PennWell 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	ANR
Eunice, LA	Patterson, LA
COLUMBIA GULF	COLUMBIA GULF TRANSMISSION CO.
Average Louisiana onshore laterals	Average of Erath, Rayne, and Texaco Henry Plant in Louisiana
LOUISIANA INTRASTATES	LOUISIANA INTRASTATES
Average of Faustina, LIG, Bridgeline, and Monterrey pipelines	Average of LIG, Bridgeline, LRC, and Acadian pipelines
SOUTHERN NATURAL	SONAT
South Louisiana	Saint Mary Parish, LA
TENNESSEE GAS	TENNESSEE GAS
Vinton, LA	Average Zone 1 of 500 & 800
TEXAS GAS TRANSMISSION	TEXAS GAS TRANSMISSION
Zone 1 (North Louisiana)	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

Gas Production 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
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	395,677,666 r	945,498,776 r	152,424,859 r	1,493,601,301 r
2001	397,310,430 r	973,832,888 r	154,069,579 r	1,525,212,897 r
2002	359,131,277 r	892,340,964 r	137,664,063 r	1,389,136,304 r
2003	350,277,616 r	889,027,838 r	132,989,506 r	1,372,294,960 r
2004	336,320,124 r	911,403,982 r	129,211,618 r	1,376,935,723 r
2005	421,351,570 r	782,151,716 r	107,687,945 r	1,311,191,231 r
January	34,652,318 r	70,304,188 r	7,525,708 r	113,332,372 r
February	30,212,033 r	65,873,457 r	9,117,184 r	103,611,197 r
March	31,714,923 r	76,726,969 r	8,797,312 r	117,559,075 r
April	29,775,801 r	74,774,242 r	9,259,366 r	113,347,355 r
May	30,546,694 r	78,856,921 r	8,789,308 r	118,662,981 r
June	29,727,543 r	77,349,804 r	9,425,132 r	115,866,655 r
July	30,288,587 r	77,884,820 r	7,497,106 r	117,598,539 r
August	30,143,731 r	79,730,570 r	7,283,421 r	117,371,408 r
September	29,315,765 r	77,741,038 r	7,453,326 r	114,340,224 r
October	30,092,440 r	80,194,983 r	7,009,119 r	117,740,749 r
November	28,283,504 r	77,771,638 r	7,020,314 r	113,064,261 r
December	28,487,287 r	80,973,835 r	7,163,851 r	116,481,436 r
2006 Total	**363,240,626 r**	**918,182,467 r**	**96,341,146 r**	**1,378,976,254 r**
January	28,681,029	79,016,930	6,444,704	114,861,810
February	25,794,420	70,469,484	7,191,597	102,708,608
March	29,123,726	79,764,278	7,125,849	116,079,600
April	28,556,125	78,001,008	7,550,526	113,682,982
May	29,452,833	82,720,956	7,287,223	119,724,315
June	28,544,274	80,015,594	7,490,320	115,847,091
July	29,491,215	82,611,444	7,755,923	119,592,979
August	27,525,989	80,466,476	7,613,752	115,748,387
September	27,178,039	79,413,387	7,768,498	114,205,177
October	27,489,222 p	81,241,200 p	7,613,152 p	116,498,920 p
November	27,082,417 p	79,976,557 p	7,673,441 p	114,672,126 p
December	27,420,075 p	80,805,334 p	7,635,291 p	115,898,850 p
2007 Total	**336,339,363 p**	**954,502,648 p**	**89,150,276 p**	**1,379,520,847 p**

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
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	1,341,176,442 r	152,424,859 r	3,837,150,457	5,330,751,758
2001	1,371,143,318 r	154,069,579 r	3,895,134,261	5,420,347,158
2002	1,251,472,241 r	137,664,063 r	3,527,116,066	4,916,252,369
2003	1,239,305,454 r	132,989,506 r	3,342,004,232 e	4,714,299,192 e r
2004	1,247,724,105 r	129,211,618 r	2,897,440,676 e	4,274,376,399 e r
2005	1,203,503,286 r	107,687,945 r	2,229,362,826 e	3,540,554,058 e r
January	104,956,505 r	7,525,708 r	169,692,578 e	282,174,791 e r
February	96,085,490 r	9,117,184 r	149,239,969 e	254,442,642 e r
March	108,441,892 r	8,797,312 r	169,763,790 e	287,002,994 e r
April	104,550,043 r	9,259,366 r	171,835,641 e	285,645,049 e r
May	109,403,616 r	8,789,308 r	185,237,944 e	303,430,867 e r
June	107,077,347 r	9,425,132 r	180,207,943 e	296,710,422 e r
July	108,173,407 r	7,497,106 r	191,348,575 e	307,019,088 e r
August	109,874,302 r	7,283,421 r	189,078,700 e	306,236,423 e r
September	107,056,803 r	7,453,326 r	173,867,972 e	288,378,101 e r
October	110,287,424 r	7,009,119 r	180,724,600 e	298,021,144 e r
November	106,055,142 r	7,020,314 r	174,711,598 e	287,787,053 e r
December	109,461,122 r	7,163,851 r	175,405,409 e	292,030,383 e r
2006 Total	**1,281,423,092 r**	**96,341,146 r**	**2,111,114,719 e**	**3,488,878,957 e r**
January	107,697,959	6,444,704	175,941,545 e	290,084,208 e
February	96,263,904	7,191,597	159,053,821 e	262,509,321 e
March	108,888,004	7,125,849	178,577,556 e	294,591,408 e
April	106,557,134	7,550,526	174,859,436 e	288,967,096 e
May	112,173,789	7,287,223	183,667,078 e	303,128,090 e
June	108,559,869	7,490,320	166,218,792 e	282,268,981 e
July	112,102,659	7,755,923	167,736,059 e	117,311,861 e
August	107,992,464	7,613,752	150,154,928 e	117,080,127 e
September	106,591,425	7,768,498	139,464,614 e	98,553,583 e
October	108,730,422 p	7,613,152 p	145,030,715 e	112,961,788 p
November	107,058,974 p	7,673,441 p	N/A	110,528,300 p
December	108,225,409 p	7,635,291 p	N/A	110,181,564 p
2007 Total	**1,290,842,012 p**	**89,150,276 p**	**1,640,704,544 e**	**3,020,696,832 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[12]

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

DATE	MARKETED			EXTRACTION	
	State	OCS[12]	Total[3]	LOSS[3]	DRY[3]
1965	3,731 e	639	4,370 e	N/A	N/A
1966	4,145 e	956	5,101 e	N/A	N/A
1967	4,640 e	1,076	5,717 e	N/A	N/A
1968	5,017 e	1,399	6,416 e	N/A	N/A
1969	5,424 e	1,804	7,228 e	179	7,049
1970	5,538 e	2,250	7,788 e	193	7,595
1971	5,474 e	2,608	8,082 e	195	7,887
1972	5,120 e	2,853	7,973 e	198	7,775
1973	5,217 e	3,025	8,242 e	207	8,036
1974	4,438 e	3,316	7,754 e	194	7,559
1975	3,792 e	3,299	7,091 e	190	6,901
1976	3,542 e	3,465	7,007 e	173	6,834
1977	3,604 e	3,611	7,215 e	166	7,049
1978	3,368 e	4,108	7,476 e	162	7,315
1979	3,149 e	4,117	7,266 e	166	7,101
1980	2,966 e	3,974	6,940 e	142	6,798
1981	2,715 e	4,065	6,780 e	142	6,638
1982	2,406 e	3,766	6,172 e	129	6,043
1983	2,190 e	3,142	5,332 e	124	5,208
1984	2,282 e	3,543	5,825 e	133	5,693
1985	1,928 e	3,086	5,014 e	118	4,896
1986	1,997 e	2,899	4,895 e	116	4,780
1987	1,974 e	3,148	5,123 e	125	4,998
1988	2,114 e	3,066	5,180 e	120	5,060
1989	2,102 e	2,977	5,078 e	121	4,957
1990	1,573 e	3,669	5,242 e	119	5,123
1991	1,777 e	3,257	5,034 e	129	4,905
1992	1,649 e	3,265	4,914 e	133	4,782
1993	1,674 e	3,317	4,991 e	130	4,861
1994	1,691 e	3,479	5,170 e	129	5,041
1995	1,683 e	3,425	5,108 e	146	4,962
1996	1,628 e	3,662	5,290 e	140	5,150
1997	1,535	3,652	5,187	147	4,980
1998	1,583	3,652	5,235	142	5,032
1999	1,598	3,636	5,234	162	5,011
2000	1,484	3,664	5,148	168	5,027 r
2001	1,532	3,673	5,205	156 e	5,025 e
2002	1,389	3,418 e	4,807	160 e	4,623 e
2003	1,377	3,235 e	4,613	127 e	4,556 e
2004	1,385	2,809 e	4,193	136 e	4,334 e
2005	1,322 e r	2,158 e	3,480	132 e	3,339 e
2006	1,407	2,093 e	3,501	132 e	3,359 e

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
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
2006	2,165,245,866	795,608,571	37,975,421	2,999,113,564

NOTE: Starting in 2002 MMS has not formally published production by state adjacent 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
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	23,970 r	19,615 r	19,517 r	18,591 r	4,259
2005	23,457 r	19,046 r	18,927 r	18,051 r	4,341 r
January	1,982 r	1,626 r	1,618 r	1,543 r	360 r
February	1,801 r	1,465 r	1,458 r	1,390 r	321 r
March	1,993 r	1,640 r	1,630 r	1,554 r	348 r
April	1,920 r	1,590 r	1,582 r	1,508 r	332 r
May	1,967 r	1,651 r	1,642 r	1,566 r	351 r
June	1,934 r	1,618 r	1,609 r	1,534 r	348 r
July	1,980 r	1,665 r	1,655 r	1,578 r	371 r
August	1,989 r	1,665 r	1,656 r	1,578 r	365 r
September	1,940 r	1,622 r	1,611 r	1,536 r	334 r
October	2,015 r	1,675 r	1,665 r	1,587 r	334 r
November	1,966	1,616	1,607	1,532	339
December	2,020	1,660	1,649	1,572	383
2006 Total	**23,507 r**	**19,494 r**	**19,382 r**	**18,476 r**	**4,186 r**
January	2,043	1,652	1,644	1,575	396
February	1,841	1,490	1,480	1,416	373
March	2,078	1,682	1,674	1,600	402
April	1,999	1,629	1,620	1,549	389
May	2,077	1,661	1,651	1,577	380
June	1,978	1,648	1,639	1,568	379
July	2,055	1,709	1,700	1,626	414
August	2,059	1,709	1,699	1,626	421
September	2,009	1,665	1,655	1,583	352
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
2007 Total	**18,140**	**14,845**	**14,763**	**14,119**	**3,507**

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

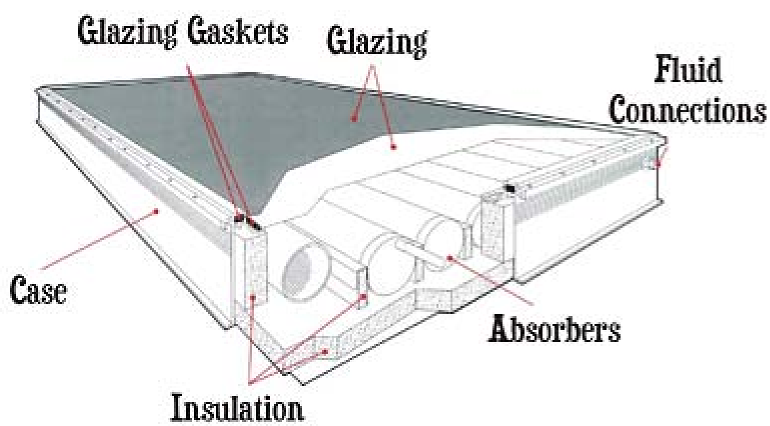
SOLAR WATER HEATING IN LOUISIANA

by
Buddy Justice, Environmental Consultant

Domestic hot water ranks only behind heating and cooling as the highest energy consumers in residences. When the correct type of system is installed by a qualified installer, Louisiana's climate can be highly suited to the use of solar collectors for hot water generation.

Integrated Collection Panels or ICPs are solar collectors that integrate water storage capacity into the collector. ICPs perform extremely well in climate zones 3 and 4 (Southern Louisiana) with no freeze protection, and perform extremely well in climate zones 5 and 6 (Northern Louisiana) with minimal freeze protection. ICPs perform well without freeze protection in Southern Louisiana simply due to their mass and size. The ICP absorber tubes are large (4" diameter), and the tube case maximizes heat retention.

Figure 1. Integrated Collection Panel



Source: URL: http://www.tctsolar.com/doa/specguide.pdf, January 2007

Louisiana's winters are milder than our neighbors in the Northern United States and a solar collector system can be installed for much less than it can be installed for in most Northern parts of the country. Elaborate, very expensive, freeze protection measures are not critical in Louisiana. Even in Northern Louisiana, where the temperatures generally fall lower during winter than they do in South Louisiana, minimal freeze protection measures will sustain a solar collection system. Without the need for expensive freeze protection systems, the cost for installing a solar collector water heater can have dramatic pay back. ICPs serve as the hot water storage tank so they are purchased according to capacity just like you would purchase a conventional electric or gas water heater (30 gallon, 40 gallon, 50 gallon). This also means that the amount of hot water available is as predictable as with a conventional water heater. ICPs can be configured in many ways, even as a direct system where it provides the only source of hot water, however, the recommended installation for the ICP is to be used as a pre-heater for your existing water heater. With ICPs properly sized, and installed as pre-heaters, they can handle total home hot water needs, except on rare occasions. This means that you will only pay for hot water when you exceed the output capacity of the ICP (the rest of the time heating your water costs nothing), and since the ICP serves as a storage tank – you double your hot water capacity and should never run out of hot water.

A 50 gallon ICP system will cost about three and a half times as much as a conventional 50 gallon electric water heater, and about two times as much as a conventional gas water heater (before applying the tax credit incentive[1]), but will pay for itself in about three years in the way of saved utility. Based on a 10 cent per kwhr rate, after the three year payback you can expect to save about $25.00 per month or $300 per year over electric water heating utility. A 30 gallon ICP will yield about one third less savings, or about $200 per year.

Figure 2. Performance Data for ICP

Florida Solar Energy Center
(FSEC - GP - 5 - 80)
(FSEC - GP - 6 - 80)
(FSEC - GP - 7 - 80)

ASHRAE 95-87
Thermal Performance
Standard
for
Solar Water Heaters

Solar Ratings &
Certification Corp.
SRCC Standard 200 - 88
(RA 92)
SRCC OG - 300

Uniform Solar Energy Code
International Association
of Plumbing &
Mechanical Officials

	FSEC Qnet		Florida Energy Factor			SRCC Solar Energy
MODEL	(BTU/day)	(KWH)	North	South/Central	Efficiency	Factor
30 Gallon	22,100	6.48	2.6	2.9	67.0%	1.4
35 Gallon	22,400	6.56	2.6	2.9	67.9%	1.4
40 Gallon	28,400	8.33	4.1	4.9	63.4%	1.6
50 Gallon	28,700	8.42	4.2	5.7	64.1%	1.6

Source: URL: http://www.tctsolar.com/doa/specguide.pdf, January 2007

For more information visit:

- URL: http://www.solardirect.com/swh/swh.htm
- URL: http://www.lses.org

To find a vendor visit:
URL: http://www.tctsolar.com

To find a Louisiana contractor visit:
URL: http://www.findsolar.com/index.php?page=findacontractor

[1] Effective January 1, 2006 through December 31, 2011, under EPACT 2005, purchases of solar water heaters for residential use are eligible for a 30% tax credit of up to $2,000. Further information about this tax credit can be found on the internet at URL: http://www.energystar.gov/index.cfm?c=products.pr_tax_credits#s4.

THE ECONOMIC IMPACT OF COMMERCIAL BUILDING ENERGY CODES IN LOUISIANA

by

Darrell Winters, P.E., C.E.M.

In late 1996, when Louisiana was moving toward the adoption of its first building energy code, the Department of Energy (DOE) was requested to study the economic impact of the adoption of ASHRAE 90.1-1989[1] as the state's commercial building energy code.

The two studies summarized below were recommended by the DOE as representative of the results that the State of Louisiana might realize if the state adopted one of the most current Commercial Building Energy Conservation Codes. These studies are illustrative of the fact that energy codes can, and do, save money. Remember that the two states discussed in this article are from totally different climate zones: Texas, Zones 2 and 3; Michigan, Zones 5 and 6. In both cases, the cost to install lighting equipment decreased in the majority of building types, primarily due to decreased lighting power density (LPD) requirements of the newer codes and increased efficiency of today's lighting equipment. The combination of these two items allows fewer lighting fixtures in most spaces. Lighting designers have adapted to specifying the appropriate fixtures to provide high-quality, uniform lighting that meets today's codes and use considerably less energy than older lighting designs and technologies.

The study conducted by the Pacific Northwest National Laboratory (PNL), dated January 21, 1997, was based largely on a previous PNL report, Hadley and Halverson, 1993. In the 1993 study, ten building types were compared, and the savings potential was presented (Table 1):

Table 1. Building Type Savings Potential, 1993

Building Type	Energy Savings, %	Savings, ¢ / s.f.
Apartment	3.4	2
Small Office	11.5	22
Medium Office	13.5	22
Large Office	11.9	21
Church	7.4	3
School	10.0	6
Hotel	7.8	19
Anchor Retail	28.6	65
Strip Shopping Mall	10.1	19
Warehouse	10.7	3
Straight Average	11.5	18

Source: Pacific Northwest National Laboratory, Hadley and Halverson, 1993

Most of the savings is associated with lighting and cooling. Newer codes allow lower LPD values, while newer lighting technologies require fewer fixtures to meet lighting requirements. Fewer lights result in lower cooling

[1] The current ASHRAE standards are products of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE), are approved by the American National Standards Institute (ANSI) and are jointly sponsored by the Illuminating Engineering Society of North America (IESNA). The most recent standard would then be properly listed as ANSI/ASHRAE/IESNA Standard 90.1-2004.

loads. In many cases, air conditioning equipment has been downsized due to reduced loads.

The 1997 study assumed that then-current building practices in Louisiana met ASHRAE 90A-1980 standards, which were not very strict. The study concluded by stating, "The results of this study, based on simulations for a hybrid Retail/Office building in Shreveport, Louisiana, and adjusted for new construction trends using the DOE's Commercial Building Energy Conservation Survey data set, show that the energy savings potential for Louisiana is about 23%."

The 1997 Louisiana Legislature enacted the Commercial Building Energy Conservation Code (CBECC). The state legislation was mandated by Congress as part of the National Energy Policy Act of 1992 (EPAct) which requires that states incorporate energy efficiency standards into their building codes for commercial buildings. In Louisiana, commercial buildings are defined as all buildings designed for human occupancy, except residential buildings of three stories or less. For multifamily residential buildings of three stories or less, the applicable code was the Council of American Building Officials Model Energy Code (CABO MEC). For all other commercial buildings, the applicable code was ASHRAE/IES 90.1-1989. The energy code took effect July 1, 1998, for state buildings and January 1, 1999, for all other commercial buildings. Effective June 21, 2005, the State of Louisiana adopted ASHRAE 90.1-2001 as its CBECC. This ASHRAE code applies to commercial buildings and multi-family residential structures over three (3) stories. The applicable code for multi-family structures three (3) stories or less is 2000 IECC.

Today, many states are upgrading to more stringent energy codes. The construction of better, more energy-efficient buildings is one of the results of the adoption of newer codes. There are other benefits as well. Several studies have been conducted to analyze the potential savings of lighting system installation costs in conjunction with the energy savings.

In 2001, the State of Texas adopted the International Energy Conservation Code (IECC) 2001 as its commercial building energy code. Recently, the State Energy Conservation Office of Texas asked the DOE to analyze the cost-effectiveness of upgrading their commercial lighting requirements to the 2003 IECC, including the LPD allowances that are a part of the 2004 standard. The main interests of the new lighting guidelines are the LPD allowances and requirements for automatic lighting shutoff controls. The building types and specific changes are shown in Table 2.

The DOE analysis results are summarized as follows:

- 31 of 32 building types show a decrease in allowed LPD.
- 28 of 32 building types show estimated decreases in lighting installation costs.
- The weighted average LPD change across all building types is an estimated decrease of 0.44 watts per square foot statewide compared to new buildings observed during the 1990s.
- The weighted average effect of the cost change across all building types is an estimated decrease in lighting installation costs of $0.79 per square foot across the state based on new buildings observed during the 1990s.
- On a whole-building weighted basis, the lighting controls will produce a payback in less than 5 years.
- From 2006 through 2030, the net present value of the energy and lighting fixture cost savings is estimated to be more than $6 billion.

The State of Michigan currently has ASHRAE 90.1-1999 as its commercial building energy code and is considering an upgrade to the 2004 standard. They requested the DOE to determine the energy effect and the cost-effectiveness of the lighting requirements of the 2004 edition of the ASHRAE standard. The comparison of the 1999 and 2004 standards reveals the changes in each building category as indicated in Table 3.

Table 2. Texas Whole Building Model Comparison, ASHRAE 2001 to 2004

Building Type	90.1-2001 LPD, W/sf	90.1-2004 LPD, W/sf	LPD Change, W/sf	Cost Change, $/sf
Automotive Repair	1.5	0.9	(0.6)	(0.97)
Convention Center	1.4	1.2	(0.2)	(0.34)
Courthouse	1.4	1.2	(0.2)	(0.62)
Dining-Bar Lounge/Leisure	1.5	1.3	(0.2)	(0.22)
Dining-Café/Fast Food	1.8	1.4	(0.4)	0.09
Dining-Family	1.9	1.6	(0.3)	0.32
Dormitory	1.5	1.0	(0.5)	(2.53)
Exercise Center	1.4	1.0	(0.4)	(0.09)
Fire Station	1.3	0.8	(0.5)	(0.52)
Gymnasium	1.7	1.1	(0.6)	(0.07)
Healthcare-Hospital	1.6	1.2	(0.4)	(0.92)
Hotel	1.7	1.0	(0.7)	(1.92)
Library	1.5	1.3	(0.2)	(0.25)
Manufacturing	2.2	1.3	(0.9)	(0.98)
Motel	2.0	1.0	(1.0)	(2.32)
Multi-Family	1.0	0.7	(0.3)	(0.33)
Museum	1.6	1.1	(0.5)	(0.65)
Office	1.3	1.0	(0.3)	(0.77)
Parking Garage	0.3	0.3	0.0	0.04
Penitentiary	1.2	1.0	(0.2)	(0.54)
Police Station	1.3	1.0	(0.3)	(0.57)
Post Office	1.6	1.1	(0.5)	(1.12)
Religious	2.2	1.3	(0.9)	(1.13)
Retail	1.9	1.5	(0.4)	(1.51)
School-College	1.5	1.2	(0.3)	(0.26)
Sports Arena	1.5	1.1	(0.4)	(0.90)
Theater-Performing Arts	1.5	1.6	0.1	0.01
Theater-Motion Picture	1.6	1.2	(0.4)	(0.40)
Town Hall	1.4	1.1	(0.3)	(0.66)
Transportation	1.2	1.0	(0.2)	(0.10)
Warehouse	1.2	0.8	(0.4)	(0.10)
Workshop	1.7	1.4	(0.3)	(0.16)

Source: Pacific Northwest National Laboratory, September 2005

The DOE analysis produced the following energy and economic savings potentials for the State of Michigan:

- 30 of 32 building types analyzed show a decrease in allowed LPD.
- 28 of 32 building types show estimated decreases in lighting installation costs.
- The weighted average LPD change across all building types is estimated to decrease 0.39 watts per square foot.
- The weighted average effect of the cost change across all building types is estimated to decrease $0.63 per square foot for lighting installations.

Table 3. Michigan Whole Building Model Comparison, ASHRAE 1999 to 2004

Building Type	LPD Change, W/sf	Cost Change, $/sf	Building Type	LPD Change, W/sf	Cost Change, $/sf
Automotive Repair	(0.6)	(1.00)	Museum	(0.5)	(0.67)
Convention Center	(0.2)	(0.26)	Office	(0.3)	(0.79)
Courthouse	(0.2)	(0.63)	Parking Garage	0.0	0.04
Dining-Bar Lounge/Liesure	(0.2)	(0.22)	Penitentiary	(0.2)	(0.55)
Dining-Café/Fast Food	(0.4)	0.09	Police Station	(0.3)	(0.59)
Dining-Family	(0.3)	0.33	Post Office	(0.5)	(1.15)
Dormitory	(0.5)	(2.60)	Religious	(0.9)	(1.17)
Exercise Center	(0.4)	(0.09)	Retail	(0.4)	(1.56)
Fire Station	(0.5)	(0.54)	School-College	(0.3)	(0.26)
Gymnasium	(0.6)	(0.07)	Sports Arena	(0.4)	(0.92)
Healthcare-Hospital	(0.4)	(0.94)	Theater-Performing Arts	0.1	0.03
Hotel	(0.7)	(1.97)	Theater-Motion Picture	(0.4)	(0.39)
Library	(0.2)	(0.26)	Town Hall	(0.3)	(0.67)
Manufacturing	(0.9)	(1.01)	Transportation	(0.2)	(0.11)
Motel	(1.0)	(2.38)	Warehouse	(0.4)	(0.10)
Multi-Family	(0.3)	(0.34)	Workshop	(0.3)	(0.16)

Source: Pacific Northwest National Laboratory, September 2006

Code requirements may increase construction costs by a small margin for some products. The energy performance standards for fenestration products, including windows and doors, are more stringent in newer codes and can cause these products to have slightly higher initial costs. Once area suppliers stock units that meet code, prices become very competitive with older models. This has been the case in several other states. What cost increase there is will be off-set by energy savings over time.

Modern construction practices produce structures that are not only safer and more energy-efficient than older buildings, but may actually achieve this without significant increases in related construction costs. Building codes continue to change, usually becoming stricter than earlier codes, but technology also improves, often offsetting the cost increases. Adapting to new codes and utilizing the latest technology, building design and construction techniques are the keys to developing cost-effective buildings in today's environment.

The CBECC is updated or amended by 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. These agencies acted together, utilizing this process, when the CBECC was updated in 2005.

BIOFUELS – PART 2: ETHANOL ISSUES

by

Bryan Crouch, Engineer

Every alternative fuel has issues that have to be addressed in order for it to be implemented. Ethanol and biodiesel are two of the easier-to-implement alternative fuels, but still face challenges. This article is the second in a series about the biofuels ethanol and biodiesel, and will cover some of the issues regarding the use of ethanol as an alternative motor vehicle fuel.

Energy Balance

One of the key reasons to use any alternative motor vehicle fuel is to increase U.S. energy security. This is accomplished by substituting fuels that are made from U.S. resources for fuels (gasoline and diesel) that are made from resources (crude oil) that are imported from nations hostile to the U.S. The ability of ethanol to increase energy security depends on its energy balance. The energy balance of ethanol production is simply the expression of the quantity of energy that is either lost or gained when converting a particular feedstock into ethanol. Virtually all of the ethanol produced in the U.S. is produced from corn, and the energy balance of corn ethanol has been a hotly debated topic since the 1970s. The calculation of the energy balance of corn ethanol includes not only the energy required in the actual conversion process, but secondary energy inputs such as corn farming and transportation, ethanol distribution, and energy credits for coproducts. Many studies have been carried out to assess the energy balance of corn ethanol with little consensus among the results, which have ranged from, approximately, -30% (energy loss) to +30% (energy gain). The wide range of results is due to wide ranging assumptions and estimates that are made for the direct energy inputs, and differences in what exactly is and is not included in secondary energy inputs; that is, where the box is drawn around the process. Several previous studies were reviewed in a 2002 study published by The U.S. Department of Agriculture (USDA)[1]. The study highlighted the differences between the studies which led to the wide range of energy balances. The debate over the energy balance of corn ethanol is not yet settled. The authors of the USDA study calculated a +34% energy balance for corn ethanol, while David Pimentel of Cornell University (his earlier study is included in USDA's 2002 study) still claims the energy balance for corn ethanol is -29% [2].

It is important to remember that, no matter what the true value of corn ethanol's energy balance is, corn ethanol cannot completely displace gasoline in the U.S. The entire corn crop in the U.S., if converted entirely to ethanol, would only replace about 12% of gasoline[3].

Cellulosic ethanol has a much greater potential to displace gasoline. The overall energy balance for cellulosic ethanol is much greater than that of corn ethanol. The USDA's calculation of a +34% energy balance for corn ethanol translates to an energy gain of, approximately, 21,000 Btu per gallon of ethanol. A 1999 study, conducted by the Argonne National Laboratory[4], found that the production of ethanol from cellulose had an energy gain of more than 60,000 Btu. Part of the gain was attributable to electricity being generated during the process. A large part of the

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[1] J. Hill, E. Nelson, D. Tilman, S. Polasky, D. Tiffany, "Environmental, Economic, and Energetic Costs and Benefits of Biodiesel and Ethanol Biofuels," *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 103, No. 30, July 2006. URL: http://www.pnas.org/cgi/content/ abstract/103/30/11206.

[2] D. Pimentel, "Ethanol Fuels: Energy Balance, Economics, and Environmental Impacts are Negative," *Natural Resources Research,* Vol. 12, No. 2, June 2003.

[3] H. Shapouri, J.A. Duffield, M. Wang, "The Energy Balance of Corn Ethanol: An Update," U.S. Dept. of Agriculture, Washington D.C., July 2002. URL: http://www.transportation.anl.gov/pdfs/AF/265.pdf.

[4] M. Wang, C. Saricks, and D. Santini, "Effects of Fuel Ethanol Use on Fuel-Cycle Energy and Greenhouse Gas Emissions," Argonne National Laboratory, Center for Transportation Research, Argonne, IL, January 1999. URL: http://www.transportation.anl.gov/pdfs/TA/58.pdf.

gain is attributable to lower fossil energy used in biomass farming and cellulosic conversion.

Public Perception

When gasoline containing 10% ethanol (commonly referred to as gasohol) started being used in the 1970s, many people experienced problems. Ethanol is corrosive to some of the materials that are typically used in fuel systems. Problems caused by corrosion, such as gasket and seal failures, were not uncommon in automotive and marine/outboard engines. Since then, engine manufacturers have largely eliminated the problems by upgrading fuel system components. Most recently manufactured vehicles and marine/outboard engines are able to use gasoline with up to 10% ethanol. The general rule is that, if the owner's manual does not specifically authorize the use of gasoline that contains ethanol, it should not be used. The only way to be sure is to contact the engine manufacturer. Many people today remember the problems and are reluctant to use fuel containing ethanol.

Cost

Outside of government mandates, cost to the consumer is the overriding factor that determines whether or not a particular alternative fuel gets used. Producers of corn ethanol that is used for motor vehicle fuel currently receive state and federal subsidies. These subsidies are typically passed on to the consumer of the fuel in the form of lower prices which help ethanol to be more price competitive with gasoline. E85 pump prices in the Midwest are commonly lower than regular unleaded gasoline prices; however, pump prices are in $ per gallon. It must be remembered that what is being bought is energy, and a gallon of E85 contains about 27% less energy than a gallon of regular unleaded gasoline. Once prices are adjusted and given on an energy equivalent basis (commonly referred to as a gasoline gallon equivalent or GGE), E85 is usually more expensive than regular unleaded gasoline. The 27% decrease in energy when switching from gasoline to E85 does not necessarily mean that fuel economy will be 27% less; it is dependent on the design of the engine and vehicle, and may be substantially less than 27%. Cellulosic ethanol is even further away from being economically feasible, but research is advancing rapidly in this area.

Vehicles and Infrastructure

Vehicles that can use E85 (flex fuel vehicles or FFVs) are readily available. FFVs are the same as their gasoline only counterparts except for upgraded fuel system materials and special sensors that measure the ethanol concentration of the fuel mixture. They can operate on any ethanol/gasoline mixture up to 85% ethanol. There are currently about 25 light duty FFV models available from 8 manufacturers. They range from mid-size sedans to half-ton trucks and SUVs. FFVs cost little to nothing more than their gasoline only counterparts. Many people are currently driving FFVs and are not aware of it. An FFV can be identified by its vehicle identification number (VIN). The National Ethanol Vehicle Coalition has an FFV VIN chart on their website[5].

There are currently no E85 filling stations in Louisiana, but with the recent enactment of a renewable fuel standard (Act 313 of the 2006 legislative session mandates that 2% of the gasoline sold in Louisiana will be ethanol, once the annualized production of ethanol in Louisiana equals or exceeds 50,000,000 gallons), and the proposal of several ethanol plants in Louisiana, it is reasonable that E85 fueling capacity will be built.

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[5] URL: http://www.e85fuel.com/e85101/flexfuelvehicles.php.

ENTERGY GULF STATES CUSTOMERS CAN BUY GREEN POWER APRIL 1ST

by

David McGee, P.E.

In a bold step for Louisiana, the Public Service Commission (PSC) accepted the PSC staff position paper of November 21, 2006, which describes a "Green Pricing" pilot program for the Entergy Gulf States territory in Louisiana (EGSI-LA). On January 11, 2007, the General Order was released.[1]

The PSC hopes to answer a number of questions through this trial. Are customers interested in green power? What is Louisiana's renewable energy potential? What is the cost of realizing Louisiana's renewable energy potential?

The PSC was required to investigate renewable energy by ACT 653 of the 2003 Regular Session of the Louisiana Legislature, also known as the Renewable Energy Development Act.[2]

The PSC commissioned an investigation of a voluntary "Green Pricing Tariff" (GPT) program, hiring J. Kennedy & Associates of Roswell, GA to advise them. Entergy Gulf States, Inc. (EGSI-LA) offered to host a trial program in its territory beginning April 1, 2007.

In a Green Pricing program, customers may contract for electricity generated from a renewable source. The contract is for one year or through March 2008. The green power is usually sold in blocks of 100-200 kilowatthours (kWh)[3].

In most states, the green power is sold for a premium, that is, at an added cost to regular power prices. The premium covers the added cost of the renewable power and marketing, and administrative costs above normal. In seven states, the price for renewable power is in place of the fuel adjustment charge. In other states, it is on top of all charges. There are 120 programs located in parts of 35 states.

To keep it simple, the PSC staff recommended that the pilot program premium be on top of the regular rates including the fuel clause adjustment. The PSC staff thinks that most green power customers want only "new" renewable power. However, they recommended that all renewables be allowed during the pilot, regardless of age. Only one renewable plant has been built in the last 10 years that fit their definition of "new." At least one is under construction at this time in St. Francisville, but will not be online during the trial. Other states do not require that all green power be from "new" sources. Three states require 50% and 13 states require 25% or less this year.[4]

The report recommended that "new" sources, built after January 1, 1997, be paid more than those built prior to that date. The older generators are not eligible for the current federal tax credit as are "new renewables," but their investments have been paid down. The only "new" development in Louisiana that can occur will be after a long term program is established.

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[1] The full text of General Order Number 01-11-07 (R-28271) can be found on the Louisiana Public Service Commission website (URL: http://www.lpsc.org) using the document access feature.

[2] ACT 653 of 2003 Regular Session accessed 12/4/2006, CHAPTER 49. LOUISIANA RENEWABLE ENERGY DEVELOPMENT ACT §3025. Legislative findings "(1) …Increasing the consumption of renewable energy resources promotes the wise use of Louisiana's natural energy resources to meet a growing energy demand, increases Louisiana's use of indigenous energy fuels and fosters investment in emerging renewable technologies to stimulate economic development and job creation in the state. (2) Louisiana should actively encourage the manufacture of new technologies through promotion of emerging energy technologies."

[3] A watthour (Wh) is an electrical energy unit of measure equal to 1 watt of power supplied to, or taken from, an electric circuit steadily for 1 hour. A kilowatthour (kWh) is one thousand watthours.

[4] From URL: http://www.green-e.org/pdf/Green-e_National_Standard.v1.pdf, accessed 12/1/2006. See Table 1.

The program is capped at 40,000 megawatthours (MWh)[5] for the one year trial. EGSI-LA is permitted $500,000 for a targeted marketing campaign and administrative costs which is to be prorated over the maximum amount of power to be sold. This works out to 1.309¢ per kWh. The staff can raise the cap if demand exceeds it and there is more renewable power available. Kennedy & Associates investigated renewable energy prices in other comparable areas to determine typical prices paid to generators and settled on 6.5¢ per kWh for new (post-'97) facilities and 5.9¢ per kWh for older facilities. This is in the typical cost range for biomass renewable power.

The program proposes that Entergy solicit bids on post 1996 renewable power at 6.5¢ per kWh and, if they do not get sufficient electricity to cover the subscriptions, then they would solicit for "any" renewables at the 5.9¢ per kWh price. These prices were averaged 50/50 giving 6.2¢ per kWh for the tariff calculation purposes. Including system transmission losses at a factor of 1.04755 brings the average price up to 6.4948¢ per kWh for green power. The PSC staff rounded this to 6.5¢ per kWh for the pilot program.

Any renewable generator can offer power for the program, but the price paid is delivered into EGSI-LA's system. All transmission charges will have to be paid by the seller. The PSC staff computed EGSI-LA's average "avoided cost," which is mainly fuel cost, to be 5.552¢ per kWh and average fuel adjustment charge for the preceding year to be 6.00¢ per kWh. The net price for green power then would be 6.5¢ – 5.552¢ = 0.943¢ per kWh.

The service rate for residential electricity is 4.092¢ per kWh. This includes all admin costs, distribution costs and profit, but no fuel cost. Other service rates are Small General Service = 5.587¢ per kWh and General Service = 4.12¢ per kWh. Large Power Service at 1.034¢ per kWh would not be likely to participate.

Regular charges billed are the service charge + the service rate X kWh + the fuel adjustment charge X kWh with each shown separately.

The green power premium was computed in the following manner:

> Green power cost – avoided cost + marketing and administrative charge = Green Power Tariff (GPT). With the above numbers, this is 6.5 – 5.552 + $500,000/40,000,000 kWh = 2.252¢ per kWh. This was rounded to 2.25¢ per kWh or $2.25 per 100 kWh block premium.
>
> The final typical price for residential = 4.092¢ base + 6.00¢ fuel adjustment charge + 2.25¢ GPT = 12.342¢ per kWh average. The bill format will be unchanged except that a line will be added for the GPT at $2.25 per 100 kWh block.

A typical home in Louisiana uses about 1100 kWh per month. If you ordered five "100 kWh blocks", your bill will be $11.25 per month more than it would have been. Any costs of this pilot program not paid by the subscribers will be included in the fuel adjustment charge.

The Green Pricing pilot program will extend the state's natural resources and make good use of some that currently go unused. A comprehensive green energy program has the potential to improve air quality, not just in Louisiana, but across the rest of the south. The PSC and EGSLI-LA have taken a step into the future, but they must find solid ground to continue.

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[5] A megawatthour (MWh) is one million watthours

RENEWED INTEREST IN NUCLEAR POWER GENERATION

by
Patty Nussbaum, Engineer

There is renewed interest in nuclear power generation resulting from increased demand for electricity, global warming, and concerns over the security of our current energy supply from foreign sources. Our nation's need for safe, clean and economical electricity generation grows every year.

Most electricity in the U. S. is generated by burning fossil fuels and has carbon dioxide as a waste product. Nuclear power is generated using the heat given off during nuclear fission.[1] Uranium, the fuel for nuclear generation, is abundant in North America. The waste products of nuclear power generation are spent fuel, other radioactive waste, and heat, but not carbon dioxide. There are 104 licensed nuclear reactors in the U.S. (Figure 1). About 20% of the electricity produced in the U.S. comes from nuclear generation. In Louisiana, about 8% of the electricity is produced from nuclear generation.

The two types of reactors currently operating in the U.S. are boiling water reactors and pressurized-water reactors.[3] 2In the boiling water reactor, water is allowed to boil in the core, thus generating steam directly in the reactor vessel. The steam is the driving force for the turbine generator. The pressurized-water reactor uses water at very high pressure in a primary circuit and steam is formed in a secondary circuit, which is isolated from direct contact with the reactor core.[3]

Nuclear generation has been used in the U.S. for over 30 years and during that time there have been efficiency improvements such that the capacity factor for nuclear power plants has increased from 60% to 90% (Figure 2). However, no new reactors have been ordered since the 1970s. Cost overruns and increased regulatory oversight following the Three Mile Island accident were factors in ending construction of new nuclear facilities. The Three Mile Island Nuclear Station, Unit 2 (TMI-2) accident in 1979 was the most serious in U.S. commercial power plant history.[4] The TMI-2 reactor is shut down and defueled; however, the accident did not kill or injure anyone inside the plant or in the surrounding community. The regulation of the industry increased after the accident and the nuclear industry in the U.S. has had an excellent safety record since then.

Louisiana has two operating nuclear reactors. River Bend Station is owned by Entergy Gulf States Inc. It is a boiling water reactor, manufactured by General Electric (turbine generator manufactured by General Electric) with a 966 megawatt capacity. Waterford 3 is owned by Entergy Louisiana Inc. It is a pressurized water reactor, manufactured by Combustion Engineering (turbine generator manufactured by Westinghouse) with a 1,157 megawatt capacity.

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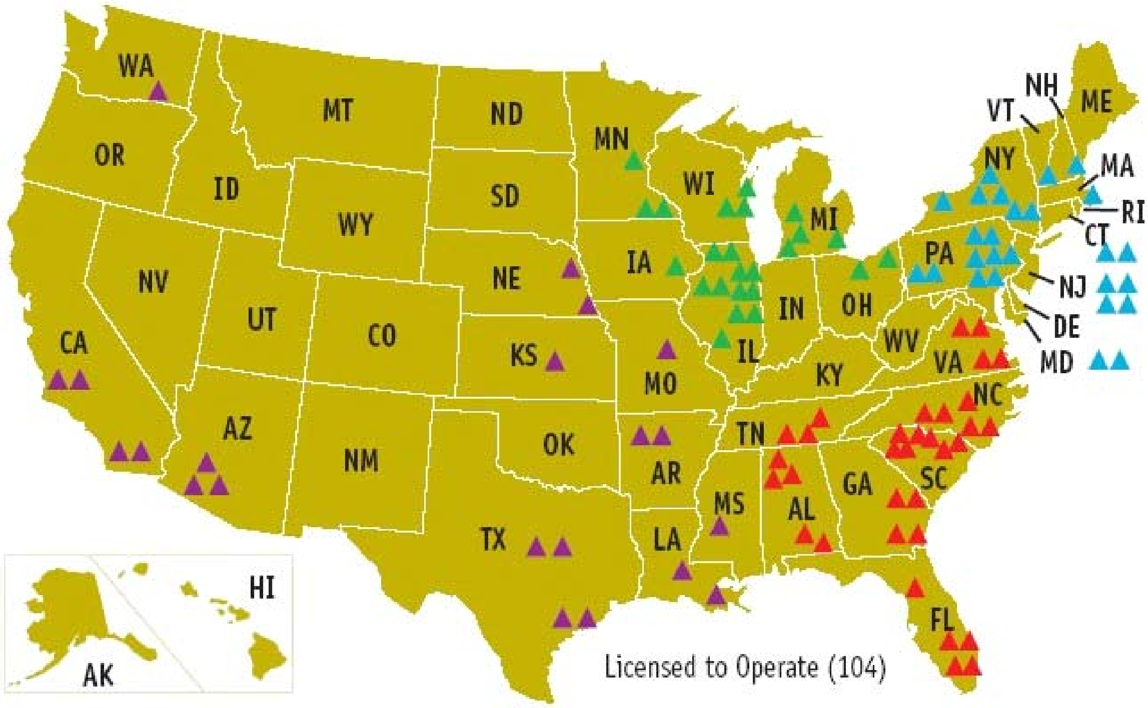
1 "Energy in a nuclear reactor is derived from a process called nuclear fission, in which a neutron strikes the nucleus of a uranium atom and is absorbed. The absorption of the neutron makes the nucleus unstable, causing it to split into two atoms of lighter elements and release heat and new neutrons. The heat is used to produce electricity, while the neutrons can potentially be absorbed by other atoms of uranium, resulting in more nuclear fissions. This continuing process of fissioning is called a chain reaction. It is sustained because, for every atom of uranium fissioned by a neutron, new neutrons are released to continue the process." Source: Department of Energy (URL: http://www.eia.doe.gov/neic/infosheets/nuclear.html, accessed 2/23/2007).

2 Source: URL: http://www.world-nuclear.org/info/inf51.html#B.

3 The primary system is the cooling system used to remove energy from the reactor core and transfer that energy either directly or indirectly to the steam turbine. The secondary system is the steam generator tubes, steam turbine, condenser and associated pipes, pumps, and heaters used to convert the heat energy of the reactor coolant system into mechanical energy for electrical generation. Source: Nuclear Regulatory Commission.

4 The Chernobyl accident in 1986 in the former Soviet Union was the most severe nuclear reactor accident to occur in any country.

Figure 1. Licensed Nuclear Plants in U.S.



REGION I

CONNECTICUT
- Millstone 2 and 3

MARYLAND
- Calvert Cliffs 1 and 2

MASSACHUSETTS
- Pilgrim 1

NEW HAMPSHIRE
- Seabrook 1

NEW JERSEY
- Hope Creek 1
- Oyster Creek
- Salem 1 and 2

NEW YORK
- James A. FitzPatrick
- Ginna
- Indian Point 2 and 3
- Nine Mile Point 1 and 2

PENNSYLVANIA
- Beaver Valley 1 and 2
- Limerick 1 and 2
- Peach Bottom 2 and 3
- Susquehanna 1 and 2
- Three Mile Island 1

VERMONT
- Vermont Yankee

REGION II

ALABAMA
- Browns Ferry 1, 2, and 3
- Joseph M. Farley 1 and 2

FLORIDA
- Crystal River 3
- St. Lucie 1 and 2
- Turkey Point 3 and 4

GEORGIA
- Edwin I. Hatch 1 and 2
- Vogtle 1 and 2

NORTH CAROLINA
- Brunswick 1 and 2
- McGuire 1 and 2
- Shearon Harris 1

SOUTH CAROLINA
- Catawba 1 and 2
- Oconee 1, 2, and 3
- H.B. Robinson 2
- Summer

TENNESSEE
- Sequoyah 1 and 2
- Watts Bar 1

VIRGINIA
- North Anna 1 and 2
- Surry 1 and 2

REGION III

ILLINOIS
- Braidwood 1 and 2
- Byron 1 and 2
- Clinton
- Dresden 2 and 3
- La Salle County 1 and 2
- Quad Cities 1 and 2

IOWA
- Duane Arnold

MICHIGAN
- D.C. Cook 1 and 2
- Fermi 2
- Palisades

MINNESOTA
- Monticello
- Prarie Island 1 and 2

OHIO
- Davis-Besse
- Perry 1

WISCONSIN
- Kewaunee
- Point Beach 1 and 2

REGION IV

ARKANSAS
- Arkansas Nuclear 1 and 2

ARIZONA
- Palo Verde 1, 2, and 3

CALIFORNIA
- Diablo Canyon 1 and 2
- San Onofre 2 and 3

KANSAS
- Wolf Creek 1

LOUISIANA
- River Bend 1
- Waterford 3

MISSISSIPPI
- Grand Gulf

MISSOURI
- Callaway

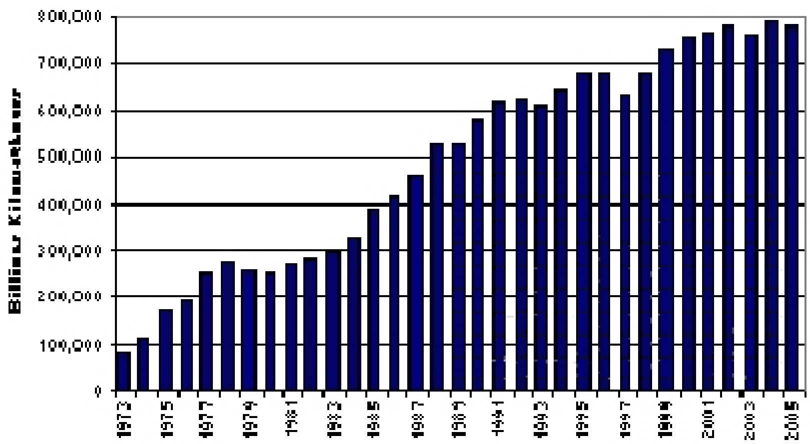
NEBRASKA
- Cooper
- Fort Calhoun

TEXAS
- Comanche Peak 1 and 2
- South Texas Project 1 and 2

WASHINGTON
- Columbia Generating Station

Note: Includes Browns Ferry Unit 1, which has no fuel loaded and required Commission approval to restart.
Source: Nuclear Regulatory Commission

Figure 2. Nuclear Generation, 1973 – 2005



Source: Energy Information Administration

Entergy Nuclear, whose parent company, Entergy Corporation (headquartered in New Orleans), is the second largest operator of nuclear power plants in the United States. Entergy Nuclear operates five reactors at four locations in Arkansas, Mississippi, and Louisiana and five reactors at four sites in Massachusetts, New York, and Vermont, as well as, providing management services to the Cooper Nuclear Station in Nebraska.[5]

Most of the existing U.S. nuclear plants are custom designs that result in higher costs to construct and maintain. The future nuclear electric generating plants in the U.S. will be using standardized designs which means that reactors will be built in families of the same design with a limited number of site-specific features. Standardized designs will reduce construction and operating costs because they are faster to build and simpler to operate.

It has been decades since the last nuclear plants were constructed; no one really knows what it will cost to build one. In an effort to reduce some of the regulatory uncertainty, and the costs associated with the uncertainty, the Nuclear Regulatory Commission (NRC) established a licensing process that combines a construction permit and an operating license (10 CFR Part 52). The process appears to be sound, but it has not been tested. The new process is designed to resolve regulatory issues before a decision is made to construct the nuclear plant. The old process had only one opportunity for public comment prior to construction. The NRC issued a construction permit based on a preliminary design and did not resolve safety issues until the plant was nearing completion resulting is schedule delays and construction cost overruns.

The new process has three parts:

1. Early site approval (Public Comment Opportunity)
   - Company obtains federal regulatory approval for a new nuclear plant site before committing to construct the plant. The early site permit can be saved for up to 20 years until the company is ready to build.
2. Design certification (Public Comment Opportunity)
   - Design certification resolves all safety issues with the design.
3. Combined license for construction and operation (Public Comment Opportunity)
   - Once the site and the design have been selected, a company can apply for a combined license (to build

[5] Entergy Nuclear, URL: http://www.entergy-nuclear.com, accessed 3/6/2007.

and operate a nuclear plant) by adding operational and site-specific details.

Entergy is a member of NuStart Energy Development, LLC.[6] NuStart is participating in a 50-50 cost sharing program with the Department of Energy (Department of Energy's Nuclear Power 2010 Initiative) to "test" the new combined licensing process. NuStart is pursuing a Construction and Operating License (COL) for a new nuclear unit at Entergy's Grand Gulf Nuclear Station in Mississippi and Tennessee Valley Authority's Bellefonte site in Alabama. No one has committed to build a new reactor site. The Energy Policy Act of 2005, however, includes federal subsidies that will go to the first plants to be built. Cost and nuclear waste are factors which must be addressed before new nuclear reactors will be built. The U.S. Department of Energy plans to store the spent fuel at Yucca Mountain, Nevada (Figure 3). However, there is opposition, and the project has faced delays. Radioactive waste is being stored at reactor sites until a licensed long term repository is designated.

Figure 3. Planned Nuclear Waste Repository

Source: Energy Information Administration

More information on nuclear power generation can be obtained from the following sources:

- Nuclear Regulatory Commission (URL: http://www.nrc.gov/)
- World Nuclear Organization (URL: http://www.world-nuclear.org/info/inf09.html)
- Energy Information Administration (URL: http://www.eia.doe.gov/fuelnuclear.html)
- Secretary of Energy Advisory Board Nuclear Energy Task Force (Draft Report), "Moving Forward with Nuclear Power: Issues and Key Factors," dated January 10, 2005 (URL: http://www.seab.energy.gov/publications/NETF_Final_Draft_0105.pdf, accessed 3/6/2007)
- NuStart Energy Development, LLC (URL: http://www.nustartenergy.com)
- Nuclear Energy Institute (URL: http://www.nei.org)

[6] NuStart Energy Development, LLC is a limited liability corporation that has nine members (Constellation Energy Group; Duke Energy; EDF International North America, Inc.; Entergy Nuclear; Exelon Corporation; FPL Group; Progress Energy; SCANA Corporation; Southern Company). NuStart Energy Development, LLC, the Tennessee Valley Authority (a federal agency) and reactor vendors, GE Energy and Westinghouse Electric Company, LLC form the NuStart Consortium.

TRANSPORTATION FUELS FROM LOUISIANA BIOMASS

by
David McGee, P.E.
Bryan Crouch, Engineer

Transportation energy accounts for almost 30% of total energy usage in the United States. Almost all transportation energy comes from fuels derived from petroleum, much of which is imported from other countries. Energy security and environmental concerns provide the impetus to displace petroleum based fuels. Ethanol and biodiesel provide alternatives to petroleum based fuels, can be produced from renewable domestic resources and have environmental benefits. Louisiana has a diverse resource base which could be exploited to produce ethanol and biodiesel. Economics aside, the following tables are an estimate of the amount of biofuel that could be reasonably produced from crops and waste products that are currently being produced in Louisiana. These estimates are then compared to the gasoline and diesel sales in Louisiana (which approximate consumption). Note, that for food crops and municipal solid waste (MSW), the calculations assume the entire resource is used for biofuel production.

Table 1. Ethanol from Sugarcane and Grains

Crop	2005 Total Production [1]		Ethanol Conversion Factor [2]		Ethanol (gallons)
Sugarcane	11,339,065	tons	18	gal./ton	204,103,170
Corn	44,227,116	bushels	2.7	gal./bu.	119,413,213
Grain Sorghum	6,106,071	cwt.	4.65	gal./cwt.	28,393,230
Oats	311,422	bushels	0.9203	gal./bu.	286,602
Wheat	5,985,589	bushels	2.483	gal./bu.	14,862,217
Total					367,058,433

Table 2. Ethanol from Biomass

Biomass	2005 Total Production (tons)	Ethanol Conversion Factor [2] (gal./ton)	Ethanol (gallons)
Forest Residues [3]	872,000	60	52,320,000
Mill Residue [3]	1,943,000	60	116,580,000
Urban Wood Waste [3]	753,870	60	45,232,200
Hay [1]	551,531	60	33,091,860
CRP Energy Crop [4]	1,170,000	60	70,200,000
Bagasse [5]	1,417,400	60	85,044,000
Municipal Solid Waste [6]	1,843,009	60	110,580,540
Total			513,048,600

Table 3. Biodiesel from Oil Crops

Crop	Total Production (lbs.)	Percent Oil [2]	Oil Weight (lbs.)	Oil Volume [8] (gal.)	Biodiesel [9] (gallons)
Cotton Seed [1]	846,650,088	13	110,064,511	15,502,044	12,401,635
Soybeans [1]	1,938,967,200	14	271,455,408	38,233,156	30,586,525
Sunflowers [1]	252,299	32	80,736	11,371	9,097
Corn [1]	2,476,718,496	2.77	68,605,102	9,662,690	7,730,152
Rice [1]	3,197,297,100	1.8	57,551,348	8,105,824	6,484,659
Waste Cooking Oil/Grease [7]				8,400,000	6,720,000
Total					63,932,068

Table 4. Gasoline and Diesel Consumption in Louisiana

Motor Fuel	Louisiana Motor Fuel Sales [10] 2005		Potential Biofuel Production from Louisiana Resources		Potential Energy Contribution Percentage
	Gallons	Trillion Btu	Gallons	Trillion Btu	
Gasoline	2,367,718,500	293.6			
Ethanol			880,107,033	73.9	25.2
No. 2 Diesel	1,103,232,000	143.4			
Biodiesel			63,932,068	7.7	5.3
Total		437.0		81.6	18.7

These estimates show that Louisiana could produce 18.7% of its transportation energy needs from biofuels produced from Louisiana resources if the entire crop production is utilized for biofuel production, one-half of the Conservation Reserve Program (CRP) land is utilized for energy crop production, and all of the cellulosic component of MSW is converted to ethanol. Additional steps, not included in this estimate, which could be taken to increase the resource available for biofuel production, include substituting higher biomass yield crops for lower yield crops, and utilizing additional land for energy crop production.

Cost is the main hindrance to the use of renewable resources to produce transportation fuels, not just the cost of the renewable resource itself, but also the cost of transporting it and producing fuel from it. The fundamental reason it costs more to produce fuel from renewable resources than from crude oil, is that crude oil has a much greater energy density. Crude oil is, however, not renewable, and over time will increase in price as the supply becomes more limited. New technology and mass production will decrease the price of renewable fuels.

Notes:

1. Production figures published by the LSU AgCenter.
2. Figures used here were deemed to be in the mid-range of commonly published figures for each category.
3. Production figures from 1999 Oak Ridge National Laboratory study.
4. According to the USDA, there are 390,000 acres of CRP land in Louisiana. CRP land is highly erodible, and as such, owners are encouraged to maintain a vegetative cover to prevent erosion. Switch grass and/or energy cane are high yield energy crops and would be suitable to grow on much CRP land. The figure used here is not actual production, but an estimate based on converting one-half (195,000 acres) of the land in the CRP to grow switch grass with a yield of 6 tons/acre.
5. Bagasse production estimated at 15% of sugar cane production. Figure used here represents one-half of bagasse production. Approximately one-half of bagasse is used for process heat.
6. Includes the whole of MSW components from paper and paperboard, wood, and food and miscellaneous organic waste. Approximately one-half of MSW from these categories is currently used for other purposes.
7. Production figure estimated from conversation with Griffin Industries. Griffin Industries is a major recycler of food industry waste, and collect a major portion of the waste cooking oil/grease in Louisiana.
8. Vegetable oil is approximately 7.1 lbs./gal.
9. Biodiesel yield is approximately 80% of oil yield.
10. Figures published by Energy Information Administration.

BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: ENERGY EFFICIENT CONSTRUCTION

by
Howard Hershberg, AIA

The *Builder's Guide to Energy Efficient Homes in Louisiana* (henceforth referred to as "*Builder's Guide*") is being updated to reflect the new code requirements that went into effect January 1, 2006. This is the first in a series of articles that will summarize the information in the guide and highlight updates.

The *Builder's Guide* is a general reference to the key elements of energy efficient construction. The energy features discussed will save the homeowner money, improve indoor air quality, resist moisture problems, and should increase long term building durability. The features summarized below will be discussed in further detail in later articles.

The concepts provide guidelines for an energy efficient and "healthy home." The more energy saving and healthy home features that can be included in the plans and specifications, the more comfortable and more durable the home will be.

Generally, the annual energy savings exceed the annual mortgage cost of the measures. Therefore, the payback period on the energy savings features provides a 100% payback within a short period of time.

Table 1 compares the specifications for an IRC 2006 code compliant residence to specifications for an ENERGY STAR (5 Star) residence.

Table 2 compares the approximate additional costs for meeting the ENERGY STAR specifications.

Key Requirements for Energy Efficient Homes

Specify a Moisture Barrier System: Drain water away from foundation, install capillary breaks in foundation, and install continuous 6 mil. Visqueen (or equal) groundcover. Make interior finish airtight by properly flashing windows, doors, roof vents, and other roof and wall penetrations through which wind driven rain may leak.

Specify an Air Barrier System: Seal all penetrations between conditioned and unconditioned spaces, particularly between living spaces and crawlspaces, attics, unheated basements, and garages. Specify continuous insulation to be used as much as possible in:

1. Exterior walls, floors over unconditioned or exterior spaces, ceilings below unconditioned or exterior spaces (including attic access covers).
2. Wall areas adjacent to attic spaces such as knee walls, attic stairways, and high interior walls with attic or exterior space behind.
3. Wall areas between conditioned and unconditioned spaces such as band joists, garage walls, basement walls, and mechanical room walls (outside the conditioned envelope).

Specify and install energy efficient windows:

1. The International Residential Code (IRC) 2006 requires U-.65 in Climate Zone 3, and U-.75 in Climate Zone 2.
2. Design home with minimal east and west glass areas or provide external shading of the glass areas. Specify additional glass area on south side for passive heating in winter months.
3. Specify double glazed windows with U-values[1] under .65 (R-values[2] of 1.54 or greater).
4. Specify low emissivity coatings, and solar heat gain coefficients (SHGC) less than .40 .

Specify heating and cooling system for high efficiency in your local climate. Refer to IRC 2006 for detailed information and climate zones:

1. Eliminate potential for back drafting of combustion appliances.
2. Specify fresh air ventilation systems per Chapter 11 of IRC 2006.

Seal ductwork:

1. Specify locating ductwork in conditioned spaces.
2. Size ductwork to assure proper airflow. Test and balance HVAC system(s). Specify test and balance as part of HVAC contractor's duties under the construction contract.
3. Specify sealing all ductwork with mastic plus fiber mesh, except at removable components with UL 181 B-M mastic.

Minimize hot water costs:

1. Specify efficient water heating equipment, use heat traps to prevent convective loops, install water heater wraps.
2. Specify water saving dish washers and clothes washers.
3. Consider "point of use" tankless water heaters.
4. Specify ENERGY STAR appliances and fixtures as much as possible.

Specify energy efficient appliances and lighting:

1. Specify fluorescent or compact fluorescent fixtures wherever possible.
2. Use recessed lights selectively; use only airtight, insulation contact fixtures.
3. Specify LED or Metal Halide lamps for exterior lighting (with daylight sensors) for security lighting.

More information on energy savings features, and the full text of the *Builder's Guide*, can be found on the DNR Technology Assessment Division website at URL: http://www.dnr.louisiana.gov.

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[1] U-value represents overall thermal conductance from outside to inside, covering all modes of heat transfer. It is a measure of heat loss or gain.

[2] R-value is a measure of how well an object (such as insulation) resists the flow of heat or cold through it.

Table 1. IRC 2006 Compliant Home Compared to ENERGY STAR 5 Star Home

	IRC 2006 STANDARD HOME	5 STAR ENERGY STAR HOME
Home Energy Rating System (HERS)	HERS Index (1 Index Pt. = 1%)	HERS Index 85 (15% More Efficient Than 100 Index)
Insulation/Infiltration Control	R-30	R-30
Cathedral Ceiling Insulation	R-30	R-30
Cathedral Ceiling Insulation	R-30	R-25
Wall Insulation, Including Sheathing	R-13	R-15.5 to R16.6
Floor Insulation	R-13	R-19
Framing Details	Standard	Energy Efficient
Moisture Control	Minimal	See Chapter 1 of *Builder's Guide*
Infiltration Control	Basic	Continuous Air Barrier
Windows and Doors	Single-Glazed	Double-Glazed Thermally
Windows	Wood	Insulated Vinyl
Doors	Wood	R-4 or Better
HVAC System		
Furnace (AFUE)	0.78	0.8
Heat Pump (HSPF)	6.8	7.2
Air Conditioner (SEER)	13	14
Ventilation	Per IRC 2006	Per IRC 2006
Thermostat	Standard	Programmable
Ductwork	13% Leakage Max.	Ducts Sealed - 3% Leakage Max. < 6 cfm./s.f. Conditioned Space
Water Heating		
Water Heater Efficiency	Standard	Moderate Efficiency
Water Heating Conservation	None	Low Flow Shower Heads, Pipe Insulation
Lighting	12 Incandescent, 3 Fluorescent, Standard Exterior	6 Incandescent, 9 Fluorescent, Efficient Exterior
Appliances	Standard	ENERGY STAR Refrigerator, Clothes Washer
Natural Cooling	Overhang At S. Facing Windows - 6"	2 Feet Min.
	Window Shading Treatments - None	3 Feet Min.

Table 2. Estimated Extra Costs of 5 Star Homes Compared to IRC 2006 Compliant Home

Description	Quantity	Unit Cost	Total Estimated Cost
Attic - Increase insulation from R-19 to R-30 (cost difference)	1,000 sq. ft.	$ 0.27	$ 270.00
Cathedral ceiling - Increase insulation from R-19 to R-30	600 sq.ft	$ 0.27	$ 162.00
Energy efficient details - no extra cost		$ -	$ -
Walls and band joist - R-13 in place of R-11, ½" foam sheathing vs. OSB, install let-in bracing, seal band joists, insulate with R-19	2,404 sq. ft	$ 0.20	$ 480.80
Insulate floor with R-19 from uninsulated condition	630 sq. ft.	$ 0.63	$ 396.90
Install double-paned, vinyl clad windows (U-value .50) vs. wood windows	346 sq.ft.	$ 2.50	$ 865.00
Air leakage - completely seal all bypasses and penetrations between conditioned and unconditioned spaces	2,000 sq.ft.	$ 0.20	$ 400.00
Heating and cooling system - size for home, ensure quality installation, design duct system, check proper airflow, consider hi-efficiency heating	1 unit	$ 250.00	$ 250.00
Cooling efficiency - select SEER 14 (or higher) vs. SEER 13	1 unit	$ 275.00	$ 275.00
Charge cooling/heat pump per manufacturer's instructions. Locate unit where air can circulate freely.	1 unit	$ 100.00	$ 100.00
Install water heater wrap on hot water heater	1 unit	$ 30.00	$ 30.00
Replace ½ of incandescent lamps with compact fluorescent lamps	6 lamps	$ 10.00	$ 60.00
Seal all supply and return duct systems	1 unit	$ 200.00	$ 200.00
Insulate ductwork to R-8 (if outside conditioned space)	400 sq.ft	$ 0.30	$ 120.00
Install improved ventilation fans; add dampered duct for fresh make-up air for ventilation system	1 system	$ 109.00	$ 109.00
Lengthen overhangs/install shade screens on east and west	330 sq. ft.	$ 2.32	$ 766.00
Install ENERGY STAR clothes washer, refrigerator, and dishwasher	assume 3 appliances	cost varies	$ 1,149.00
		Initial Cost Subtotal:	**$ 5,634.00**
		Initial Reduction in Heating and Cooling System (Estimated):	**$ (1,700.00)**
		Initial Net Total Cost:	**$ 3,934.00**

LOUISIANA OIL AND GAS PRODUCTION FORECAST

by
Manuel Lam, Senior Analyst

Louisiana ranks among the top four states in oil and gas production and is second in per capita energy consumption. It has produced oil and gas for almost a century. This forecast presents data for crude oil and natural gas production from state regulated land and water bottoms and projected prices for the next five years.

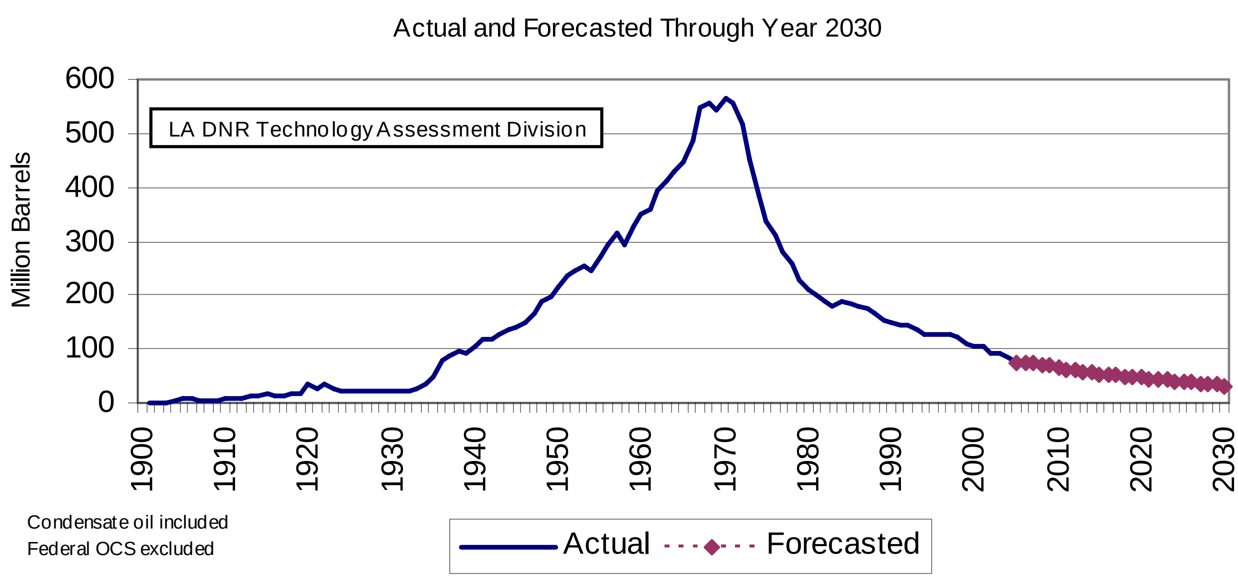
Oil Production Forecast

The average annual rate of production decline over the past ten year period was 5.8%. The DNR Technology Assessment Division short term model is projecting an average of 3.0 % decline per year for the next five years.

Factors contributing to the year-to-year deviations in oil production are:

- Changes in wildcat drilling and development of marginal fields within the state
- Early capping of stripper wells by major producers
- Unstable prices of crude oil
- Changes in environmental laws, especially those concerning salt water discharge
- The changing balance between world crude oil supply and demand
- The number of active rigs in the region
- Military conflicts or political instability in some producing countries (OPEC members and the former the Soviet Union)
- Application of advanced technology such as 3-D and 4-D seismic
- State and local tax incentives

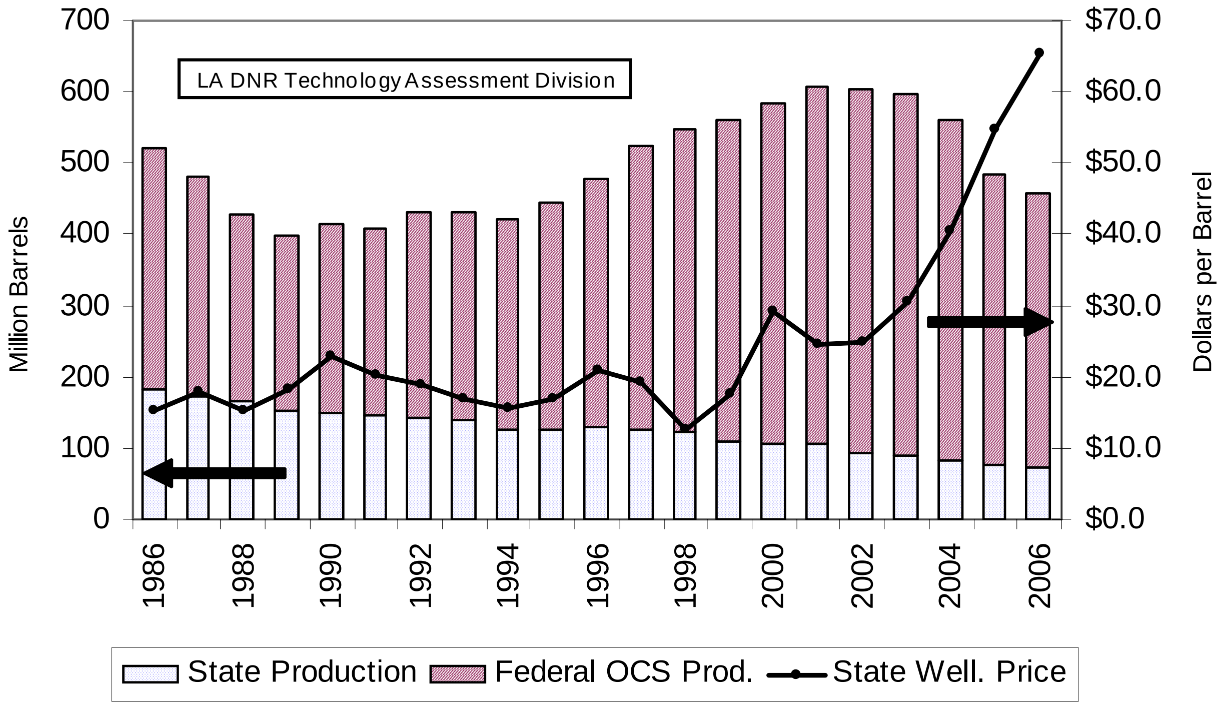
Figure 1. Louisiana State Oil Production



Crude Oil Price Projection

Oil prices are determined in the international markets and are difficult to project. Major factors affecting oil prices are: a) political stability of producing countries, b) world environmental issues, c) industrialized countries conservation practices, d) weather related demand for petroleum products, e) production restraints by OPEC countries, f) economy changes in consumer nations, and g) stability in labor forces.

Figure 2. Louisiana Oil Production and Price



Gas Production Forecast

The average annual rate of production decline over the last 10 years was 2.0%. The DNR Technology Assessment Division short term forecast model predicts a 2.8% per year decline for FY2007/08 through FY2011/12. Three years out of the last ten have shown production increases.

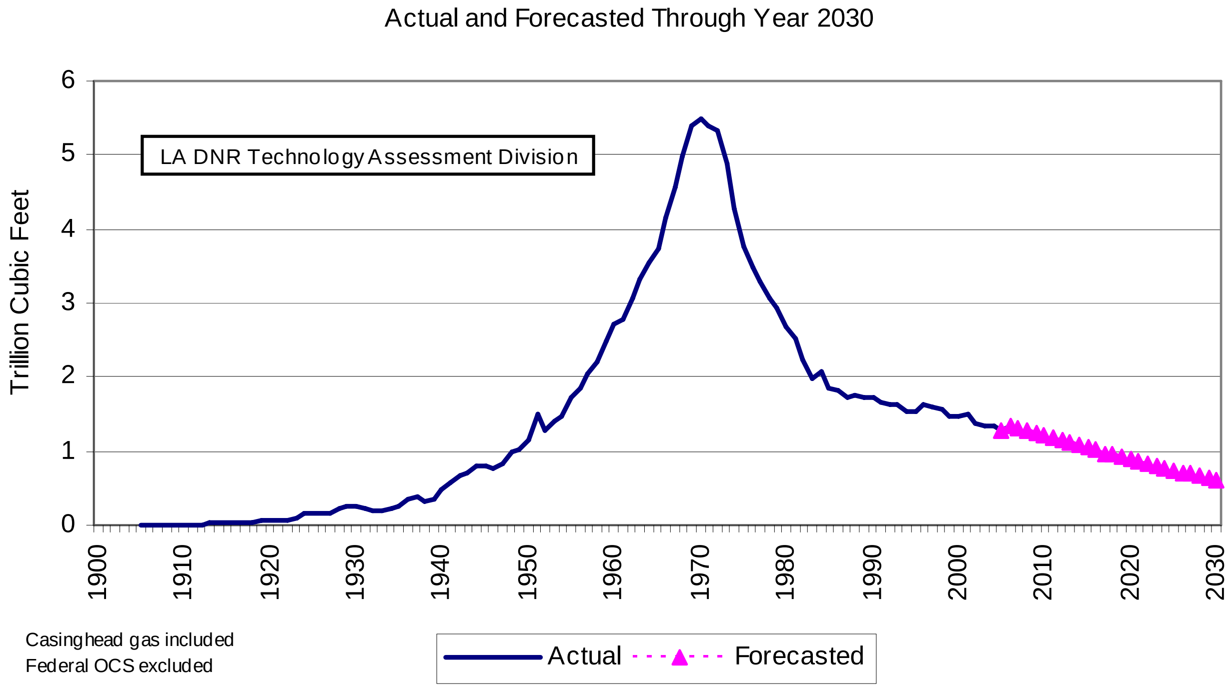
Factors contributing to the year-to-year deviations are:

- Effects on industrial gas demand from chemical industry activity
- Growth in use of natural gas to meet clean air requirements in electric power generation and transportation
- Mild or severe winter weather patterns
- Offshore drilling moratoriums in other states
- Changes in environmental laws, especially the Clean Air Act Amendments of 1990
- Production capacity higher than demand
- Price of gas relative to fuel oil and the amount of switching between these two fuels
- Peak day deliverability of the U.S. pipeline system

- Foreign imports
- State and local tax incentives

The deep FY2005/06 decline was caused by hurricanes Katrina and Rita, and FY2006/07 forecast increases are attributed to the recovery from the disaster rather than a reverse in production trend. The demand for gas may increase as the manufacturing and utilities industries continue to switch to gas for cleaner energy, and if natural gas prices remain competitive.

Figure 3. Louisiana State Gas Production



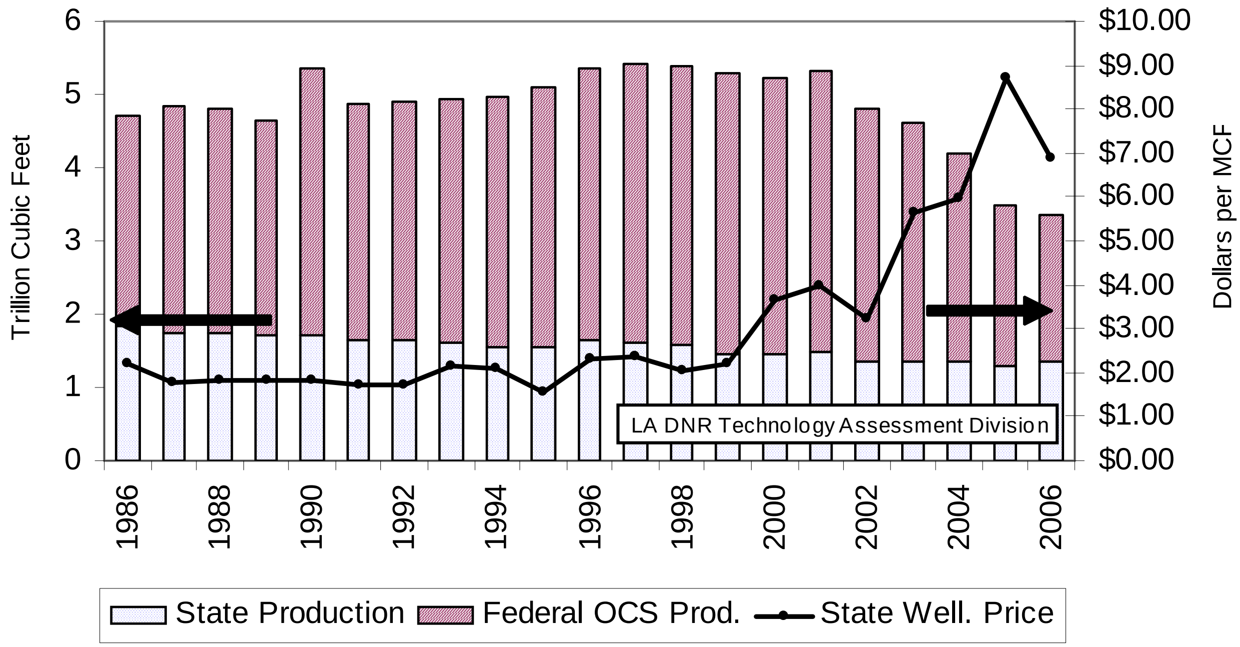
Natural Gas Price Projection

Natural gas prices act differently than crude oil prices. Oil prices are driven mostly by the international oil market, but natural gas prices are driven more by factors such as weather, storage levels, curtailments, market changes, new consumption and NAFTA (North America Free Trade Agreement). Natural gas is harder to transport and store, and needs the proper infrastructure (pipelines, compression stations, LNG tanks, etc.). The major cost components of natural gas prices are: cost of infield production, cost of transportation, cost of marketing, and investment rate of return. As the historical data shows, marketing cost is the only cost that oscillates widely.

Gas prices increased as regulations phased out in the early 80's. With deregulation, natural gas started trading in the spot and commodity markets. Since 1985, this spot market for gas has grown in importance and, today, it is the major player in the determination of gas prices. In April 1990, natural gas futures contracts started trading in the New York Mercantile Exchange (NYMEX). A NYMEX gas future contract calls for delivery of 10,000 MCF of gas during a specific month, 1 to 12 months in the future. The contract delivery point of the gas is Sabine Pipe Line Company's Henry Hub terminal near Erath, Louisiana.

Gas prices are also affected by psychological factors in the trading market and often the expectation of soft prices is enough to bring them about. Cold winter weather will usually erase much of the psychological element of low gas prices.

Figure 4. Louisiana Gas Production and Price



State mineral revenues are dependent on both the Louisiana production volumes and energy prices. Oil prices are determined in the international markets and are difficult to project. Historical data shows great swings in the price of oil and gas, and there is considerable uncertainty about future prices.

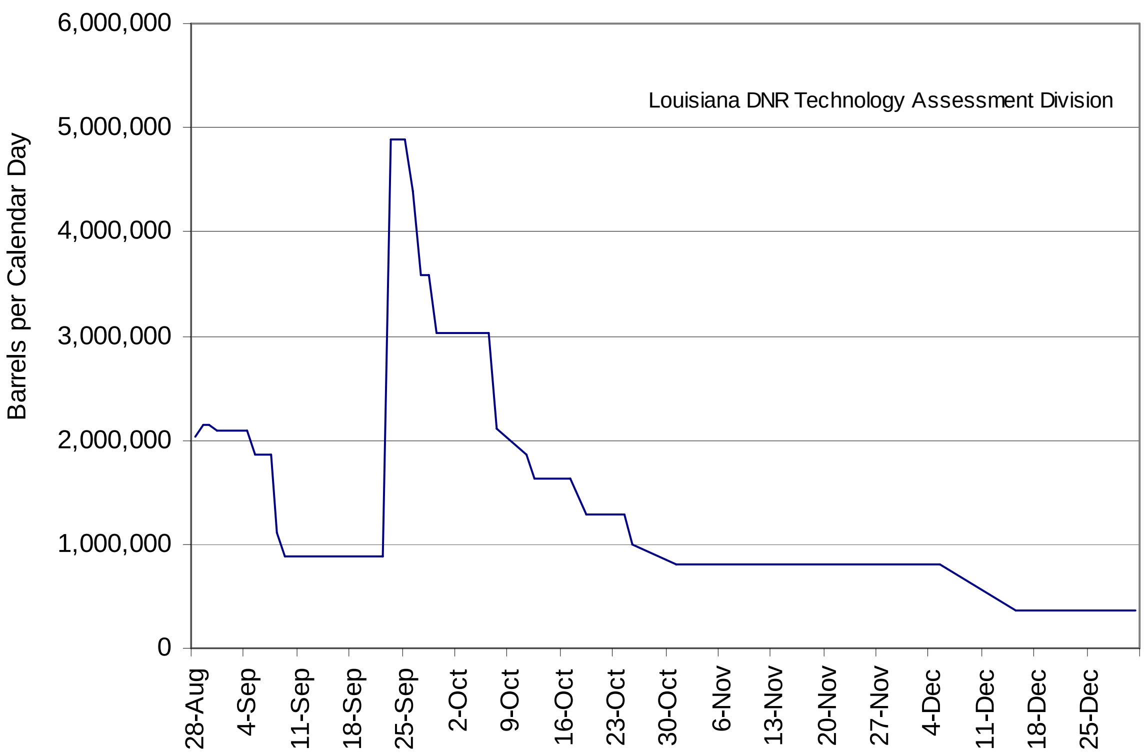
In part two of this series we will discuss the potential effect of various projected oil and gas prices for the next five years.

HIGHLIGHTS OF THE 15TH EDITION OF THE LOUISIANA CRUDE OIL REFINERY SURVEY REPORT

by
J. Bryan Crouch, P.E.

The 15th edition of DNR's Louisiana Crude Oil Refinery Survey Report covers the 12-month period from July 1, 2005 to June 30, 2006. Hurricanes Katrina and Rita struck during this survey period causing large amounts of refinery capacity to shutdown (see figure). As a result, throughput was reduced (Table 1) and the overall operating rate was reduced to 84.5%. As of June 30, 2006, total Louisiana refining capacity was 2,953,442 barrels per calendar day, an increase of 40,779 barrels per calendar day from the previous survey. Top products from Louisiana refineries, according to percentage of total product slate, are shown in Table 2.

Shutdown Refinery Capacity from Hurricanes Katrina and Rita, 2005



The 15th edition of the *Louisiana Crude Oil Refinery Survey Report* will be published soon. If you are currently on our mailing list as a subscriber to this publication, a hard copy will be mailed to you automatically. If you would like your name added to our subscriber mailing list to receive a free copy of the current edition, as well as future editions, of the *Refinery Survey*, submit an email request to techasmt@la.gov (include your name and address, and specify which publication you are requesting), or contact us at 225-342-1270.

Table 1. Louisiana Operating Refinery Capacity and Throughput

Refinery	Operating Capacity as of 6/30/06 (bcd)	Operating Capacity Change [1] (%)	Throughput 7/1/05 - 6/30/06 (barrels)	Throughput Change [2] (%)
Calcasieu Refining Co - Lake Charles	55,000	77.42	13,547,768	23.62
Calumet Lubricants Co LP - Cotton Valley	12,158	0.00	3,018,699	2.66
Calumet Lubricants Co LP - Princeton	8,284	-2.60	2,852,135	-6.85
Calumet Shreveport LLC - Shreveport	41,000	2.50	14,966,511	404.09
Chalmette Refining LLC - Chalmette	196,000	0.51	52,559,000	-19.37
Citgo Petroleum Corp - Lake Charles	438,000	0.00	147,782,668	5.99
ConocoPhillips - Belle Chasse	247,000	0.00	46,988,100	-45.77
ConocoPhillips - West Lake	239,000	0.00	63,550,771	-22.75
ExxonMobil Refining & Supply Co - Baton Rouge	501,000	1.52	168,630,000	-6.00
Marathon Petroleum Co LLC - Garyville	255,000	0.00	86,912,143	-8.75
Motiva Enterprises LLC - Convent	225,000	0.00	82,125,000	0.00
Motiva Enterprises LLC - Norco	240,000	0.00	72,943,060	-4.60
Murphy Oil USA Inc - Meraux 3	120,000	0.00	8,469,318	
Placid Refining Co - Port Allen	56,000	13.13	19,484,621	8.17
Shell Chemical Co - St. Rose	55,000	1.85	17,943,436	13.51
Valero Refining Co - Krotz Spings	80,000	0.00	24,245,668	-16.13
Valero Refining Co - Norco	185,000	0.00	85,338,390	38.81
Totals [3]	2,953,442	1.40	911,357,288	-5.05

1. Change from end date (6/30/2005) of previous DNR survey to end date (6/30/2006) of current DNR survey.

2. Change from previous DNR survey throughput (7/2004 - 6/2005) to current DNR survey throughput (7/2005 - 6/2006).

3. Murphy was not able to respond to previous survey due to outage resulting from Hurricane Katrina.
Throughput change total does not include Murphy.

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

Product	Total Product Slate (%)
Regular gasoline	48.26
Diesel	13.90
Jet fuel/Kerosene	7.79
Fuel oil	6.13
Residual/Coke	4.26
Premium gasoline	2.88

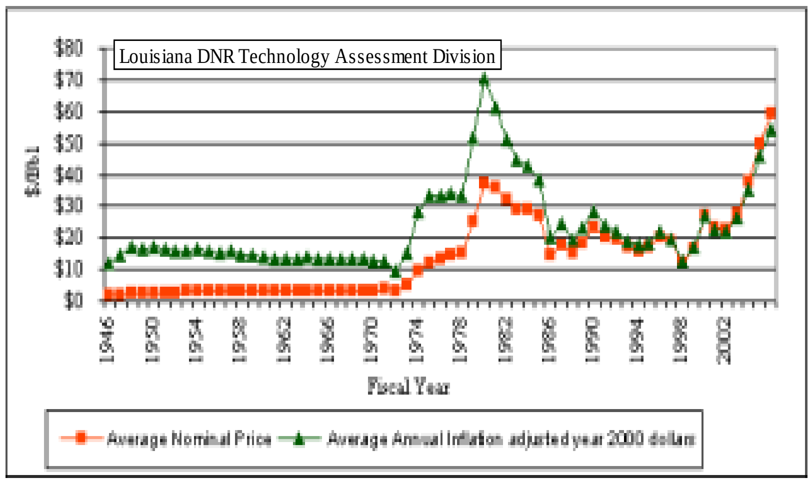
THE PRICE OF OIL - PART 1: A BRIEF HISTORY OF OIL PRICING

by
P. R. Sprehe
Energy Economist

For much of the 20th Century the Texas Railroad Commission (TRC), through its production proration orders, was a primary determinant of the wellhead price of crude oil in the U. S. (Figure 1). But, in 1973, the oil exporting countries exercised their growing market power by withholding supply in a geopolitical dispute that drove U. S. prices higher. Market control over prices subsequently shifted to the Organization of Petroleum Exporting Countries (OPEC).

The U. S. then began a long period of transition to market deregulation of oil and natural gas prices in an effort to stimulate additional domestic supply. By 1986, prices had stabilized in the $20 per barrel ($/bbl) range. Following the collapse of the Berlin Wall in 1989 (the symbol of the opening of the global economy), the 1990s began a prolonged period of stable, and slightly declining, oil prices.

Figure 1. Nominal and Real (Inflation Adjusted Year 2000 Dollars) Average Annual Crude Oil Prices (1946-2005)

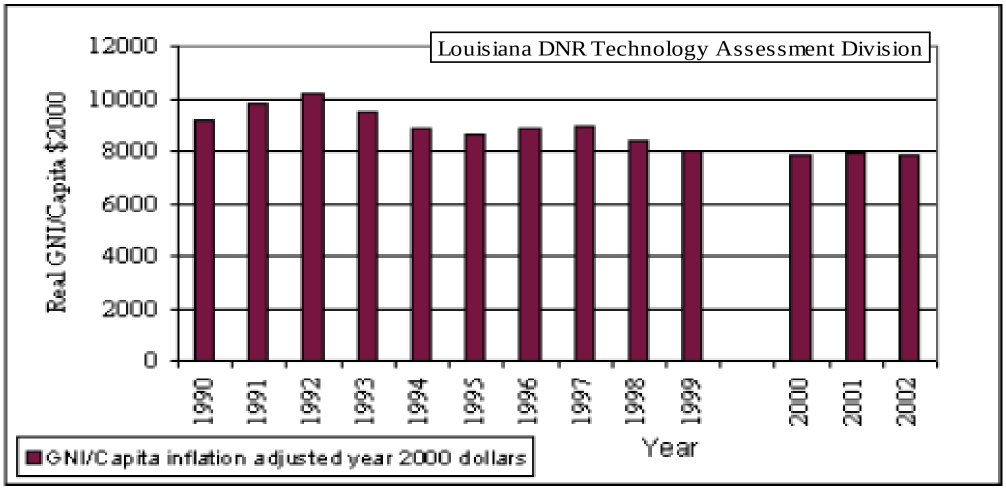


But Saudi Arabia began to experience internal political unrest over declining gross national income (GNI) per capita. During the second quarter of 1999, the OPEC countries agreed to a price range for crude oil of $22.00 - $28.00/bbl, again asserting their market power.

Between the second quarter of 1999 and the fourth quarter of 2002, and just prior to the invasion of Iraq in the first quarter of 2003, the average price of oil was very near the mid-point of the price range, about $25.00/bbl, an increase of nearly $5.00/bbl over the average price for the period of the 1990s. This price range accomplished its purpose of stabilizing Saudi GNI/capita and easing internal unrest temporarily (Figure 2).

OPEC has not publicly made any reference to a new price range over the succeeding seven years. Were the price range to be updated by OPEC for (1) inflation, and (2) a decline in the value of the U. S. dollar, the new price range would likely be $37 - $47/bbl. This new and hypothetical range is arrived at by adjusting for commodity price inflation—which is what OPEC is paying for in their current reinvestment in internal nation building activities, and an adjustment for the decline in the value of the dollar against the euro. In view of the sustained growth in crude oil demand, even in the face of prices exceeding the new hypothetical range, it would not be unreasonable to again hypothesize an OPEC floor price at the top of this newly calculated price range, i.e., $45.00 - $50.00/bbl, as the new OPEC consensus should OPEC again achieve market control.

Figure 2. In Saudi Arabia, the GNI/Capita (in Real Inflation Adjusted Year 2000 Dollars)



Market control of oil pricing has shifted to the likes of hedge funds and large banking institutions with proprietary trading operations whose raw financial power and electronic speed move futures markets on every rumor or fact of unrest in an oil exporting nation, or to the development of a hurricane threatening to disrupt production in the Gulf of Mexico. The role of these financial behemoths in controlling the crude oil futures market pricing can be discerned from Commitment of Traders (COT) reports filed with the Commodity Futures Trading Corporation (CFTC).

For example, open interest is the total of all futures and/or options contracts entered into and not yet offset by a transaction, by delivery, or by exercise. Open interest has nearly tripled as of June 27, 2006 from June 24, 2003. Clearly, the volume of transactions without offset indicates the anticipation that prices will go higher in the future than they were on June 27, 2006.

COT reports are filed by both commercial traders, those who are "…commercially engaged in business activities hedged by the use of the futures or options markets…," and non-commercial traders, those who are speculators. The net long positions of both sets of traders have nearly doubled since June 24, 2003, reflecting how potential geopolitical events are expected to drive oil prices higher.

By December 2004, the futures markets had begun to show a condition known as "contango," i.e., the condition in which distant delivery prices for futures exceed spot prices.

IN MEMORIAM

Paul Robert "Bob" Sprehe
Economist

September 8, 1933 – February 7, 2007

Technology Assessment Division
Louisiana Department of Natural Resources

BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: ENERGY EFFICIENT PACKAGES

by
Howard Hershberg, AIA

The *Builder's Guide to Energy Efficient Homes in Louisiana* is being updated to reflect new code requirements.

Investments in energy efficient features in new homes are remarkable because everyone wins:

- Most homeowners win because they receive a positive cash flow within 1-3 years.
- Homeowners benefit from improved comfort, better indoor air quality, reduced moisture problems, and fewer health problems.
- Builders have fewer callbacks, and make additional profit from the extra construction costs.
- Heating and cooling contractors have fewer call backs.
- Realtors receive additional fees from the additional cost of the energy features, and enhance their reputations by selling the higher quality homes that homebuyers appreciate.
- Participating financial institutions receive higher mortgage payments and have more secure loans because the homes have lower annual ownership costs due to reduced utility bills.
- National lending agencies such as the Federal Housing Authority (FHA) and the Veteran's Administration (VA) usually require some degree of efficiency by mandating that new homes comply with the latest Residential Energy Code (IRC) 2006. However, this may vary on a state-by-state, parish-by-parish, or county-by-county basis.
- The local community benefits as more money stays within the community, and local subcontractors and product suppliers make additional income by selling improved energy efficient features.

Achieving Energy Efficiency

Overall success, resulting in a well-designed and constructed home that is also energy efficient, requires careful and cooperative collaboration between the owner, the architect (or licensed home designer), and the builder. The architect or designer should serve as the main coordinating party between the participants.

Designing and building a home that uses energy wisely definitely does not mean sacrificing a home's aesthetic qualities or amenities. Quite the opposite; usually, the better the home is designed, the easier and more natural it is to make it energy efficient, comfortable and convenient. While an energy efficient home usually utilizes better quality materials than a standard code compliant home, the payback due to increased energy savings (for the better quality materials) is usually 2-3 years. After the payback is 100% complete, the owner benefits from the energy savings for the duration of the mortgage; and as long as he occupies the home.

Quality of Construction Affects Energy Efficiency

Quality of the basic construction goes a long way to providing comfort to the homeowner and to affording savings on energy costs. The following areas should be thoroughly reviewed in the design process and during construction:

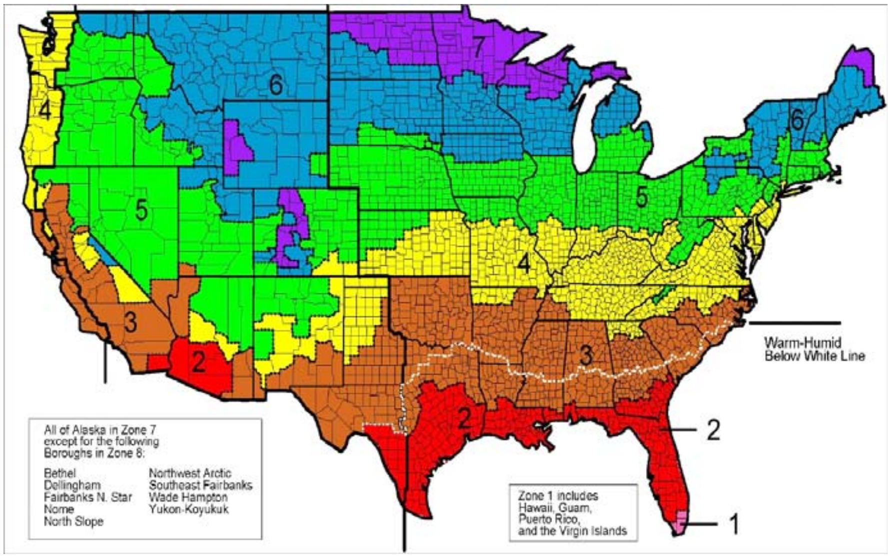
1. Quality of framing and installation of insulation and windows.
2. Attention to detail in sealing air leaks.
3. Design and installation of the heating and cooling equipment.
4. Effectiveness in sealing duct leaks.

International Residential Code 2006 (IRC 2006)

The state of Louisiana adopted IRC 2006, effective January 2007, as its residential building code. Chapter 11 is the section that deals with residential energy efficiency. Chapter 11 of the IRC 2006 contains a climate zone map that governs which residential building components are permitted in each of the 6 climate zones. In addition to dividing the United States and it's territories into 6 climate zones (see figure), it also deals with:

1. The building thermal envelope.[1]
2. Insulation and fenestration.[2]
3. Duct insulation for supply and return ducts.
4. Duct sealing.
5. Air leakage and moisture control.
6. Recessed lighting - limiting air leakage.

International Residential Code (2006) Climate Zone Map



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[1] The building envelope consists of the building's roof, walls, windows and doors. The envelope controls the flow of energy between the interior and exterior of the building. Source: U.S. DOE EERE website (URL: http://www.eere.energy.gov, May 2, 2007.
[2] Fenestration is defined as the arrangement, proportioning and design of windows and doors in a building.

THE PRICE OF OIL - PART 2:
MARKET MOVING GEOPOLITICAL EVENTS

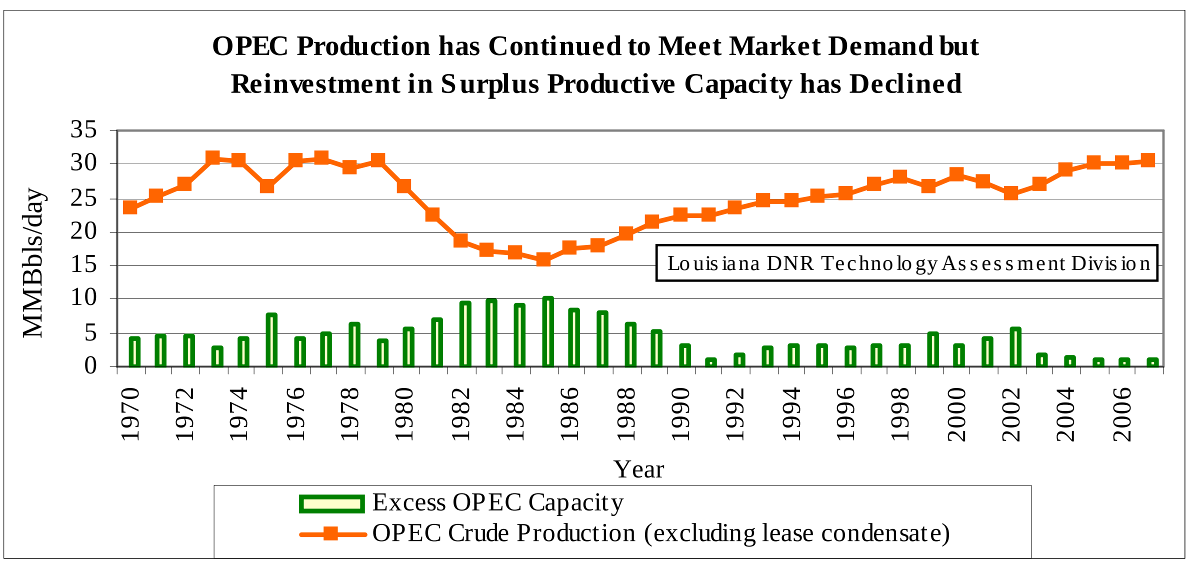
by
P. R. Sprehe
Energy Economist

Eight years have now passed since the second quarter of 1999 and the price range established by OPEC has been eclipsed by three significant global geopolitical events: (1) the war in Iraq; (2) a decline in reinvestment in oil productive capacity by the National Oil Companies (NOCs), largely excluding the western private sector companies from many exploration and production contracts; and (3) the growth of oil demand in China and India.

In the first quarter of 2003, the invasion of Iraq resulted in a growing anti-American sentiment in many parts of the world, particularly in Muslim oil producing nations. The potential for disruption in supply by terror organizations is deemed to be a very high probability.

A second factor that magnifies the financial impact of the potential for a disruption of supply has been the decline in reinvestment in productive capacity by nearly all of the NOCs. Whatever surplus productive capacity exists across the globe, it exists primarily within OPEC, particularly Saudi Arabia (Figure 1). According to the Energy Information Administration's Erik Kreil, only about 500,000 bbls/day of excess capacity exists outside of OPEC.

Figure 1. OPEC Production



A third factor exerting its influence over oil prices as we move through 2007 has been the growth in oil demand coming from China and India (Figure 2). This spurt in demand growth further compounds the financial impact on oil prices in light of the potential for disruption of supply (Figure 3).

Figure 2. Oil Consumption in China, India and the United States

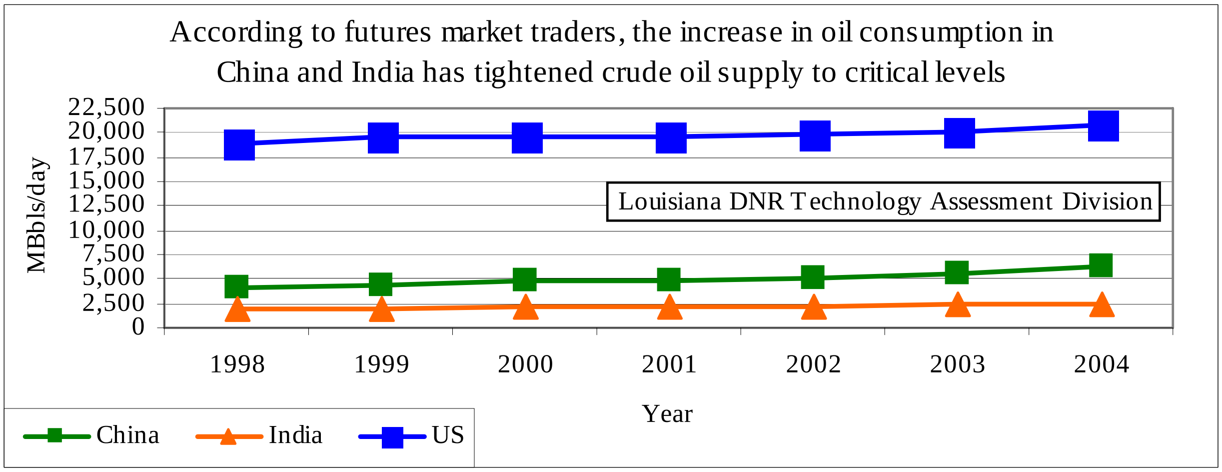
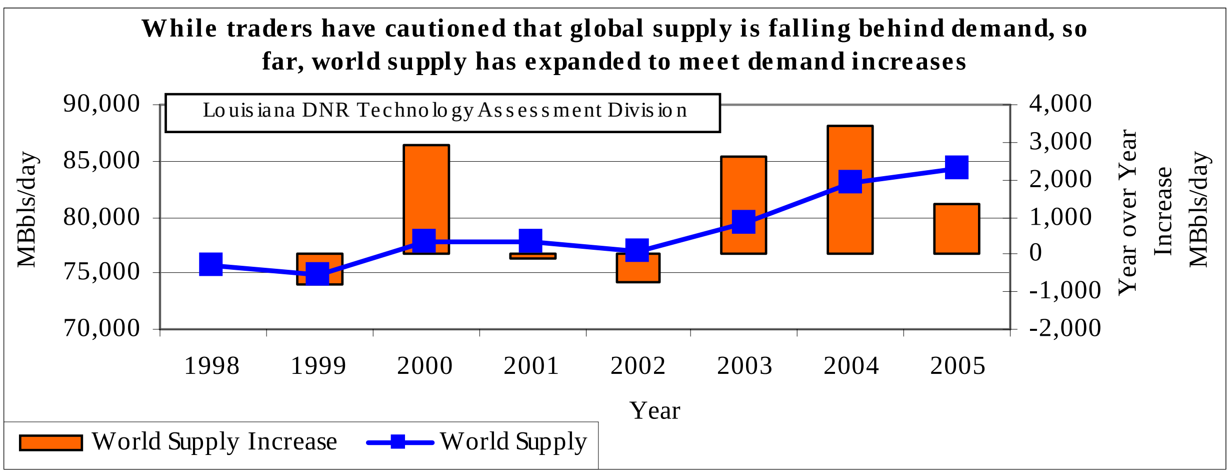


Figure 3. World Oil Supply



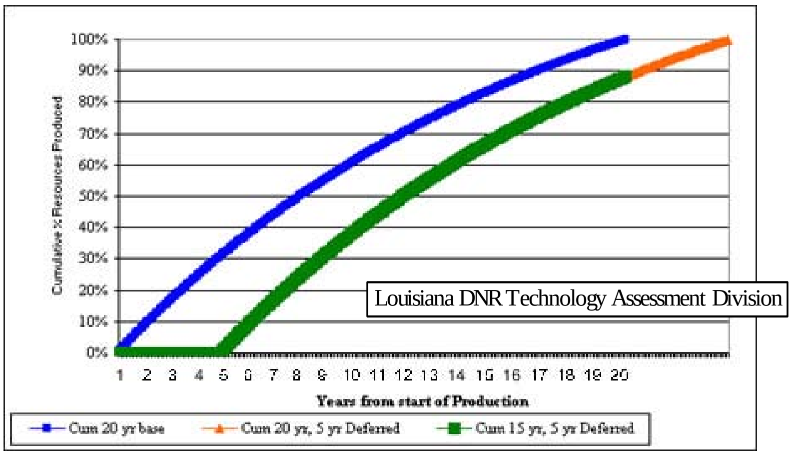
Following the first quarter of 2003 invasion of Iraq, these geopolitical events have contributed to the shifting of market control over oil prices, this time from OPEC to other factors.   These policy issues are the real world factors that the financial behemoths can legitimately speculate on through their proprietary trading operations.

The "Disruption or Terror Premium" can be hypothesized as the difference between the probable new price range of OPEC, which is approximately \$50.00/bbl, and the current spot and futures prices as influenced by the interpretation of these 3 geopolitical events by the financial hedge funds. Today, that premium would approximate \$20.00/bbl.

It is clear that a large number of these autocratic economies rely on single commodities as their source of national income. The world is experiencing a run-up in prices of almost all commodities. These dictatorial powers are basking in the corruption associated with very large and newly found cash flows. They also are reluctant to reinvest in new productive capacity, whether the commodity be oil and natural gas or metals. On the contrary, it is becoming popular to unilaterally abrogate agreed tax and royalty regimes after foreign investment in property, plant and equipment have already been made by outside investors. Recent examples of this behavior include Russia, Venezuela, Chad, and Bolivia, to name but a few.

In the short term, reduced surplus productive capacity in any commodity type resource results in market price escalation. But in the longer run, deferral of development/production reduces the net present value of the commodity resource to that nation (Figure 4).

Figure 4. Net Present Value of a Nation's Recoverable Resources



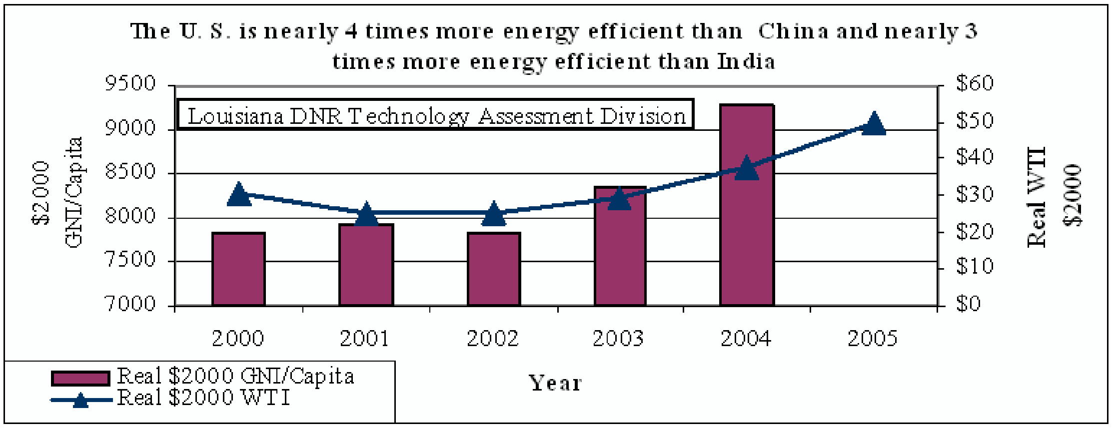
Fortunately, free market economies are not powerless: (1) they will innovatively search for process efficiencies to reduce the quantity of commodity used in a process; and (2) they will search for alternate sources and kinds of raw material, as in the case of oil and natural gas, unconventional sources of supply located in more secure geographic locales.

The Terror organizations who are virulently anti-American are also anti-moderate Arab States. The Gulf Cooperation Council member states, i.e., Saudi Arabia, Kuwait, Bahrain, Qatar, United Arab Emirates, Sharjah, Oman, are viewed as being supported by the U. S. and cooperating with the U. S. To constrain internal unrest, these nations require a "Floor Price" for oil that will sustain growth in Gross National Income/Capita (GNI/Capita). Today, that floor price is likely near the upper end of the newly calculated price range, i.e., $45.00 - $50.00/bbl. This potential for destabilization means that these nations cannot afford to allow the market price to fall below the "floor price." This also means that large volumes of unconventional oil resources such as oil sands and oil shales have become economic to develop. Because of the enormous volumes of these unconventional oil resources located within countries with stable legal and regulatory institutions there will not likely be any constraint on oil supply for decades into the 21st Century. And, conversely, because many autocratic oil and natural gas producers have unilaterally abrogated agreed tax and royalty regimes, they are no longer the foreign direct investment target that a constrained raw material supply might otherwise command.

Surplus productive capacity margins will remain constrained since it takes roughly 5 years to develop large new conventional and unconventional oil resources. Therefore, futures prices are likely to remain under the control of the hedge funds and proprietary trading desks of large banks.

In the interim, dramatic improvements in energy efficiencies in China, India, and the U. S. would reduce pressure on oil demand growth (Figure 5).

Figure 5. Growth of Gross National Income of China, India and the United States (in Real Inflation Adjusted Year 2000 Dollars)



The uncertain energy supply and price climate created by the price jump in the second quarter of 1999 and the natural gas price jump in 2000 caused a dramatic decline in investment in property, plant and industrial equipment (PPE) in the U. S. As a result, employment growth rates fell by half the rate of growth as in the 1990s.

An enlightened business leadership in the U. S., Canada, and the developed world will soon recognize that energy supply no longer has the stigma of uncertainty for business investment of 7 years ago; that developed nations are a stable and dependable location for PPE investment; that oil prices will likely remain within a price range of $45.00 - $50.00/bbl, plus a disruption premium; and there will be a gradual reduction of the disruption premium over time as new investment in unconventional supply accelerates, as well as investment in conventional supply where development options become available.

In the U. S., this potential PPE "boomlet" bodes well for employment growth, with associated growth in skilled labor jobs and skilled labor compensation levels.

IN MEMORIAM

Paul Robert "Bob" Sprehe
Economist

September 8, 1933 – February 7, 2007

Technology Assessment Division
Louisiana Department of Natural Resources

BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: THE HOUSE AS A SYSTEM

by
Howard Hershberg, AIA

The *Builder's Guide to Energy Efficient Homes in Louisiana* (henceforth known as "*Builder's Guide*") is being updated to reflect new code requirements. This is the third in a series of articles that will summarize the information in the guide and highlight updates.

Residential problems of unhealthy homes generally occur because of the failure of the home to properly react to the outdoor or indoor environment. Some common residential problems of unhealthy homes are as follows:

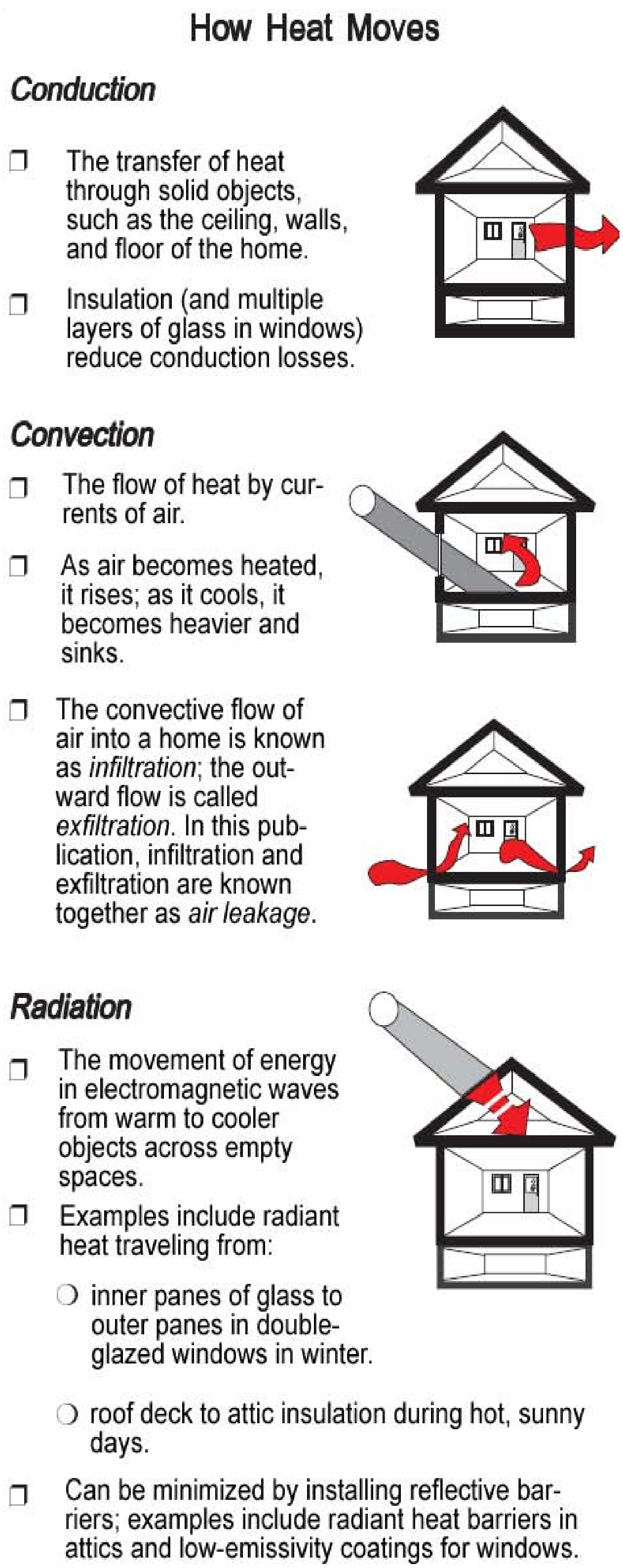
- Mold on walls, ceilings and furnishings
- Mysterious or unusual odors
- Excessive heating/cooling bills
- High humidity
- Rooms that are never comfortable
- Decayed structural wood and other materials
- Termite and other pest infestations
- Fireplaces that do not draft properly
- High levels of radon, formaldehyde or carbon monoxide

The house should be designed to properly function in spite of fluctuating temperatures, moisture levels and air pressures. If the following factors are kept at desirable levels, the house will provide comfort and a healthy air quality:

- **Moisture Levels** - Measured as relative humidity (RH), high humidity causes discomfort and generally promotes growth of mold and dust mites.
- **Temperature** - Both dry bulb (measured by a regular thermometer) and wet bulb, which indicates the amount of moisture in the air. The dry bulb and wet bulb temperatures can be used to find the relative humidity of the air.
- **Air Quality** - The level of pollutants in the air such as formaldehyde, radon, carbon monoxide, and other detrimental chemicals, as well as organisms such as mold and dust mites. The key determinant of air quality problems is the strength of the source of the pollutant.
- **Air Movement** - The velocity at which air flows in certain areas of the home. Higher velocities make the occupants more comfortable in the summer, but less comfortable in the winter.
- **Structural Integrity** - The ability of the materials that make up the home to create a long term barrier between the exterior and the interior space.

Heat loss and heat gain between a home and its exterior envelope have a major impact on health and comfort. Figure 1 explains the primary modes of heat transfer. The architect or licensed designer focuses on reducing conduction heat gain and loss by specifying more insulation.

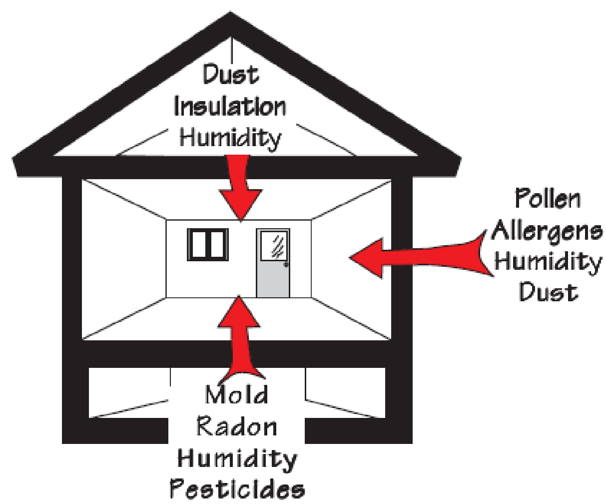
Figure 1. How Heat Moves



The best solution for indoor air quality (IAQ) problems is to build a residence as tightly as possible and install an efficient ventilation system that can bring in fresh, filtered outside air. The major factor affecting IAQ is the level of pollutant causing the problem. The solution to poor IAQ is removing the problem source. Air leaks often bring in air quality problems:

- Mold from crawlspaces and from outdoors
- Radon from crawl spaces and under slab areas
- Humidity from crawl spaces and outdoor air
- Pollen and other allergens from outdoor air
- Dust and other particles from crawlspaces and attics.

Figure 2. Air Quality Problems from "Fresh" Air

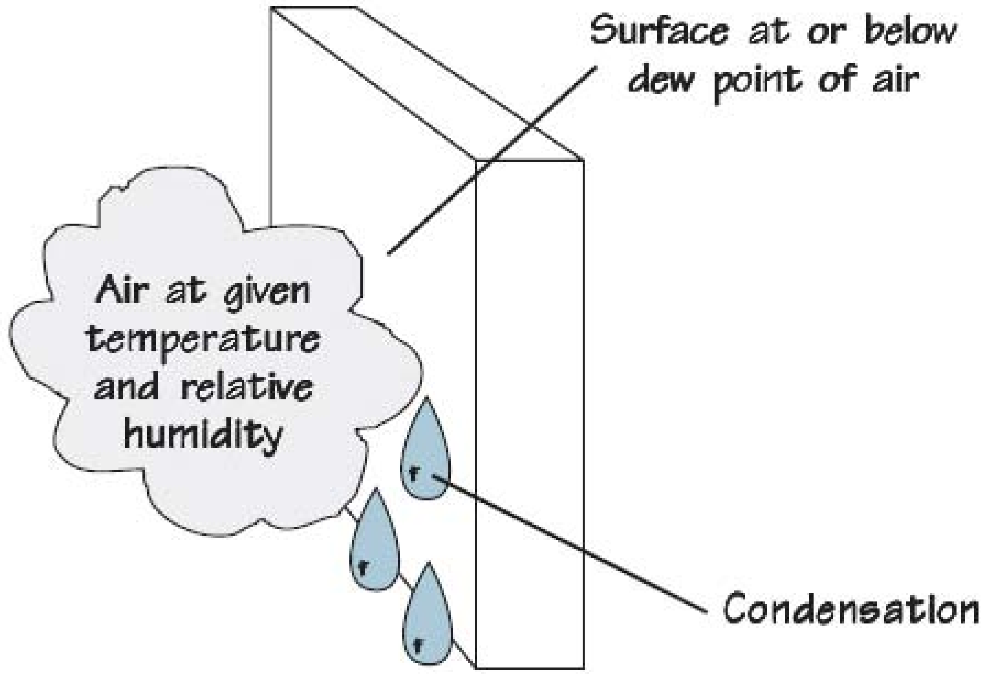


Preventing condensation involves reducing the relative humidity[1] of the air, increasing the temperatures of surfaces exposed to moist air, and blocking the flow of moisture using air barriers and vapor barriers. However, builders, architects, and designers should also allow spaces that might

[1] Air is made up of gases such as oxygen, nitrogen, and water vapor. The amount of water vapor that air can hold is determined by its temperature. Warm air can hold more vapor than cold air. The amount of water vapor in the air is measured by its relative humidity. At 100% relative humidity, water vapor condenses into a liquid. The temperature at which water vapor condenses is its dew point.

trap moisture to have drying potential – the ability to shed or reject moisture.

Figure 3. Conditions for Condensation



The heating, ventilating and air conditioning system (HVAC) is designed to provide comfort and improved air quality year round. Energy efficient homes, especially passive solar designs[2], can reduce the number of hours that the HVAC system is needed. Poor HVAC design causes higher utility bills than necessary as well as discomfort. Poor HVAC design can also lead to moisture and air quality problems.

In the field of building science, the term boundary has been applied to an external barrier created to control moisture, air leakage, and thermal conduction losses and gains. Every successful energy efficient home should have a moisture boundary, air leakage (pressure) boundary, and thermal boundary that separates unconditioned areas of the home from areas with heating or cooling.

In Figure 4, two different boundaries are shown for homes identical in shape and size. The boundary in example A, which depicts standard construction, is smaller than the boundary in example B. However, it is also more complicated. The boundary in example B is simpler because it incorporates virtually the entire exterior. One advantage of the boundary in example B is that the ductwork is all located within the sealed insulated envelope of the home. In example A's boundary, the ducts must be sealed and insulated as they are part of the boundary. The air quality and durability of a home depend on how well these boundaries are installed and maintained.

More information on energy saving features, and the full text of the *Builder's Guide*, can be found on the DNR Technology Assessment Division website at URL: http://www.dnr.louisiana.gov/tad.

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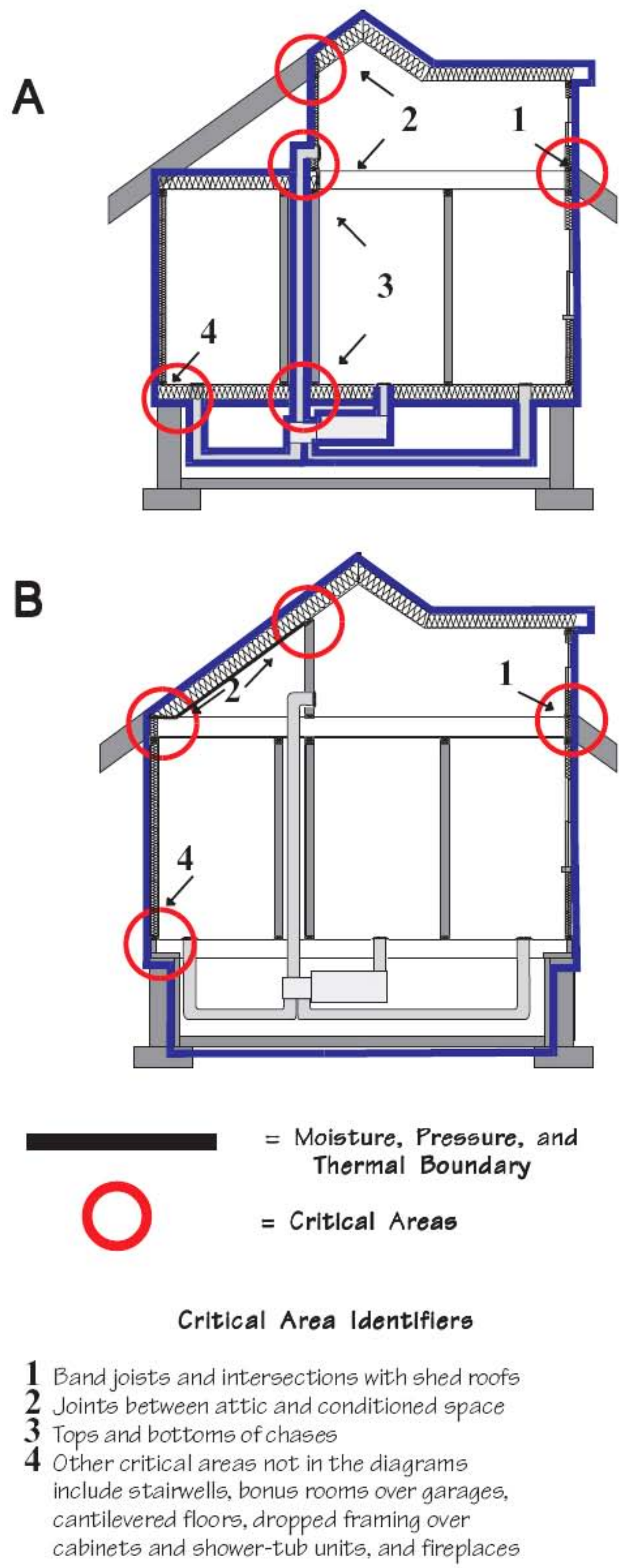
[2]Passive solar energy means that mechanical means are not employed to utilize solar energy. Solar energy is a radiant heat source. When sunlight strikes a building, the building materials can reflect, transmit, or absorb the solar radiation. Additionally, the heat produced by the sun causes air movement that can be predictable in designed spaces. These basic responses to solar heat lead to design elements, material choices and placements that can provide heating and cooling effects in a home.

Figure 4. Residential Boundaries



BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: AIR LEAKAGE AND SEALING – MATERIALS AND TECHNIQUES

by
Howard Hershberg, AIA

The *Builder's Guide to Energy Efficient Homes in Louisiana* (*Builder's Guide*) is being updated to reflect new code requirements. This is the fourth in a series of articles that will summarize the information in the guide and highlight updates.

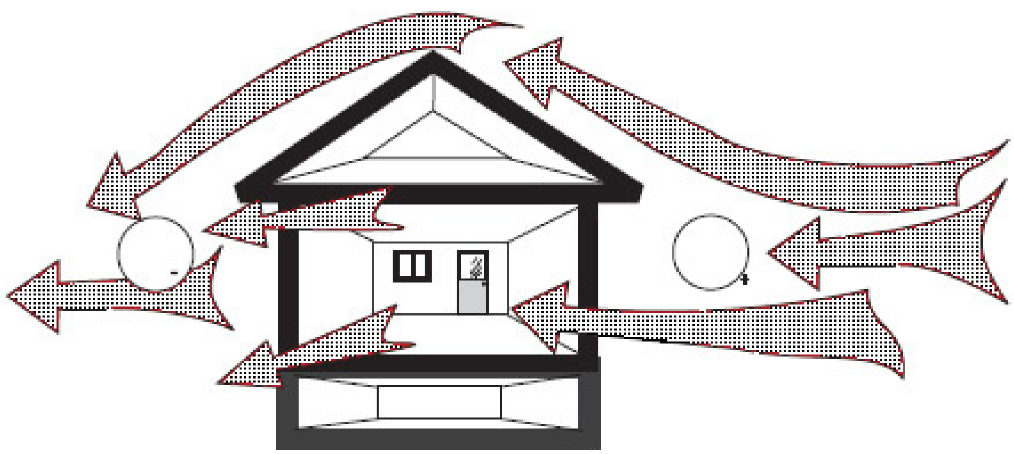
Air leakage is a major problem for both new and existing homes. It can contribute 30% or more to home heating and cooling costs, create comfort and moisture problems and draw in pollutants. The reduction (or prevention) of air leakage requires a continuous air barrier. The air barrier creates a tight building envelope and minimizes air currents through the insulation, thereby helping the insulation to maintain the designed R-values.

The R-value for standard insulation drops if air leakage occurs through the material. To install a proper air barrier, seal all penetrations in the envelope and install a continuous air barrier material such as house wrap or drywall around the envelope. Air leakage is the result of holes and a pressure difference that forces air to flow through a hole.

A pressure difference is commonly caused by:

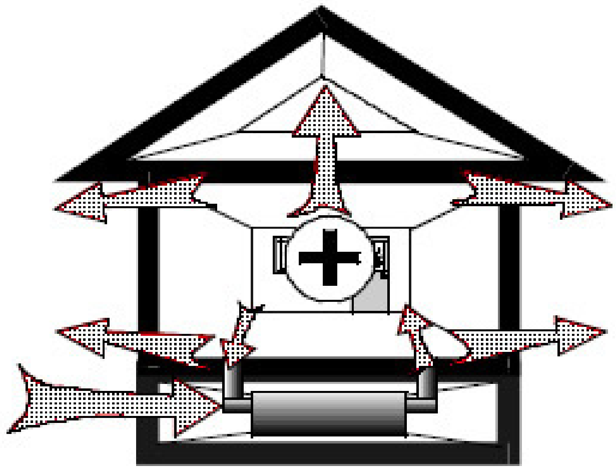
- Wind (Figure 1)
- Stack Effect (Figure 2)
- Mechanical Blowers (Figure 3)

Figure 1. Wind Driven Infiltration



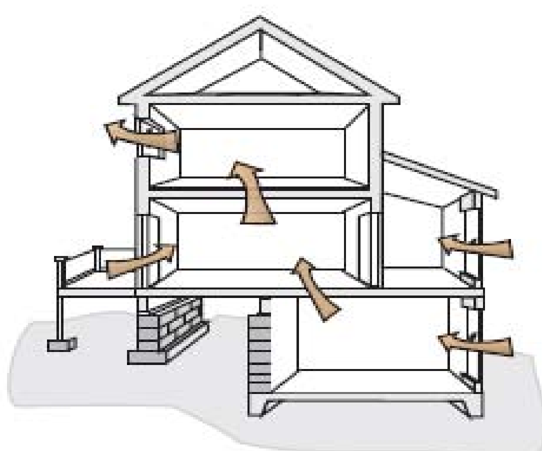
On average, wind in the Southeast creates a pressure difference of 10 to 20 Pascals on the windward side. However; most homes have only small cracks on the exterior, and winds are variable.

Figure 2. The Stack Effect



Leaks in supply and return ductwork can cause pressure differences of up to 30 Pascals. Exhaust equipment such as kitchen and bath fans and clothes dryers can also create pressure differences.

Figure 3. Mechanical System Infiltration



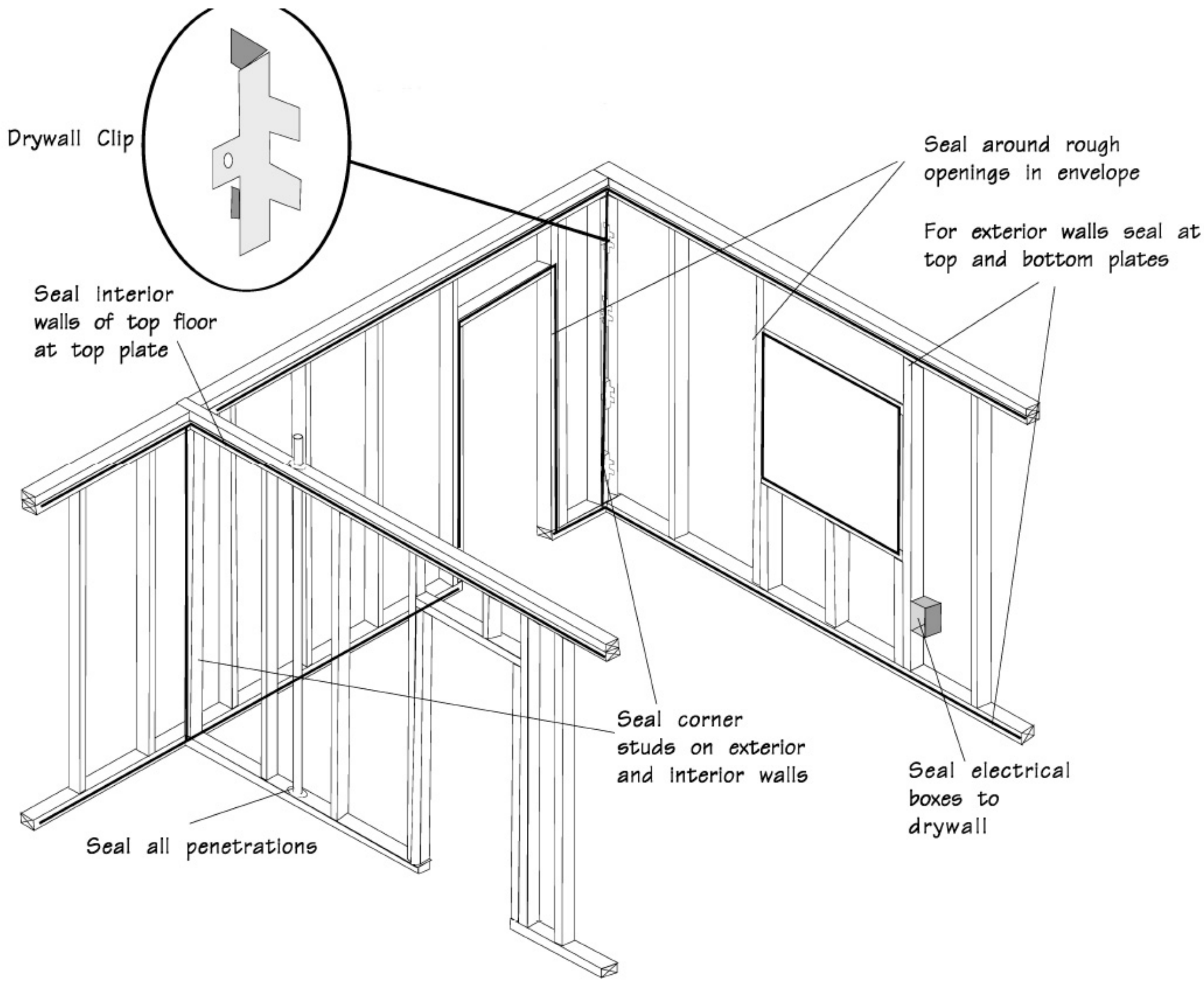
The stack effect can create pressure differences between 1 to 3 Pascals due to the power of rising warm air. Crawlspace and attic holes are often large.

The first step in creating an effective air barrier system is to seal off all of the holes in the building envelope. Concentrating on air leakage through doors and windows and ignoring effective air barriers will not make a house tight.

Most air barrier systems rely on a variety of caulks, gaskets, and weather stripping. They also may include sheet materials such as plywood, drywall, and housewraps. The additional cost for these materials can range from $500 to $700. However, the benefits they pay back to the owner in saved energy costs, healthy home environment, and improved indoor air quality (IAQ) is worth thousands of dollars over the life of the mortgage.

The airtight drywall approach (ADA) is an air sealing system that connects the interior finish of drywall and other building materials together to form a continuous barrier (Figure 4). ADA has been used on hundreds of houses and has proven to be an effective technique to reduce air leakage, as well as keeping moisture, dust, and insects from entering the home.

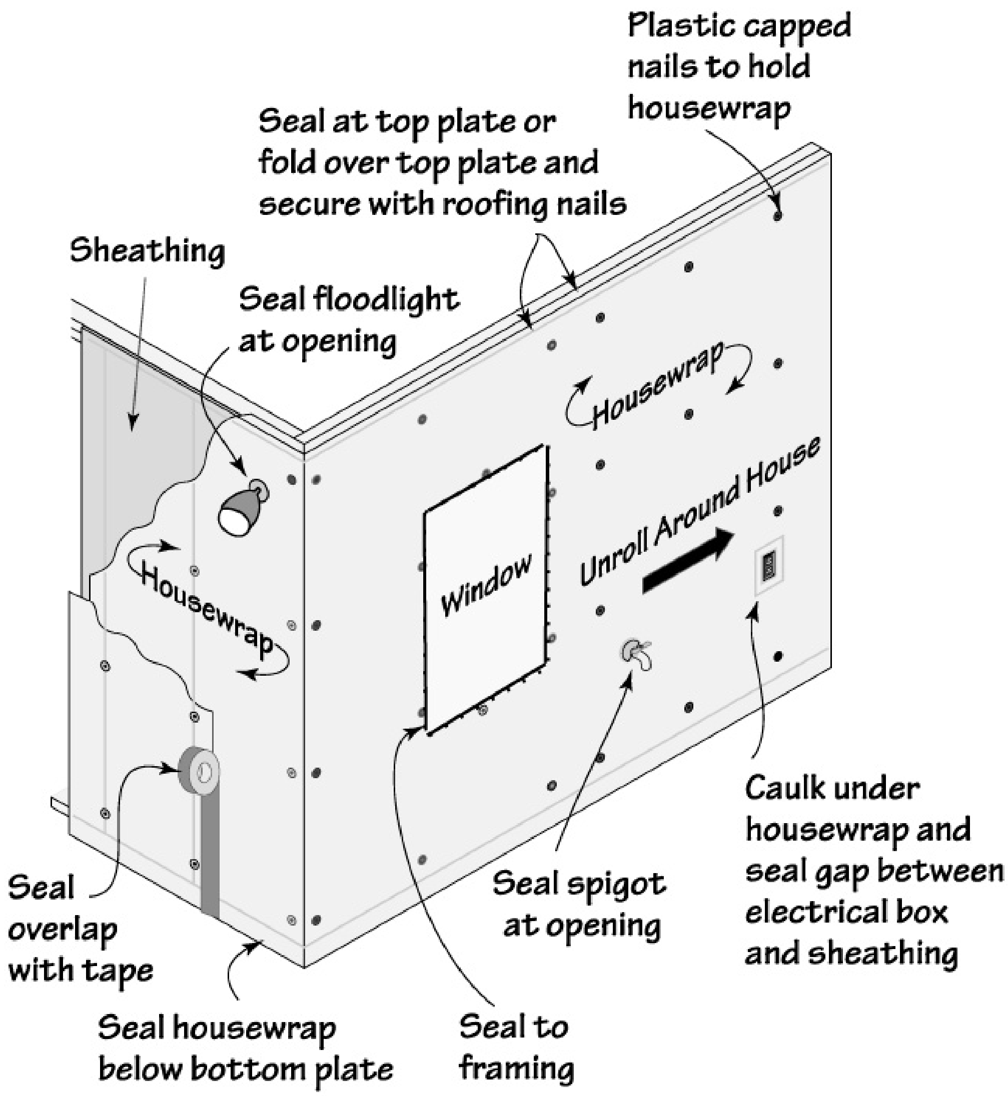
Figure 4. Airtight Drywall Approach Air Barrier



ADA uses either caulk or gasket to seal and to make the drywall continuous air barrier system. ADA gaskets have “memory” when they are compressed by the drywall and then when released they return to their original configuration. These gaskets may be installed before the drywall crew arrives. **However, they must be instructed to leave the ADA gaskets intact.**

There are several new housewraps on the market that can be used effectively as air barriers (Figure 5). Housewrap materials can reduce air leaks through exterior walls if installed properly. They are advantageous in Louisiana because they are permeable to water vapor, thus helping prevent moisture build-up in walls. (They seal out wind and rain, but allow the walls to “breathe” by allowing water vapor to pass through.)

Figure 5. Recommended Housewrap Installation Process & Procedures



More information on energy savings features, and the full text of the *Builder’s Guide*, can be found on the DNR Technology Assessment Division website at URL: http://www.dnr.louisiana.gov/tad.

SELECTED LOUISIANA ENERGY STATISTICS

Among the 50 states, Louisiana's rankings (in 2006 unless otherwise indicated) were:

PRIMARY ENERGY PRODUCTION
(Including Louisiana Outer Continental Shelf (OCS)[1])

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 liquefied natural gas (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
5th	in natural gas
8th	in total energy (2005)
6th	in dry natural gas proved reserves
7th	in crude oil proved reserves

ENERGY CONSUMPTION (2004)

2nd	in industrial energy
3rd	in per capita energy
3rd	in natural gas (2005)
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 1.35 TCF in 2003 and 2004, 1.28TCF in 2005, and 1.35TCF in 2006.

State controlled gas production is on a long term decline rate of 3.2% per year, though the current short term (2007-2012) forecast decline is around 2.8% 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 73.9 million barrels in 2006.

State controlled crude oil production is on a long term decline rate of 3.5% per year, though the current short term (2007-2012) forecast decline is around 3.0% per year. If oil stays above $55.00 per barrel, the decline will remain as predicted, and if the price drops below that, the decline rate will be higher.

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

Louisiana OCS territory has produced approximately 85.4% of the 16.7 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 2006. Currently, Louisiana OCS territory produces 79.0%

[1] 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.

of the oil and 72.3% of the natural gas produced in the entire U.S. and 83.5% of the oil and 73.2% 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 3.91 TCF in 1999, fell to 3.34 TCF in 2003, 2.90 TCF in 2004, 2.33 TCF in 2005, and 2.08 TCF in 2006.

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. Since then, 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; 505 million barrels was produced in 2003, 477 million barrels in 2004, 407 million barrels in 2005, and 410 million barrels in 2006..

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 2006/07, these revenues are estimated to be in the vicinity of $1.35 billion, or about 12.7% of total estimated taxes, licenses, and fees.

At constant production, the State Treasury gains or loses about $10.4 million of direct revenue from oil severance taxes and royalty payments for every $1 per barrel change in oil prices.

For every $1 per thousand cubic feet (MCF) change in gas prices, at constant production, the State Treasury gains or loses $40.1 million in royalty payments, and increases or decreases gas full rate severance tax by 3.9 cents per MCF or about $38.9 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 1,996 permits in 2005, and increased to 2,137 permits in 2006.

The annual 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 2004 the average swung back to 91 active rigs, in 2005 the average rose to 108 active rigs, and in 2006 the average rose to 118 active rigs. The lowest year average between 1981 and 2005 was 64 active rigs in 1993.

The annual average active rotary rig count for Louisiana OCS reached a high of 109 rigs in 2001 and is in a downward trend. It was 87 in 2007, 81 in 2003, 76 in 2004, 74 in 2005, and 70 in 2006. The lowest year average between 1981 and 2006 was 23 active rigs in 1992.

LOUISIANA, AN ENERGY CONSUMING STATE: AN UPDATE USING 2004 DATA

by

Bryan Crouch, P.E.

Louisiana is a net energy consuming state; that is, Louisiana consumes more energy than it produces. In 2004, Louisiana consumed 3,816.3 trillion BTUs (TBTUs) of energy and produced 2,312.9 TBTUs (not including OCS oil and gas production). The reason for Louisiana's huge energy consumption is the petrochemical and petroleum refining industry in the state that produces and exports to the rest of the nation, enormous volumes of energy intensive chemicals and fuel products. Figures 1 & 2 break up total Louisiana energy consumption by sector and source, respectively.

Figure 1. Louisiana Energy Consumption Percentage by Sector - 2004

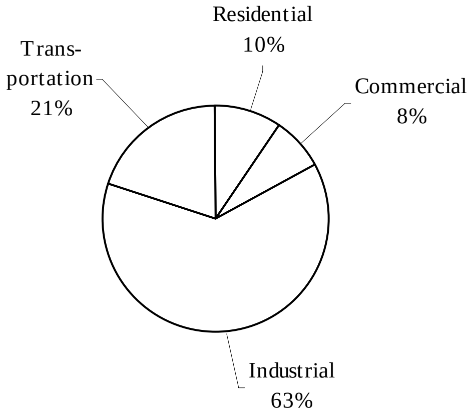
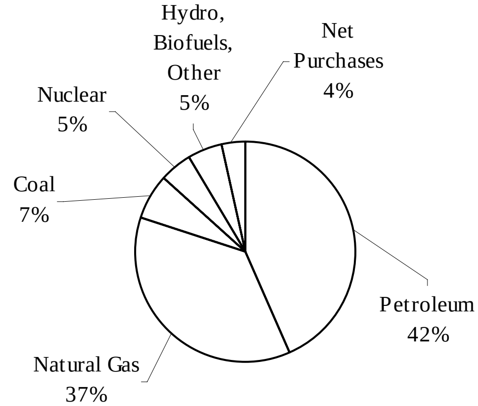


Figure 2. Louisiana Energy Consumption Perecentage by Source - 2004



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.

Table 2 on the following page presents the Louisiana energy balance for 2004. Energy production from Louisiana's federal OCS area dwarfs state production. The energy balance is calculated both inclusive and exclusive of Louisiana's OCS oil and gas production.

Table 1. Louisiana Energy Consumption Rankings Among the States - 2004

Category	Rank	TBTU	#1 State (TBTU)
Residential	22	369.3	California (1,556.1)
Commercial	21	285.9	California (1,556.3)
Industrial	2	2,403.1	Texas (6,400.4)
Transportation	12	758.1	California (3,199.6)
Coal	31	256.7	Texas (1,626.0)
Natural Gas	3	1,400.0	Texas (3,941.2)
Petroleum	5	1,651.1	Texas (5,801.3)
Electricity	18	272.1	Texas (1,093.9)
Total	8	3,816.3	Texas (11,971.4)
Per Capita (MBTU)	3	848.9	Alaska (1,186.2)

Table 2. Louisiana Energy Balance - 2004 [1]

ENERGY SOURCE		PRODUCTION		CONSUMPTION		NET STATE ENERGY PRODUCTION Excluding OCS	NET STATE ENERGY PRODUCTION Including OCS
PETROLEUM:	STATE OIL[2]	485.3 TBTU[4]	(83.7 MMBBL)	1,651.1 TBTU	(310.5 MMBBL)	-1,165.8 TBTU	1,601.9 TBTU
	LOUISIANA OCS OIL[2]	2,767.7 TBTU[4]	(477.2 MMBBL)				
NATURAL GAS	STATE GAS [3]	1,404.2 TBTU[4]	(1.35 TCF)	1,400.0 TBTU	(1.346 TCF)	4.2 TBTU	2,959.2 TBTU
	LOUISIANA OCS GAS [3]	2,955.0 TBTU[4]	(2.841 TCF)				
COAL:	LIGNITE	55.5 TBTU	(3.805 MMSTON)	256.7 TBTU	(16.1 MMSTON)	-201.2 TBTU	-201.2 TBTU
NUCLEAR ELECTRIC POWER		178.0 TBTU	(17.0 Billion kWH)	178.0 TBTU	(17.0 Billion kWH)	0.0 TBTU	0.0 TBTU
HYDROELECTRIC, BIOFUELS & OTHER		189.9 TBTU		189.9 TBTU		0.0 TBTU	0.0 TBTU
NET INTERSTATE PURCHASES OF ELECTRICITY INCLUDING ASSOCIATED LOSSES				140.6 TBTU	(41.205 Billion kWH)	-140.6 TBTU	-140.6 TBTU
TOTALS:	EXCLUDING LOUISIANA	2,312.9 TBTU		3,816.3 TBTU		-1,503.4 TBTU	
	INCLUDING LOUISIANA (	8,035.6 TBTU		3,816.3 TBTU			4,219.3 TBTU

The Louisiana energy balance for 2004 shows that the state consumed 1,503 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 4,219 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)
kWH = Kilowatt hour
MMSTON = Million Short Tons

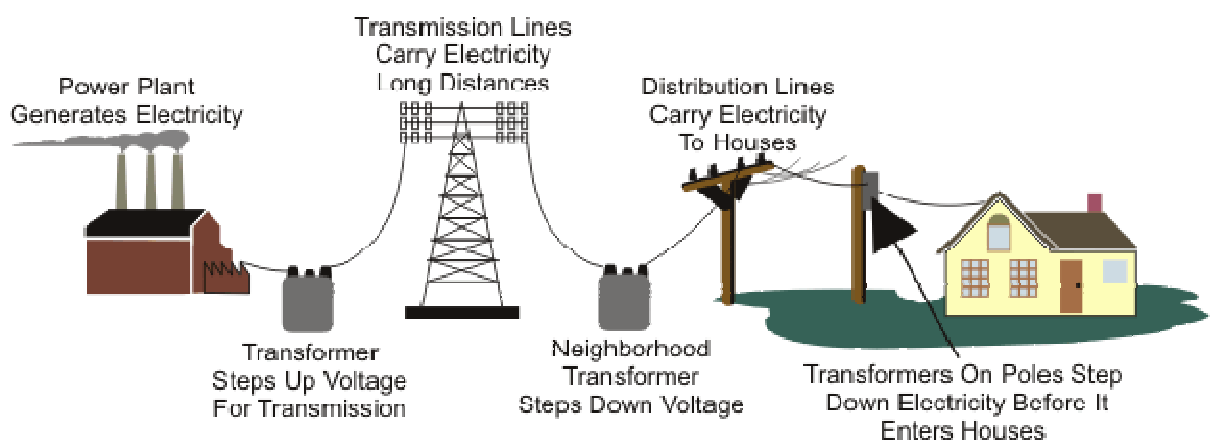
1. Unless otherwise noted, data is obtained from the Energy Information Administration's latest published figures for state energy consumption.
2. Includes condensate
3. Includes gas plant liquids
4. Louisiana Department of Natural Resources data

LOUISIANA ELECTRIC GENERATION – 2007 UPDATE

by
Patricia Nussbaum, PE

Electricity is available to consumers because utilities and nonutility electricity power producers operate electric generating units. The fuel sources for these generating units include fossil fuels (coal, natural gas and petroleum), uranium, and renewable fuels (water, geothermal, wind, and other renewable energy sources). Total electric power generation in the U.S. in 2005 was 4,055 billion kilowatthours (kWh). Coal was used to generate 49.7% of electricity in 2005. Nuclear generating units were the second largest contributor at 19.3%. Natural gas was used to generate 18.7% and petroleum generated 3.0% of the electricity. Of the renewables, water had the largest share at 6.5% with non-water renewables only about 2.7%. (These include geothermal, refuse, waste heat, waste steam, solar, wind, wood, blast furnace gas, batteries, and chemicals.)

Figure 1. Key Elements of the Electric Power Grid



Source: EIA

In 2005, 58% of the generating capacity in Louisiana came from electric utilities and 42% came from independent power producers (IPPs) and cogeneration. The state had a net electricity generation capacity in 2005 of 92,616,878 megawatthours (MWh).

The primary energy source for generating electricity in Louisiana is natural gas. However, of the ten largest plants (by generating capacity), five use natural gas as the primary energy source (Willow Glen, Nine Mile Point, Little Gypsy, Acadia Energy Center, Michoud), three use coal (Big Cajun 2, R. S. Nelson, Rodemacher) and two are nuclear generating plants (Waterford 3, Riverbend).

The top five retailers of electricity are investor-owned utilities: Entergy Louisiana Inc., Entergy Gulf States Inc., Cleco Power LLC, Southwestern Electric Power Co., and Entergy New Orleans Inc. Louisiana has approximately 2,176,000 retail customers and the average retail price is 8.03 cents per kilowatthour.

Entergy has not decided to build a nuclear unit, but it is positioning itself to have the option to build a nuclear unit. Entergy Nuclear has signed a project development agreement with GE-Hitachi Nuclear to order reactor components and is on schedule to submit a combined construction and operating license application for its Grand Gulf nuclear site in Mississippi by the end of 2007 and a second application for its River Bend site in Louisiana in mid-2008.[1]

Figure 2. Major Electric Power Plants in Louisiana

Source: EIA

All of this data was secured from the Energy Information Administration (EIA) web site (URL: http://www.eia.doe.gov) and uses the statistics available as of 2005. The full report "Louisiana Electric Generation – 2007 Update" will be available on the DNR website (URL: http://www.dnr.louisiana.gov/tad) in September 2007.

[1] URL: http://www.entergy-nuclear.com/news_room/newsrelease.aspx?NR_ID=1017, accessed 8/16/07.

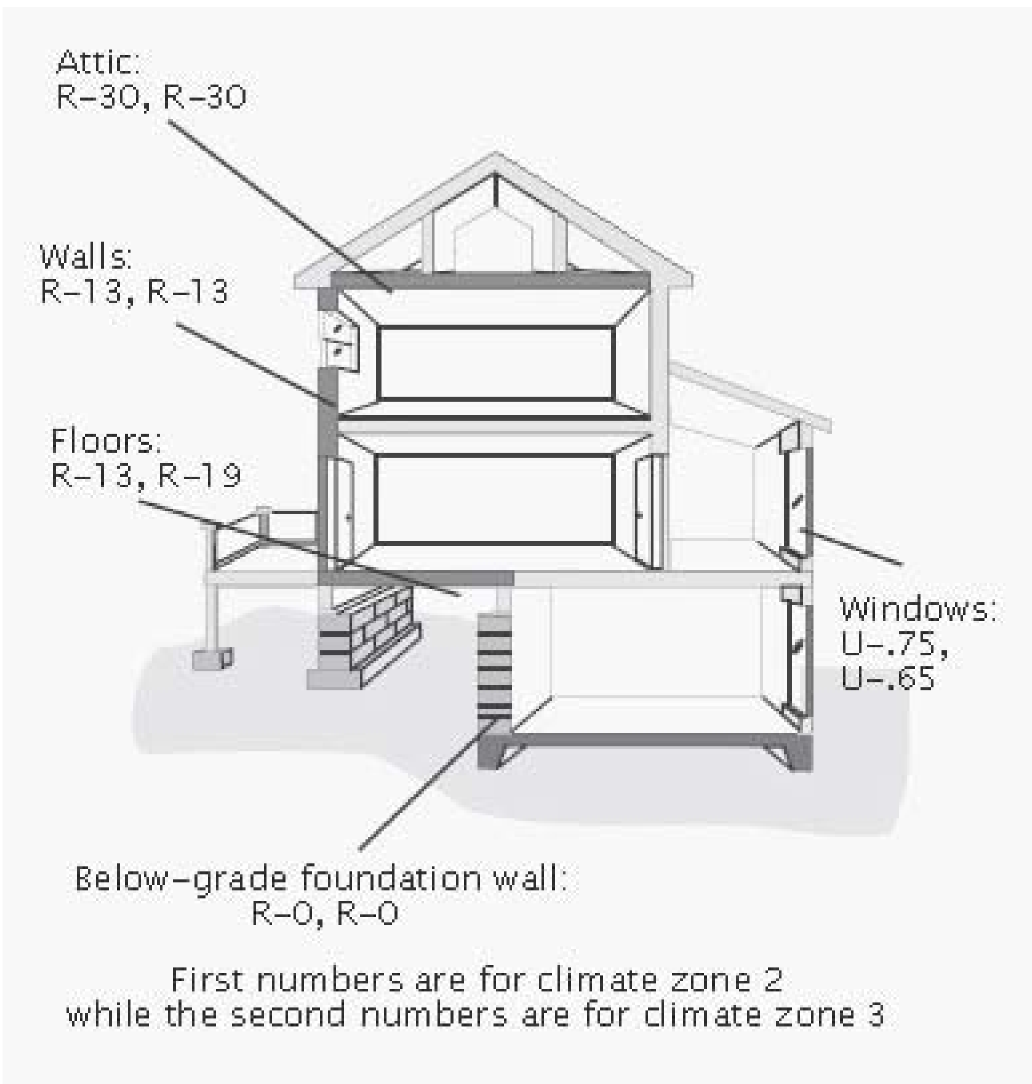
BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: INSULATION MATERIALS AND TECHNIQUES

by
Howard Hershberg, AIA

The *Builder's Guide to Energy Efficient Homes in Louisiana* (*Builder's Guide*) is being updated to reflect new code requirements. This is the fifth in a series of articles that will summarize the information in the guide and highlight updates.

The key to an effective insulation system is acquisition and proper installation of quality insulation products**.** A house should have a continuous layer of insulation around the building envelope. Insulation should be in direct contact with the continuous air barrier around the residence for maximum R value (Figure 1). Studies show that improper or incomplete insulation installations can cut performance of the insulation by 30% or more.

Figure 1. Insulating the Building Envelope – Recommended R-values



The following guidelines are critical for optimum performance when installing any insulating material:

- Seal all air leaks between conditioned and unconditioned areas.
- Obtain complete coverage of the insulation.
- Minimize air leakage through the material.
- Avoid compressing insulation.
- Avoid lofting (installing too much air) in loose fill products

Insulation Materials:

- **Fiberglass** (R value 2.4 – 4.4 per inch) comes in batts, rolls, and loose fill products. It is also available in high density board material. Recycled glass is used in the production process. Fiberglass is used for insulating almost every building component, including the foundation, attics, and ductwork.

- **Cellulose** (R value 3.0 – 3.6 per inch)**,** which is made from recycled newsprint, comes mainly in loose fill form. Loose fill cellulose is used for insulating attics. It can be used in walls when installed with a binder, netting, or covering. Because of its high density, cellulose has the advantage of helping to stop air leaks as well as providing insulation value. Cellulose batts are now on the market also.

- **Rock wool** (R value 2.6 per inch) is mainly available as a loose fill product, and can be installed in attics or blown, using damp spray methods, into walls. It is fireproof, and several manufacturers use recycled products in the production process.

- **Molded–expanded polystyrene (MEPS)** (R value 4.0 to 5.0 per inch), known as beadboard, is a foam product made from molded plastic beads. It has the lowest R-value per inch; but it is also the cheapest of the foam insulations. MEPS is used in several building products including insulated concrete forms (ICF's) and structural insulated panels (SIPS). It performs well in below grade applications.

- **Extruded Polystyrene (XPS)** (R value 5.0 per inch) is a homogeneous polystyrene foam product. It comes in characteristic colors of blue, pink, and green. It is an excellent product for below grade applications as well as exterior sheathing.

- **Polyisocyuranate and polyurethane** (R value 6.8 to 7.2 per inch) are insulating foams with some of the highest available R-values per inch. They are not designed for use below grade.

- **Open–cell polyurethane sprayed foam** (R value 5.5 to 6.5 per inch) is used primarily to seal air leaks and to provide an insulating layer.

- **Icynene Foam** (R value 3.6 per inch) is used primarily to seal air leaks and provide an insulating layer. It is made with carbon dioxide rather than with more polluting gases such as Pentene or hydrochloroflurocarbons used in other foams. It is either sprayed or injected.

- **Aerated concrete**, including lightweight, autoclaved concrete (processed at high temperature) can provide a combination of moderate R-values and thermal masses for floors, walls, and ceilings.

Fiberglass, rockwool, and cellulose products are the most economical and should serve as bulk insulation in attics, walls, and floors. In attics, loose –fill products are usually more expensive than batts or blankets. Blown cellulose and rockwool are denser than fiberglass helping reduce air leakage. Foam products are most economical when they can be applied in thin layers as part of a structural system or to help seal air leaks. Foundation wall or slab insulation, exterior sheathing over wall framing, insulation as part of structural panels for walls and roofs, and spray applied foam insulation are some examples.

Many of Louisiana's homes have slab-on-grade floors for the first story of conditioned space. Since Hurricanes Katrina and Rita in 2005, Louisiana has adopted a new statewide building code restricting where new homes can be built on concrete slabs below certain elevations. The Department of Natural Resources cautions and warns home builders, contractors, architects, and licensed home designers to contact the local permit office before commencing any forming, excavating, or slab pouring. Most permit offices require submission of a finish slab elevation to be submitted and approved prior to any physical work taking place on the site.

Where permitted, in northern sections of the state particularly, insulating the exterior of the slab can reduce winter heating bills up to 10% to 20%. However, because subsurface termite and Formosan termite infestation is so prevalent in Louisiana, preventing termites is a key goal for any building in the state. This is especially pertinent when a visual inspection is not possible. Figures 2 and 3 show suggested slab details that will help to prevent termite infestation.

The following guidelines are also suggested to assist in termite prevention:

- Proper drainage - slope soil away from home and install foundation drainage.

- Remove organic matter - remove all wood from around foundation before backfilling.

- Direct moisture away from the home - use well maintained gutters and downspouts that connect to a drainage system.

- Provide continuous termite shields - protect pressure treated wood sill plate and other framing members with continuous aluminum or galvanized termite shield.

- Treat soil and monitor pests - homeowners should be sure to hire a reputable termite company that will provide a full guarantee against pests. Install termite traps or other monitoring methods so occupants can see if pests are near the building.

More information on energy savings features, and the full text of the *Builder's Guide*, can be found on the DNR Technology Assessment Division website at URL: http://www.dnr.louisiana.gov/tad.

CORRECTION: In the *Builder's Guide to Energy Efficient Homes in Louisiana: Air Leakage and Sealing – Materials and Techniques (*featured in the July 2007 Energy Facts) Figure 2 should be titled "Mechanical System Infiltration" and Figure 3 should be titled "The Stack Effect".

Fig.2 Possible Monolithic Slab Details

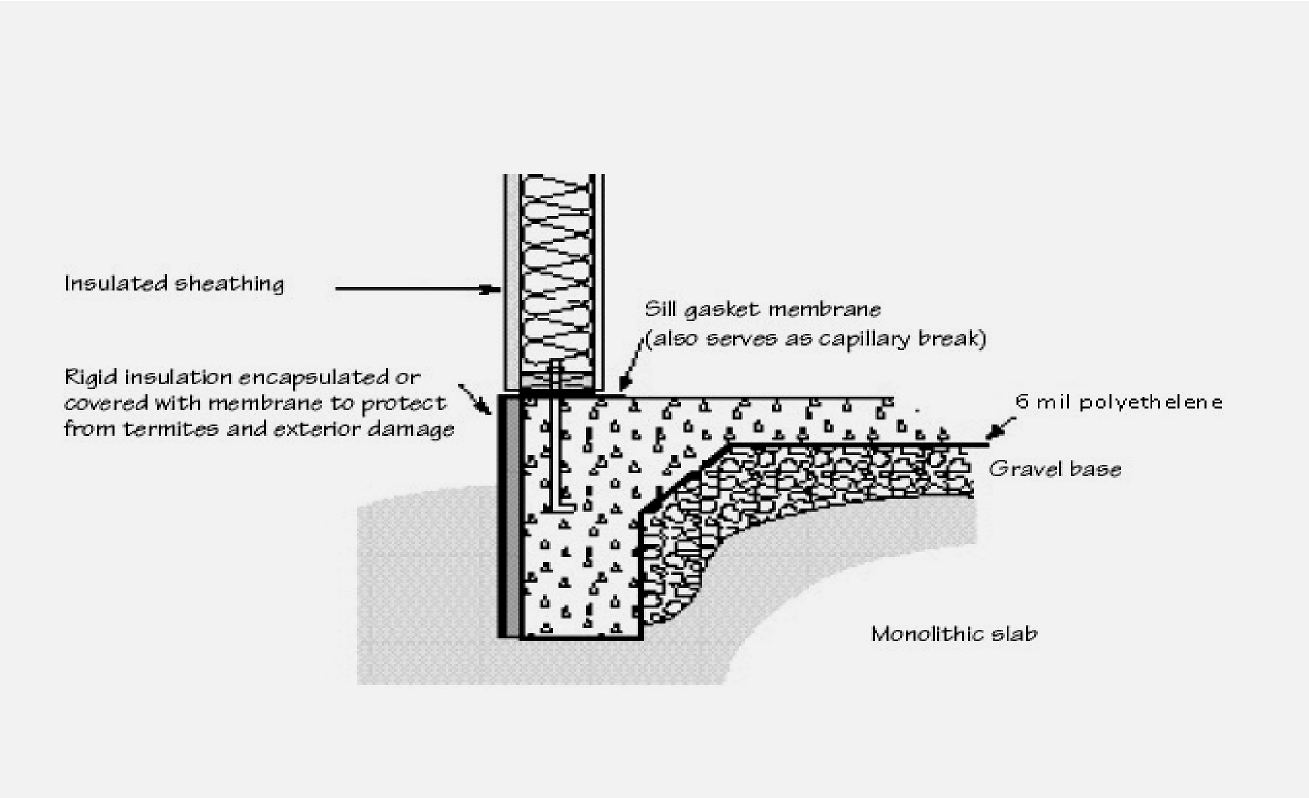
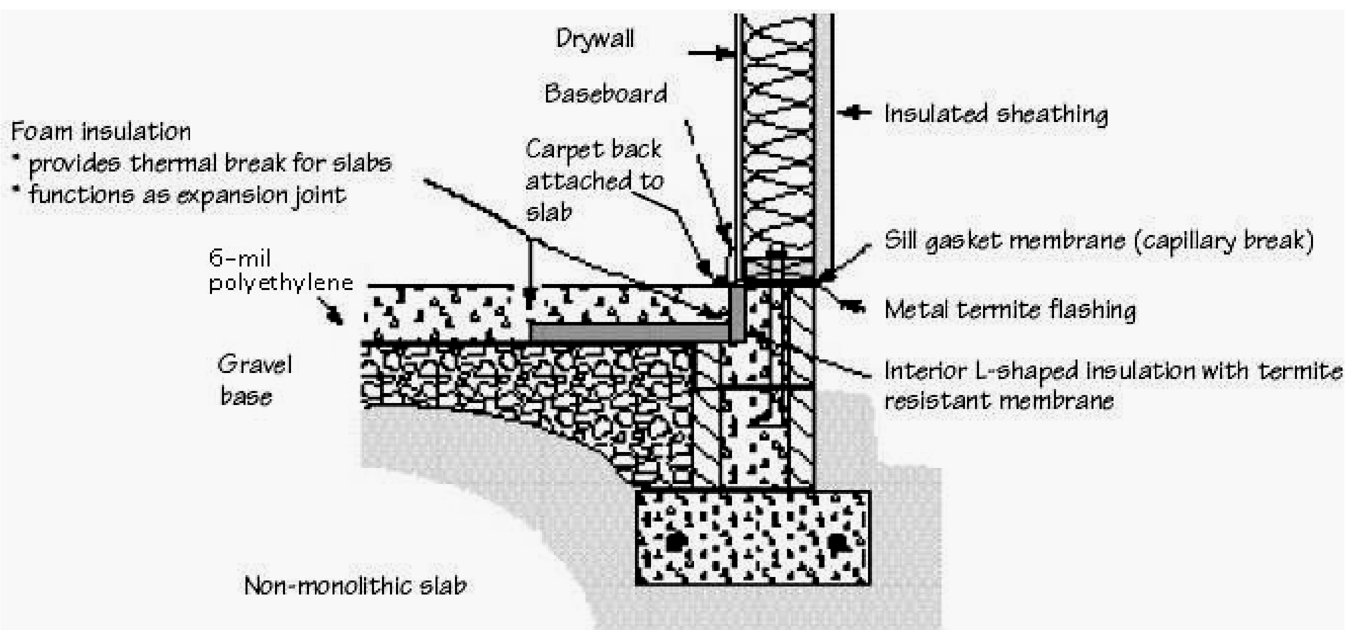


Figure 3. Possible In-Fill Slab Details



LOUISIANA ENERGY LEGISLATION - 2007 REGULAR SESSION

by
Billy Williamson, Engineer Intern

During the 2007 regular session of the Louisiana State Legislature nine pieces of energy legislation were passed. In the House of Representatives, twenty-two pieces of energy legislation were proposed, only five of which passed. The bills proposed by the Senate, on the other hand, had a far higher rate of passage. Of the five energy bills proposed by the Senate, four were passed. These new laws are summarized below.

Act 173, effective June 27, 2007, excludes from the sales and use tax the use, lease, rental, or repair of drilling rigs and component parts which are to be used primarily in outer continental shelf (OCS) waters. Act 173 seeks to increase revenue generated by the repair of OCS drilling rigs off of the Louisiana coast. This would also reduce the overall cost of OCS drilling by reducing the capital and maintenance costs, thus promoting OCS drilling off of the Louisiana coast.

Act 471, effective July 1, 2007, excludes the cost of natural gas and electricity purchased by paper or wood products manufacturing facilities from state sales and use tax. Act 471 is meant to reduce operating costs for paper and wood products manufacturing facilities, thus keeping these facilities operating in the state. By retaining these facilities, the state can utilize its forests as a readily renewable resource.

Act 335, effective July 9, 2007, makes three major changes to the State Uniform Construction Code. The bill calls for a Louisiana State Uniform Construction Code Council to serve at the pleasure of the Governor rather than a three year fixed term. The bill changes current law by adopting the 2006 International Residential Code for One- and Two-Family Dwellings (IRC 2006), with amendments. Included in IRC 2006 is the 2006 International Energy Conservation Code (IECC 2006). It also requires all jurisdictions to use building code enforcement officers or certified third-party providers contracted by the municipality, parish, or regional planning commission to enforce the code.

The bill includes the wind limitations design criteria of the 2003 edition of the International Residential Code (IRC) in lieu of the 2006 edition. However, upon publication, the 2009 IRC, including the wind limitations design criteria, is to be adopted. The administrative, mechanical, plumbing, and electrical portions of IRC 2006 are still excluded under the new law. Finally, the Act states that Appendix J *(Existing Buildings and Structures)* of the IRC may be adopted and enforced at the parish, municipal, or regional planning levels only.

Act No. 110, effective June 22, 2007, was passed regarding standard building codes. It changes the effective Commercial Building Energy Conservation Code for all commercial buildings over 1000 square feet and residential buildings over three stories to ASHRAE 90.1-2004 from ASHRAE 90.1-2001[1]. Act 110 also changes the effective edition of the International Energy Conservation Code (IECC) covering all multi-family residential buildings up to three stories from the 2000 edition to the 2006 edition.

Act 323, effective July 9, 2007, requires insurers to submit rates and rating plans to provide an actuarially justified discount, credit, rate differential, adjustment in deductible, or other adjustment to reduce the insurance premium to insureds who build or retrofit a structure to comply with the State

[1] American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

Uniform Construction Code or make improvements to their property that are demonstrated to reduce the amount of loss from a windstorm or hurricane. Act 323 strengthens the State Uniform Construction Code by offering residents an opportunity to lower their insurance costs by upgrading to the code.

Act 270, effective July 6, 2007, requires that all state-funded major facility projects meet energy efficiency standards. The bill defines "major facility project" explicitly as any project which fits the size criteria provided in Table 1. Any state-funded renovation project which involves more than 50% of the replacement value or a change in occupancy is considered a "major facility project," as well. Act 270 requires that each major facility project be designed, built, and certified to exceed the state energy code requirements by at least 30% when the increase is determined to be cost effective based on a 30 year life-cycle cost (LCC) analysis. The bill also recommends the use of Louisiana products for any qualifying project when feasible. Act 270 should reduce energy consumption and increase demand for building and construction products made in Louisiana. With respect to Act 270, House Resolution 97 was passed by the House and filed with the Secretary of State on June 26, 2007 requesting that the House Committee on Commerce study the feasibility of imposing green building standards on the construction of public buildings.

Table 1. Major Facility Project Size Criteria

Effective Date	Applicable Building Size
July 6, 2007	20,000 square feet or larger
January 1, 2009	15,000 square feet or larger
January 1, 2010	10,000 square feet or larger
January 1, 2011	5,000 square feet or larger

Act 371, effective July 11, 2007, provides a tax credit equal to fifty percent of the first twenty-five thousand dollars of the cost of each wind or solar energy system installed on the taxpayer's home or a rental apartment property after January 1, 2008. The credit can be used in addition to any federal tax credits earned for the same system.

The preceding laws will promote the growth or return of several energy industries to Louisiana by reducing the burden of taxation on their respective industries. However, it will be several years before the full effects of these pieces of legislation are realized. Also, this new legislation is designed to reduce the state's electricity consumption and, in turn, reduce emissions and lower the overall cost of energy in the state.

BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: INSULATION IDEAS

by
Howard Hershberg, AIA

The *Builder's Guide to Energy Efficient Homes in Louisiana* (*Builder's Guide*) is being updated to reflect new code requirements. This is the sixth in a series of articles that will summarize the information in the guide and highlight updates.

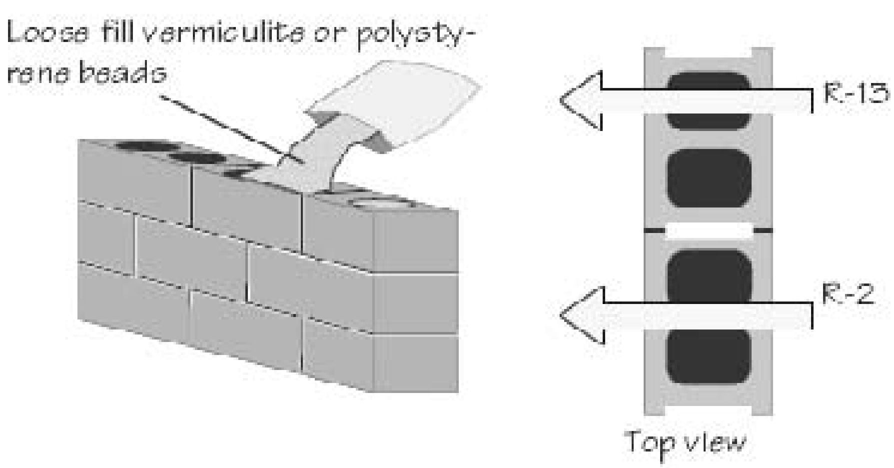
Foundation Wall Insulation: Foundation walls and other masonry walls are usually made of concrete masonry units (c.m.u.) or poured in place concrete. Insulating c.m.u. walls is usually more difficult to insulate than frame walls because there is no convenient cavity to house insulation batts.

Concrete Masonry Unit (c.m.u.) walls: Builders can insulate c.m.u. wall cores using one or a combination of the following:

Vermiculite - R-2.1 per inch
Polystyrene inserts or beads – R-3.6 to 4.4 per inch
Polyuretane Foam – R 5.5 to 6.5 per inch

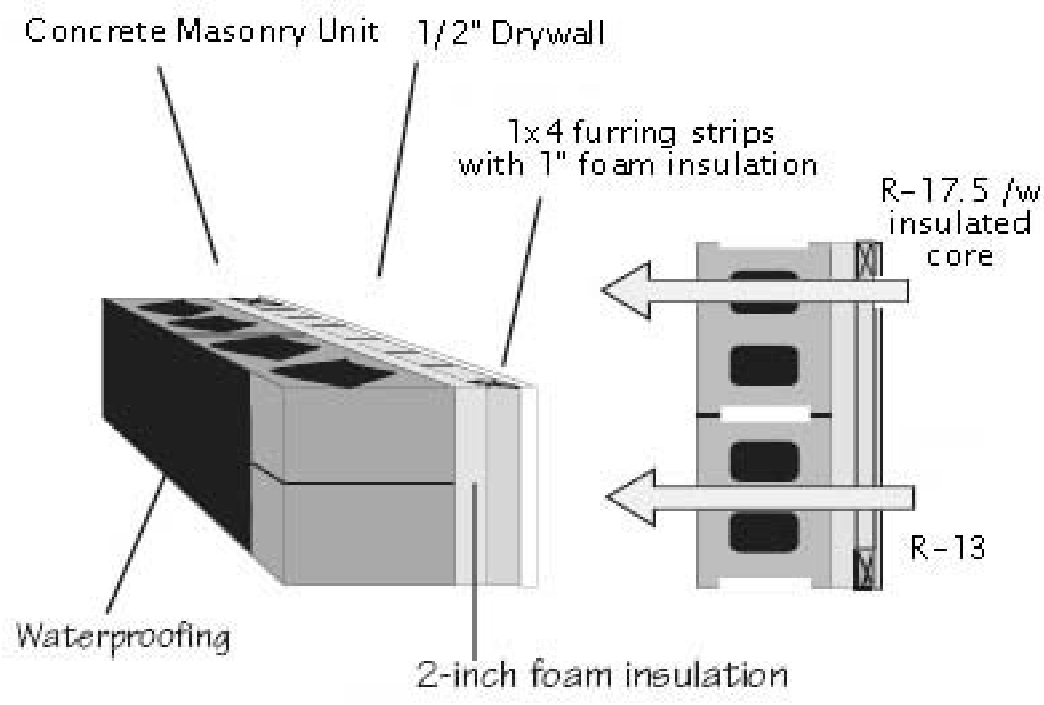
Unfortunately the substantial thermal bridging through the concrete connections between cores largely depreciates the potential R-value derived from placing insulation in the cores. Please see Figure 1 following.

Figure 1. Insulating Concrete Block Cores



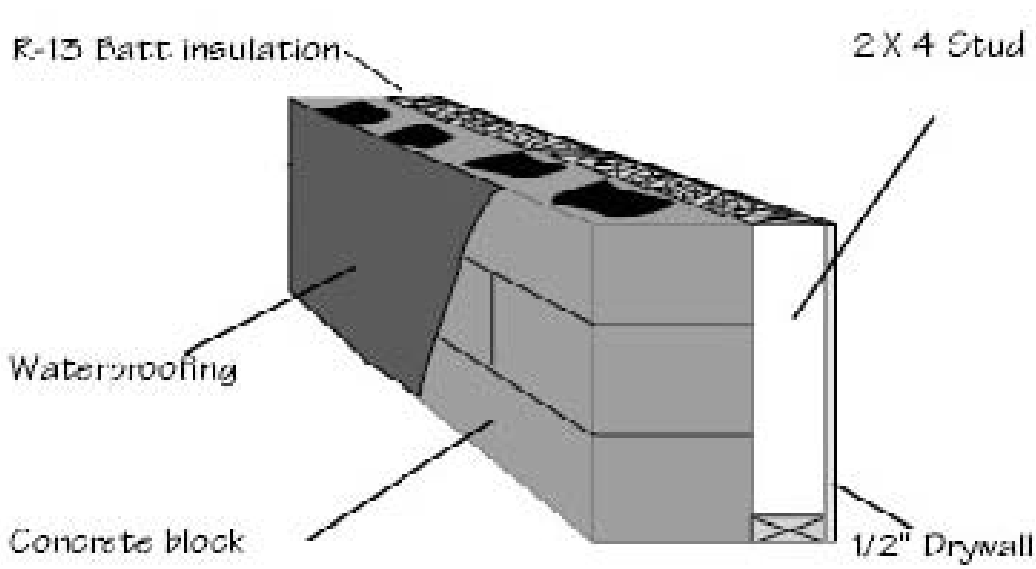
Interior foam wall insulation: Foam insulation may be added to the interior of masonry walls, however, it may have to be covered to resist damage and to meet local fire codes. In many cases ½" drywall is sufficient for both of the above, but builders, architects, and home designers are cautioned to consult local permit offices to avoid costly change orders in the field. Please see Figure 2 following.

Figure 2. Interior Foam Wall Insulation (R-10 to R-14 overall)



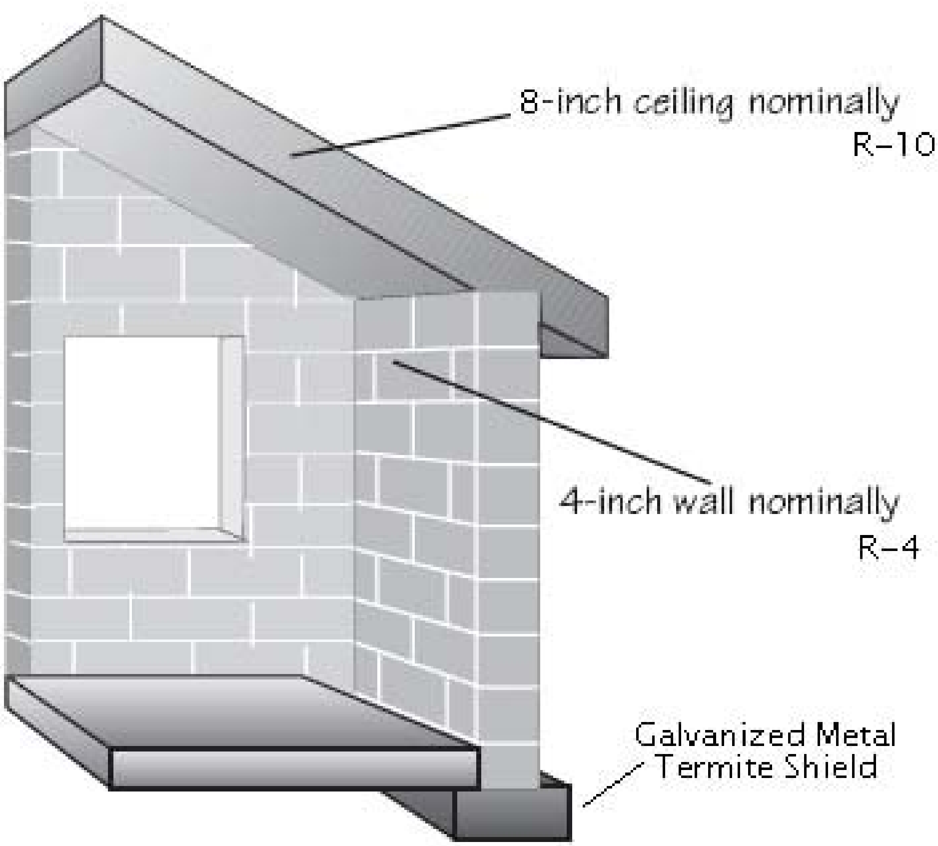
Interior framed wall: In certain instances, architects or designers may detail and specify an interior framed wall inside the masonry (c.m.u.) wall. Standard frame wall insulation and air sealing techniques can then be applied. Please see figure 3 following.

Figure 3. Interior Framed Wall



Lightweight c.m.u. products: Lightweight air-entrained concrete is a viable alternative wall system. The aerated concrete can be shipped as c.m.u., or as panels. It combines elevated R-values with thermal mass. Please see figure 4 following.

Figure 4. Lightweight Concrete Products (R-4 to R-10 overall)



Insulated Concrete Form (I.C.F.) wall systems: Polystyrene or polyurethane can be used as formwork for poured or sprayed structural concrete. Many of these systems can be very economical where high heating/cooling expenses are prevalent. As with other exterior foams, the foam forms should not be in direct contact with the ground, whenever possible, to avoid termites. If ground contact cannot be avoided then use termiticide treated foam and place termite shield at the base of the wall.

Insulating crawlspaces in Louisiana is only advantageous where there is no chance of flooding, where the humidity is below a relative humidity (RH) of 70% for most of the year and where heating degree days (H.D.D.'s) considerably outnumber cooling degree days(C.D.D.'s). H.D.D.'s and C.D.D.'s can readily be obtained from your local news station or from your local newspaper. Consult the FEMA flood maps (discussed earlier) for flood information.

More information on energy saving features, and the full text of the *Builder's Guide*, can be found on the DNR Technology Assessment Division website at URL: http://www.dnr.louisiana.gov/tad; click on the *Builder's Guide* link.

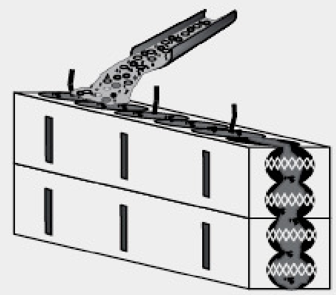
Figure 5. Insulated Concrete Foam Foundation Systems

INSULATED CONCRETE FORM (ICF) FOUNDATION SYSTEMS

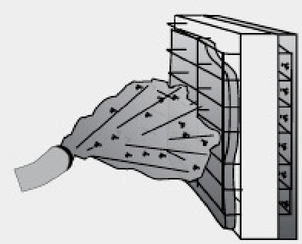
Foam insulation systems that serve as formwork for concrete foundation walls or even the entire exterior wall system of the home can save on the cost of materials and reduce heat flow. Although expensive, ICF's can serve as the entire wall system for the home. Advantages include improved termite control due to lack of wood in the exterior structure, durability, hurricane resistance, continuous insulation, and noise control. Examples of these types of products include:

Foam blocks — Several companies manufacture foam blocks that can be installed quickly on the footings of a building. Once stacked, reinforced with rebar, and braced, they can be filled with concrete. Key considerations are:

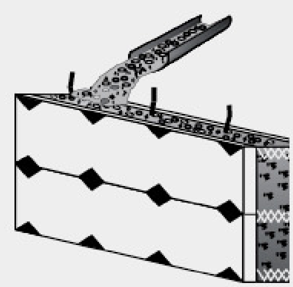
- Bracing requirements — the cost of bracing the foam blocks before construction may outweigh any labor savings from the system. Some products require little bracing while others need substantially more.
- Stepped foundations — make sure of the recommendations for stepping foundations — some systems have 12" high blocks or foam sections, while others are 16" high.
- Reinforcing — follow the manufacturer's recommendations for placement of rebar and other reinforcing materials.
- Concrete fill — make sure that the concrete ordered to fill the foam foundation system has sufficient slump to meet the manufacturer's requirements. These systems have been subject to blowouts when the installer did not fully comply with the manufacturer's specifications. A blowout is when the foam or its support structure breaks and concrete pours out of the form. *
- Termites — follow the guidelines in this chapter concerning termite prevention strategies with any foam product. Homes built completely with ICF's will minimize termite risks because they eliminate framing lumber. *



Spray-on systems — Concrete can be sprayed onto foam panels which are covered by a metal reinforcing grid, part of which is exposed. A structural concrete mixture is sprayed onto the exposed reinforcing metal. As with foam block systems, installers must follow manufacturer's recommendations carefully for a successful system.



Foam panel/ snap tie systems — Some companies produce systems in which insulation panels are locked together with plastic snap ties. A space, typically eight inches, is created between the foam panels that is filled with concrete. As with foam block systems, installers must follow manufacturer's recommendations carefully for a successful system.



Note: These systems should not be used below grade to reduce potential for termite infestation.

* In Louisiana use termiticide treated foam whenever possible.

BIOFUELS – PART 3: BIODIESEL BASICS

by
Bryan Crouch, Engineer

Biodiesel is the easiest alternative fuel to implement. Very little change is required in regard to transportation, refueling infrastructure, and vehicles for it to be used. Biodiesel fits into a category of alternative fuels called biofuels. Biofuels can be defined as fuels that are derived from recently-living biological resources, and as such, are further categorized as renewable fuels. Biodiesel is to petroleum diesel what ethanol is to gasoline. This is the third in a series of articles about biofuels and will cover the basics of biodiesel.

What is Biodiesel?

A common misconception is that biodiesel is the same as raw vegetable oil. Although biodiesel can be, and usually is, derived from vegetable oil, vegetable oil must be chemically processed into biodiesel. Biodiesel is the name given to fatty-acid alkyl esters (long chains of carbon molecules attached to an alcohol molecule) when used as a substitute for petroleum based diesel fuel. Biodiesel contains no petroleum. Since it is derived from vegetable oils and other organic oils, it can be considered as a renewable fuel. Biodiesel can be burned in most compression-ignition (diesel) engines, either undiluted or mixed with petroleum diesel in any ratio, with little or no required engine modifications. By definition, biodiesel means 100% biodiesel. Mixtures of biodiesel and petroleum diesel are referred to as biodiesel blends and are designated as B2, B10, etc., with the number indicating the percentage of biodiesel in the blend. Blends of B20 and higher qualify for alternative fuel credits under the Energy Policy Act, but only B100 is recognized as an alternative fuel.

How is Biodiesel Made?

The main chemical process in the production of biodiesel is transesterification. Transesterification is accomplished by reacting an organic oil with an alcohol over a catalyst (usually sodium hydroxide or potassium hydroxide). The result of the reaction is a mixture of fatty-acid alkyl esters and glycerin. The other processes in biodiesel production include pretreatment for some feedstocks, clean-up of biodiesel and glycerin, and methanol recovery.

Feedstocks (the organic oil in the transesterification process) for biodiesel production vary widely. The most common feedstock is soybean oil. Others include sunflower oil, rapeseed oil, Chinese tallow tree oil, and recycled cooking oils and grease. One interesting and promising feedstock is algae. The oil yield from algae is much higher than from vegetable oils and it can be grown in non-farmland and non-forest areas.

How Does Biodiesel Compare to Petroleum Diesel?

Some of the important points of comparison between petroleum diesel and biodiesel are fuel economy, cetane number, emissions, cold weather performance, and lubricity.

Similar to the relationship of ethanol to gasoline, a particular volume of biodiesel contains less energy than the same volume of petroleum diesel; however, ethanol’s disadvantage to gasoline is 32% whereas biodiesel’s disadvantage to petroleum diesel is only about 10%. Less energy per volume translates into lower fuel economy.

The cetane number for diesel fuel is similar to the octane number for gasoline; both are a measure of the ignition characteristics of the fuel. Autoignition is the combustion of fuel which is not initiated by an external source. Gasoline engines have an external source of ignition (spark plugs); thus, autoignition is not desirable. The octane number measures the ability of gasoline to resist autoignition. A higher octane number corresponds to a greater ability to resist autoignition. Diesel engines do not have an external source of ignition, and thus rely on autoignition to ignite the fuel. The cetane number measures the ability of diesel fuel to autoignite quickly. Low autoignition time corresponds to smoother and more complete combustion, both of which are desirable. A higher cetane number corresponds to faster autoignition. Petroleum diesel in the U.S. typically has a cetane rating in the low 40s and biodiesel typically in the low 50s.

Biodiesel contains about 11% oxygen by weight. The oxygen in the fuel helps it to burn more completely which reduces exhaust emissions. B100 reduces hydrocarbon emissions by almost 70%, and carbon monoxide and particulate matter emissions by almost 50%. A B20 blend achieves emission reductions of 20% and 12% respectively. On the other hand, oxygenated fuels tend to increase emissions of nitrogen oxide. B100 and B20 increase nitrogen oxide emissions by approximately 10% and 2% respectively. Nitrogen oxide emissions contribute to the formation of ground level ozone. Research to lower or eliminate nitrogen oxide from biodiesel emissions is ongoing. Biodiesel is also more environmentally benign than petroleum diesel. It is non-toxic and contains no sulfur.

Biodiesel is at a disadvantage to petroleum diesel in cold weather. At low temperatures, wax crystals begin to form in diesel fuel. As the temperature further drops, the wax crystals will increase and can clog fuel filters and injectors and will finally gel and cease flowing. These same issues affect biodiesel, but at higher temperatures. The temperature at which diesel fuel begins to crystallize is called the cloud point. Petroleum diesel has a cloud point of around 5 º F. B100 and B20 have cloud points of about 35 º F and 15 º F respectively. Fuel additives can be used in petroleum diesel and biodiesel to lower cloud points and help alleviate the problem.

Diesel engine fuel pumps and injectors rely on the diesel fuel itself for proper lubrication. In the early 1990s, the EPA began mandating lower sulfur content in diesel fuel. When sulfur is removed, diesel fuel loses much of its lubricating ability. Biodiesel has better lubrication qualities than low sulfur petroleum diesel and can thereby help extend the life of diesel engine components that rely of the fuel for lubrication. Biodiesel can also be used as an additive to petroleum diesel to restore the lubricity lost from removing sulfur.

The next article will cover economics, vehicles, infrastructure, and other issues that address the viability of biodiesel as an alternative transportation fuel.

Sources

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Alternative Fuels and Advanced Vehicles Data Center website (URL: http://www.eere.energy.gov/afdc/).
"Biomass Energy," *Kirk-Othmer Encyclopedia of Chemical Technology*, 5th ed.

BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: MOISTURE AND MOISTURE MANAGEMENT – PART 1

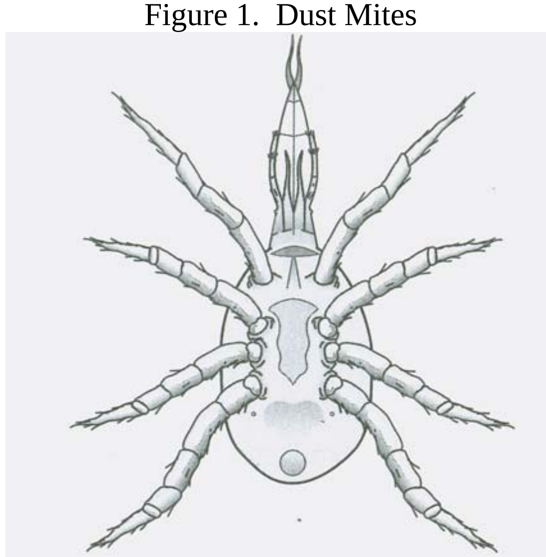
by
Howard Hershberg, AIA

The *Builder's Guide to Energy Efficient Homes in Louisiana* (*Builder's Guide*) is being updated to reflect new code requirements. This is the seventh in a series of articles that will summarize the information in the guide and highlight updates.

"Moisture in American homes causes billions of dollars in property damage and millions of cases of respiratory disease each year."[1] Moisture and condensation problems are troublesome and destructive to residences during all seasons of the year. Moisture and condensation inside the home should be controlled as much as possible at its source. Homeowners may choose one of several types of whole house ventilation systems to reduce or eliminate moisture and condensation from the home. Exterior moisture should be controlled, shed, and drained away from the home as rapidly as possible. Water corrodes metal, dissolves glue, warps wood and weakens mortar.

Moisture and water condensation lead to building deterioration by biological pests. These biological pests, which include bacteria/viruses, cockroaches, fungi, pets, and termites, can often cause a serious threat to the respiratory health of the buildings' occupants. Cockroaches, fungi, pets, dust mites, and termites all insert dust particles into the air. Contaminated dust particles are responsible for most allergy and asthma symptoms. "Dust mite population increases as relative humidity and wetness increase inside the building envelope. The feces of dust mites are one of the most powerful allergens known to man."[1] High relative humidity and the moisture condensation it causes, encourage the growth of dust mites, cockroaches, termites, and fungi (mold and mildew). Infestation by these pests in wall cavities will eventually cause deterioration and future structural damage.

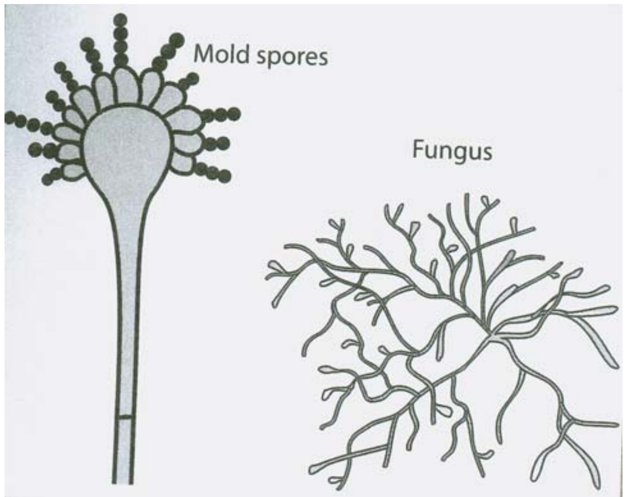
Figure 1. Dust Mites



SOURCE: See Footnote 1

[1] John Krigger and Chris Dorsi, *Residential Energy: Cost Savings and Comfort for Existing Buildings*, Saturn Resource Management, Inc., Montana, 2004.

Figure 2. Mold and Mildew



SOURCE: See Footnote 1

Water intrusion into a home is destructive because water greatly reduces the thermal resistance (R-value) of insulation and can permanently damage it. This could play havoc with the thermal boundary of the house, the wall cavities, and all of the safeguards which serve to protect the building envelope. Degrading or a major reduction of the insulation R-Value will allow warm air infiltration through the wall cavities in the summer time; and will allow thermally conditioned air to escape out of the building envelope in the winter time. Both of these undesired conditions will affect the health and well being of the occupants. These undesired conditions will also have very deleterious effects on the interior finishes of the house, and will have unseen negative effects on the wall cavities and structure of the house over an extended period of time. For every cubic foot per minute (cfm) of air leakage out of the house, an equal number of cfm of air must enter from outside to make up for the loss. Humid and unconditioned air from outside will be brought indoors during the heating & cooling seasons. Humid and unconditioned air and condensation in the homes' wall cavities is highly attractive to termite colonies as well as other pests.

Outside air infiltration may also bring stack gasses, outdoor odors, and other impurities into the space from the outside.

More information on energy savings features, and the full text of the *Builder's Guide*, can be found on the DNR Technology Assessment Division website at URL: http://www.dnr.louisiana.gov/tad; click on the *Builder's Guide* link.

RAILROAD COMPETITION LEGISLATION PENDING IN CONGRESS

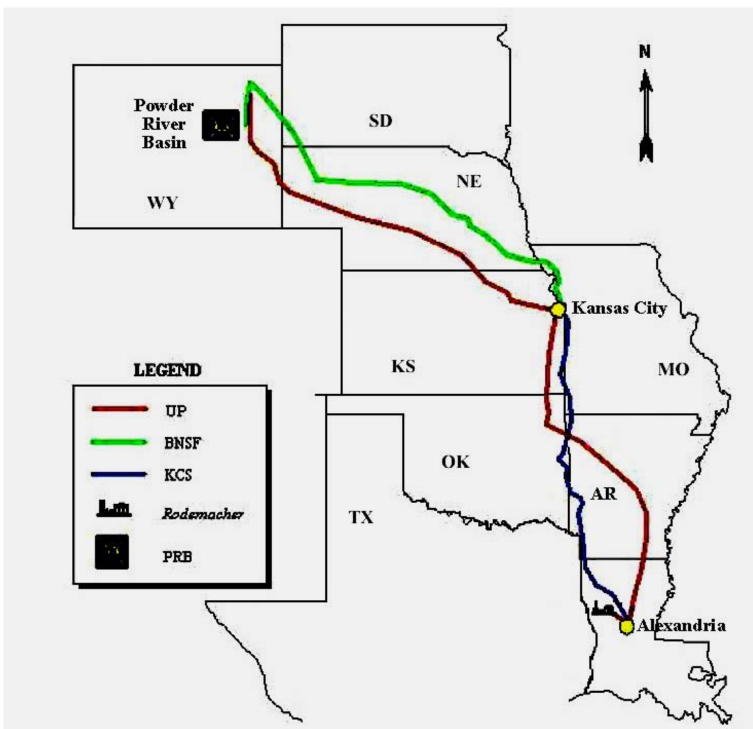
by

Patricia Nussbaum, PE

There is legislation pending in Congress to improve competitiveness of the railroad system in the United States. This legislation is important to Louisiana because unpredictable service and higher rail transportation costs are impacting the chemical industry and utility providers in this state. The proposed legislation amends title 49, United States Code, to ensure competition in the rail industry, enable rail customers to obtain reliable rail service, and provide those customers with a reasonable process for challenging rate and service disputes. About half of the electricity generation in the United States uses coal (most of which is shipped by rail) as the fuel source.

In 1980, the Staggers Rail Act deregulated the railroad industry, and consolidations and downsizing of the rail system resulted. Seven major freight railroads handle the rail traffic in the United States. The Clean Air Act Amendments of 1990 (CAAA) limited sulfur dioxide (SO_2) emissions and coal-fired power plants switched to low-sulfur coal. Shipments of low-sulfur coal from Wyoming's Powder River Basin increased. Coal shipments were also traveling greater distances to the power plants east of the Mississippi River. Rail capacity is not increasing and the demand for rail transportation is increasing with bottlenecks and increased shipping costs as the result.

Selected Routes for PRB Coal Moving to Rodemacher



SOURCE: Lafayette Utilities System

Senator David Vitter and Senator Mary Landrieu cosponsored the legislation. The Rodemacher plant, a coal-fired generating plant in Louisiana, gets its coal by rail from the Powder River Basin which is 1500 miles away. The Rodemacher plant is a captive rail customer; the last 19 miles are served by only one rail provider.[1]

[1] A captive rail customer is a rail customer who has no competitive alternative to a single railroad serving its location. Captivity occurs over the entire route or only a portion of the route. Competitive rail traffic exists when shipments between origins and destinations can be served by more than one railroad.

SUMMARY OF SENATE BILL 953

S.953
Title: A bill to amend title 49, United States Code, to ensure competition in the rail industry, enable rail customers to obtain reliable rail service, and provide those customers with a reasonable process for challenging rate and service disputes.
Sponsor: Sen Rockefeller, John D., IV [WV] (introduced 3/21/2007)   Cosponsors (11)
Related Bills: H.R.2125
Latest Major Action: 10/23/2007 Senate committee/subcommittee actions. Status: Committee on Commerce, Science, and Transportation Senate Subcommittee on Surface Transportation and Merchant Marine Infrastructure, Safety and Security. Hearings held.

SUMMARY AS OF:
3/21/2007--Introduced.

Railroad Competition and Service Improvement Act of 2007 - Sets forth Surface Transportation Board directives calling for effective competition among rail carriers and reliable rail transportation service for rail customers.

Requires a rail carrier, upon shipper request, to establish rates for transportation and provide requested service between any two points on the carrier's system.

Prohibits the Board from issuing a certificate authorizing construction and operation of railroad lines, short line purchases by Class II and Class III rail carriers, or consolidation, merger, and acquisition of control of rail carriers, or exempt from such certificate requirements any person, transaction, or service with respect to such activity, if the activity involves a transfer of interest in a line of railroad, from a Class I rail carrier to a Class II or III rail carrier, and the activity would: (1) restrict the ability of the Class II or Class III rail carrier to interchange traffic with other rail carriers; (2) restrict competition of rail carriers in the region affected by the activity in a manner that would violate U.S. antitrust laws; or (3) require higher per car interchange rates for Class II or Class III rail carriers to interchange traffic with other rail carriers. Prescribes procedures for Board review of any activity alleged to have resulted in a restriction of competition.

Makes mandatory (currently, discretionary) entry by rail carriers into reciprocal switching agreements where the Board finds it is practicable and in the public interest, or where such agreements are necessary to provide competitive rail service.

Requires the Board to designate any state or substantial part of a state as an area of inadequate rail competition after making certain findings.

Requires the Board to post rail service complaints on its website.

Sets forth time limits for the Board to act on complaints filed alleging unlawfulness of a new or revised rail rate, rule, or practice.

Establishes the Office of Rail Customer Advocacy.

Grants rail customers access to a Board process for determining rail rate reasonableness in railroad market dominance cases.

Requires submission to arbitration of certain rail rate, service, and other disputes.

Authorizes the Board to investigate rail carrier violations on its own initiative (under current law, the Board is authorized to investigate only on complaint). Requires the Board (currently, discretionary) to initiate an investigation upon receiving a complaint alleging rail carrier violations.

SOURCE: Library of Congress (http://thomas.Inc.gov)

BUILDER'S GUIDE TO ENERGY EFFICIENT HOMES IN LOUISIANA: MOISTURE AND MOISTURE MANAGEMENT – PART 2

by
Howard Hershberg, AIA

The *Builder's Guide to Energy Efficient Homes in Louisiana* (*Builder's Guide*) is being updated to reflect new code requirements. This is the eighth in a series of articles that will summarize the information in the guide and highlight updates.

Now that we have discussed the damaging and deleterious ways moisture and condensation from moisture can affect buildings, we will look at common ways that moisture and moisture condensation enter residences and buildings as well as some methods to assist in preventing moisture intrusion into buildings and residences.

Moisture moves into a home or building during wet seasons and it moves out during drier seasons. Moisture is a major problem when it reaches a level that encourages termites, dust mites, dry rot and fungi. Water intrusion problems can determine how long a building or residence may survive.

Rain water leaks in the roof, walls, and foundation, are causes of moisture problems. Poor site drainage which allows capillary seepage into the foundation also causes moisture problems. Water moves easily as a liquid or vapor from the ground through porous building materials like concrete and wood. Another source of moisture problems is undetected plumbing leaks which drip water unnoticed into the building or residence.

Table 1. Common Ways That Moisture Enters Buildings

LIQUID FLOW	**Driven by gravity or air pressure differences or both; water flows into building's holes and cracks. Roof leaks and plumbing leaks can also deposit large amounts of water into a home or building.**
CAPILLARY SEEPAGE	**Liquid water creates a suction of it's own as it moves through tiny spaces within and between building materials. This capillary suction draws water seepage from the ground. Seepage also redistributes water from leaks, spills, and condensation.**
AIR MOVEMENT	**Air movement carries water vapor into and out of the building and its cavities. Air pressure difference is the driving force for this air movement. Holes in the building shell are the leakage paths. If the air reaches saturation (the dew point), condensation will occur.**
VAPOR DIFFUSION	**Water vapor will move through solid objects depending on their permeability and the vapor pressure.**
LIQUID FLOW	**Liquid flow is the most serious water threat because it can move large amounts of water into a home or building rapidly. Capillary seepage can also move water into a home rapidly through damp soil and a porous foundation.**

Water leakage must be prevented. The exterior walls and roof of any building should be absolutely watertight. Roof leaks and plumbing leaks should be stopped immediately and their sources repaired as soon as detected (see Figure 1). The building site should be planned and graded to keep rainwater, ground water, and irrigation water away from the building. If the home or building is raised (not a slab foundation); and is in a moist area; consider permanently installing an impermeable ground cover (such as a 6 mill polyethylene sheet) over the surface of the ground under the first floor or under the foundation. This is called a “ground moisture barrier”. This can serve as a capillary break to prevent ground moisture from entering the first floor or foundation via the building’s “stack effect”. The ground next to the home or building should slope away from the building to drain rainwater away as quickly as possible. Install rain gutters and grade the site if necessary to swiftly carry rainwater away from the building foundation. If water must flow near the building; cap the ground near the building with impermeable concrete or clay (see Figure 2). Reduce capillary seepage with drainage ditches, French drains, perimeter water barriers, and foundation waterproofing. Dampness due to high groundwater may require sump pumps to keep the foundation dry.

High relative humidity[1] in indoor air causes comfort problems in summer; and condensation problems in both summer and winter. Experts on cooling say that the relative humidity of summer air should be less than 60% for summer comfort (in warm climates); and less than 40% in cold climates to avoid interior moisture condensation problems.

The average occupant evaporates 4 pints of water into the air daily through respiration or perspiration. Showers, house cleaning and cooking can add up to an additional 3 pints per person daily. Water tracked into the home on shoes, clothes, umbrellas, etc., evaporates and adds humidity to the interior air (see Figure 3). Moist firewood, houseplants, and unvented combustion heaters also add moisture and pollutants, affect relative humidity, and can be a source of water vapor and dangerous combustion by-products as well.

Methods of combating interior water vapor, and preventing moisture problems:

1. Remove moisture from indoor air by cooling the indoor air below its dew point. This is commonly done with central air conditioning systems, room air conditioners, heat pumps, and possibly with dehumidifiers.

2. Add insulation to walls, floors, and ceilings of the home or building.

3. Prevent moisture problems with “ground water moisture barriers”, air barriers (in warm climates), vapor barriers in cold climates, maximum recommended insulation in building cavities, and sealing all penetrations in the building envelope.

4. Kitchen and bathroom exhaust fans are acceptable for removing moisture and pollutants at their source. However, they are not recommended if whole house ventilation is being installed in the home (see ventilation discussion following).

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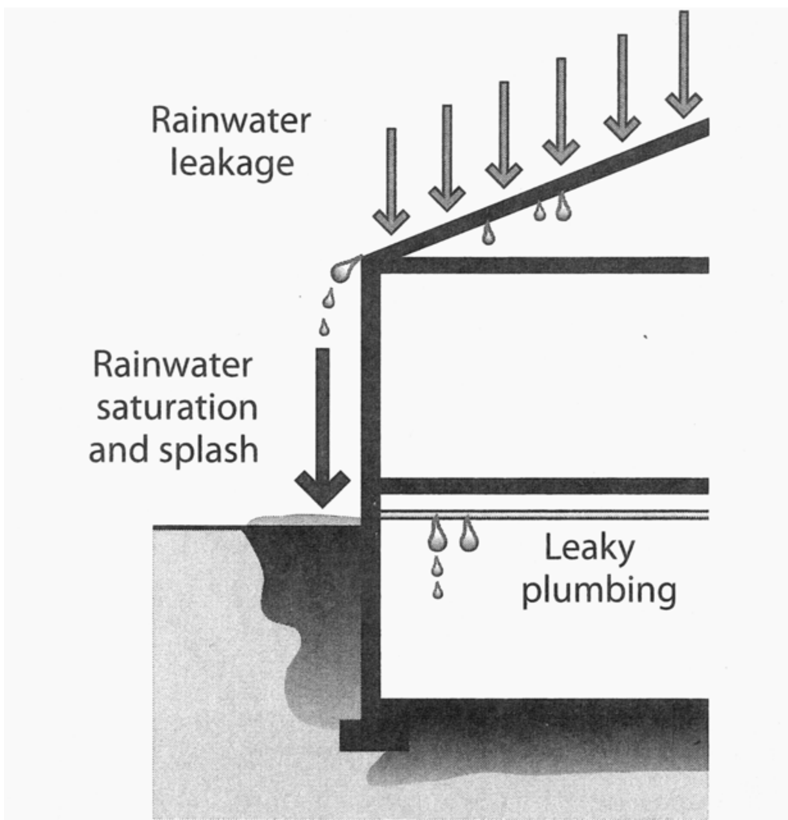
[1] Relative humidity is the percent (%) of maximum moisture that air at a given temperature can hold. Relative humidity is 100% when the air is saturated with moisture. If more moisture is added to the air @100% relative humidity; the moisture condenses on cool objects throughout the building. Some of these objects may be visible, while others aren’t visible. The moisture content of a building’s components is directly related to the relative humidity of the air surrounding them.

Almost all residential and most commercial buildings allow some air leakage between indoors and outdoors. Hopefully this natural air leakage is enough to keep the indoor air quality (IAQ) relatively fresh. However, natural air leakage doesn't ventilate all areas of the building evenly. This leaves some home or building areas drafty and fresh and others stagnant and polluted. Air leakage is highest during severe weather, especially in winter because it is driven by temperature and wind. Air leakage during severe weather increases heating and cooling costs. Ventilation is an important health and safety concern in moderately airtight homes. A moderately airtight home has a blower door leakage rate of less than 1 cubic foot per minute at 50 pascals (1 cfm_{50}) per square foot or around .35 natural air changes per hour. Homes or buildings with less than .35 natural air changes per hour should have mechanical whole house ventilation systems installed. Whole house ventilation should be included in the original design whenever possible because of the high costs of installing whole house ventilation as a retrofit measure.

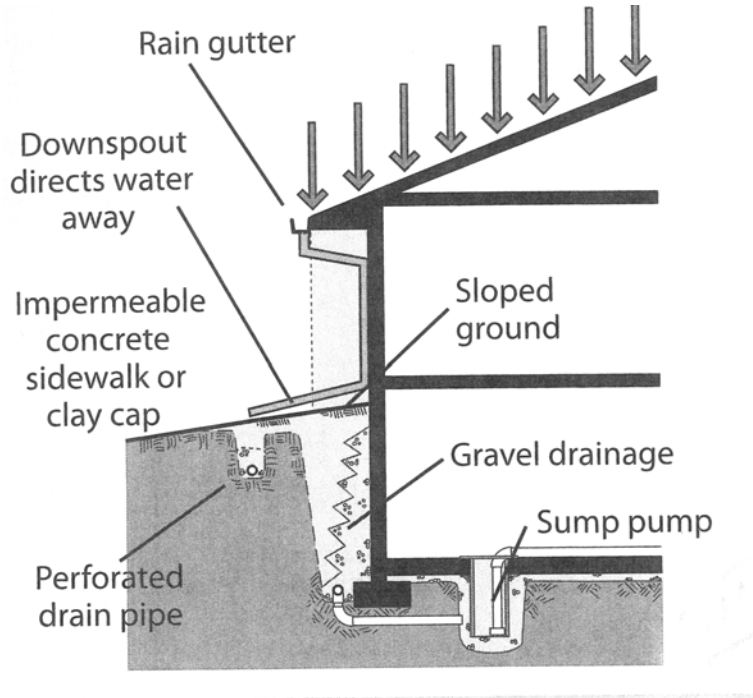
More information on energy savings features, and the full text of the *Builder's Guide*, can be found on the DNR Technology Assessment Division website at URL: http://www.dnr.louisiana.gov/tad and click on the *Builder's Guide* link.

Figure 1. Water Leakage and Seepage



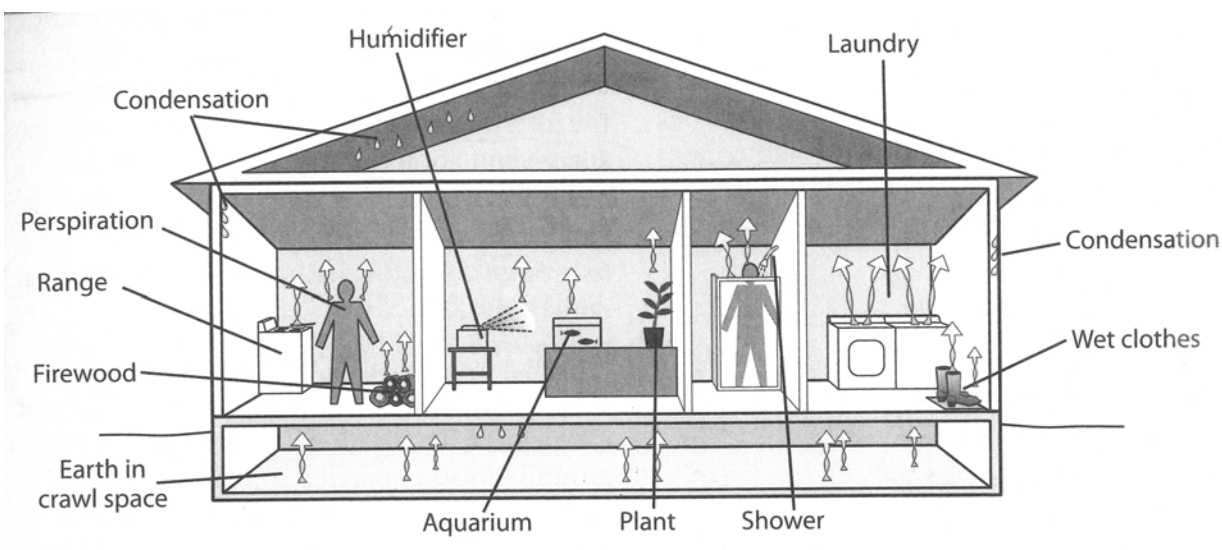
SOURCE: John Krigger and Chris Dorsi, *Residential Energy: Cost Savings and Comfort for Existing Buildings*, Saturn Resource Management, Inc., Montana, 2004.

Figure 2. Preventing Water Damage



SOURCE: John Krigger and Chris Dorsi, *Residential Energy: Cost Savings and Comfort for Existing Buildings*, Saturn Resource Management, Inc., Montana, 2004.

Figure 3. Sources of Water Vapor



SOURCE: John Krigger and Chris Dorsi, *Residential Energy: Cost Savings and Comfort for Existing Buildings*, Saturn Resource Management, Inc., Montana, 2004.

ETHANOL

by

Bryan Crouch and Manfred Dix

Introduction and Brief History

Over the last few years, several factors have contributed to the decision of policymakers to encourage the search for alternative fuels. Among those factors were the environmental consequences of the usage of fossil fuels, the high price of crude oil and the high dependency of the United States on foreign oil.

Chief among the alternatives encouraged are fuels from "renewable sources", and among them, "biofuels". The two most important biofuels supported in current policies are ethanol and biodiesel, with the former getting the lion's share of assistance.

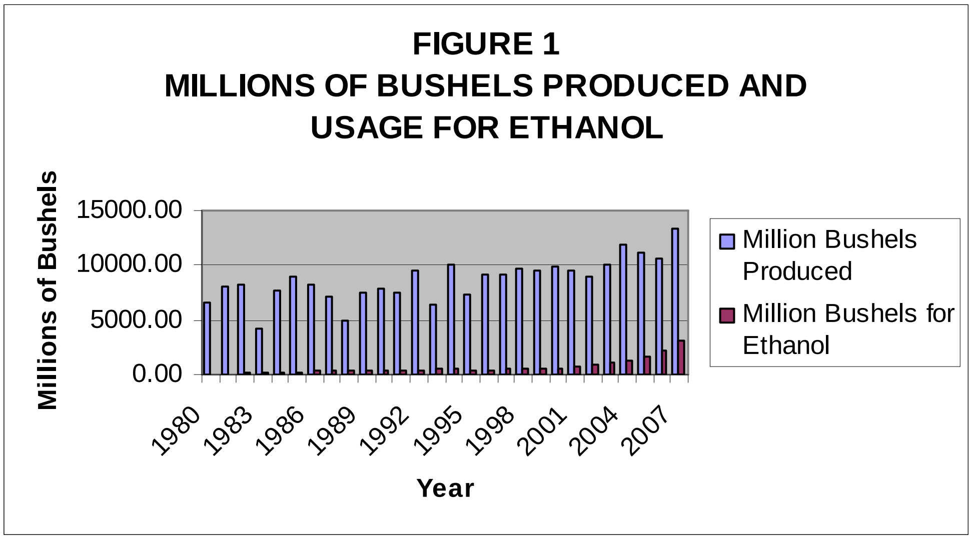
Until to the mid-1970s, policymakers' support for alternative fuels was insignificant; however, the oil embargo of 1974 changed that. It created a consciousness that the United States needed to reduce its dependence on imported crude oil. In that spirit, the Energy Tax Act of 1978 (ETA) was the first piece of legislation passed by Congress (and signed by President Carter) that actively subsidized the use of gasohol. Specifically, it introduced an excise tax exemption of gasohol (an exemption that would change in form over time). This subsidy "created" ethanol as fuel for the first time, and in the same year of passing the ETA, the first 20 million gallons of commercial ethanol production capacity came on-line. The Clear Air Act Amendment of 1990 required, for the first time, the use of oxygenated or reformulated gasoline, a further boost to ethanol production. And finally, the Energy Policy Act of 2005 established a renewable fuel standard, which mandates the use of ethanol and other renewable fuels in gasoline.

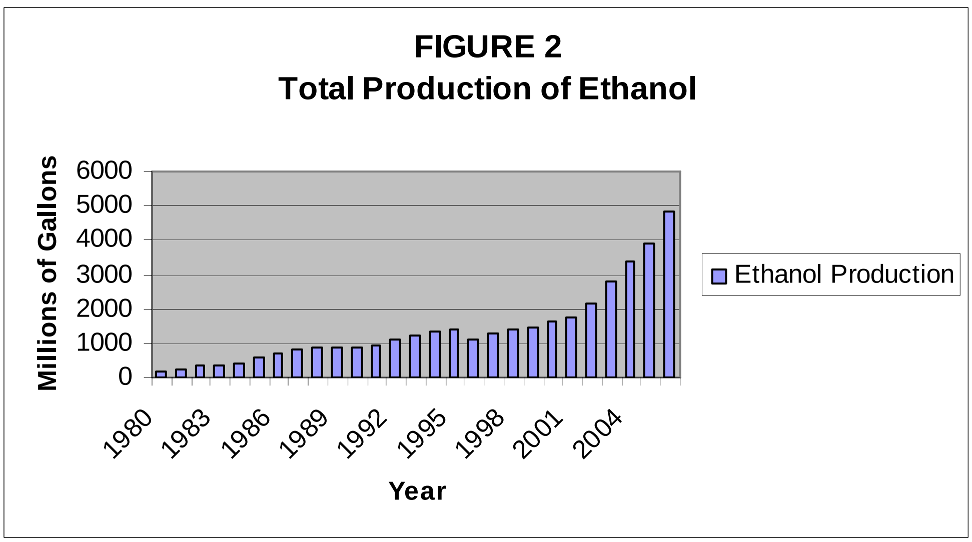
In addition to federal subsidies, Louisiana began subsidizing ethanol production in 1979 by exempting gasohol from the state gasoline tax. In 1986, the tax exemption was dropped in favor subsidies paid directly to ethanol producers. In 1987, the subsidy payments were limited to a total of $15.1 million which was reached in early 1988, and in 1989, the subsidies were repealed.

Production

Production of ethanol has steadily, and at times, dramatically, increased since 1980. In the United States it is usually produced from the distillation of fermented simple sugars derived from corn. Ethanol may be produced from other sources, like wheat, potatoes, or cellulosic material such as switchgrass, rice straw and sugar cane. Brazil, a very big producer of ethanol as well, produces it mostly from sugar cane.

Figure 1 below shows the total amount of bushels of corn produced in the period 1980-2007, and the amount from it dedicated to the production of ethanol. In the early 1980s, less than 200 million bushels of corn were used to manufacture ethanol, representing no more than 2% of the total production of the grain. This share increased steadily throughout the 80s and 90s, with a big jump after the turn of the century. In 2002 the percentage of corn production for ethanol reached double digits with 11.1%, and currently, in 2007, it stands at almost a quarter (24%). In the same period the amount of ethanol produced increased dramatically. While in the early 1980s production was less than 400 million gallons, in 2006 it reached almost 5 billion gallons (see figure 2).





Nine ethanol plants were built in Louisiana with a peak production of 32 million gallons in 1986. When state subsidies ended, production ceased. There has been no commercial production of ethanol in Louisiana since 1990.

The only ethanol production in Louisiana is from a pilot-scale cellulosic plant in Jennings. Other ethanol plants are planned or under construction in Jennings, Lacassine, Donaldsonville, and Belle Chase.

Incentives for Ethanol

Ethanol production and consumption is highly subsidized. There are numerous incentives at the federal and state level. A table by the U.S. Department of Energy (accessible at:

http://www.eere.energy.gov/afdc/progs/tech_matrx.cgi) summarizes most available incentives at the federal level and in the various states. It shows that, for ethanol alone, the total amount of state level incentives around the country added up to 323, while the count at the federal level stands at 20. The following is a summary of federal and Louisiana incentives.

A. At the federal level:
   a) By far the most important tax incentive is the so-called Volumetric Ethanol Excise Tax Credit (VEETC) established in 2005 by the American Jobs Creation Act of 2004. This is a tax credit of 51 cent per gallon of ethanol given to gasoline suppliers who blend ethanol with gasoline. The U.S. Treasury Department estimates that over the period 2005 to 2011 this subsidy will cost on average $2.7 billion dollars per year.
   b) Small Ethanol Producer Credit: This credit was introduced in 1990 and expanded by the Energy Policy Act of 2005. This is an ethanol production credit of 10 cents per gallon on the first 15 million gallons produced by a small producer (as defined by law).
   c) Special Depreciation Allowance for New Cellulosic Biomass Ethanol Plant Property: A taxpayer may take a depreciation deduction of 50% of the adjusted basis of a new cellulosic ethanol plant in the year it is put in service.
   d) Fuel ethanol is also protected by a special import duty from foreign countries. A 2.5% ad valorem tariff and a duty of 54 cents per gallon of ethanol imported for fuel use is applied to imports into the United States from most countries. However, most ethanol from the Caribbean Basin Initiative countries may be imported free. Imports from Brazil, the largest ethanol exporter in the world, are subject to the fees.
   e) The Renewable Fuel Standard Mandate: This is a mandate by the Energy Policy Act of 2005, and thus, not a subsidy in itself. However, it may be viewed as an indirect subsidy, since it guarantees a market to the biofuel industry. This standard establishes very specific goals to be achieved until 2012. For example, in 2006 suppliers must have blended 4 billion gallons of renewable fuel into gasoline, and this must increase annually to 7.5 billion gallons in 2012.

B. In the state of Louisiana:
   a) Alternative Fuel Vehicle and Refueling Infrastructure Tax Credit: The state offers an income tax credit worth 20% of the cost of converting a vehicle to operate on an alternative fuel, 20% of the incremental cost of purchasing an Original Equipment Manufacturer (OEM) AFV or hybrid electric vehicle (HEV), and 20% of the cost of constructing an alternative fuel refueling station. For the purchase of an OEM AFV or HEV, the tax credit cannot exceed 2% of the total cost of the vehicle or $1,500, whichever is less.
   b) Renewable Fuels Standard: Subject to certain provisions, within six months following the point at which cumulative monthly production of denatured ethanol produced in the state equals or exceeds an annual production volume of at least 50 million gallons, 2% of the total gasoline sold by volume in the state must be denatured ethanol produced from domestically grown feedstock or other biomass materials.
   c) Beginning July 1, 2006, renewable fuel plants operating in Louisiana and deriving ethanol from the distillation of corn must use corn crops harvested in Louisiana for at least 20% of the facility’s total feedstock. In succeeding years, the minimum percentage of Louisiana-harvested corn used to produce renewable fuel in Louisiana facilities must be at least the same percentage of corn used nationally to produce renewable fuel as reported by the U.S. Department of Agriculture's (USDA) Office of the Chief Economist.

Ethanol Benefits and Controversies

Supporters of the industry point out several benefits of ethanol production. The production of almost five billion gallons of ethanol blended into gasoline meant that the United States needed to import 206 million fewer barrels of oil in 2006 (approximately a 5% decrease). Furthermore, the contribution to the country's Gross Domestic Product in 2006 was in the order $23 billion, not an insignificant number. And finally, all the investment and ethanol sales will generate a huge amount of tax revenue to the federal, state and local governments. Such revenues will more than offset the subsidies enjoyed by the industry, and therefore, they will pay for themselves.

Despite all these benefits pointed out by supporters of ethanol, the industry does not lack in detractors. The criticisms to this dramatic support enjoyed by the ethanol industry fall into different categories: 1) pressure on food supply and prices; 2) the net energy balance of ethanol; and 3) the suspected highly intense water usage of the ethanol industry and other environmental effects.

1) Pressure on food supply and prices: As we have seen above, the share of corn used in ethanol production in the total corn harvest has increased steadily, and it is presently 24%. Furthermore, corn is used in several other industries ranging from breakfast food to animal feed. If ethanol uses more and more, less is available to everything else, putting pressure on corn prices, and consequently on the prices of goods produced by the other industries, particularly food industries.
2) Some critics point out the small positive or possibly negative "net energy balance" (NEB) of ethanol. The net energy balance is the difference between the energy that ethanol (or any other fuel) gives minus the energy that one has to devote to manufacture it. There is controversy in the literature whether the NEB is positive or negative; however, there seems to be agreement that, if positive, ethanol's NEB is fairly small. Also, a gallon of ethanol contains about 30% less energy than a gallon of gasoline. This means that 1.3 gallons of ethanol are required to drive a vehicle the same distance as one gallon of gasoline.
3) Finally, some critics point out that ethanol uses fairly high amounts of water for its production. Estimates vary, but some put the number of gallons of water per gallon of ethanol at 1,700 (almost all of which is used to grow the corn; the corn to ethanol process uses 4 – 6 gallons of water per gallon of ethanol). Large increases in the production of ethanol could contribute to rapid depletion of some aquifers. Furthermore, the increase in the planting of corn can have negative environmental impacts through the movement of agrichemicals, especially nitrogen, phosphorus and pesticides from farms to other habitats and other aquifers. For example, it was pointed out that the higher nitrogen inputs could lead to an increase in the so-called "dead zone" in the Gulf of Mexico and Chesapeake Bay, and to nitrate, nitrite and pesticide residues in well water.

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