10 Arkansas Energy Data Profile

a primary energy perspective

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2010 Arkansas Energy Data Profile

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August 2010
2010 Arkansas Energy Data Profile

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2010 Arkansas Energy Data Profile

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Preface

Act 7 of 1981 directed the Arkansas Energy Office, a division of the Arkansas Economic Development Commission, to compile an energy profile of the state. This profile is to include production, consumption, prices, and expenditures of the primary energy sources that include coal, petroleum, natural gas, nuclear power, and renewable energy. The 1993 Energy Data Profile was the first published version of the comprehensive picture of energy usage in Arkansas. Since then, energy data profiles have been updated in 1995, 2003, 2006, 2007, and now 2010.

Like previous profiles, the 2010 Arkansas Energy Data Profile is an informational reference, a planning resource, and a catalyst for discussion. Unlike the other profiles, the 2010 Arkansas Energy Data Profile describes the historic energy trends and current state of the Arkansas energy economy during the 1970-2007 period focusing on primary energy and the state of Arkansas' energy economy. In addition, snapshots of emission-related topics are provided in the Profile.

We hope the Profile will help state planners and policymakers develop energy policies that are balanced and based on the best available information. The Profile should also raise the level of awareness in state government and with the public about energy issues and facts that impact the everyday lives of all Arkansans.

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section 1

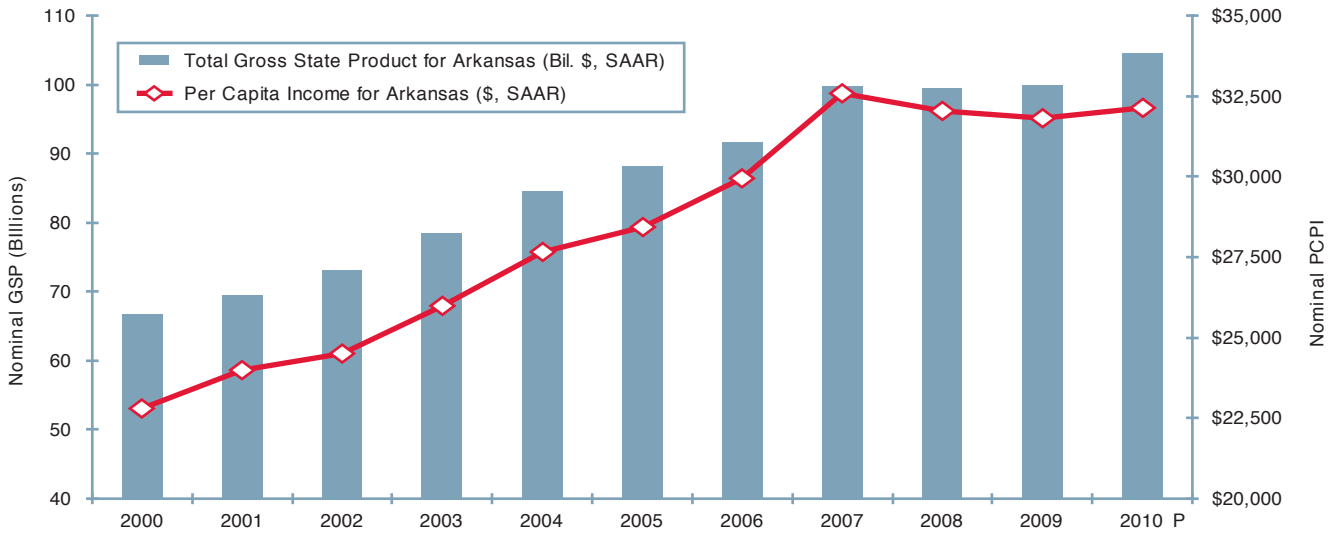
Overview of the Energy Economy 2007

1.1 State of Arkansas Energy Economy in 2007

From the perspective of 2010, the overall performance of the Arkansas economy in 2007 as measured by Gross State Product (GSP) was good. In terms of nominal dollars, there was continuous growth in GSP throughout the decade (see Figure 1.1.1). The decade began with a three-year period of accelerating GSP growth.[1] This was followed by a period of decelerating growth during the 2004-2006 period, after which Arkansas' GSP grew at an annual rate of 5.5% from the fourth quarter of 2006 through the fourth quarter of 2007.

Nominal per capita personal income (PCPI) also demonstrated positive growth throughout the 2000-2007 period. Arkansas PCPI grew from $22,802 in the fourth quarter of 2000 to $32,572

Figure 1.1.1 National Gross State Product and Personal Income Per Capita for Arkansas (4th Quarter, Seasonally Adjusted Annual Rate)



Source: The Arkansas economic data were obtained from Moody's Analytics, a division of Moody's Economy.com, http://www.economy.com/default.asp, May 2010.

1 This report is limited to energy data ending in 2007 because at the time of the report's preparation this was the most recent data available from the Energy Information Administration (EIA). However, the economic data in this report incorporates later data including 2010 preliminary data (2010P). Also, some emission data are for years other than 2007.

in the fourth quarter of 2007. This is a gain of $9,769 (43%) in PCPI as compared to the U.S. rate of 30% during 2000 to 2007 period.

Arkansas labor markets showed strength in 2007 (see Figure 1.1.2). Labor force data published by the Bureau of Labor Statistics indicate that 2007 was the fourth consecutive year for both labor force and employment growth. As 2007 came to a close, the unemployment rate hovered around 5.2%.

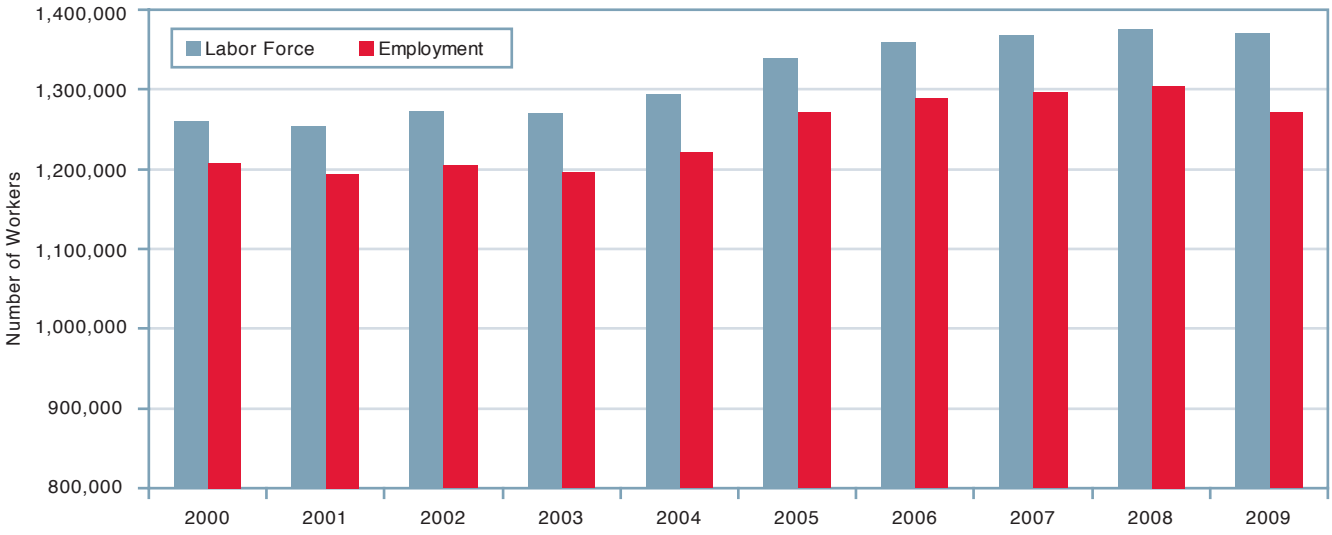
As 2007 came to a close the six-year national economic expansion teetered on the brink of a contraction. Major financial institutions were realizing substantial losses and write downs as a consequence of collapsing housing and mortgage markets. As events unfolded, the National Bureau of Economic Research dated December 2007 as the beginning of an economic recession.

1.2 Overview of Total Energy Production and Total Energy Consumption: Arkansas 2007

Table 1.2.1 summarizes the Arkansas energy activities in terms of energy production and consumption in 2007. The top portion of Table 1 shows Arkansas' energy production while the bottom portion addresses Arkansas' energy consumption. The total production of energy (588.7 Trillion Btu) is the total amount of produced energy measured in Btu by different energy resources. Primary energy sources include fossil fuels, nuclear power, and renewable energy. Often some of these energy resources are referred to as the major fuel sources or feedstocks. Included among these primary energy resources are coal resources, natural gas resources, crude oil resources, and renewable energy resources. Energy in the form of electric power is also produced with nuclear power at the nuclear reactors at Nuclear One in Russellville.[2]

Energy consumption (1,149.3 Trillion Btu) is more complex than energy production. Strictly, energy consumption means consuming energy to develop

Figure 1.1.2 2000-2009 Arkansas Labor Market Characteristics
Civilian Labor and Civilian Employment



Source: "Discover Arkansas," Arkansas Workforce Center, Department of Workforce Services, http://www.discoverarkansas.net/?PAGEID=67&SUBID=131, May 2010.

2 Nuclear power is classified by the Energy Information Administration as a primary energy source like coal, natural gas, crude oil, and renewables. However, strictly speaking, it is not a fuel source for energy since nuclear power is derived from nuclear fuels like uranium that are not produced in Arkansas. This report follows the EIA protocol and considers energy produced using nuclear power as a primary energy source.

power, heat, or as a raw input in a manufacturing process. Alternatively, total energy consumption is often referred to as the consumption of the major fuel types and nuclear power. In Table 1.2.1, this consumption is called total resource energy consumption since the consumed energy is obtained directly from primary energy resources. The table also shows total electric power (527.4 Trillion Btu) which is the consumption of electric power produced using different types of fuels and nuclear power. Finally, there is the consumption of energy by end-users. This is the end-use consumption by the major economic sectors.

Table 1.2.1 contains several underlying energy accounting relationships. First, for each energy resource, the sum of each energy resource consumed by each end-user plus the amount consumed in the generation of electric power equals the total amount of that resource energy consumed. For example, the amount of resource energy consumed from coal is 275 trillion Btu. Of this amount, 265.2 trillion Btu were consumed in the production of electric power and 9.8 trillion Btu were consumed by industrial users (275 = 265.2 + 9.8). This was 23.9% (= 275/1,149.3x 100) of all energy resource consumption. Also, the sum of each end-user's energy consumption by type of energy resource, electricity use, and electric losses equals that particular end-users total consumption of energy. As an illustration of this relationship, the transportation sector consumed 295.1 trillion Btu in 2007, of which 284.9 trillion Btu came from the consumption of petroleum and 10.2 trillion Btu came from the consumption of natural gas (295.1 = 284.9 + 10.2). This amounted to 25.7% (= 295.1/1,149.3 x 100) of all energy consumed by the end-use sectors. Finally, summing each end-user's total end-use consumption equals the total energy consumption in Arkansas in 2007 (1,149.3 = 228.6 + 162.0 + 463.7 + 295.1).

Table 1.2.1 2007 Arkansas Production and Consumption of Energy (Trillion Btu)

ARKANSAS ENERGY PRIMARY ENERGY PRODUCTION 2007*				
Total Energy Production (Trillion Btu)			**588.7**	**100.0%**
			Production in Physical Units	
Coal	1.9	0.3%	83,000	Short Ton
Natural Gas	272.0	46.2%	269,886	Mcf
Crude Oil	35.0	5.9%	6,031,000	Barrels (42 gals)
Nuclear Power	162.4	27.6%	15,486,102	Megawatt Hours
Renewable Energy**	117.4	19.9%	11,195,002	Megawatt Hours

ARKANSAS ENERGY CONSUMPTION 2007		
Total Resource Energy Consumption	**1,149.3**	**100.0%**
Coal	275.0	23.9%
Natural Gas	228.0	19.8%
Petroleum	386.9	33.7%
Nuclear Electric Power	162.4	14.1%
Renewable Energy*	117.4	10.2%
Net Interstate Flow of Electricity	-20.4	na
Total Electric Power	**527.4**	**100.0%**
Coal	265.2	50.3%
Natural Gas	65.2	12.4%
Petroleum	0.8	0.2%
Nuclear Electric Power	162.4	30.8%
Renewable Energy	33.7	6.4%
Total End-Use Consumption	**1,149.3**	**100.0%**
Residential	**228.6**	**19.9%**
Coal	0.0	0.0%
Natural Gas	32.7	14.3%
Petroleum	5.0	2.2%
Retail Electricity	59.4	26.0%
Electrical System Energy Losses	128.2	56.1%
Renewable Energy	3.3	1.4%
Commercial	**162.0**	**14.1%**
Coal	0.0	0.0%
Natural Gas	32.2	19.9%
Petroleum	2.1	1.3%
Retail Electricity	40.3	24.9%
Electrical System Energy Losses	86.9	53.6%
Renewable Energy	0.5	0.3%
Industrial	**463.7**	**40.3%**
Coal	9.8	2.1%
Natural Gas	87.7	18.9%
Petroleum	94.1	20.3%
Retail Electricity	60.9	13.1%
Electrical System Energy Losses	131.3	28.3%
Renewable Energy	79.9	17.2%
Transportation	**295.1**	**25.7%**
Coal	0.0	0.0%
Natural Gas	10.2	3.5%
Petroleum	284.9	96.5%
Retail Electricity	0.0	0.0%
Electrical System Energy Losses	0.0	0.0%
Renewable Energy	0.0	0.0%

* Primary energy sources include coal, natural gas, crude oil, renewables, and nuclear power. Often there are references to energy production by fuel source in which case the energy fuel sources are coal, natural gas, and crude oil. For a discussion of this distinction, see footnote 2.

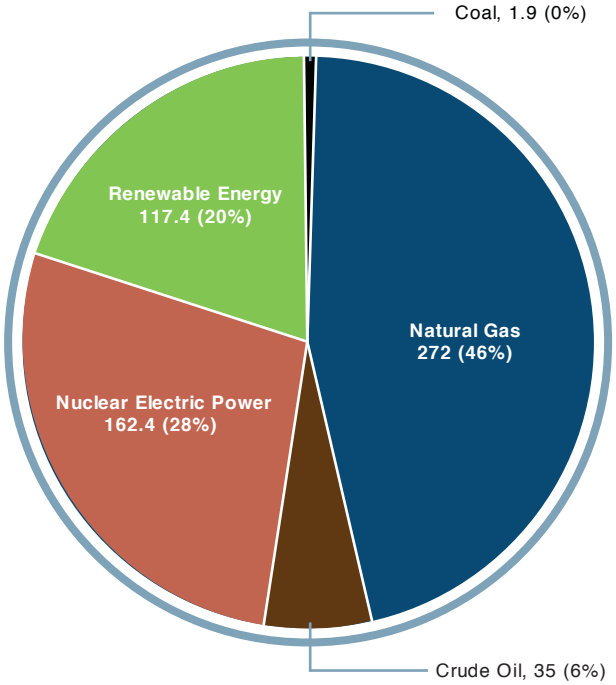
** The physical units for renewable energy were estimated by Institute for Economic Advancement using the total amount of renewable energy produced (Btu) produced and a conversion factor to convert Btu into megawatt hours.

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

1.2.1 Total Energy Production

The Arkansas production of energy in 2007 reached a historic peak of 588,702 billion Btu. That year's annual energy production growth rate was 3.2%, which was substantially less than the previous year's growth rate of 18.6%. The slowing in the growth of energy production in 2007 was due to declining natural gas and crude oil production. Table 1.2.1 shows a breakdown of the Arkansas total energy production by primary energy source for 2007 as reflected in Figure 1.2.1.1. Natural gas was the major fuel source for energy production (46.2%) followed by nuclear power (27.6%) and renewable energy (19.9%). The combined energy produced by these three fuel sources was 93.7% of the total energy produced. Energy derived from coal and crude oil are minor contributors to energy production in Arkansas.

Figure 1.2.1.1 2007 Arkansas Total Energy Production (Trillion Btu and Percent of Total)



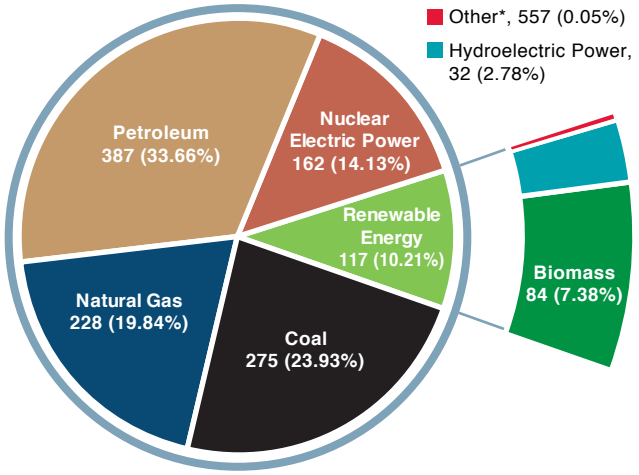
Total Energy Production was 588.7 Trillion Btu.

Source: U. S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

1.2.2 Total Energy Consumption

Table 1.2.1 breaks down the Arkansas energy consumption into resource energy consumption and end-use energy consumption components. The table also shows the energy consumed by fuel source in the production of electric power. In 2007 the Arkansas economy consumed 1,149.3 trillion Btu of energy (see Figure 1.2.2.1). Since Arkansas' economy produced 588.7 trillion Btu of energy in 2007, Arkansas was an overall net user of energy. Arkansas had to import sufficient energy to consume an additional 560.7 trillion Btu.

Figure 1.2.2.1 2007 Arkansas Resource Energy Consumption (Trillion Btu and Percent of Total)



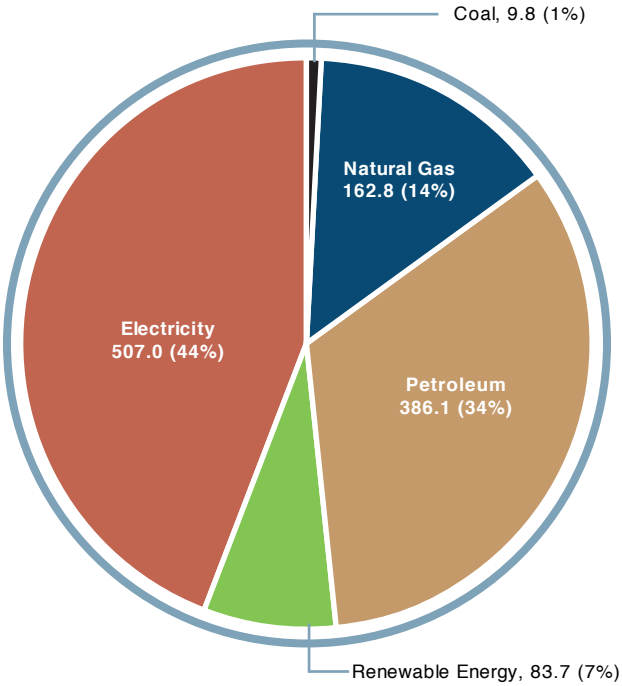
Total Consumption of Energy Resources was 1,149.3 Trillion Btu.

*Other: Geothermal, wind, and solar.

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

Energy consumption can either be in terms of resource energy consumption (see Figure 1.2.2.1) or the energy consumed by end-users (see Figure 1.2.2.2). Resource energy consumption refers to the amount of energy resources consumed. Resource energy consumption includes all the energy sources used to provide end-use energy, plus the energy resources used by businesses that produce and sell electric power to the private and public sectors of the economy.

Figure 1.2.2.2 2007 Arkansas End-User Energy Consumption by Energy Source (Trillion Btu and Percent of Total)

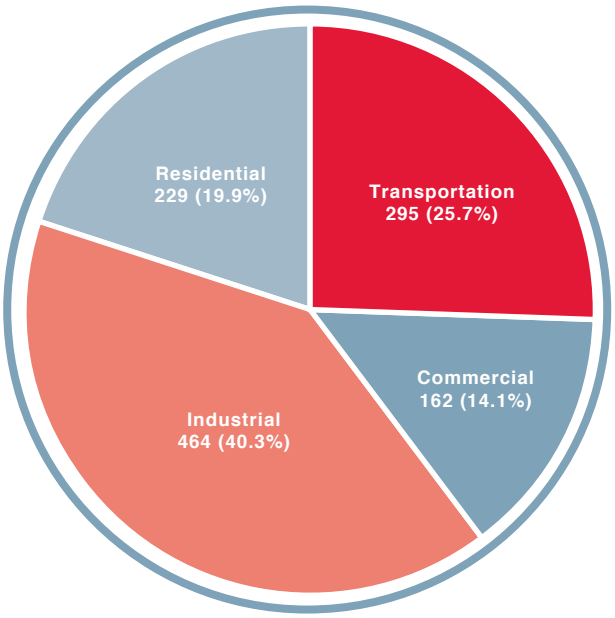


Total Energy Consumption was 1,149.3 Trillion Btu.

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

End-use energy consumption refers to the energy consumption by major end-users or sectors (see Figure 1.2.2.3). These include the transportation, industrial, commercial, and residential sectors. It is important to note that end-users consume retail electricity derived from electric power generation and that part of this power is lost in the transmission of electricity to the end-users.

Figure 1.2.2.3 2007 Arkansas Energy Consumption by End-Use Sector (Trillion Btu and Percent of Total)



Total Consumption of Energy by End-user was 1,149.3 Trillion Btu.

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

1.3 Production and Consumption of Arkansas Primary Energy Resources

In this section, the discussion is based on the production and consumption data presented in Table 1.2.1. As indicated by the data in Table 1.2.1, coal and petroleum products were the major fuels imported into Arkansas. In 2007 Arkansas mined 83,000 short tons of coal that produced 1.9 trillion Btu, but Arkansas consumed 275 trillion Btu as resource energy.[3] End-users consumed 9.8 trillion Btu of energy from coal, and the generation of electric power that used coal fired furnaces consumed an additional 265.2 trillion Btu. Hence, Arkansas imported sufficient energy from coal to consume 273.1 trillion Btu in order to realize a total coal energy consumption of 275 trillion Btu.

Arkansas produced 6,031,000 barrels of crude oil in 2007. Petroleum products are produced from crude oil by a refinery process. Arkansas has two operating refineries capable of producing approximately 77,000 barrels per day. Refining crude oil into petroleum products uses energy which makes it difficult to link produced crude oil Btu to consumed petroleum Btu. Nevertheless, it is clear from the earlier discussion that Arkansas consumes more energy from petroleum than it produces, and therefore, in 2007 Arkansas was a net importer of energy derived from petroleum.[4] The major end-user of petroleum energy was the transportation sector which consumed 74% of the petroleum energy.

Data in Table 1.2.1 indicate that Arkansas' marketed production of natural gas was 269,886 mcf which corresponds to producing 272 trillion Btu in 2007.[5] Natural gas consumption was 228 trillion Btu. End-users consumed a total of 162.8 trillion Btu of energy from natural gas while electric power generation consumed 65.2 trillion Btu.

Arkansas' sole nuclear power plant generated an equivalent 162.4 trillion Btu during 2007. Nuclear electric power accounted for 30.8% of the electric power sector's energy (see Figure 1.3.1). As shown in Table 1.2.1 end-users shares of nuclear electric power are reflected in their consumption of retail electricity. In addition, some electricity created with nuclear power may be a portion of the electric power exported into the national electrical grid. Arkansas' net interstate energy flow of electricity is a negative 20.4 trillion Btu, indicating Arkansas was a net exporter of electric power in 2007.[6]

Renewable energy includes naturally replenishing resources that are flow-limited energy resources. Renewable energy resources include biomass/wood, hydro, geothermal, wind, and solar. In 2007 Arkansas produced and consumed a total 117.4 trillion Btu of renewable energy (see Table 1.2.1). The end-users consumption of renewables was 83.7 trillion Btu while 33.7 trillion Btu of renewable energy was consumed in the production of electric power.

Since the electric power sector is both a consumer of energy and a producer of energy, the sector

3 U.S. Energy Information Administration/Annual Coal Report 2008, http://www.eia.doe.gov/cneaf/coal/page/acr/table1.pdf.

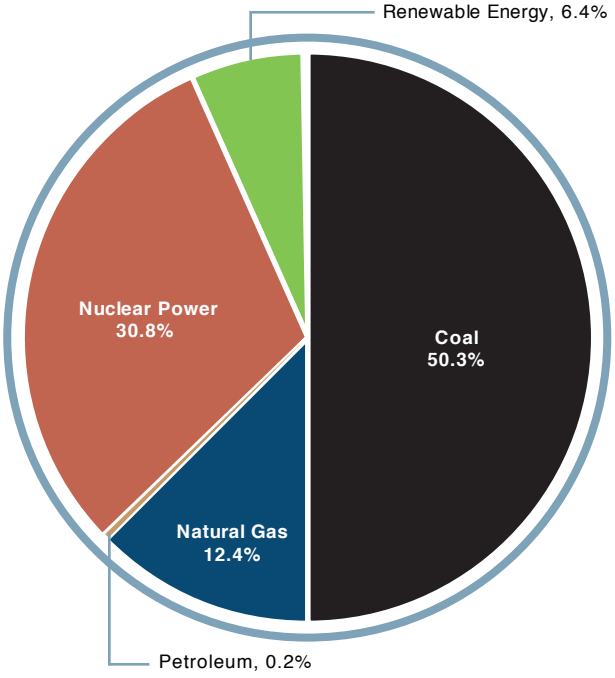
4 According to Steve Sharp, P.E., coal, natural gas, and crude oil fuels burned in power plants are imported into Arkansas from other states. Most coal comes from Wyoming, most natural gas comes from Texas or Oklahoma, and most crude oil comes from Louisiana and Texas. A reason for this is that currently it is more economical to import these fuels from regions with large reserves and lower extraction costs. Sharp, Steven, P.E., Rockhounding Arkansas: Geology and Sources of Energy, http://www.rockhoundingar.com/geology/energy.html, July 2010.

5 Marketed production of natural gas refers gross withdrawals of natural gas from production reservoirs, less gas used for reservoir repressuring, nonhydrocarbon gases removed in treating and processing operations, and quantities vented and flared. Marketed production of natural gas is also referred to as consumable grade natural gas. U.S. Energy Information Administration, glossary of terms. (See Appendix F Table F.5)

6 Net interstate flow of electricity is the difference between the sum of electricity sales and losses within a state and the total amount of electricity generated within that state. A positive number indicates that more electricity (including associated losses) came into the state than went out of the state during the year; conversely, a negative number indicates that more electricity (including associated losses) went out of the state than came into the state. U.S. Energy Information Administration, glossary of terms.

is an energy intermediary. It purchases and consumes energy as it produces electric power for retail. In 2007 Arkansas' production of electric power consumed 527.4 trillion Btu from all fuel sources, including nuclear power to produce electric power. The consumption of electrical power by end-users is complicated by the fact that there are electrical system energy losses between the production of electrical power and the retailing of electric power. In 2007 end-users consumed 160.6 trillion Btu of electric power while interstate flow from Arkansas accounted for 20.4 trillion Btu for a combined total of 181 trillion Btu. There are 346.4 (=527.4-181) trillion unaccounted Btu. These unaccounted Btu are the estimates of the electrical system energy losses or the transmission losses associated with providing the end-users electricity.[7]

Figure 1.3.1 2007 Total Electric Power Produced in Arkansas by Primary Energy Source



Total Electric Power produced in Arkansas was 527.4 Trillion Btu.

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

1.4 Energy Prices and Expenditures in Arkansas 2007

Energy price estimates are computed as the average cost per unit of sales for each of the major energy sources which includes coal, natural gas, petroleum, wood and waste, and electricity. The prices are converted into nominal dollars per million Btu by appropriate conversion factors.[8] Energy expenditures are calculated by multiplying the energy price for each fuel in dollars per million Btu by the adjusted fuel consumption in millions of Btu.[9] Adjustments are made to take into account fuel consumption that has no direct fuel cost (solar, wind, wood, and waste) and to remove process fuels.

In 2007 the average energy price in Arkansas was $16.66 per million Btu, which ranked 41st among the states (see Table 1.4.1). In 2007 Arkansas' energy expenditures totaled $12,533 million and ranked 33rd among the states (see Table 1.4.2). The relatively higher energy expenditure in Arkansas reflects its higher energy consumption per person rather than the price of energy. Energy cost per person or energy expenditure per person was $4,428 in 2007 which ranked 21st among the states (see Table 1.4.3). This high ranking reflects the relatively moderate energy expenditures in Arkansas compared to other states and the relatively low population of the state.

7 There are several other types of energy losses associated with the production and distribution of electricity. There are energy losses that result from the consuming fuels to produce electricity. Section 6.2.2 discusses this type of energy loss. There are losses of electricity at a utility level which may include electricity that is unaccounted for by a utility. Estimates of this loss are discussed in Section 6.3 and shown in Table 6.3.1.

8 Energy Information Administration, State Energy Data System 2007: Prices and Expenditures, http://www.eia.doe.gov/emeu/states/sep_prices/notes/pr_technotes_2007.pdf, May 2010.

9 Ibid, p.6.

Table 1.4.1 2007 Energy Prices by State

Rank	State	Dollars Per Million Btu
1	Hawaii	25.20
2	Connecticut	24.93
3	District of Columbia	24.68
4	Massachusetts	23.89
5	New Hampshire	23.25
6	Vermont	22.90
7	Rhode Island	22.72
8	New York	21.78
9	Maryland	21.60
10	Florida	21.47
11	Nevada	21.12
12	Delaware	20.82
13	Arizona	20.72
14	California	20.12
15	New Jersey	19.55
16	Maine	19.17
17	North Carolina	19.17
18	New Mexico	19.05
19	Pennsylvania	18.30
20	Oregon	18.23
21	Alaska	17.87
22	Wisconsin	17.84
23	Missouri	17.73
24	Ohio	17.71
25	Washington	17.63
26	Texas	17.60
27	Virginia	17.58
28	South Dakota	17.45
29	Michigan	17.37
30	Illinois	17.27
31	Montana	17.26
32	Kansas	17.23
33	Tennessee	17.19
34	Mississippi	17.16
35	Georgia	17.10
36	South Carolina	17.04
37	Colorado	17.00
38	Minnesota	17.00
39	Oklahoma	16.76
40	Nebraska	16.72
41	**ARKANSAS**	**16.66**
42	Utah	16.44
43	Iowa	16.12
44	Alabama	16.01
45	Kentucky	15.99
46	Idaho	15.92
47	West Virginia	15.28
48	Wyoming	14.81
49	Indiana	14.41
50	Louisiana	14.19
51	North Dakota	13.22
	United States	**18.23**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Table 1.4.2 2007 Energy Expenditures by State

Rank	State	Million Dollars
1	Texas	140,651
2	California	121,829
3	New York	63,642
4	Florida	60,747
5	Pennsylvania	49,301
6	Illinois	48,297
7	Ohio	48,190
8	New Jersey	39,609
9	Michigan	36,882
10	Georgia	35,678
11	Louisiana	33,624
12	North Carolina	32,574
13	Virginia	30,509
14	Indiana	28,627
15	Massachusetts	25,862
16	Tennessee	25,462
17	Missouri	23,342
18	Washington	23,224
19	Wisconsin	22,455
20	Minnesota	21,708
21	Alabama	21,606
22	Maryland	21,490
23	Kentucky	20,316
24	Arizona	20,198
25	South Carolina	18,130
26	Colorado	17,033
27	Oklahoma	17,027
28	Connecticut	15,146
29	Iowa	14,334
30	Mississippi	13,392
31	Oregon	13,175
32	Kansas	12,803
33	**ARKANSAS**	**12,533**
34	Nevada	10,571
35	Utah	8,739
36	West Virginia	8,369
37	New Mexico	7,877
38	Nebraska	7,877
39	Maine	6,696
40	Alaska	6,260
41	Hawaii	6,174
42	Idaho	5,418
43	New Hampshire	5,335
44	Montana	5,265
45	Wyoming	4,546
46	North Dakota	4,110
47	Delaware	3,849
48	South Dakota	3,585
49	Rhode Island	3,567
50	Vermont	2,687
51	Arizona	2,392
	United States	**1,233,058**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Table 1.4.3 2007 Energy Expenditures by Person

Rank	State	Dollars Per Person
1	Alaska	9,191
2	Wyoming	8,687
3	Louisiana	7,688
4	North Dakota	6,442
5	Texas	5,899
6	Montana	5,504
7	Maine	5,090
8	Hawaii	4,833
9	Iowa	4,805
10	Kentucky	4,796
11	Oklahoma	4,719
12	Alabama	4,670
13	West Virginia	4,624
14	Kansas	4,610
15	Mississippi	4,585
16	New Jersey	4,577
17	Indiana	4,518
18	South Dakota	4,506
19	Delaware	4,465
20	Nebraska	4,451
21	**ARKANSAS**	**4,428**
22	Connecticut	4,340
23	Vermont	4,329
24	Ohio	4,199
25	Minnesota	4,189
26	Tennessee	4,141
27	Nevada	4,138
28	South Carolina	4,116
29	District of Columbia	4,069
30	New Hampshire	4,065
31	Wisconsin	4,011
32	New Mexico	4,010
33	Massachusetts	3,998
34	Missouri	3,971
35	Pennsylvania	3,969
36	Virginia	3,963
37	Maryland	3,825
38	Illinois	3,766
39	Georgia	3,746
40	Michigan	3,670
41	Idaho	3,621
42	North Carolina	3,603
43	Washington	3,601
44	Oregon	3,527
45	Colorado	3,517
46	Rhode Island	3,387
47	California	3,349
48	Florida	3,338
49	New York	3,276
50	Utah	3,274
51	Arizona	3,179
	United States	**4,093**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

1.5 The Public Sectors Energy Use

The Arkansas Economic Development Commission provided the Institute for Economic Advancement energy data that described the monthly energy expenditures of various state agencies for the fiscal year beginning July 2006 and ending June 2007. This is a very large data base with thousands of entries and for hundreds of state government entities. The Commission also provided the expenditures by energy source for the school districts in Arkansas for the same period. These energy expenditures are summarized in this section of the report.

According to the this state agency database during the fiscal year 2006-2007, the state agencies total energy expenditures were approximately $95 million (see Table 1.5.1). Expenditures for electricity account for 66% of all energy expenditures, while expenditures for natural gas and propane accounted for 34% of the total. As a group, institutes of higher education accounted for approximately 77% of all agency's energy expenditures which dominated all other agency energy expenditures.

The database of energy expenditures by school districts consisted of 249 school districts, and they supported the education of 464,601 students.[10] For the Fiscal Year 2006-2007, the school districts energy expenditures totaled approximately $74.4 million as shown in Table 1.5.2. The average energy expenditure by school district was $330.6 thousand. In terms of energy sources, the majority of school district energy expenditures (97%) were for electricity and natural gas. On a per student basis, energy expenditure per student was $162 for the state. For the 249 school districts, the average energy expenditure was $174.63. In Figure 1.5.1 a histogram shows the energy expenditures per student for all 249 school districts.

10 Enrollment data reference.

Table 1.5.1 Arkansas State Agency Energy Expenditures by Energy Source
Fiscal Year 2006-2007

CATEGORY	ELECTRICITY	ELECTRICITY SPECIAL	NATURAL GAS & PROPANE	TOTAL	PERCENT BY CATEGORY
Department of Finance & Administration	$2,079,635	$0	$747,165	$2,826,800	3.0%
Department of Heritage	$6,038,407	$0	$1,612,112	$7,650,519	8.0%
Department of Human Services	$3,434,360	$12,672	$1,899,378	$5,346,410	5.6%
Institutions of Higher Education	$46,744,718	$78,418	$26,400,017	$73,223,153	76.8%
Legislative and Government Agencies	$2,582,539	$181,240	$989,645	$3,753,425	3.9%
Technical Colleges	$1,855,114	$0	$446,304	$2,301,419	2.4%
Other	$144,334	$0	$61,616	$205,950	0.2%
Total	**$62,879,108**	**$272,330**	**$32,156,238**	**$95,307,676**	**100.0%**
Percent of Total by Energy Source	**66.0%**	**0.3%**	**33.7%**	**100.0%**	

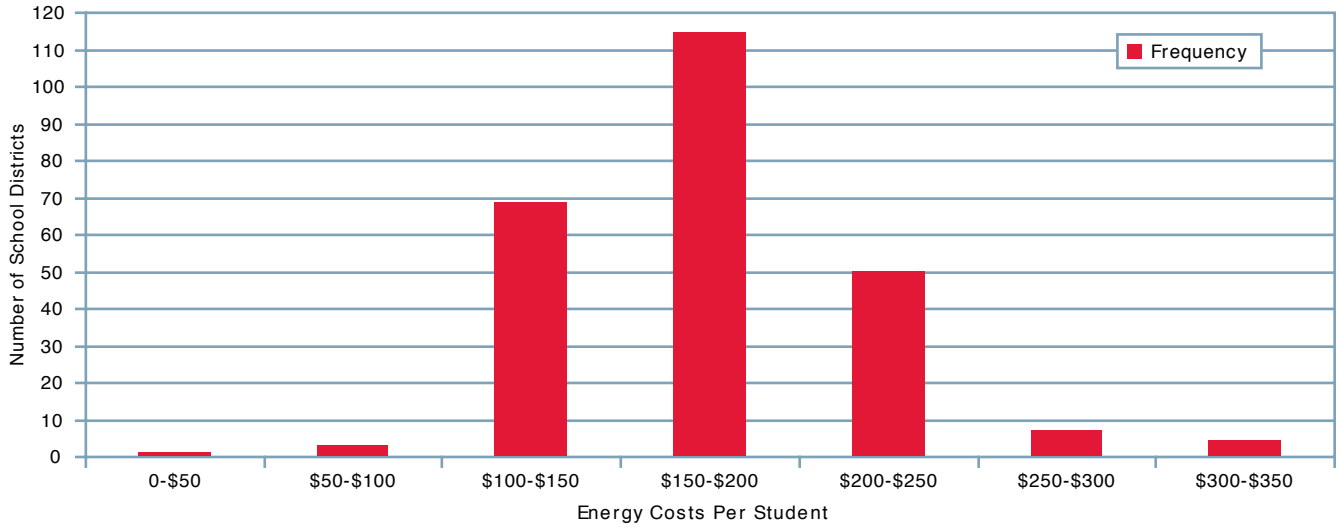
Source: Arkansas Economic Development Commission, Arkansas Energy Office.

Table 1.5.2 Arkansas School Districts Energy Expenditures by Energy Source
Fiscal Year 2006-2007

	NATURAL GAS	ELECTRICITY	OIL	BOTTLED GAS BUTANE-PROPANE	COAL	TOTAL
Expenditure by Energy Source	$18,602,543	$53,736,904	$148,175	$1,875,595	$4,519	$74,367,735
Percent of Total by Energy Source	25.0%	72.3%	0.2%	2.5%	0.01%	100%
Average Energy Expenditures by Source	$84,943	$215,811	$2,694	$26,050	$1,130	$330,628
Count	219	249	55	72	4	249
ENERGY EXPENDITURES ON A PER STUDENT BASIS						
Total Expenditure by Energy Source Per Student	$41	$118	$0	$4	$0	$162.64
Percent of Total Expenditure by Energy Source Per Student	25.0%	72.4%	0.2%	2.5%	0.01%	100%
Average School District Energy Expenditures by Source Per Student	$41	$122	$0	$11	$0	$174.63

Sources: Arkansas Economic Development Commission, Arkansas Energy Office. Arkansas Department of Education, 2006-2007 Statewide Information Systems Database, http://adedata.k12.ar.us/Districts/EnrollmentByGrade.aspx, February 2007.

Figure 1.5.1 Energy Expenditures Per Student by School District
Fiscal Year 2006-2007



Source: Computations by the Research Group, Institute for Economic Advancement, College of Business, University of Arkansas at Little Rock.

section 2

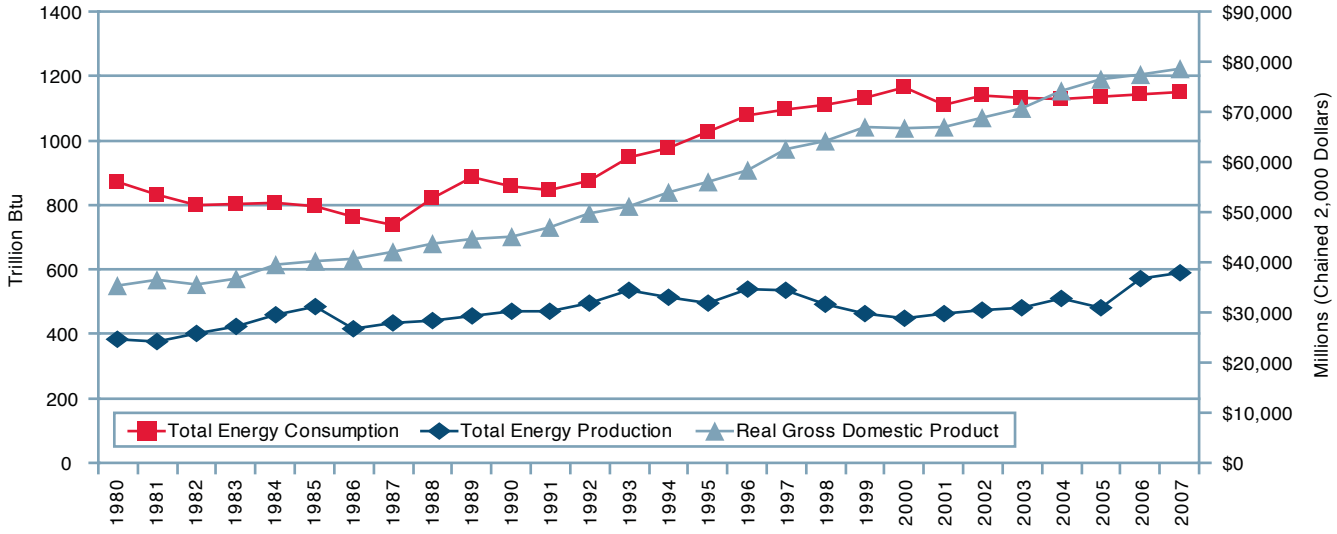
Historic Energy Trends in Arkansas Energy Economy 1970-2007

2.1 Economic Activity, Energy Consumption, and Production in 2000-2007

Arkansas' real gross state product (GSP) contracted 0.04% during the 1999 to 2000 period, but during the 2000-2007 period, it expanded continuously growing by 18% (see Figure 2.1.1). In comparison to 1990s growth, energy consumption has remained relatively flat so far in this decade. Immediately following the events of 9/11/2001, Arkansas energy consumption declined, and since then it has not returned to the pre 9/11 levels. This collapse in energy consumption was primarily due to reductions in petroleum related energy consumption. In particular, it was related to declines in the consumption of jet fuels associated with the reduction in travel in the post 9/11 economy.

Total energy production in Arkansas increased by 31.5% over the 2000-2007 period. The majority of this new energy production is associated with new natural gas production (68%), and the activities in the Fayetteville Shale Play that started accelerating after 2005. Increased energy production from renewables accounted for 6.1%

Figure 2.1.1 1980-2007 Arkansas Gross State Product, Energy Consumption, and Energy Production



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

of Arkansas' total energy production increase. Increases in electric power accounted for 29% of the energy production growth during this period.

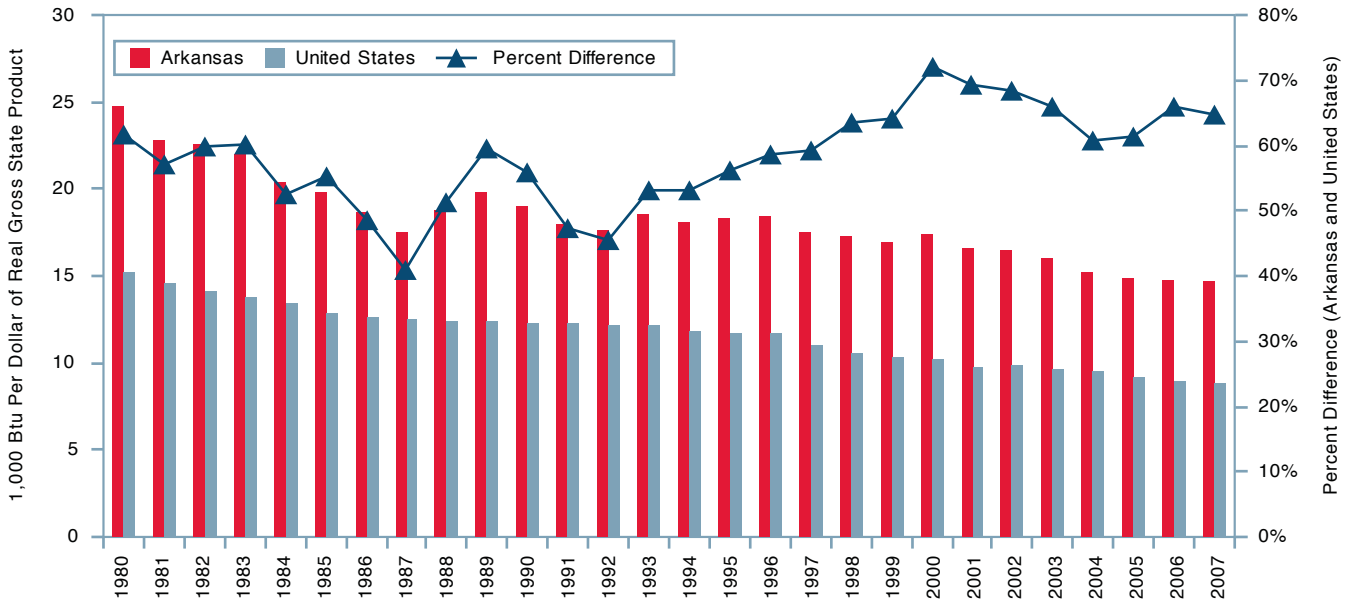
2.2 Comparisons of Energy Consumption Per Dollar of Gross Product and Per Capita

Energy consumption per dollar of real GSP continued to decline throughout this decade as real GSP outpaced the growth in energy consumption (see Figure 2.2.1). The fact that real GSP grew faster than energy consumption means that energy consumption per dollar of real GSP is declining. This means Arkansas economy is becoming more energy efficient in producing its real GSP. Factors that contribute to enhanced energy efficiency are the adoptions of new technologies that have greater energy productivity and energy conservation efforts. In addition, the composition of Arkansas' industries is also changing from its historic manufacturing base to a service based economy which means that its industrial base is becoming less energy intensive.

Even though Arkansas is becoming more energy efficient, it has yet to achieve the same energy efficiency as the United States. The percentage gap between energy consumption per dollar of GSP in Arkansas and consumption per dollar of Gross Domestic Product (GDP), in the United States reached a maximum of 72% in 2000 for the 1980-2007 period. This means that Arkansas energy consumption per dollar of GSP was 72% higher than in the United States. Since then, the energy efficiency gap narrowed slightly between Arkansas and the United States reaching a level of 65% in 2007.

Arkansas is located in a region of the nation that has relatively high energy consumption per dollar of gross state product. In comparison to other states, Arkansas' energy consumption per dollar of gross state product ranked 11th in the nation in 2007. Compared to its surrounding states, Arkansas had a lower energy consumption per dollar of gross state product than Louisiana, Mississippi, and Oklahoma, but a higher amount than Texas, Tennessee, and Missouri. Arkansas and its neighboring states ranked in the top twenty-three states that had the highest energy consumption per dollar of gross state product in 2007 (see Table 2.2.1).

Figure 2.2.1 1980-2007 Energy Consumption Per Dollar of Product, Arkansas and United States



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

Table 2.2.1 2007 Energy Consumption Per Dollar of Gross State Product

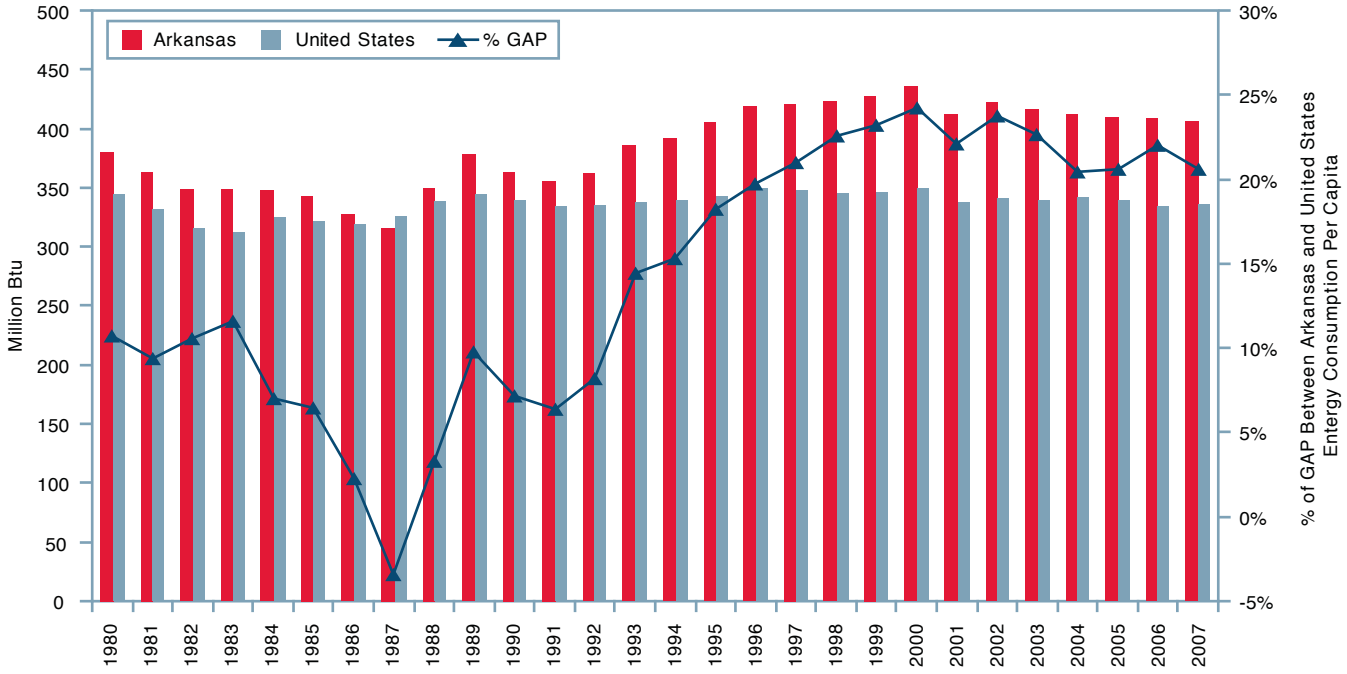
Rank	State	1,000 Btu Per Dollar
1	Louisiana	26.1
2	Wyoming	23.8
3	Alaska	23.7
4	North Dakota	18.9
5	West Virginia	18.8
6	Mississippi	17.6
7	Montana	17.3
8	Kentucky	15.9
9	Alabama	15.7
10	Oklahoma	15.5
11	**ARKANSAS**	**14.6**
12	Indiana	13.8
13	South Carolina	13.4
14	Texas	13
15	Kansas	11.8
16	New Mexico	11.8
17	Idaho	11.6
18	Maine	11.4
19	Iowa	11.4
20	Tennessee	11.1
21	Nebraska	10.5
22	Ohio	10.4
23	Missouri	10.3
24	South Dakota	10
25	Georgia	9.5
26	Wisconsin	9.4
27	Utah	9.3
28	Michigan	9.1
29	Pennsylvania	9.1
30	Minnesota	8.8
31	North Carolina	8.2
32	Virginia	8.2
33	Washington	8
34	Illinois	7.9
35	Oregon	7.7
36	Vermont	7.6
37	Florida	7.5
38	Colorado	7.5
39	Nevada	7.5
40	Arizona	7.5
41	New Jersey	7.1
42	Hawaii	7
43	Maryland	6.8
44	New Hampshire	6.3
45	Delaware	6
46	Rhode Island	5.7
47	California	5.5
48	Massachusetts	4.9
49	Connecticut	4.9
50	New York	4.3
51	District of Columbia	2.6
	Gross Domestic Product United States	**8.9**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

One reason for high energy consumption per dollar of GSP in Arkansas is that its energy consumption per capita is also high (see Figure 2.2.2). Historically, the Arkansas economy consumes more energy per person than is consumed in the United States economy. Only for a brief period in the late 1980s did Arkansas consume less energy per person than the nation. In the first decade of the 21st century, the consumption gap per person between Arkansas and the United States was near its highest historical level, but since then it has trended downward to a current level of 20.5%.

Although Arkansas is not a large energy consumer, ranking 29th in coal consumption, 34th in natural gas consumption, 32nd in petroleum consumption, and 30th in retail electricity sales among the states, its per capita energy consumption was high (15th) in 2007. High consumption per capita in Arkansas can be attributed to several factors including its low population density, the fact that Arkansas is a rural state, and the lack of mass transit causing the state to have high average gallons used per registered vehicle (4th highest in the nation at 703.8 gallons per vehicle (see Appendix C Table C.2).

Figure 2.2.2 1980-2007 Arkansas vs. United States Energy Consumption Per Capita
(Million Btu)

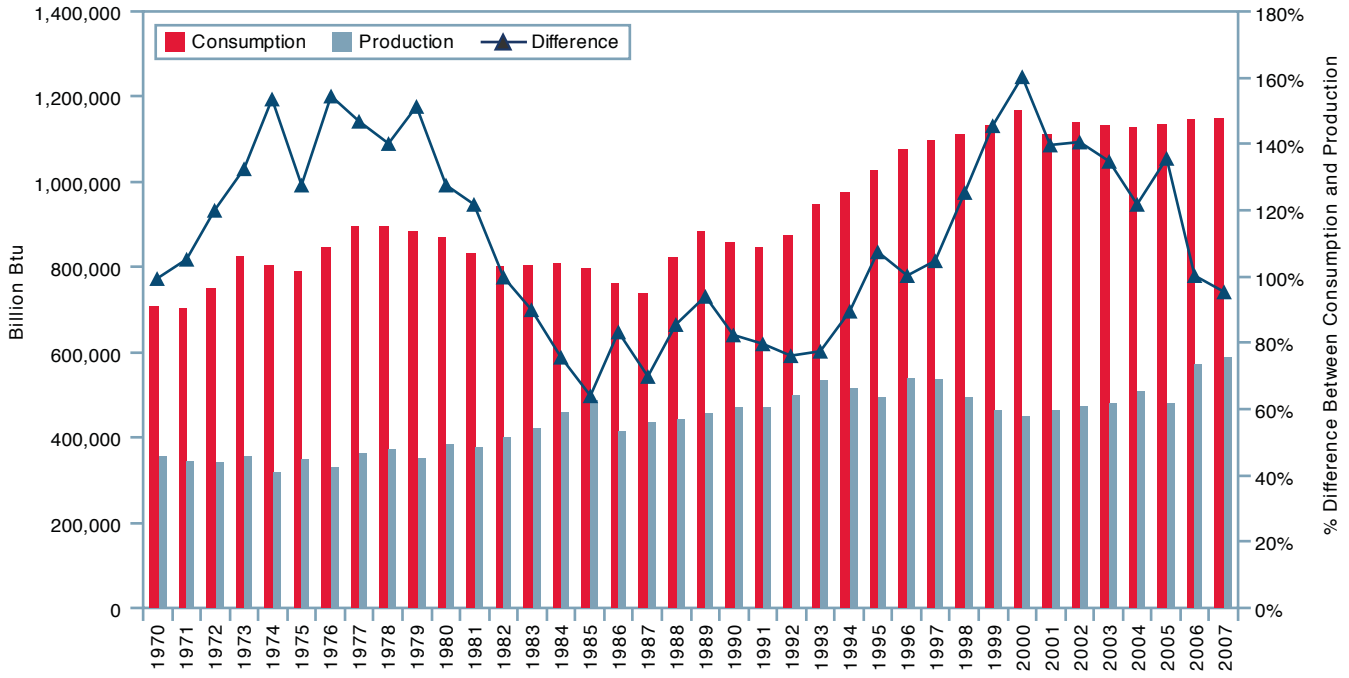


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

2.3 Overall Trends in Arkansas Energy Production and Consumption 1970-2007

Overall, Arkansas consumes more energy annually than it produces from all sources. During the 1970-2007 period, Arkansas' consumption of energy averaged approximately twice (212%) its annual production of energy. The ratio of energy consumption to energy production reached a maximum of 261% in 2000, and since then, it has declined as the Arkansas energy production has risen relative to its energy consumption. This rise is primarily due to increased natural gas production in Arkansas, (see Figure 2.3.1).

Figure 2.3.1 1970-2007 Arkansas Total Production and Consumption (Billion Btu)

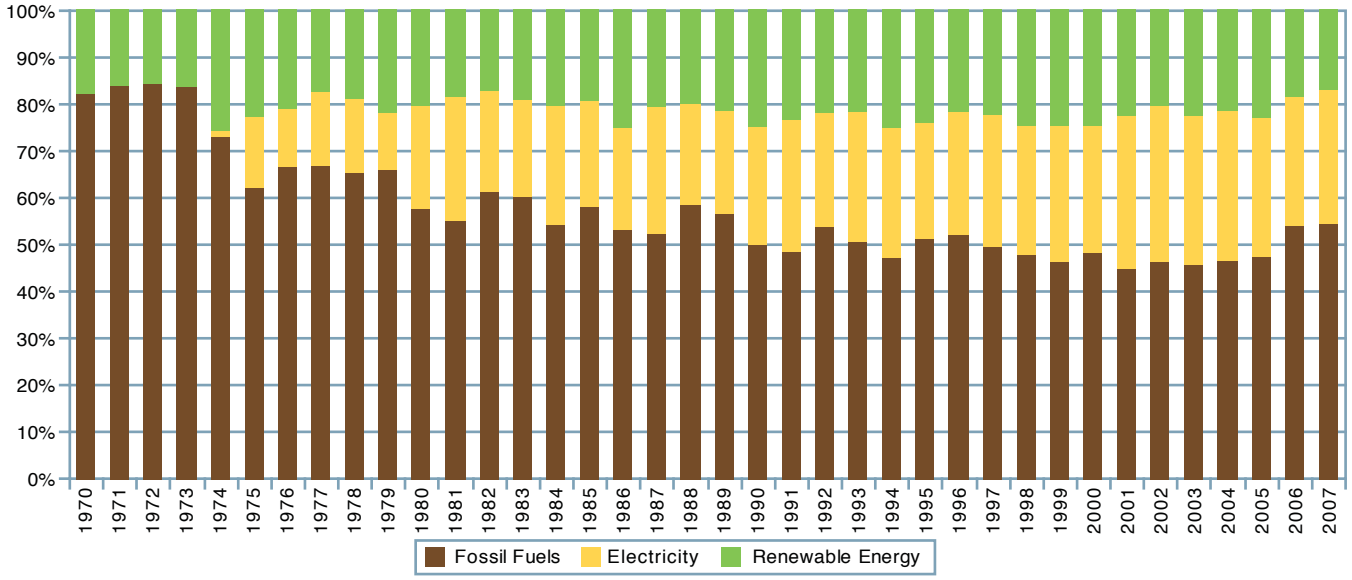


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

2.4 Total Energy Production From All Energy Sources for Arkansas1970-2007

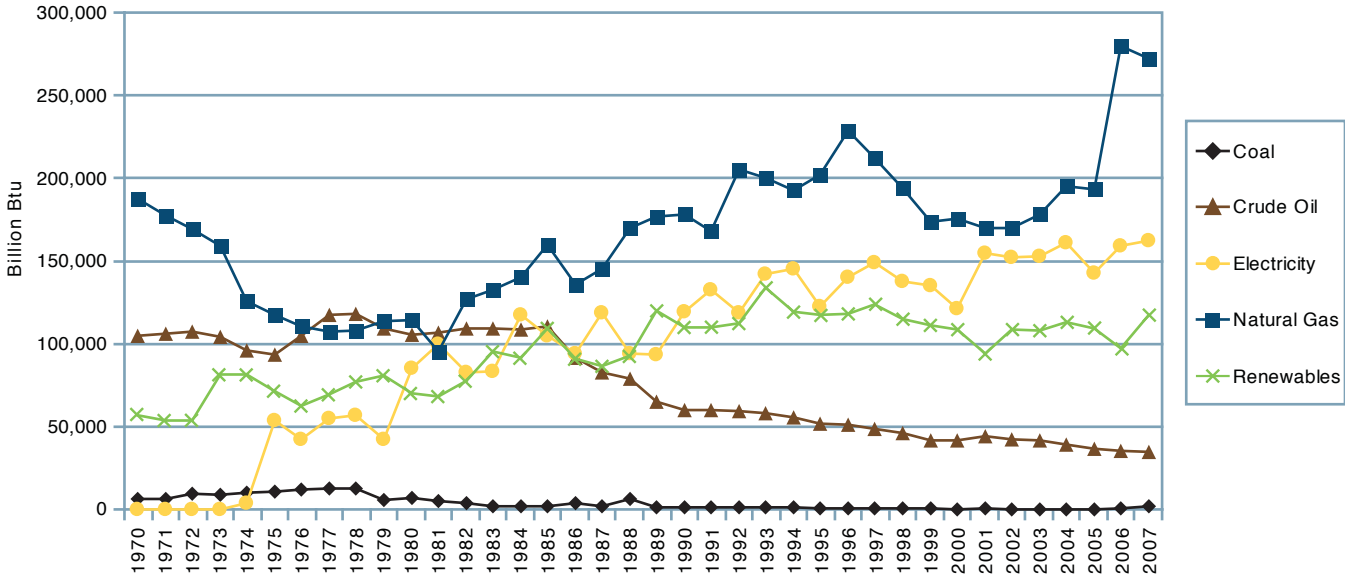
Arkansas produces energy from five primary energy sources (see Figure 2.4.1). The fossil fuels include coal, crude oil, and natural gas. Electric power is produced directly with nuclear power and indirectly by other fuel sources. Renewable energy is most often referred to as biomass, hydropower, solar, geothermal, and wind.[11] Energy produced using coal and crude oil fuels have become less significant in Arkansas. On the other hand, electricity, renewables, and natural gas are major fuel

Figure 2.4.1 1970-2007 Arkansas Energy Production Estimates by Primary Energy Source (Percent of Total)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure 2.4.2 1970-2007 Arkansas Total Energy Production by Primary Energy Source (Billion Btu)



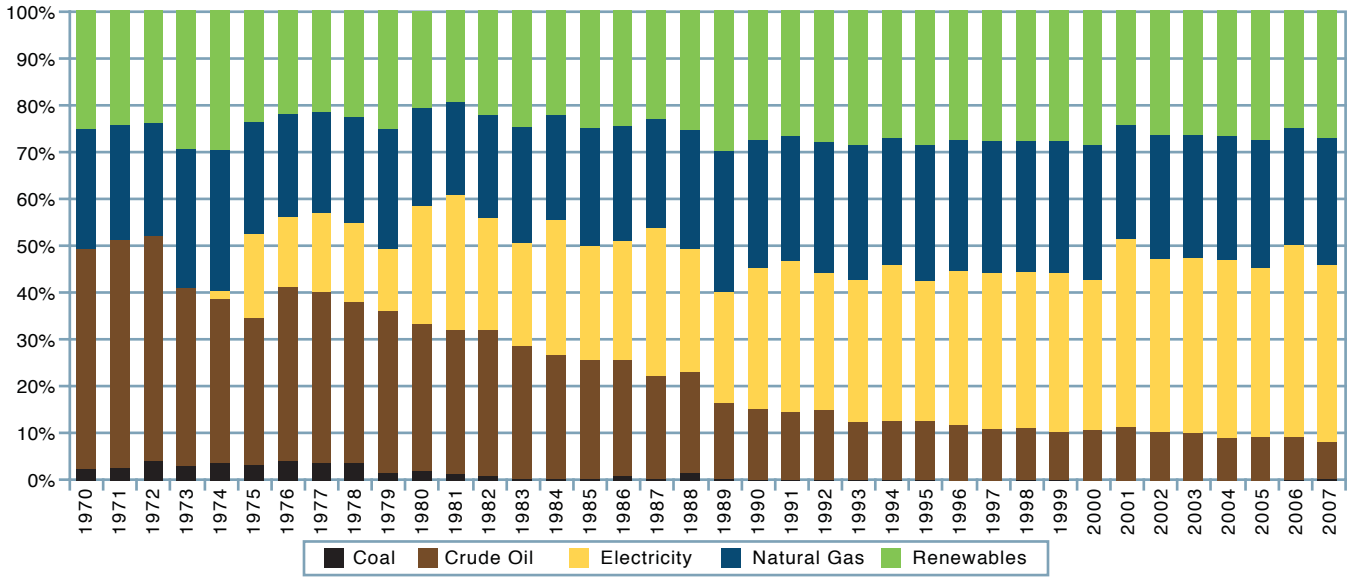
Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

11 Energy Information Administration, Energy Resources: Renewable, http://www.eia.doe.gov/kids/energy.cfm?page=renewable_home-basics, May 2010.

sources for energy production in the Arkansas economy. In 1970 these fuel sources combined to produce 69% of Arkansas' total energy production (see Figure 2.4.2). By 2007 their combined share of Arkansas energy production was 94%.

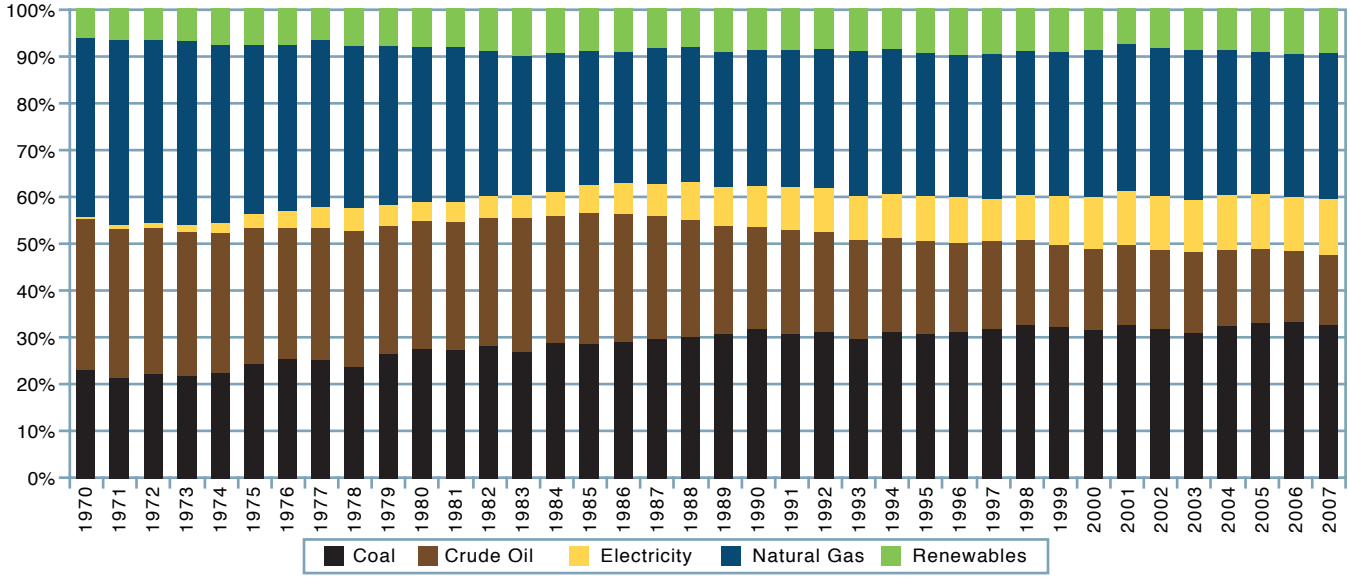
Compared to the U. S. energy production, Arkansas uses quite a different mixture of fuel sources to produce energy. In 1970 the U.S. produced 45% of its energy using electricity, natural gas, and renewables; by 2007 the three fuel sources contributed 52% to total energy production in the U.S. (see Figure 2.4.4). Coal and crude oil provided 48% of the fuels for U.S. energy production. In 2007 coal and crude oil production in Arkansas contributed less than 6% to the state's overall energy production (see Figure 2.4.3).

Figure 2.4.3 1970-2007 Arkansas Total Production by Energy Source (Percent of Total)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure 2.4.4 1970-2007 United States Total Production by Energy Source (Percent of Total)

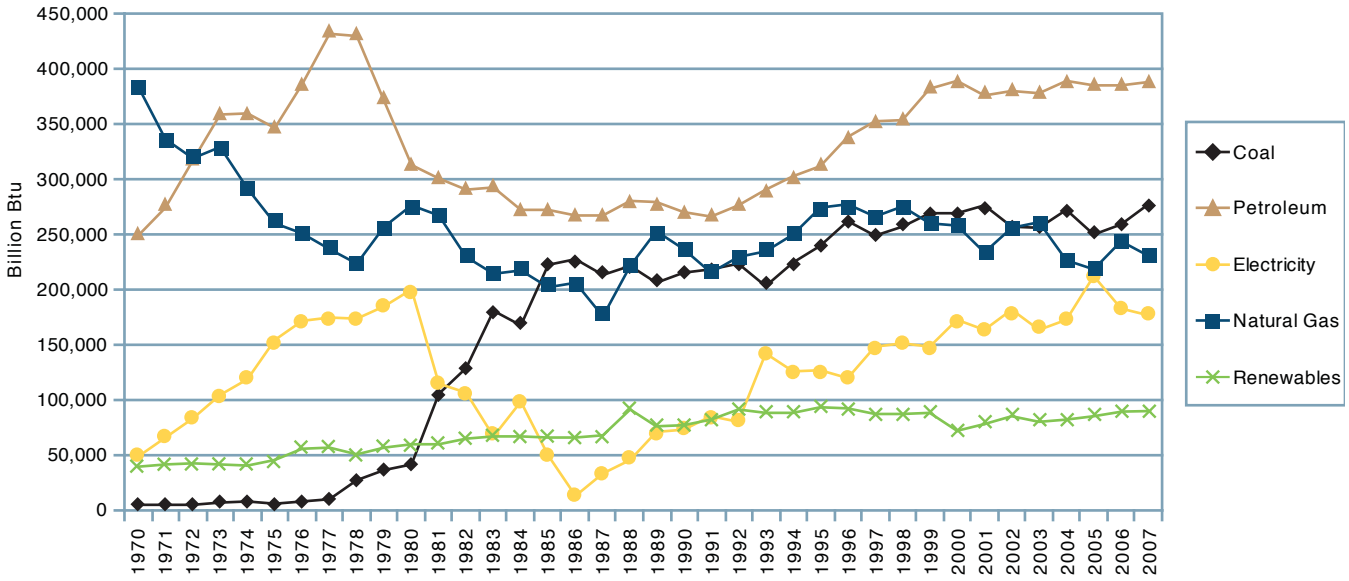


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

2.5 Total Energy Consumption From All Energy Sources for Arkansas 1970-2007

Energy consumption by energy source does not mirror energy production by primary energy source in Arkansas (see Figure 2.5.1). The amounts of coal and petroleum consumed in Arkansas are much larger than what is produced in Arkansas. Since the early 1980s, the consumption of coal imported into Arkansas for the production of steam to power electric generating plants has been increasing. In 2007 coal was the second highest energy consumable behind petroleum consumption. The consumption of petroleum has rebounded from its peaks in the mid-1970s and through its decline in consumption in the 1980s. In 2007 the consumption of petroleum fuels was close to its 1976 level, but its share of total energy consumed was 34% instead

Figure 2.5.1 1970-2007 Arkansas Total Energy Consumption by Energy Source (Billion Btu)

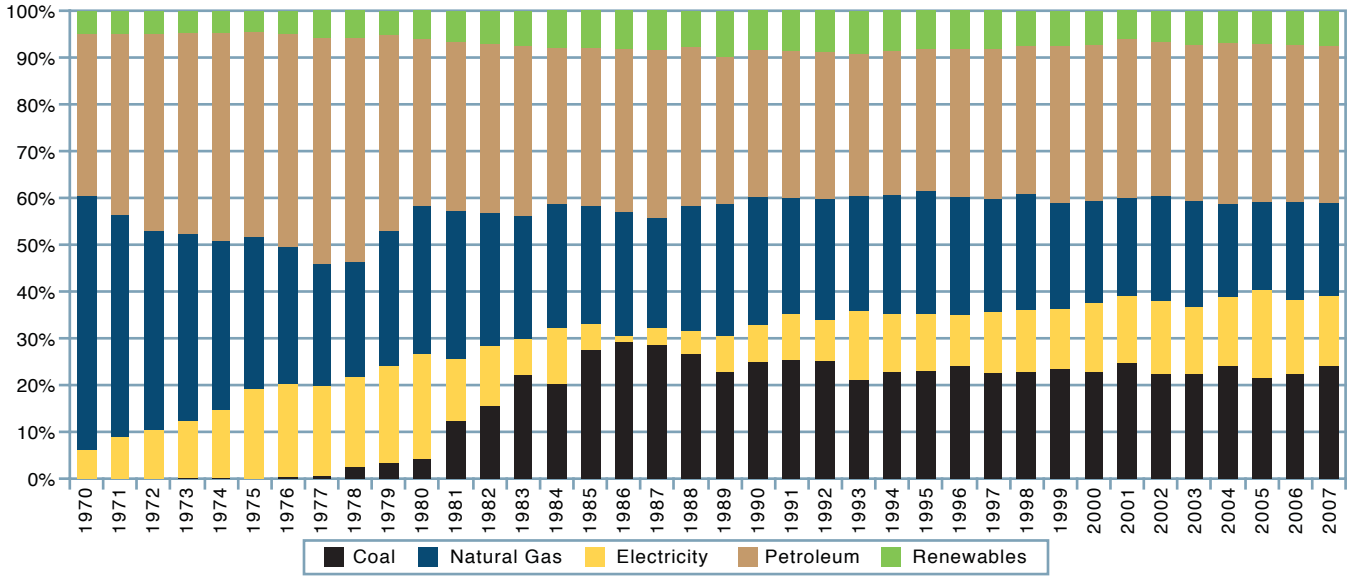


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

of 46% as in the earlier period. The consumption of energy from renewable energy sources remained a relatively small share (7.4% in 2007) of energy consumed in Arkansas by energy sources.

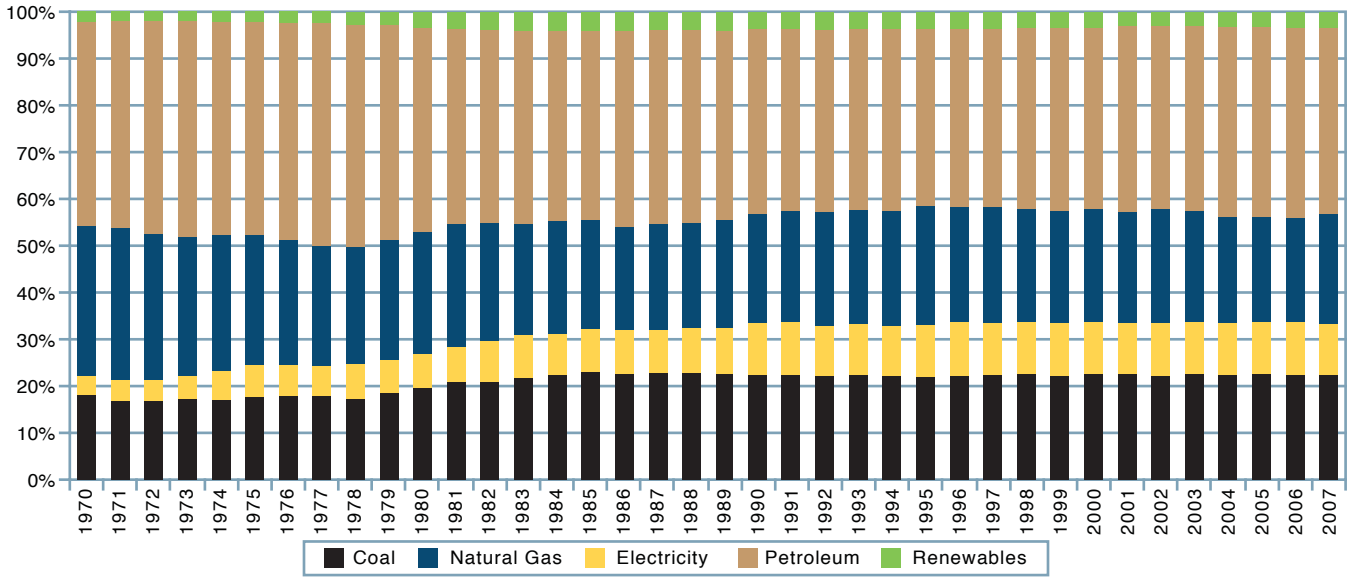
The Arkansas consumption of energy by primary source resembles that of the U.S. (see Figures 2.5.2 and 2.5.3). During the 1970-2007 period, Arkansas and the U.S.'s annual shares of energy consumed by energy source are almost identical. In terms of these energy consumption shares, Arkansas consumes slightly less coal and petroleum but more renewable energy fuels and natural gas than the national counterparts.

Figure 2.5.2 1970-2007 Arkansas Total Consumption by Energy Source (Percent of Total)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure 2.5.3 1970-2007 United States Total Consumption by Energy Source (Percent of Total)

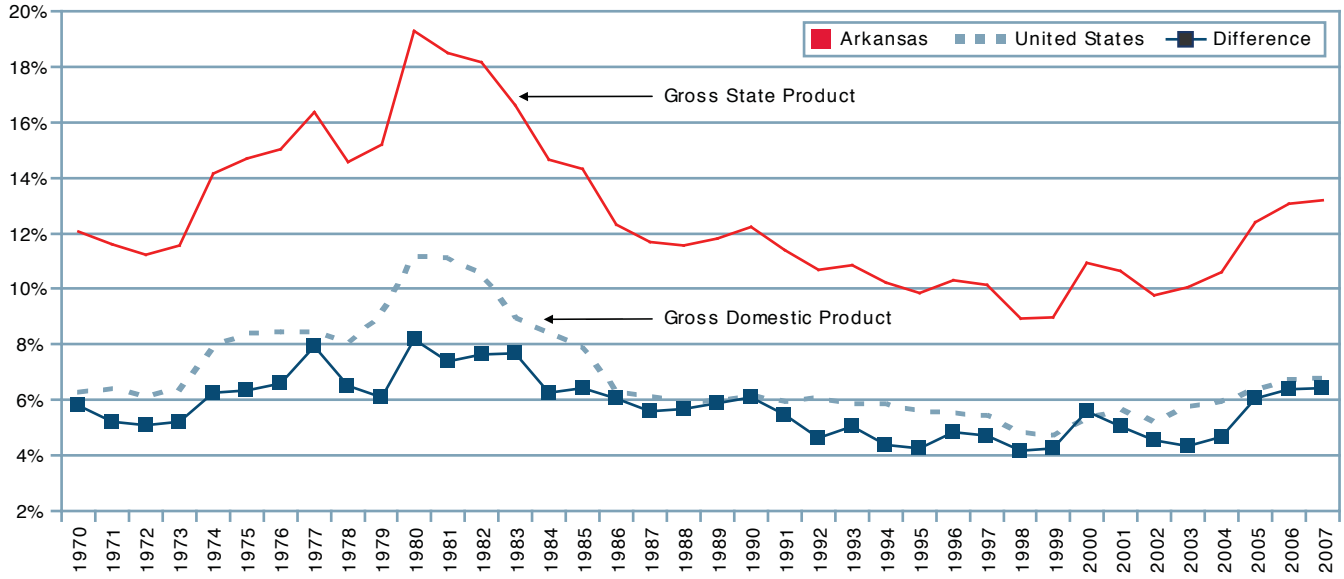


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

2.6 Energy Expenditures Share of Gross State Product

The Arkansas energy expenditures as a share of its GSP is larger than the United States counterpart. Figure 2.6.1 compares energy expenditure shares for Arkansas and the United States for the 1970 to 2007 period. Over this period, energy expenditures in Arkansas averaged 13 percent of its GSP while their counterpart for the nation averaged 7 percent of gross domestic product. The difference between these two shares averaged 6 percent over this period with a range in variation of 4 to 8 percent.

Figure 2.6.1 1970-2007 Energy Expenditures as a Percentage of Gross Products, Arkansas and United States

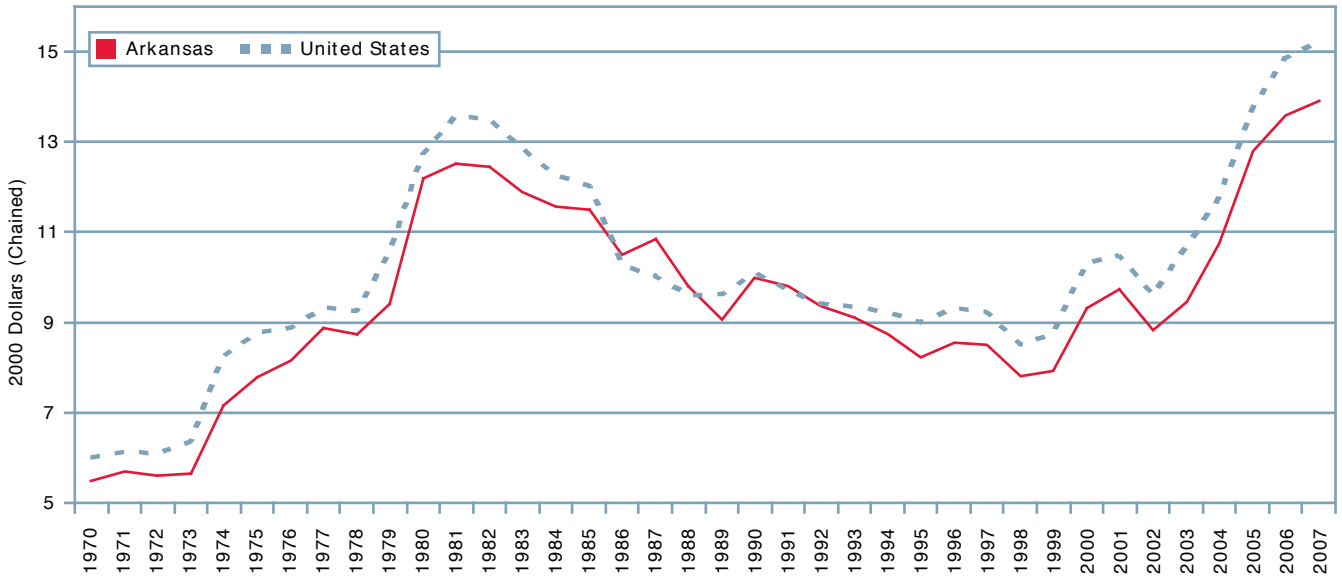


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

2.7 Energy Prices

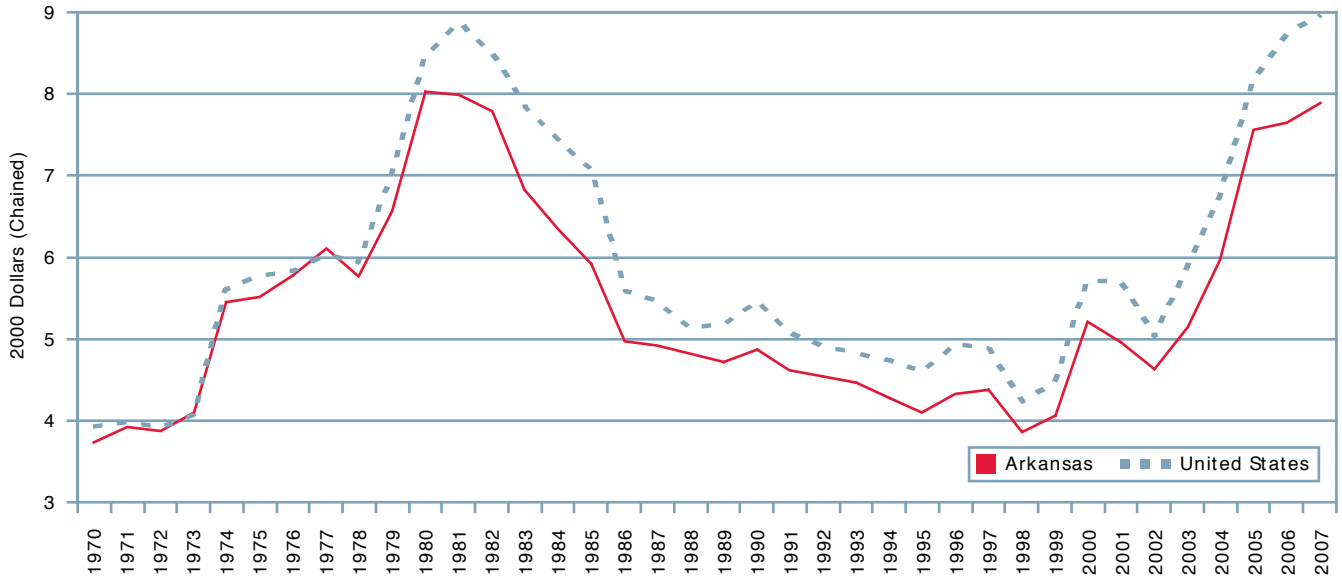
As discussed previously, total energy price estimates are computed as the average cost per unit of sales for each of the major energy sources which includes coal, natural gas, petroleum, wood and waste, and electricity. Primary energy prices include coal, natural gas, and petroleum fuel prices but exclude renewable fuels and electricity. Figures 2.7.1 and 2.7.2 show the price trends for these price series. As indicated by these charts, the Arkansas energy prices trended with the United States and were generally lower. This is more evidence that the Arkansas relatively high energy expenditure per capita is associated with its high energy consumption per person rather than energy prices.

Figure 2.7.1 1970-2007 Total Energy Prices Per Million Btu
Arkansas and United States



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010

Figure 2.7.2 1970-2007 Primary Energy Prices Per Million Btu,
Arkansas and United States

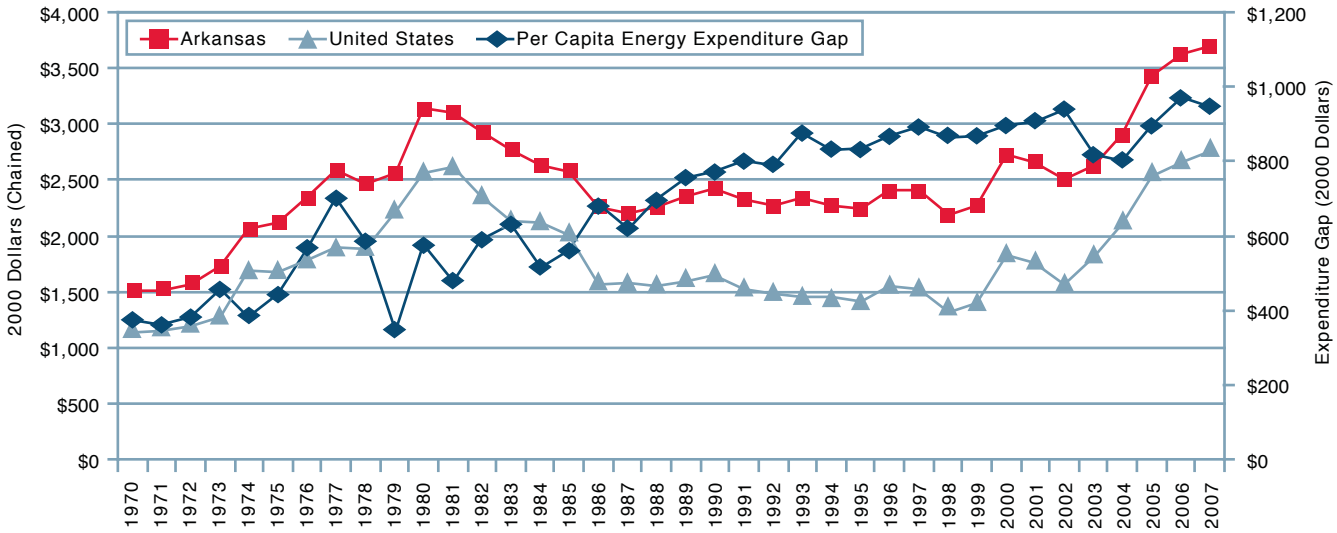


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

2.8 Energy Per Capita Expenditures

As a consequence of Arkansas' high energy consumption per person, high energy expenditures, and small population, energy expenditures per capita are higher in Arkansas relative to the United States. The following chart shows a comparison between energy expenditures per person in Arkansas and the United States. Over time the difference in the energy expenditures per person has steadily widened between Arkansas and the United States. In 2007 the size of the energy expenditure gap was $945 in terms of 2000 dollars.

Figure 2.8.1 1970-2007 Energy Expenditures Per Capita, Arkansas and United States



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

section 3

Coal

3.1 General Information

2007 Arkansas Production and Consumption of Coal (Trillion Btu)

AR Production 2007		
Total Energy Production	**588.7**	**100.0%**
Coal	1.9	0.3%
Production	**Physical**	**Units**
Coal	83,000	Short Tons

AR Consumption 2007		
Total Resource Energy Consumption	**1,149.3**	**100.0%**
Coal	275.0	23.9%
Total Electric Power	**527.4**	**100.0%**
Coal	265.2	50.3%
Total End-Use Consumption	**1,149.3**	**100.0%**
Residential	228.6	19.9%
Coal	0.0	0.0%
Commercial	162.0	14.1%
Coal	0.0	0.0%
Industrial	463.7	40.3%
Coal	9.8	2.1%
Transportation	295.1	25.7%
Coal	0.0	0.0%

Coal was first mined in Arkansas from strip mines. However, as coal production increased, it became difficult to mine the remaining near-surface coals with the equipment then available, thus underground methods were adopted. With the steady introduction of larger surface mining equipment, it became economically feasible to resume mining from open cuts. Since 1957 surface mining output of coal has exceeded that from underground mines.

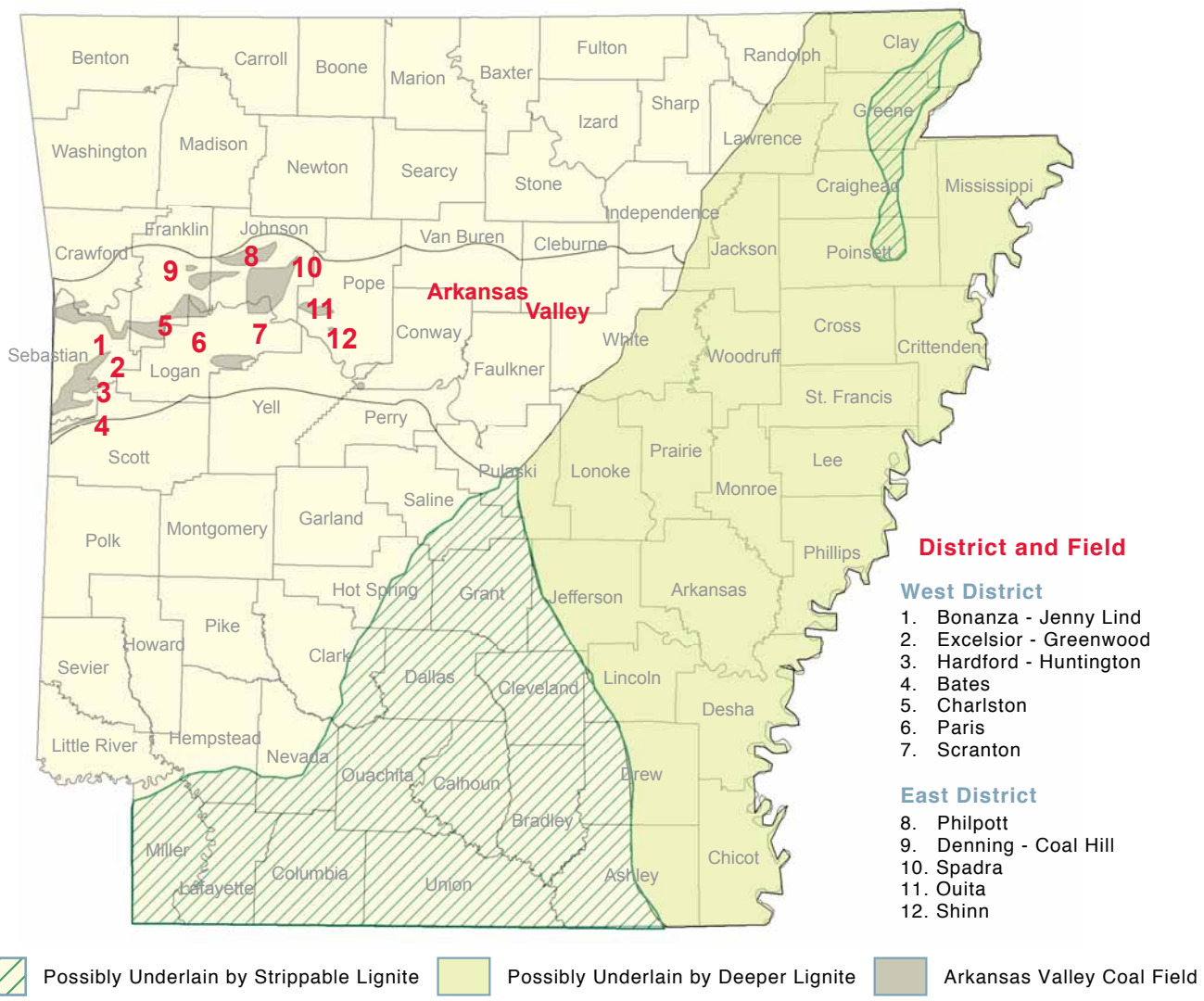
The peak year of coal mining activity in Arkansas was 1909, when annual production reached approximately 2,400,000 short tons. According to the United States Geological Survey (USGS), original coal reserves in Arkansas prior to mining amounted to almost 2.2 billion short tons.[12] Approximately 106.8 million short tons of coal had been mined through 2007. The remaining reserves in Arkansas are more than two billion short tons.

According to Arkansas Geological Survey, Arkansas' coal fields are located in the Arkansas River Valley between the western border of the state and Russellville, encompassing an area about 33 miles wide and 60 miles long.[13] The Lower Hartshorne coal bed near the base of the McAlester Formation is the thickest and the most extensive coal bed in Arkansas. This coal bed has been, and will continue to be, the most economically important coal bed. Commercial mining of coal in Arkansas has been limited to Johnson, Sebastian, Logan, Franklin, Pope, and Scott Counties. As of 2007

12 Haley, B. R., 1987, Resource of low-volatile bituminous coal and semianthracite in west-central Arkansas, 1978: U. S. Geological Survey Bulletin 1632, p. 54.

13 Arkansas Geological Survey, http://www.geology.ar.gov/fossil_fuels/Coal.htm, July 6, 2010.

Figure 3.1.1 Coalfields and Lignite Resources in Arkansas



Source: Keystone Coal Industry Manual, 2003. THe digram was prepared by William V. Bush, http://www.geology.ar.gov/fossil_fuels/coal_geo_ar_valleyprov.htm, August 2010.

the Ferrell-Cooper Mining in Scott County mined an overwhelming amount of coal in Arkansas.[14]

Arkansas' coal has been used largely to produce steam at power electric generating plants and steam locomotives, as metallurgical coal in steel mills, to heat homes and buildings, and as a source of coal tar and other chemicals.[15] One of the main advantages of Arkansas' coal is that it gives off little smoke when burned. Another advantage is that its sulfur content is relatively low, compared to many coals mined in the United States and elsewhere.

Arkansas also has approximately 2 billion tons of proven reserves of lignite coal. Lignite coal is low grade coal with a high content of volatile matters which makes it suitable for conversion into gas and liquid petroleum products.[16]

14 The Encyclopedia of Arkansas History and Culture, http://www.encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?entryID=352, July 6, 2010.

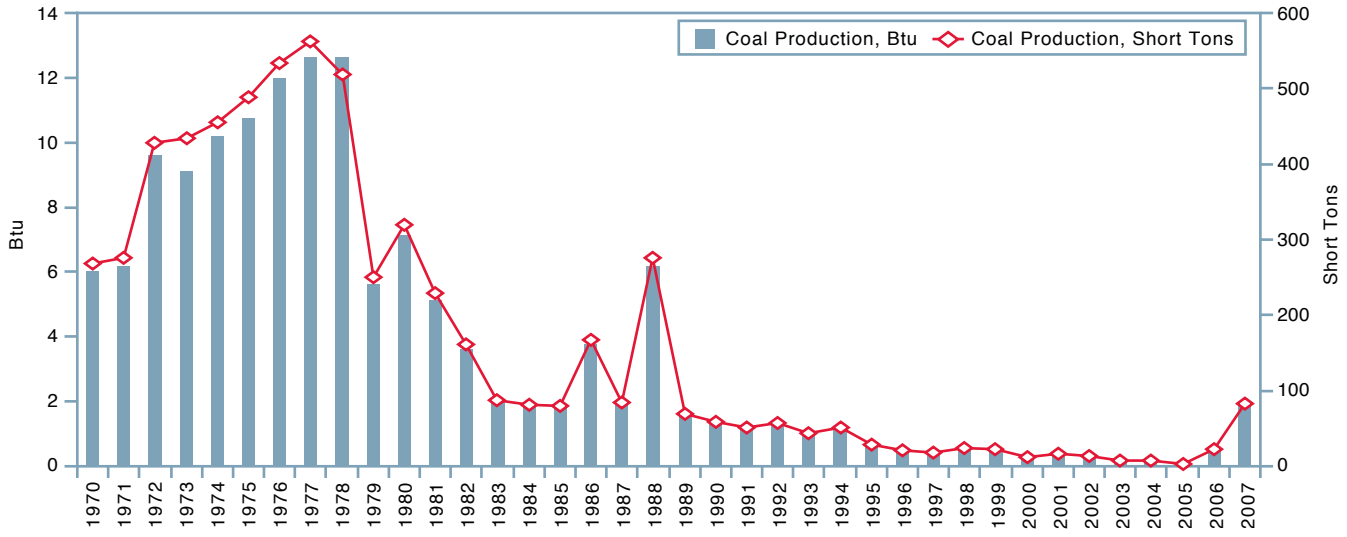
15 Arkansas Geological Survey, http://www.geology.ar.gov/fossil_fuels/Coal.htm, July 6, 2010.

16 Arkansas Geological Survey, http://www.geology.ar.gov/fossil_fuels/lignite.htm, July 2010.

3.2 Coal Production

Coal is one of the dominant energy sources used for electricity generation in Arkansas. Coal-fired power plants account for about one-half of the electricity produced within the state, and these plants rely entirely on coal deliveries from Wyoming[17]. As shown by Figure 3.2.1, coal production in Arkansas peaked in 1978 amounting to 12.6 trillion Btu. In the following year, production decreased by approximately 40% before reaching its second major peak of 7.2 trillion Btu in 1980. Between 1980 and 1987, coal production fluctuated reaching its third peak of 6.2 trillion Btu in 1988. From 1988 to 2005 the production of coal in the state experienced a constant decrease, reaching its lowest production level of 0.1 trillion Btu in 2005. Since that time, coal production has been increasing, totaling 1.9 trillion Btu in 2007.

Figure 3.2.1 1970-2007 Arkansas Coal Production (Trillion Btu, Thousand Short Tons)



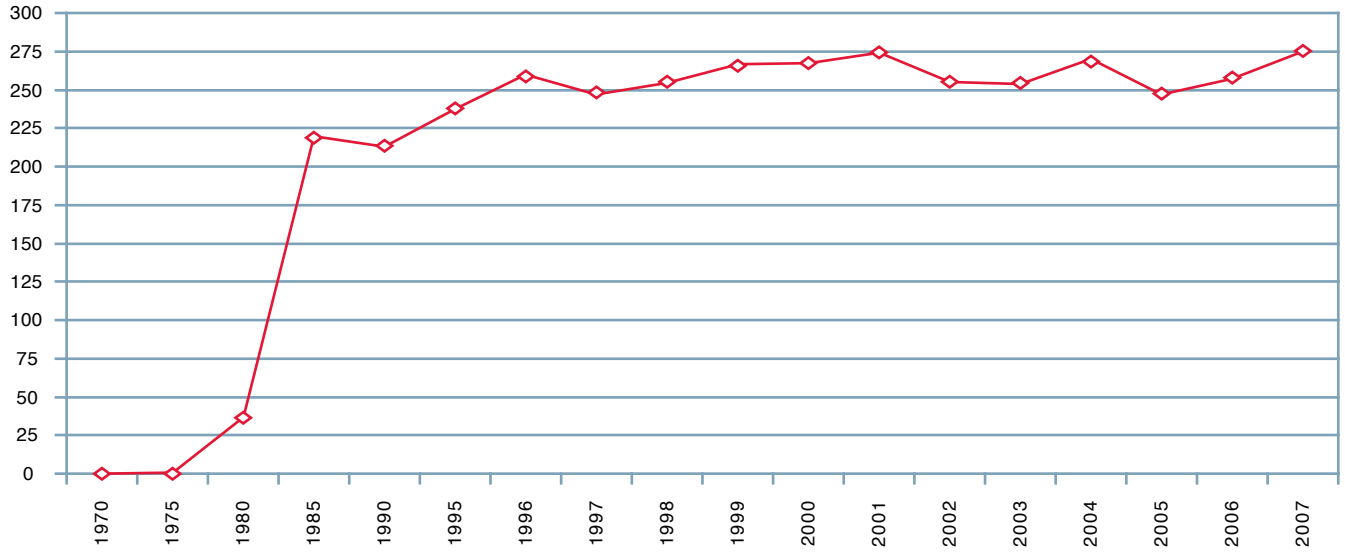
Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

17 U.S. Energy Information Administration, State & U.S. Historical Data, State Energy Profiles, Arkansas, http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=AR.

3.3 Coal Consumption

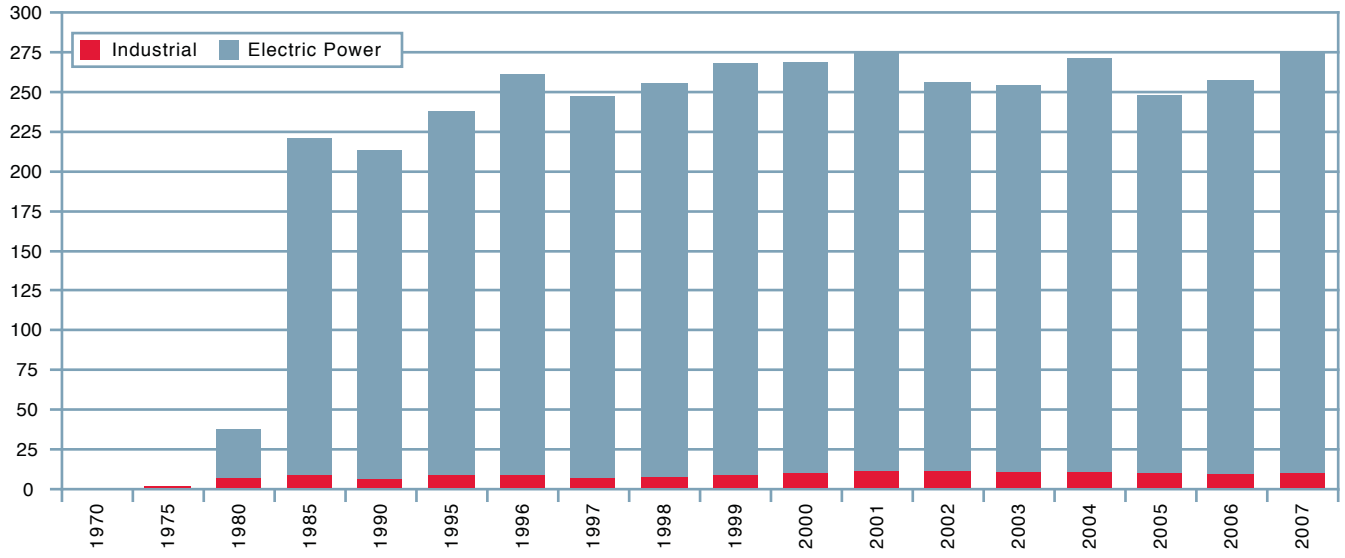
Being a net importer of coal, Arkansas coal consumption increased approximately 7% in 2007 (see Figure 3.3.1). It has been estimated that approximately 96% of Arkansas coal imports are used by the electric utilities to produce electrical power (see Figure 3.3.2). Entergy Arkansas, Inc. operates three coal-fired power plants across the state, and Southwestern Electric Power Company operates a single coal-fired power plant in Arkansas.[18] Industrial coal consumption increased by an estimated 7% in 2007. Arkansas coal consumption has now increased by roughly 25% since 1985 (from 219.8 trillion Btu to 275.0 trillion Btu).

Figure 3.3.1 1970-2007 Arkansas Coal Consumption Estimates (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Figure 3.3.2 1970-2007 Arkansas Coal Consumption Estimates by Sector (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

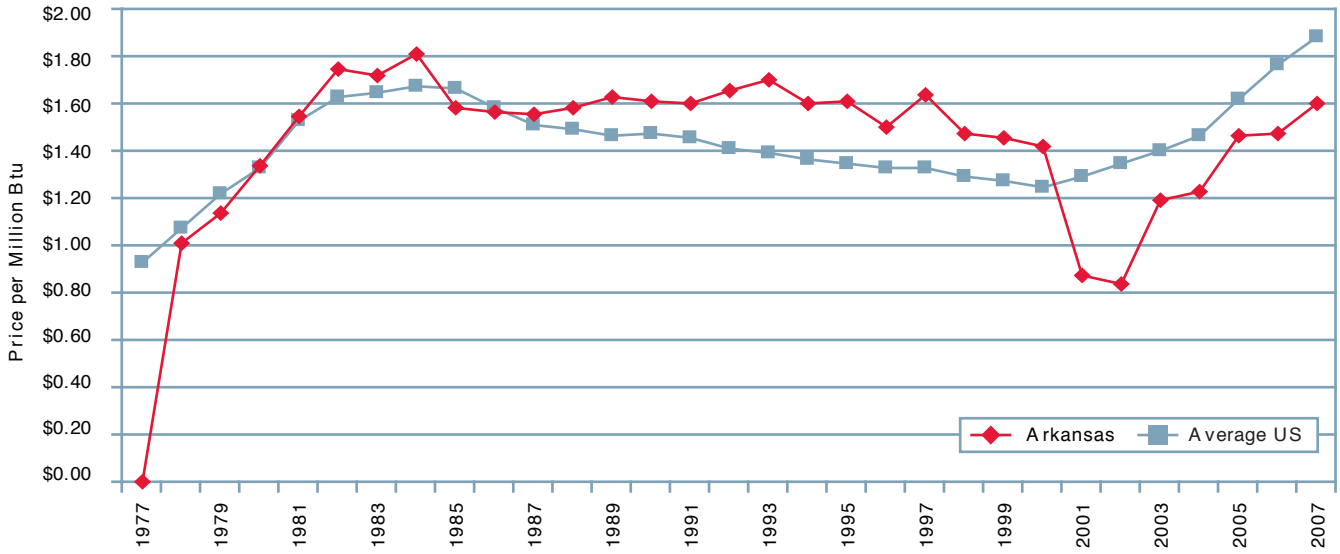
18 U.S. Energy Information Administration, State & U.S. Historical Data, State Energy Profiles, Arkansas, http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=AR.

3.4 Coal Prices and Expenditures

As noted, the major use of coal in Arkansas is for electric power generation. It is interesting to note that in recent years, coal has had a relatively low price in Arkansas compared to the United States (see Figure 3.4.1). Since the precipitous decline in the delivered price of coal for electric power generation starting in 2000, the relative price of coal in the electric power sector has been lower than the average price in the United States.

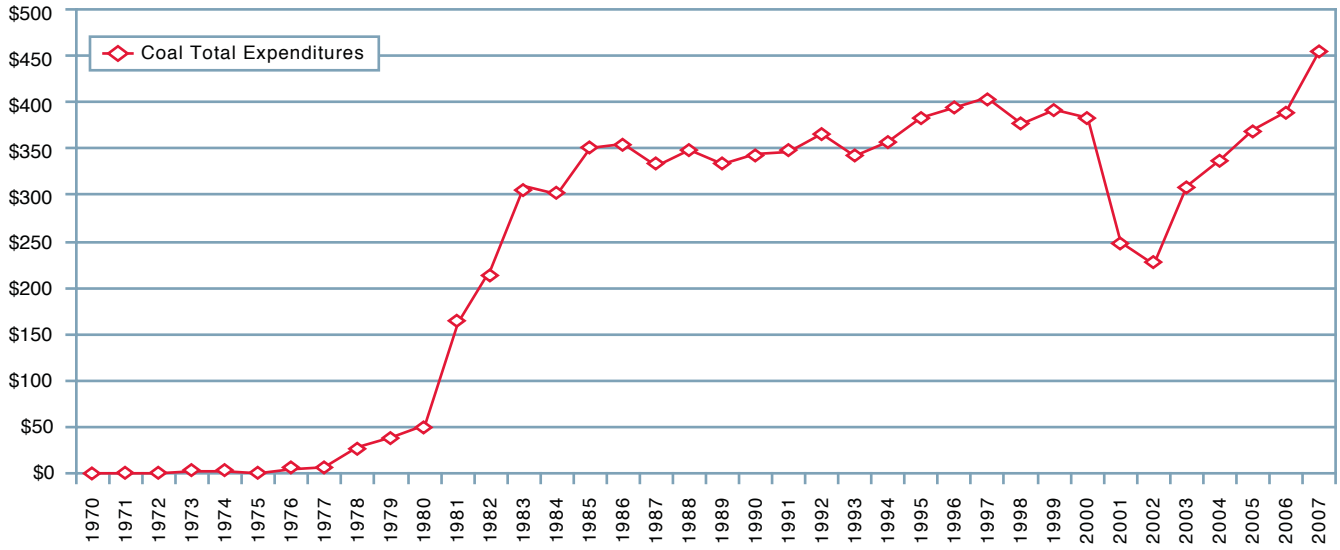
Arkansas coal expenditures closely parallel the price of coal. Coal expenditures were minimal from 1970 to 1975 and then rose significantly as coal was introduced into the Arkansas economy (see Figure 3.4.2).

Figure 3.4.1 1977-2007 Price of Coal, Electric Power Sector (Nominal Dollars per Million Btu)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

Figure 3.4.2 1970-2007 Arkansas Coal Expenditures (Million Nominal Dollars)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

In 2007 the price of coal per million Btu ranked 37th in the nation at $1.65. State expenditures for coal in 2007 ranked 31st among all states and amounted to $454 million.

Table 3.4.1 2007 Coal Prices and Expenditures, Ranked by State

PRICES		
Rank	State	Nominal Dollars Per Million Btu
1	Vermont	3.81
2	Rhode Island	3.75
3	Maine	3.16
4	Mississippi	2.94
5	New Hampshire	2.90
6	New Jersey	2.89
7	Connecticut	2.85
8	Massachusetts	2.80
9	North Carolina	2.75
10	District of Columbia	2.67
11	Georgia	2.63
12	Florida	2.58
13	Virginia	2.57
14	California	2.47
15	New York	2.47
16	South Carolina	2.38
17	Delaware	2.37
18	Alaska	2.34
19	Alabama	2.17
20	Maryland	2.16
21	Louisiana	2.14
22	Idaho	2.06
23	Tennessee	1.99
24	Pennsylvania	1.98
25	Hawaii	1.93
26	Washington	1.92
27	Indiana	1.91
28	West Virginia	1.91
29	Nevada	1.91
30	Kentucky	1.86
31	Michigan	1.84
32	Ohio	1.83
33	New Mexico	1.79
34	Wisconsin	1.79
35	South Dakota	1.66
36	Texas	1.65
37	**ARKANSAS**	**1.65**
38	Arizona	1.61
39	Minnesota	1.55
40	North Dakota	1.42
41	Oregon	1.42
42	Illinois	1.41
43	Utah	1.39
44	Missouri	1.35
45	Colorado	1.27
46	Kansas	1.24
47	Iowa	1.23
48	Oklahoma	1.20
49	Montana	1.12
50	Wyoming	1.10
51	Nebraska	0.92
	United States	**1.88**

EXPENDITURES		
Rank	State	Million Nominal Dollars
1	Indiana	3,004
2	Pennsylvania	2,957
3	Ohio	2,682
4	Texas	2,662
5	Georgia	2,457
6	North Carolina	2,280
7	Alabama	1,924
8	Kentucky	1,897
9	West Virginia	1,875
10	Florida	1,857
11	Illinois	1,532
12	Michigan	1,475
13	Tennessee	1,340
14	Virginia	1,176
15	Missouri	1,086
16	South Carolina	1,057
17	Wisconsin	831
18	Maryland	707
19	Arizona	705
20	New York	635
21	North Dakota	597
22	Iowa	569
23	Minnesota	568
24	Utah	543
25	Mississippi	543
26	Wyoming	542
27	Louisiana	534
28	New Mexico	529
29	Colorado	495
30	Kansas	493
31	**ARKANSAS**	**454**
32	Oklahoma	448
33	Massachusetts	336
34	New Jersey	323
35	Montana	228
36	Nebraska	200
37	Washington	183
38	California	164
39	Nevada	158
40	Delaware	151
41	New Hampshire	130
42	Connecticut	114
43	Oregon	64
44	South Dakota	55
45	Hawaii	37
46	Alaska	30
47	Idaho	21
48	Maine	21
49	District of Columbia	1
50	Rhode Island	0
51	Vermont	0
	United States	**42,673**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

section 4

Natural Gas

4.1 General Information[19]

2007 Arkansas Production and Consumption of Natural Gas (Trillion Btu)

AR Energy Production 2007		
Total Energy Production	**588.7**	**100.0%**
Natural Gas	272.0	46.2%
Production	**Physical**	**Units**
Natural Gas	269,869	Million cu. ft.
AR Consumption 2007		
Total Resource Energy Consumption	**1,149.3**	**100.0%**
Natural Gas	228.0	19.8%
Total Electric Power	**527.4**	**100%**
Natural Gas	65.2	12%
Total End-Use Consumption	**1,149.3**	**100.0%**
Residential	228.6	19.9%
Natural Gas	32.7	14.3%
Commercial	162.0	14.1%
Natural Gas	32.2	19.9%
Industrial	463.7	40.3%
Natural Gas	87.7	18.9%
Transportation	295.1	25.7%
Natural Gas	10.2	3.5%

Arkansas natural gas production accounted for approximately one percent of annual U.S. natural gas output and 46% of Arkansas produced energy in 2007. Most of the state's natural gas production takes place in the Arkoma basin, although several wells also operate in the Gulf Coastal Plain. In addition to conventional production (vertical wells) and unconventional production (horizontal wells), small amounts of natural gas have been extracted from coalbed methane deposits in the Arkoma basin since 2001, with a cumulative production of about 10 billion cubic feet (Bcf).

The Fayetteville Shale is an unconventional gas reservoir located on the Arkansas side of the Arkoma Basin, ranging in thickness from 50 to 325 feet and ranging in depth from 1,500 to 6,500 feet. The shale covers numerous counties in central and eastern Arkansas, including Cleburne, Conway, Faulkner, Independence, Johnson, St. Francis, Prairie, Van Buren, White, and Woodruff. While shale has been explored and tested as a gas resource since the 1980s, only recently (starting in 2004) has it become an economically viable gas supply. This is because of higher natural gas commodity prices and improved drilling technologies.[20] In 2007 there were approximately 2.5 million acres leased within the Arkansas Fayetteville Shale Play.[21]

19 U.S. Energy Information Administration, State & U.S. Historical Data, State Energy Profiles, Arkansas, http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=AR.

20 "The Fayetteville Shale Play 2007: Tapping the Power." *Fayetteville Shale Play Frequently Asked Questions.* Arkansas Business, Special Report, 22, August 27, 2007.

21 "The Fayetteville Shale Play 2007: Tapping the Power." *The Fayetteville Shale Play: A Geological Overview.* Arkansas Business, Special Report, 21, August 27, 2007.

According to the Arkansas Geological Survey there were approximately 436 completed wells drilled in the Fayetteville Shale as of September 2007, and by February 2008, there were 561 producing gas wells. Many more wells have been drilled, but they have been capped waiting for gas gathering systems before becoming producing wells. Major energy producers in the shale include Southwestern Energy and Chesapeake Energy; they reported combined expenditures of approximately $1.5 billion in efforts to develop the Fayetteville Shale Play in 2007. Indirect investments in activities related to the Fayetteville Shale have also occurred. Schlumberger, an oil field and natural gas service provider built a Conway, Arkansas, facility to provide well services in the Fayetteville Shale Play. Southwestern Energy and Chesapeake Energy opened regional facilities to expedite their operations. Other industry partners involved with Fayetteville Shale exploration and development ventures include: Hallwood Energy, KCS Resources, Tepee Petroleum, Edge Petroleum, Alta Operating, Aspect Energy, XTO Energy (purchased by Exxon in 2010) and 14 other companies.[22]

Several major natural gas pipelines from Texas, Louisiana, and Oklahoma pass through the state on the way to markets in the Midwest and Northeast. Additionally, two new pipeline projects will soon be able to transport gas extracted from newly productive wells in Texas, Louisiana, and Arkansas. The recently completed 500-mile Midcontinent Express Pipeline passes through Texas and Arkansas, and the 187-mile Fayetteville Express Pipeline passes through Arkansas and is expected to be complete in late 2010 or early 2011.[23]

In terms of resource energy consumption, the natural gas share of total energy consumption has fallen steadily. In 1970 the natural gas energy share of total energy consumed was 54%, but by 2007 its energy share of total consumption had declined to 20%. This decline was chiefly caused by an increasing share of electric power produced from nuclear power energy, which rose from zero percent in 1970 to 14% in 2007, and from a general increase in energy efficiency in the consumption of energy.

Although industries in the state are still the leading user of natural gas, Arkansas industrial sector's natural gas consumption has declined in recent years. Until 2001 the industrial sector accounted for more than one-half of the state's natural gas consumption but this share fell to 40% by 2007. Almost one-half of Arkansas households use natural gas as their primary energy source for home heating.

22 Arkansas Geological Survey, Fossil Fuels, Gas, http://www.geology.ar.gov/fossil_fuels/gas.htm.

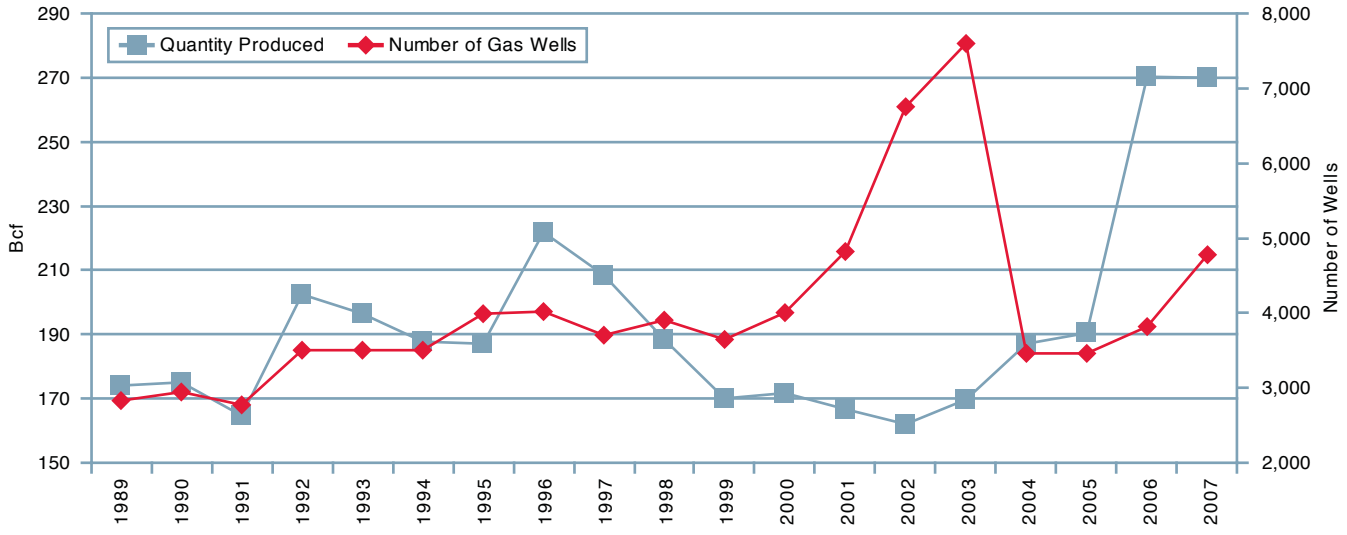
23 Fayetteville Express Pipeline LLC, http://www.fepipeline.com.

4.2 Natural Gas Production

Natural gas production reached its current annual peak of 279.5 trillion Btu in 2006, and then declined by 2.68% to 272.0 trillion Btu in 2007 (see Figure 4.2.1). Continued development of the Fayetteville Shale Play resulted in the number of gas wells increasing by approximately 25%, from 3,814 to 4,773 in 2007. The Arkansas average gas well production in 2007 decreased approximately 20%, from 71 to 57 mcf per well. Southwestern Energy describes a typical gas well drilled in 2007 as having an average horizontal lateral length of 3,120 feet, and an average drilling time of 15 days to drill to total depth. Estimated ultimate recoveries (EUR) for horizontal wells with laterals greater than 3,000 feet range from 2.0 to 2.5 Bcf per well. Southwestern Energy reports that the average completed horizontal well with multistage slick water fracturing costs approximately $2.9 Million per well.[24]

Arkansas ranked 12th (out of 32 states) in 2007 in regard to marketed production of natural gas with an estimated 269,886 Bcf (see Appendix F Table F.5). The state's proven reserves of natural gas amounted to 3,305 Bcf, ranking Arkansas 16th out of 27 states in 2007 (see Appendix F Figure F.3)

Figure 4.2.1 1989-2007 Arkansas Natural Gas Production and Wells in Use (Billions Cubic Feet and Number of Wells)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

24 Arkansas Geological Survey, Fossil Fuels, Gas, http://www.geology.ar.gov/fossil_fuels/gas.htm.

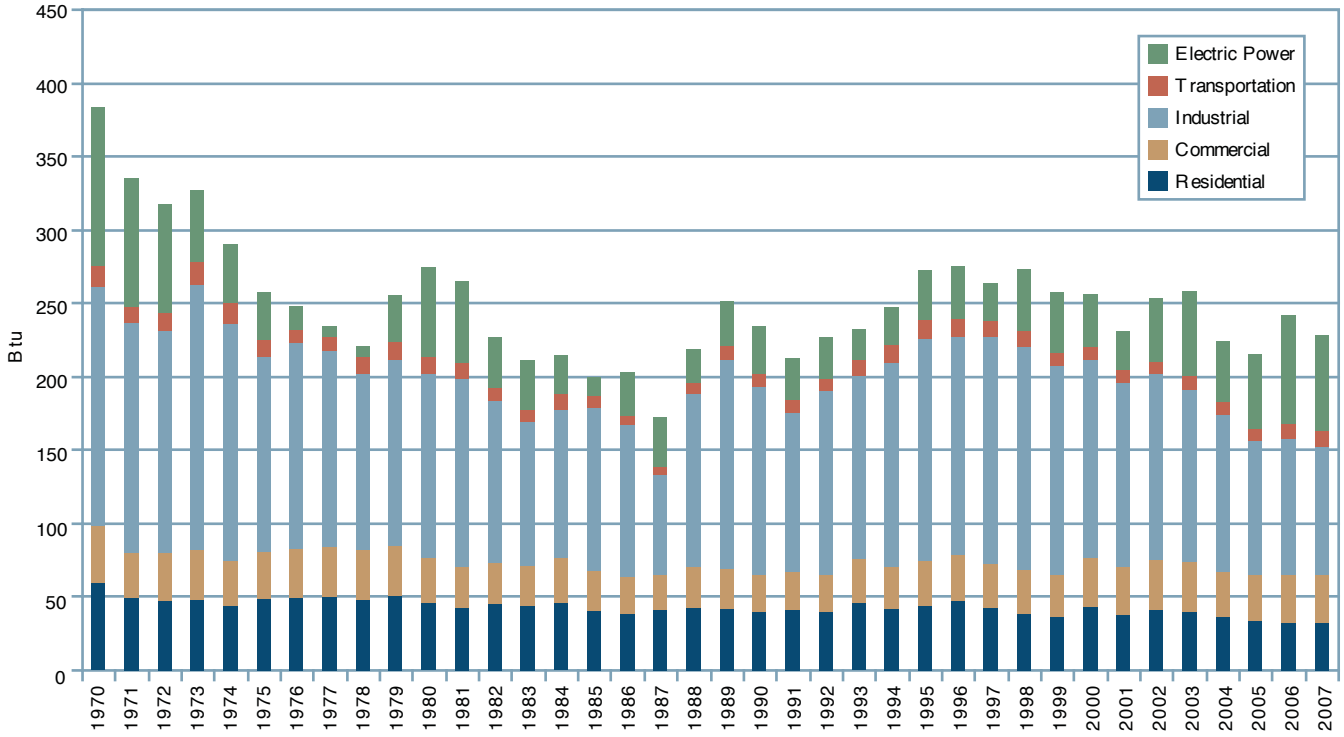
4.3 Natural Gas Consumption by End-Users

Arkansas' natural gas consumption has declined from its 1970 level to 2007 level by 155 trillion Btu or approximately 41% (see Figure 4.3.1). This percent decline actually overstates the decline of natural gas consumption during the 1970-2007 period since consumption of natural gas is the highest on record in 1970 while 2007's natural gas consumption is one of the lowest. Over the 1970-2007 period, natural gas consumption in Arkansas declined on an average annual basis of 0.7 percent.

Among the end-users during the 1970-2007 period, industrial consumption decreased approximately 46% or by 0.4 percent on an average annual basis, the transportation sector decreased its consumption of natural gas by nearly 24% or by 0.7 percent on an average annual basis, the commercial sector consumption decreased by 18% or by 0.3 percent on an average annual basis; residential sector natural gas consumption decreased by 45% or by 1.2 percent on an average annual basis. Electric utility consumption of natural gas went through several swings during the 1970-2007 period. Overall, natural gas consumption for generating electric power declined by 40% during this period, but its average annual growth rate was 10.9 percent. This indicates there have been several years with very large annual increases in natural gas consumption for electric power generation like 1978 to 1979 and 1985 to1986 relative to the end-use sectors (see Appendix F Figure F.4).

Figure 4.3.2 breaks down natural gas consumption for 2007 by major end-users. The industrial users consumed the largest among of natural gas at 38%, followed by the electric utility sector consumption at 29% of total consumption; the residential sector consumed 14%, the commercial sector consumed 14%, and the transportation sector consumed 5% of total consumption.

Figure 4.3.1 1970-2007 Arkansas Natural Gas Consumption (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

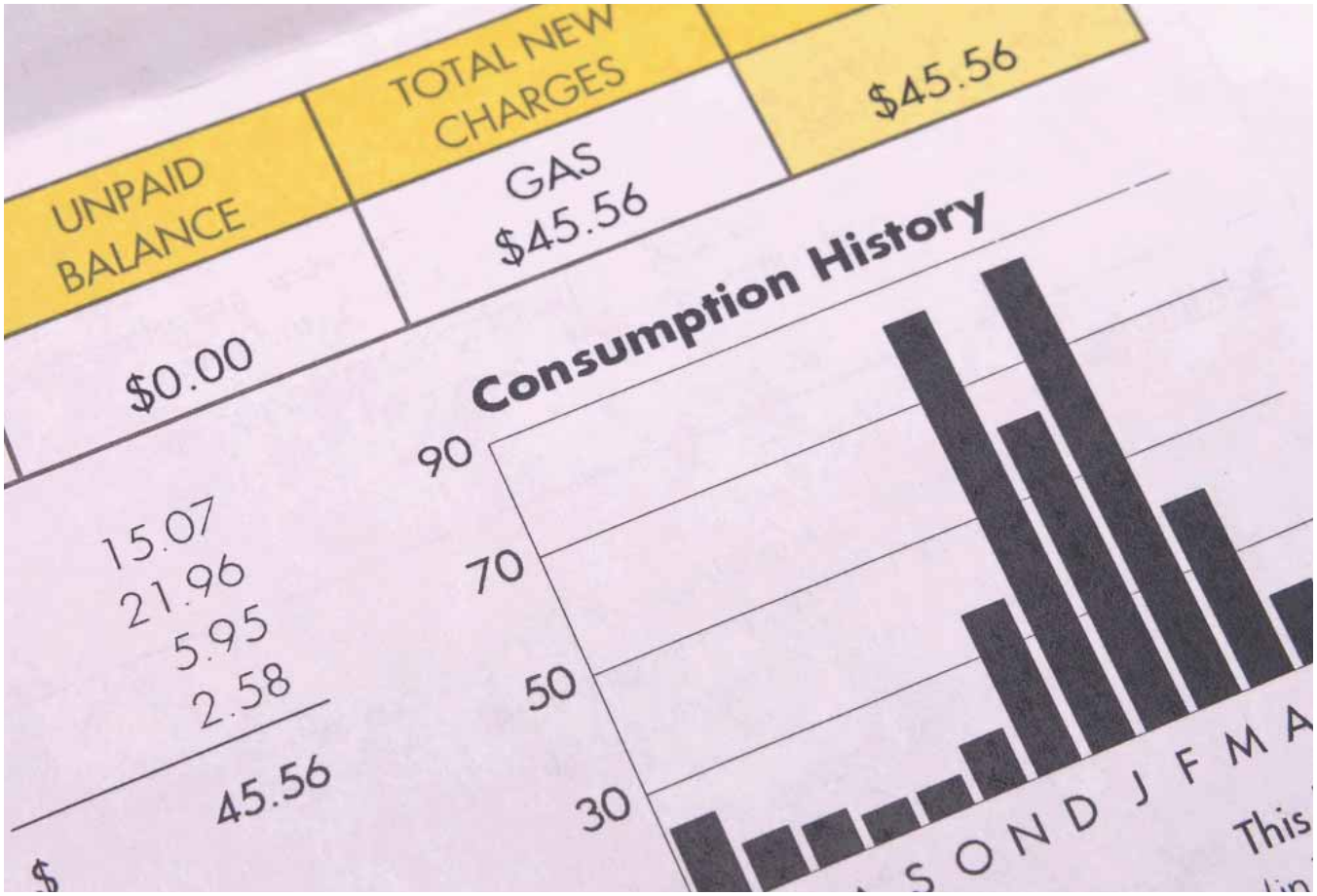
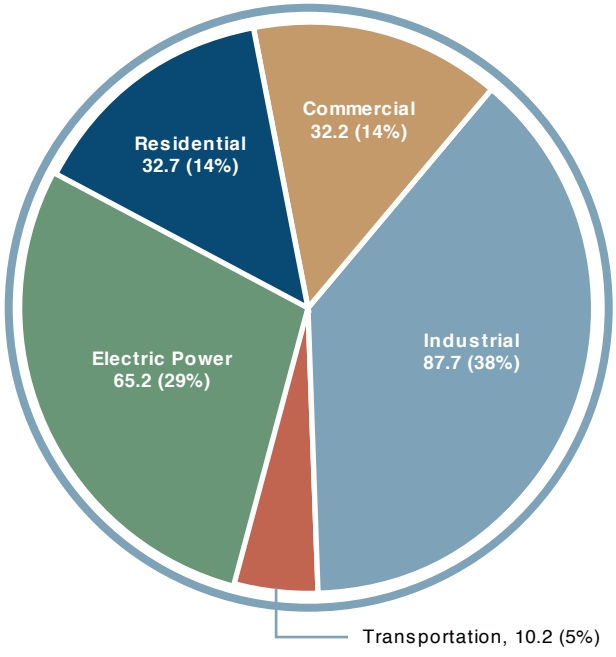


Figure 4.3.2 2007 Arkansas Natural Gas Consumption by Economic Sector (Trillion Btu and Percent of Total)



Source: U. S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

4.4 Natural Gas Prices and Expenditures in 2007

As noted, electric power and industry end-users are the major consumers of natural gas. In 2007 natural gas prices in Arkansas were less than the national average and the average price for all states. Natural gas prices ranked 30th in 2007 while natural gas expenditures in Arkansas ranked 33rd among the states (see Table 4.4.1).

Table 4.4.1 2007 Natural Gas Prices and Expenditures, Ranked by State

PRICES		
Rank	State	Nominal Dollars Per Million Btu
1	Hawaii	26.82
2	District of Columbia	14.12
3	Vermont	12.67
4	Maryland	12.45
5	Massachusetts	12.19
6	New York	11.43
7	Pennsylvania	11.43
8	Ohio	11.40
9	New Jersey	11.34
10	Missouri	11.32
11	North Carolina	11.26
12	Connecticut	11.03
13	West Virginia	10.93
14	Georgia	10.90
15	Delaware	10.84
16	Virginia	10.83
17	Tennessee	10.72
18	Rhode Island	10.70
19	Washington	10.51
20	New Hampshire	10.25
21	Wisconsin	10.17
22	South Carolina	10.03
23	Illinois	9.86
24	Montana	9.59
25	Michigan	9.58
26	Idaho	9.53
27	Iowa	9.52
28	Florida	9.50
29	Kentucky	9.46
30	**ARKANSAS**	**9.33**
31	Minnesota	9.30
32	Indiana	9.22
33	Kansas	9.09
34	Alabama	9.06
35	Oregon	9.04
36	Nebraska	9.03
37	Maine	8.93
38	South Dakota	8.91
39	California	8.69
40	Arizona	8.44
41	New Mexico	8.38
42	Nevada	8.13
43	Mississippi	8.07
44	Oklahoma	7.96
45	North Dakota	7.56
46	Louisiana	7.30
47	Utah	7.16
48	Texas	7.09
49	Wyoming	6.99
50	Colorado	6.85
51	Alaska	5.76
	United States	**9.30**

EXPENDITURES		
Rank	State	Million Nominal Dollars
1	Texas	21,460
2	California	19,816
3	New York	13,779
4	Illinois	9,377
5	Ohio	9,139
6	Florida	8,910
7	Pennsylvania	8,283
8	Michigan	7,657
9	Louisiana	7,571
10	New Jersey	7,196
11	Massachusetts	5,068
12	Georgia	4,889
13	Indiana	4,818
14	Oklahoma	4,560
15	Wisconsin	3,999
16	Virginia	3,427
17	Minnesota	3,425
18	Alabama	3,399
19	Arizona	3,218
20	Missouri	3,112
21	Colorado	2,971
22	Washington	2,770
23	North Carolina	2,702
24	Mississippi	2,622
25	Maryland	2,567
26	Iowa	2,373
27	Tennessee	2,283
28	Oregon	2,247
29	Kansas	2,190
30	Nevada	2,104
31	Kentucky	2,013
32	Connecticut	1,981
33	**ARKANSAS**	**1,919**
34	South Carolina	1,782
35	Utah	1,356
36	Nebraska	1,271
37	New Mexico	1,079
38	West Virginia	981
39	Rhode Island	962
40	Idaho	726
41	New Hampshire	662
42	Montana	572
43	Delaware	526
44	District of Columbia	471
45	Alaska	461
46	Wyoming	454
47	South Dakota	426
48	Maine	420
49	North Dakota	298
50	Vermont	112
51	Hawaii	78
	United States	**196,482**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010.

section 5

Petroleum

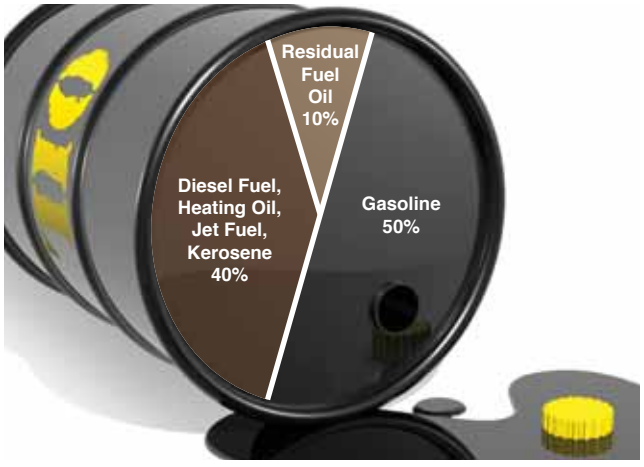
5.1 General Information[25]

2007 Arkansas Production and Consumption of Natural Gas (Trillion Btu)

AR Energy Production 2007		
Total Energy Production	**588.7**	**100.0%**
Crude Oil	35.0	5.9%
Production	**Physical**	**Units**
Crude Oil	6,031,000	Barrels (42 gal)
AR Consumption 2007		
Total Resource Energy Consumption	**1,149.3**	**100.0%**
Petroleum	386.9	33.7%
Total Electric Power	**527.4**	**100%**
Petroleum	0.8	0.2%
Total End-Use Consumption	**1,149.3**	**100.0%**
Residential	228.6	19.9%
Petroleum	5.0	2.2%
Commercial	162.0	14.1%
Petroleum	2.1	1.3%
Industrial	463.7	40.3%
Petroleum	94.1	20.3%
Transportation	295.1	25.7%
Petroleum	284.9	96.5%

Arkansas extracts small amounts of crude oil mostly from stripper wells (wells that produce less than 10 barrels per day) in the southern part of the Gulf Coastal Plain of south Arkansas. Arkansas has two refineries located in the same region. Petroleum products are delivered by barge via the Arkansas and Mississippi Rivers. The TEPPCO pipeline also supplies petroleum products from Texas and Louisiana. Arkansas is one of the few states in the nation that allows the statewide use of conventional motor gasoline. (Most states require the use of special fuel blends in nonattainment areas due to air quality considerations.)

Typical U.S. Refinery Yield from a Barrel of Crude Oil



25 U.S. Energy Information Administration, State & U.S. Historical Data, State Energy Profiles, Arkansas, http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=AR.

5.2 Crude Oil Production

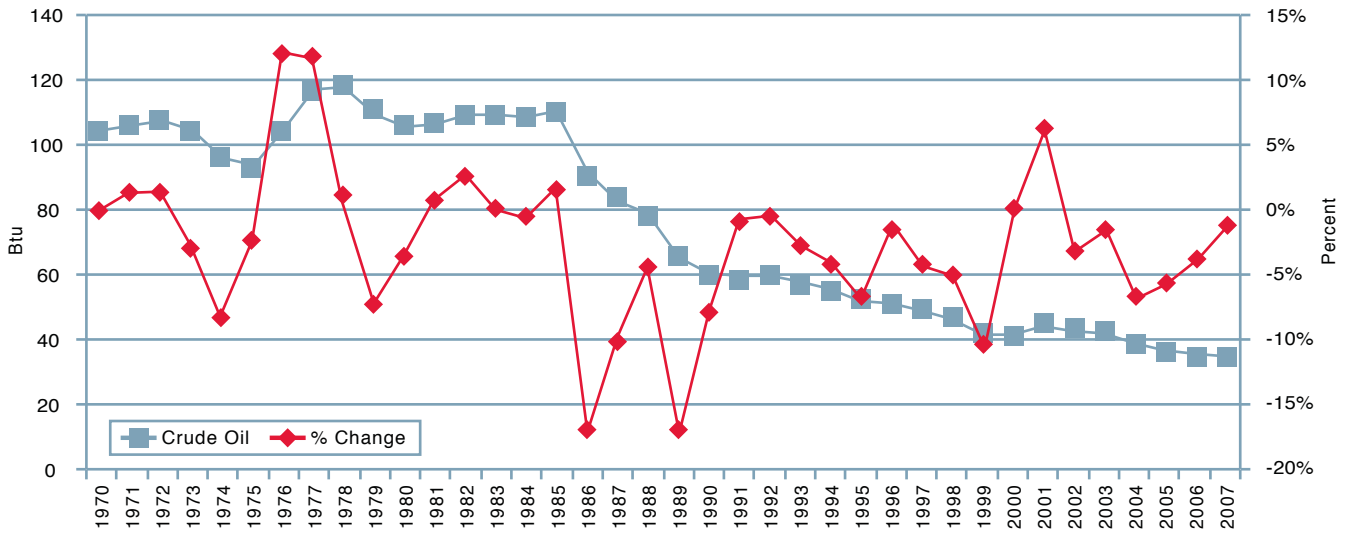
From 1970 through 1985, Arkansas crude oil production fluctuated, reaching its peak of 117.2 and 117.9, respectively for two consecutive years (see Figure 5.2.1). Since 1986, crude oil production has been experiencing a decreasing trend, amounting to 35.0 trillion Btu in 2007. Arkansas ranked number 17 (out of 31 states) in annual production of crude oil in 2007, with an estimated 6.03 million barrels (42 U.S. gallons per barrel, see Table G.1). In regard to the proved reserves of crude oil, Arkansas ranked number 19th (out of 24 states) with an estimated 31 million barrels (Table G.8).

5.3 Petroleum Consumption

Petroleum consumption increased approximately 0.6% between 2006 and 2007, from 384.7 trillion Btu to 386.9 trillion Btu (see Figure 5.3.1). Overall petroleum consumption has become less volatile since 2000 as compared to the 1970 to 2000 period. Figure 5.3.2 shows that this reduction in the volatility of petroleum consumption has been widespread across the end-user sectors.

Figure 5.3.3 shows the percent distribution of Arkansas petroleum consumption by sector in 2007. Petroleum consumption by the transportation sector makes up 73.64% followed by the industrial

Figure 5.2.1 1970-2007 Arkansas Crude Oil Production Estimates
(Trillion Btu and Annual Percent Change)

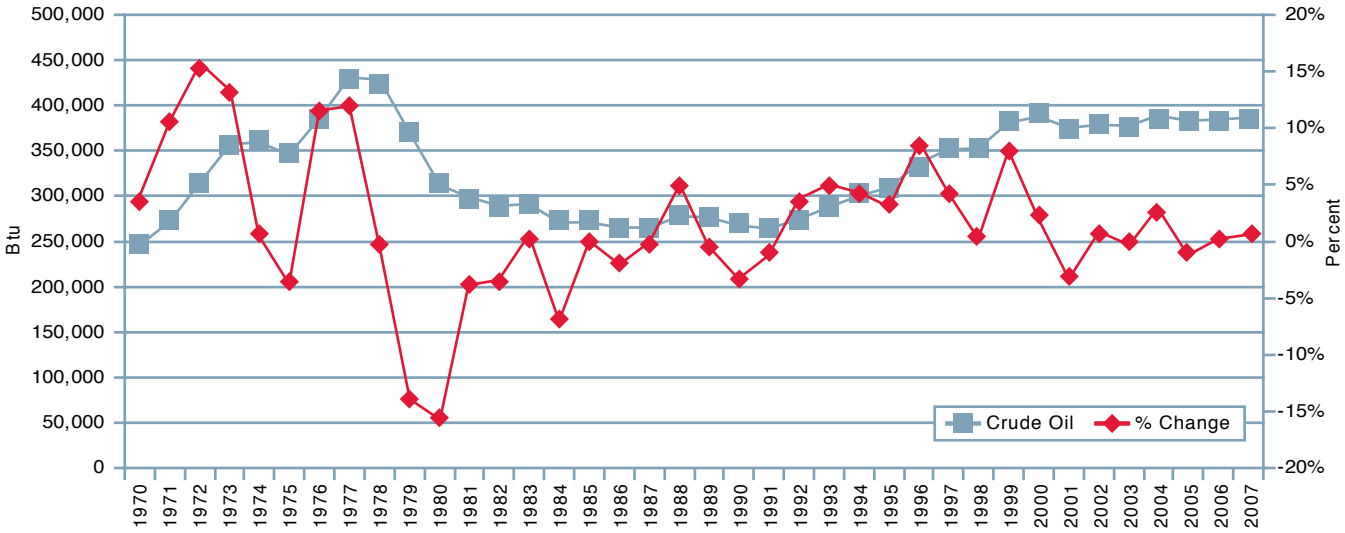


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

sector (24.32%), the residential sector (1.29%), the commercial sector (0.54%), and the electric utility sector (0.21%). While Arkansas petroleum consumption by all sectors fluctuated during the 1960-1996 period, it has been fairly constant since 1997 (Figure 5.3.2). In Figure 5.3.3, petroleum consumption shares by end-users and for electric power generation are shown for 2007, where industrial and transportation sectors are the major consumers of petroleum. Table 5.3.1 breaks down Arkansas' end-users petroleum consumption by fuel type for 2007. As such, data in this table show the different petroleum products consumed by the end-users and the relative importance of the various petroleum products for each end-user.

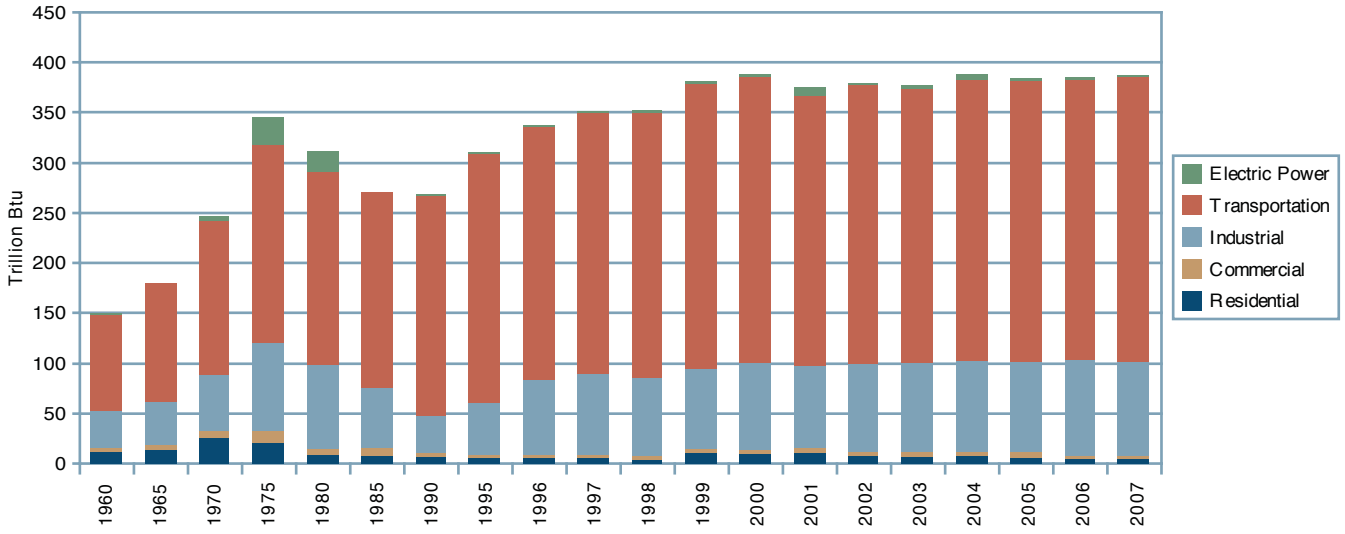
In Table 5.3.1, the petroleum consumption by end-user and for the generation of electric power is broken down by the type of fuels consumed during 2007. For each of these petroleum users

Figure 5.3.1 1970-2007 Arkansas Petroleum Consumption (Trillion Btu and Percent Change)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

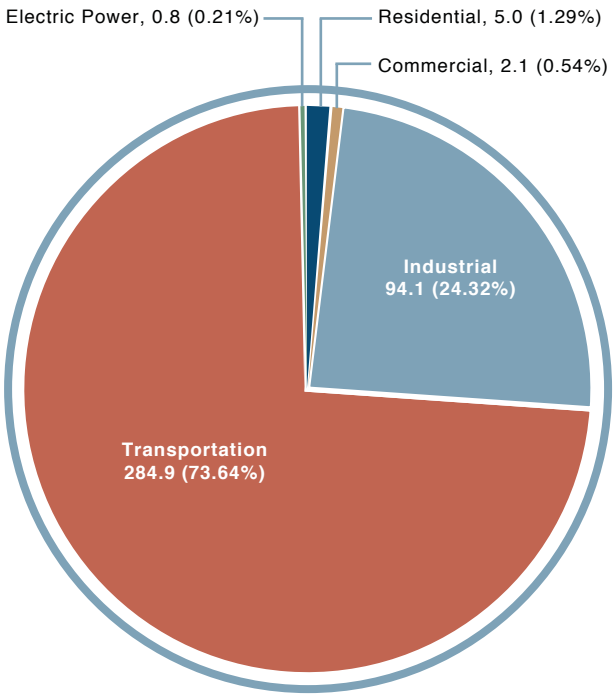
Figure 5.3.2 1960-2007 Arkansas Petroleum Consumption, All Sectors, Selected Years



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

the table shows the number of barrels consumed by fuel type, the Btu equivalence, and percentage break downs. Fuel totals by sector indicate the amount of fuels by type consumed by this group of consumers. The major fuels consumed are motor gasoline (49%) and distillate fuel oil (34%).

Figure 5.3.3 2007 Arkansas Petroleum Consumption by End-Use and Electric Power Sectors (Trillion Btu and Percent of Total)



Note: *Other petroleum products includes pentanes plus, other hydrocarbons, oxygenates, hydrogen, unfinished oils, gasoline, special naphthas, jet fuel, lubricants, asphalt and road oil, and miscellaneous products.*

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Table 5.3.1 2007 Arkansas End-User Petroleum Consumption by Fuel Type

	Thousand Barrels	Trillion Btu	% of Total
Residential Sector			
Distillate Fuel Oil	3	0.0	0.2%
Kerosene	6	0.0	0.4%
LPG	1,416	5.1	99.4%
Total	1,425	5.1	
Commercial Sector			
Distillate Fuel Oil	90	0.5	21.1%
Kerosene	9	0.1	2.1%
LPG	204	0.7	47.9%
Motor Gasoline	123	0.6	28.9%
Total	426	1.9	
Industrial Sector			
Distillate Fuel Oil	7,091	41.3	42.4%
LPG	1,069	3.8	6.4%
Motor Gasoline	950	5.0	5.7%
Residual Fuel Oil	69	0.4	0.4%
Other	7,554	43.6	45.1%
Total	16,733	94.1	
Transportation Sector			
Distillate Fuel Oil	16,825	98.0	32.1%
Aviation Gasoline	110	0.6	0.2%
Jet Fuel	1,226	7.0	2.3%
LPG	59	0.2	0.1%
Lubricants	383	2.3	0.7%
Motor Gasoline	33,889	176.9	64.6%
Total	52,492	285.0	
Electric Power Sector			
Distillate Fuel Oil	63	0.4	47%
Residual Fuel Oil	70	0.4	53%
Total	133	0.8	
Fuel Totals for All Sectors			
Distillate Fuel Oil	24,072	140.2	34%
Kerosene	15	0.1	0%
LPG	2,748	9.8	4%
Motor Gasoline	34,962	182.5	49%
Residual Fuel Oil	139	0.8	0%
Aviation Gasoline & Jet Fuel	1,336	7.6	2%
Lubricants	383	2.3	1%
Other	7,554	43.6	11%
Total	71,209	386.9	100%

Note: *Other petroleum products includes pentanes plus, other hydrocarbons, oxygenates, hydrogen, unfinished oils, gasoline, special naphthas, jet fuel, lubricants, asphalt and road oil, and miscellaneous products.*

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

5.4 Petroleum Prices and Expenditures in 2007

In 2007 Arkansas' average price of petroleum was $20.42 per million Btu. Petroleum prices in Arkansas ranked 21st among the states that year. In terms of expenditures on petroleum, Arkansas ranked 33rd among the states with expenditures of $7,664 million (see Table 5.4.1).

Table 5.4.1 2007 Petroleum Prices and Expenditures, Ranked by State

PRICES		
Rank	State	Nominal Dollars Per Million Btu
1	District of Columbia	22.45
2	Rhode Island	21.45
3	Vermont	21.31
4	Michigan	21.07
5	Idaho	21.00
6	Oregon	20.87
7	Nebraska	20.87
8	Maryland	20.78
9	Connecticut	20.76
10	Kansas	20.76
11	Wyoming	20.73
12	Utah	20.73
13	Wisconsin	20.65
14	Colorado	20.62
15	Pennsylvania	20.62
16	Nevada	20.61
17	North Dakota	20.59
18	Illinois	20.58
19	New Mexico	20.54
20	Arizona	20.50
21	**ARKANSAS**	**20.42**
22	Ohio	20.34
23	North Carolina	20.32
24	Iowa	20.30
25	Massachusetts	20.29
26	South Dakota	20.28
27	New Hampshire	20.26
28	Minnesota	20.18
29	California	20.04
30	Oklahoma	19.89
31	Maine	19.86
32	Washington	19.69
33	Virginia	19.64
34	Alabama	19.62
35	Missouri	19.56
36	Indiana	19.52
37	West Virginia	19.36
38	Delaware	19.32
39	Tennessee	19.28
40	Mississippi	19.15
41	Montana	19.05
42	New York	18.95
43	South Carolina	18.61
44	Georgia	18.56
45	Florida	18.37
46	New Jersey	18.12
47	Kentucky	18.08
48	Texas	18.08
49	Alaska	17.97
50	Louisiana	17.41
51	Hawaii	16.95
	United States	**19.45**

EXPENDITURES		
Rank	State	Million Nominal Dollars
1	Texas	94,946
2	California	73,781
3	Florida	36,406
4	New York	30,892
5	Pennsylvania	27,798
6	Illinois	26,834
7	Ohio	26,242
8	New Jersey	23,080
9	Louisiana	20,978
10	Michigan	20,456
11	Georgia	20,353
12	Virginia	19,689
13	North Carolina	19,639
14	Indiana	16,051
15	Tennessee	15,438
16	Washington	15,212
17	Missouri	14,830
18	Massachusetts	13,868
19	Minnesota	13,389
20	Kentucky	12,912
21	Wisconsin	12,673
22	Arizona	12,199
23	Alabama	12,009
24	Maryland	11,579
25	South Carolina	10,653
26	Colorado	10,593
27	Oklahoma	10,316
28	Iowa	8,939
29	Connecticut	8,227
30	Mississippi	8,221
31	Kansas	8,026
32	Oregon	8,026
33	**ARKANSAS**	**7,664**
34	Nevada	6,016
35	Utah	5,890
36	New Mexico	5,536
37	West Virginia	5,422
38	Alaska	5,198
39	Nebraska	4,903
40	Hawaii	4,877
41	Maine	4,680
42	Montana	3,573
43	Idaho	3,480
44	New Hampshire	3,436
45	Wyoming	3,248
46	North Dakota	2,780
47	South Dakota	2,459
48	Delaware	2,104
49	Rhode Island	1,963
50	Vermont	1,865
51	District of Columbia	505
	United States	**739,856**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

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section 6

Electric Power

6.1 General Information

2007 Arkansas Production and Consumption of Electric Power (Trillion Btu)

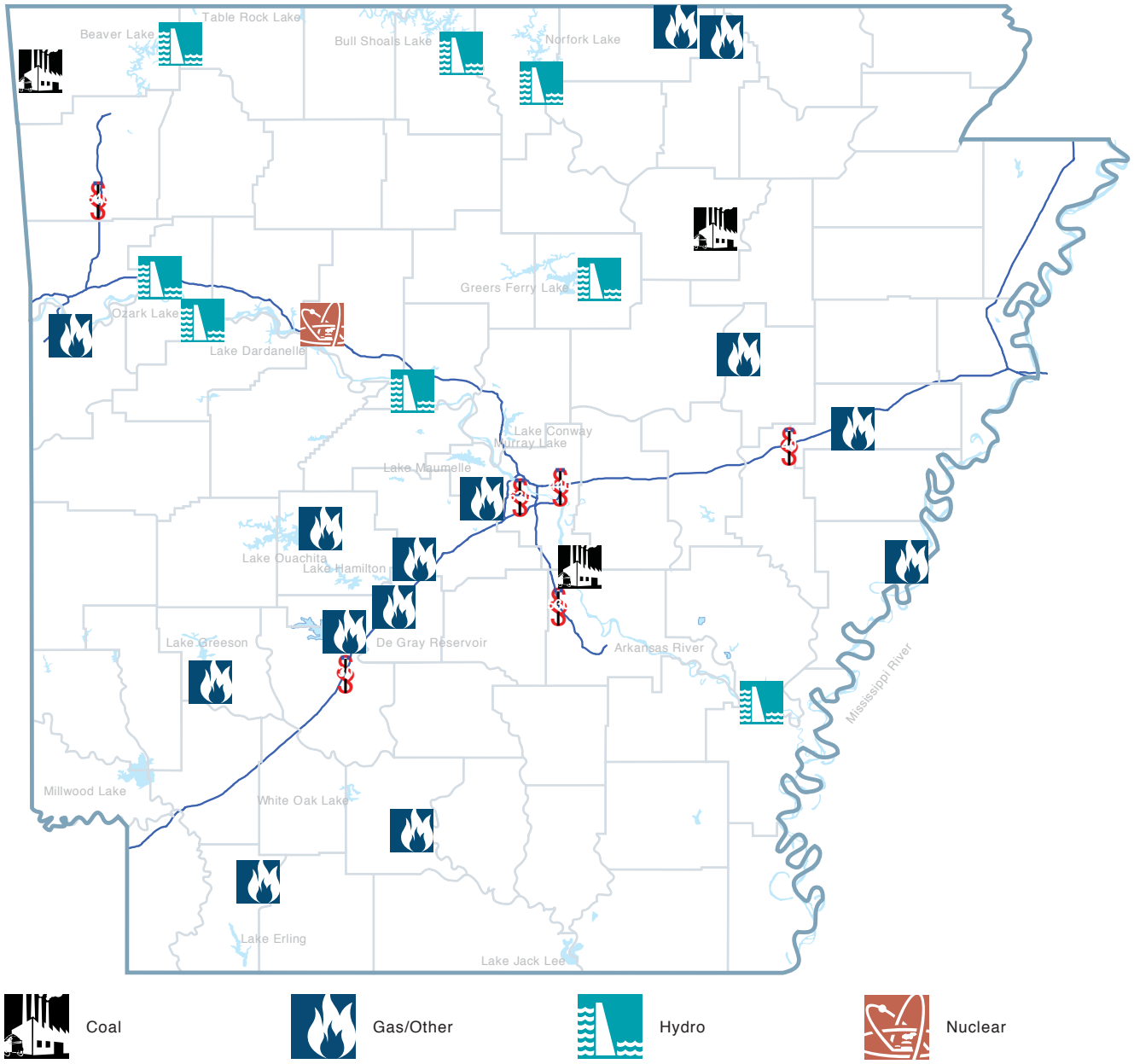
AR Production 2007		
Total Energy Production	**588.7**	**100.0%**
Electric Power Production by Primary Energy Source	**527.4**	**100.0%**
Coal	265.2	50.3%
Natural Gas	65.2	12.4%
Petroleum	0.8	0.2%
Nuclear Power	162.4	30.8%
Renewable Energy	33.7	6.4%
Production	**Physical**	**Units**
Coal	15,629	Short Tons
Natural Gas	64	Billion Cu. Ft.
Petroleum	133,000	Barrels (42 gal)
Nuclear Power	15,486,102	Megawatt Hours
Renewable Energy	4,660,000	Megawatt Hours
AR Consumption 2007		
Total Resource Energy Consumption	**1149.3**	**100.0%**
Electric Power	527.4	45.9%
Total End-Use Sector Consumption	**1,149.3**	**100.0%**
Residential	228.6	19.9%
Retail Electricity	59.4	26.0%
Electrical System Energy Losses	128.2	56.1%
Commercial	162.0	14.1%
Retail Electricity	40.3	24.9%
Electrical System Energy Losses	86.9	53.6%
Industrial	463.7	40.3%
Retail Electricity	60.9	13.1%
Electrical System Energy Losses	131.3	28.3%
Transportation	295.1	25.7%
Retail Electricity	0.0	0.0%
Electrical System Energy Losses	0.0	0.0%
Net Interstate Flow of Electricity	-20.4	-

The electric power industry is an interesting segment of our energy economy, since electric power is both a consumer of energy resources and a source of energy itself. As a primary energy source, nuclear power is used to generate electricity and is counted as a component of total energy production. Electricity produced with other fuel sources (resources) are not counted as part of the total energy production since these fuels are consumed in the production of electric power. Nuclear power contributed 162.4 trillion Btu (27.6%) to the total energy produced in Arkansas in 2007. Nuclear power accounted for 30.8% of all the electric power production (527.4 trillion Btu) in Arkansas while the remaining electric power (69.2%) was produced using other resources (or feedstock energy sources). The resource energy consumption of electric power (527.4 trillion Btu) amounted to 45.9% of all resource energy consumed in 2007. Approximately 65% of produced electrical power was lost by the electrical system in the transmission of electricity to end-users.

6.2 Electricity Production

The industry consists of traditional electric utility companies that serve specific geographic territories, along with a few nonutility power

Figure 6.2.1 Arkansas Electric Power Generation Facilities (Power Plants by Fuel Type)



Source: The University of Arkansas at Little Rock GIS Applications Laboratory compiled the data contained herein from various sources*. Where the data were translated from one format to another, the UALR GIS Lab made all reasonable efforts to preserve the data quality. Acceptance or use of this data is done without any expressed or implied warranty.

* Arkansas Geographic Information Office, Arkansas Highway and Transportation Department and the U.S. Geological Survey

producers that often produce power for their own use and sell their excess production to utility companies. Utilities may have public or private ownership, and may also be owned by municipalities. In Arkansas these companies are listed in Table 6.2.1.

Table 6.2.1 Arkansas Electric Utilities

Name
Arkansas Electric Cooperative Corporation
Arkansas Oklahoma Gas Company
Arkansas Valley Electric Cooperative
Arkansas Western Gas Company
Ashley-Chicot Electric Cooperative
Augusta Light & Power
Benton Utilities
Bentonville Light & Water System
C & L Electric Cooperative
Carroll Electric Cooperative
CenterPoint Energy
City of Paris Utilities
City of Siloam Springs
Clarksville Light & Water Company
Clay County Electric Cooperative
Conway Corporation
Craighead Electric Cooperative
Empire District Electric Company
Entergy Arkansas
Farmers Electric Cooperative
First Electric Cooperative
Hope Water & Light Company
Jonesboro City Water & Light Company
Logan Township Gas Users Association
Mississippi County Electric Cooperative
North Arkansas Electric Cooperative
North Little Rock Electric Company
OG&E Energy Corp.
Osceola Municipal Light & Power
Ouachita Electric Cooperative
Ozarks Electric Cooperative
Paragould Light Water & Cable
Petit Jean Electric Cooperative
Piggott Municipal Light, Water & Sewer
Prescott Water & Light Company
Rich Mountain Electric Cooperative
South Central Arkansas Electric Cooperative
Southwest Arkansas Electric Cooperative
Southwestern Electric Power Company (SWEPCO)
West Memphis Utility Commission
Woodruff Electric Cooperative

Source: Arkansas Economic Development Commission Energy Office. http://arkansasenergy.org/energy-in-arkansas/utilities-in-arkansas.aspx.

Electricity is produced by using a primary source of energy as a feedstock to heat water, turn a turbine, excite a photovoltaic cell, or employ some other means to generate electric power. In 2007 electric utility companies in Arkansas operated 37 generating plants with a total nameplate capacity of 11,940.8 megawatts of power.[26] An additional 14 generating plants operated by other entities had nameplate capacities of 4,520.9 megawatts (see Figure 6.2.1)

Many different energy feedstocks are used to power the electric generators in Arkansas. In terms of nameplate capacity, more than half (54.2%) the capacity comes from natural gas fired generators. Another 24% of the nameplate capacity is in coal fired generators. Table 6.2.2 lists the nameplate capacities of Arkansas generators and their respective capacities in 2007.

Table 6.2.2 Arkansas Electric Generator Nameplate Capacities by Feedstock Energy Source

Type of Generator	Capacity in Megawatts	% of Total Capacity
Biomass	41.3	0.3%
Black Liquor	333.5	2.0%
Distillate Fuel Oil	22.9	0.1%
Natural Gas	8,924.2	54.2%
Nuclear	1,845.0	11.2%
Subbituminous Coal	3,958.0	24.0%
Hydropower	1,336.8	8.1%
Total	**16,461.7**	**100.0%**

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

26 Nameplate capacity indicates the maximum amount of electricity that can be created by the generator at any given time.

6.2.1 Consumption of Energy Resources in Electricity Production

Actual consumption of feedstock energy sources in 2007 was quite different than would be expected by looking at the nameplate generating capacities. More than half the feedstock energy used to generate electricity came from coal (50.3%), while nuclear energy accounted for 30.8% of energy sources used, and natural gas 12.4%.

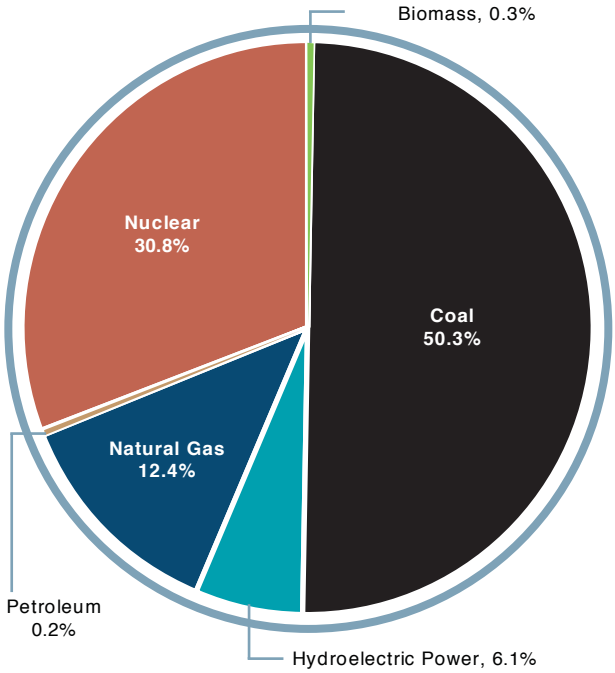
Although the use of renewable sources of fuel to produce electricity has increased markedly in recent years, renewable sources contributed only marginally to the production of electricity in 2007. The largest amount of electricity produced from a renewable source came from hydroelectric power plants. Hydropower electricity production only accounted for 6.1% of total feedstock energy consumption. An additional renewable source was biomass, which accounted for less than one percent of the total feedstocks consumed that year. Table 6.2.1.1 lists the energy sources used to produce electricity in Arkansas in 2007; Figure 6.2.1.1 illustrates the relative amounts of each fuel used.

Table 6.2.1.1 2007 Arkansas Primary Energy Sources Consumed to Produce Electricity

Fuel Source	2007 Consumption Billion Btu	2007 Consumption % of Total Consumption
Biomass	1,744	0.3%
Black Liquor	-	-
Distillate Fuel Oil	804	0.2%
Natural Gas	65,218	12.4%
Nuclear	162,418	30.8%
Subbituminous Coal	265,232	50.3%
Water	31,992	6.1%
Total	**527,409**	**100.0%**

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure 6.2.1.1 2007 Arkansas Electric Power Sector Consumption by Primary Energy Source (Percent of Total)



Total Electric Power Consumption was 527.4 Trillion Btu.

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

6.2.2 Transforming Primary Energy Sources into Electric Power

In the process of consuming the fuel sources as feedstocks to produce electricity, some of the nascent energy in the fuel is lost, so that, for example, a use of one billion Btu of coal to produce electricity would not result in one billion Btu of electric energy. The ratio of Btu of source fuel consumed to Btu of electric energy produced is different for each type of fuel, and can vary with the quality of each fuel source and the efficiency of the electricity production method. The amount of energy lost by the fuels used for electricity production is estimated annually based upon the value (in Btu) of the fuels themselves and the value of the electricity sold, used within the electricity producing sector itself, and traded with other states. In 2007 total electricity supply was 186,282 billion Btu, generated from fuels containing an estimated value of 527,409 billion Btu. This means that 341,127 billion Btu were lost during the production and transmission processes, a stunning 65% of the nascent energy, mostly through heat losses and transmission losses.

6.3 Electricity Consumption

While end-use consumption of other sources of energy has stayed relatively constant or only slowly risen, the consumption of electricity has risen quite steadily and rapidly over the past decades. In 1990 the supply of electricity in Arkansas amounted to 133,409 billion Btu; by 2007 it had risen to 186,282 billion Btu, (54.6 billion kilowatt-hours), an annual average increase of 2.3%.

The supply of electricity includes electricity generated by electric power producers and other commercial and industrial heat and power producers (who produce power for their own use, selling excess power to the electric industry). The vast majority of electric power is disposed of through retail sales, with additional amounts consumed by direct use by producers. Interstate trade is used to sell excess electricity or purchase additional power needed for consumption. The difference between total disposition (distribution) and total supply is estimated as losses of electric power, most of which are sustained during the power transmission process.[27] Table 6.3.1 details the supply and disposition of electric power in Arkansas in 2007. Because Arkansas electricity producers generated an excess of supply over disposition, net interstate trade that year was positive (i.e., a net export from Arkansas to other states).

Table 6.3.1 2007 Arkansas Supply and Disposition of Electric Power (Millions of Kilowatt-hours)

Supply	
Generation	
Electric Utilities	45,523
Independent Power Producers	6,311
Combined Heat and Power, Electric	847
Electric Power Sector Generation Subtotal	52,681
Combined Heat and Power, Commercial	2
Combined Heat and Power, Industrial	1,913
Industrial and Commercial Generation Subtotal	1,915
Total Net Generation	54,596
Total Supply	**54,596**
Disposition	
Retail Sales	
Full Service Providers	47,055
Facility Direct Retail Sales	-
Total Electric Industry Retail Sales	47,055
Direct Use	1,995
Estimated Losses	4,293
Total Disposition	**53,343**
Net Interstate Trade	**1,254**

Sources: U.S. Energy Information Administration, Form EIA-923, "Power Plant Operations Report" and predecessor forms. U.S. Energy Information Administration, Form EIA-860, "Annual Electric Generator Report." U.S. Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report." DOE, Office of Electricity Delivery and Energy Reliability, Form OE-781R, "Annual Report of International Electric Export/Import Data," predecessor forms, and National Energy Board of Canada.

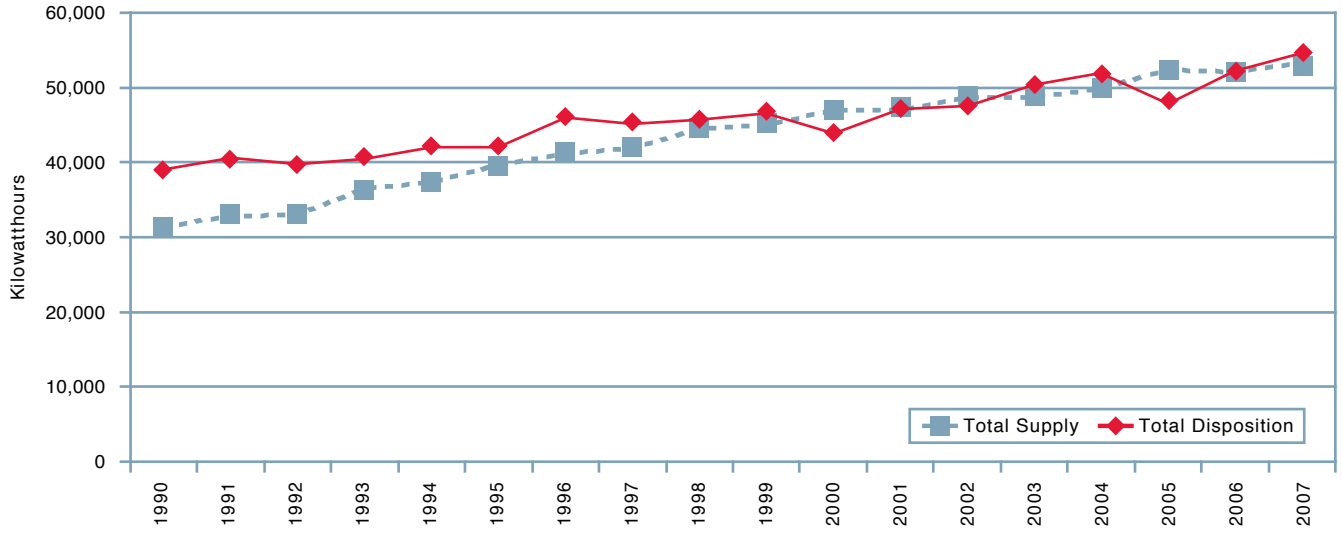
27 This power transmission process does not include the transmission losses between the electric providers and the end-users that were discussed in Section 1.3. Direct use is commercial and industrial electrical use that is either self generated, produced and consumed by the same entity, or is the electric power used at a facility the houses the generation equipment in direct support of producing the electric power.

Figure 6.3.1 traces the total supply and disposition of electricity in Arkansas from 1990 through 2007. Note that in every year other than 2000 and 2005, Arkansas' total supply exceeded total disposition, making Arkansas a net exporter of electricity.

In 2007 Arkansas ranked 30th among the states in total retail electricity sales. They amounted to 56.7 million Btu per capita, or 16,556 kilowatt-hours (kWh) per person. Since Arkansas was ranked 32nd in population, it may be inferred that electricity sales per capita were slightly more than would be expected in Arkansas.

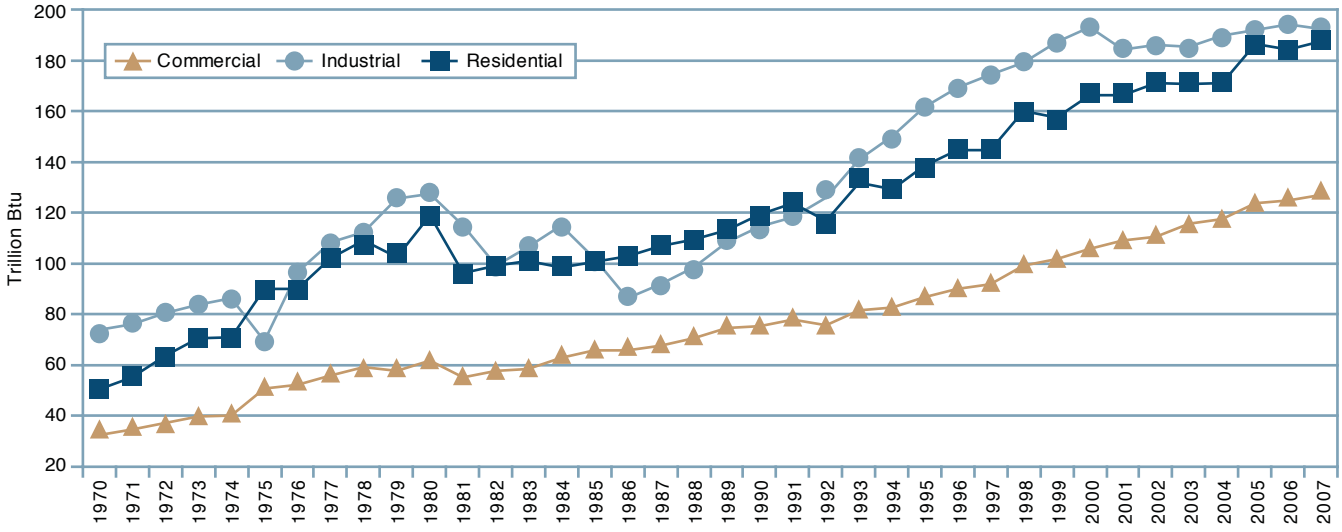
Electricity consumption is relatively evenly distributed among the residential, commercial, and industrial sectors of the state's economy, with the residential and industrial sectors each consuming 37% and 38% of total consumption in

Figure 6.3.1 1990-2007 Arkansas Total Supply and Disposition of Electricity
(Thousands of Kilowatt-hours)



Sources: U.S. Energy Information Administration, Form EIA-923, "Power Plant Operations Report" and predecessor forms. U.S. Energy Information Administration, Form EIA-860, "Annual Electric Generator Report." U.S. Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report." DOE, Office of Electricity Delivery and Energy Reliability, Form OE-781R, "Annual Report of International Electric Export/Import Data," predecessor forms, and National Energy Board of Canada.

Figure 6.3.2 1970-2007 Arkansas Electricity Consumption by Sector
(Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

2007. The commercial sector that year consumed only 25% of the total. Consumption of electricity by the transportation sector was negligible, well under 0.01% of total consumption.

Changes in consumption of electricity over time have been most pronounced in the residential and commercial sectors, with consumption in the industrial sector rising somewhat less. Between 1970 and 2007 residential electricity consumption quadrupled from 15 to 59 trillion Btu and commercial consumption quadrupled from 10 to 40 trillion Btu. The increase in consumption is attributable to both an increase in the number of residential and commercial consumers and an increase in usage by both types of consumers. Industrial consumption, on the other hand, increased from 22 to 61 trillion Btu during the same period, a somewhat lower rate of increase.

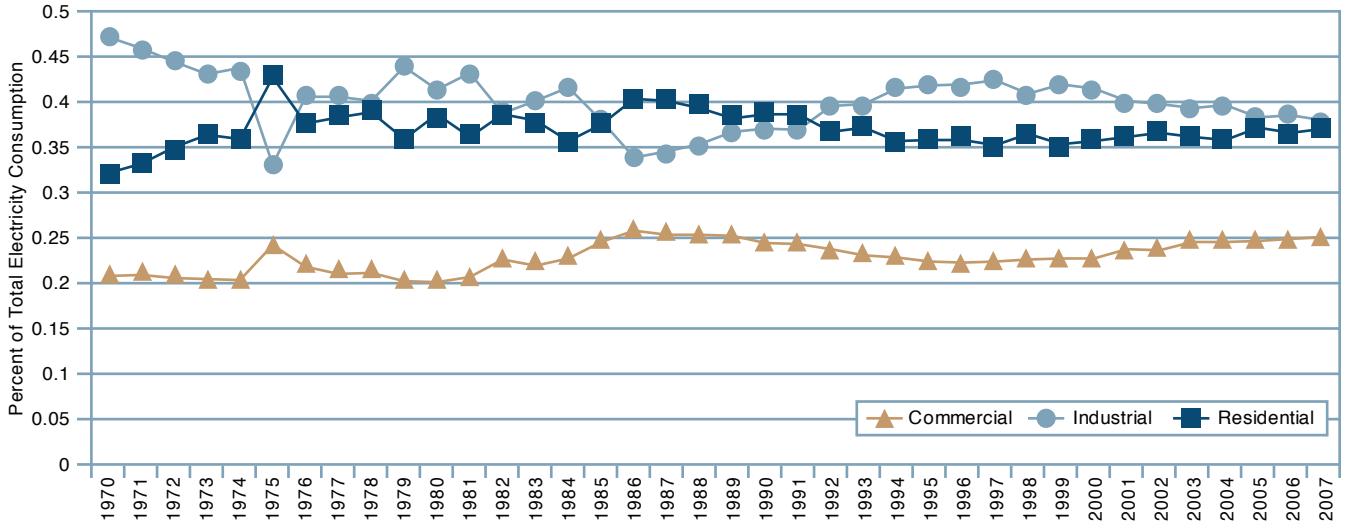
Figure 6.3.2 illustrates the total consumption of electricity by sector from 1970 through 2007; Figure 6.3.3 displays the consumption by each sector as a percent of total consumption. Note the steady increase in consumption by all sectors shown in Figure 6.3.2, while demand among the sectors remained fairly constant and proportional as seen in Figure 6.3.3.

Along with the consistent, substantial increase in electric power consumption for the past four decades has been a corresponding increase in CO_2 emissions from electricity generating plants. The increase between 1970 and 2007 amounted to 1,345 million metric tons of CO_2, an increase of about 3% per year. The amount of the CO_2 disbursed is directly related to the fuel used to generate electricity. Arkansas' continued reliance on coal as a source fuel portends a continuation of this trend. For details on emissions, see Section 8.

6.4 Electricity Prices and Expenditures

Arkansas' retail price for electricity in 2007 was $20.57 per million Btu, well below the U.S. average of $26.84. This resulted in Arkansas' rank of 37th among all the states. Total retail expenditures for electricity in Arkansas were $3.183 billion, resulting in a ranking of 32nd, another indication that consumption in Arkansas was higher than would be expected. Compared to its neighboring states, Arkansas had rather low electricity prices in 2007, with lower prices only in Missouri that year. Table 6.3.2 details the prices and state rankings of Arkansas and the surrounding states in 2007.

Figure 6.3.3 1970-2007 Arkansas Electricity Sales by Sector (Percent of Total Sales)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Table 6.4.1 2007 Retail Electricity Prices

Place	Dollars Per Million Btu	State Rank
Texas	$29.85	16
U.S.	**$26.84**	**-**
Louisiana	$24.77	23
Mississippi	$23.74	24
Oklahoma	$21.41	32
Tennessee	$20.78	36
ARKANSAS	**$20.57**	**37**
Missouri	$19.24	42

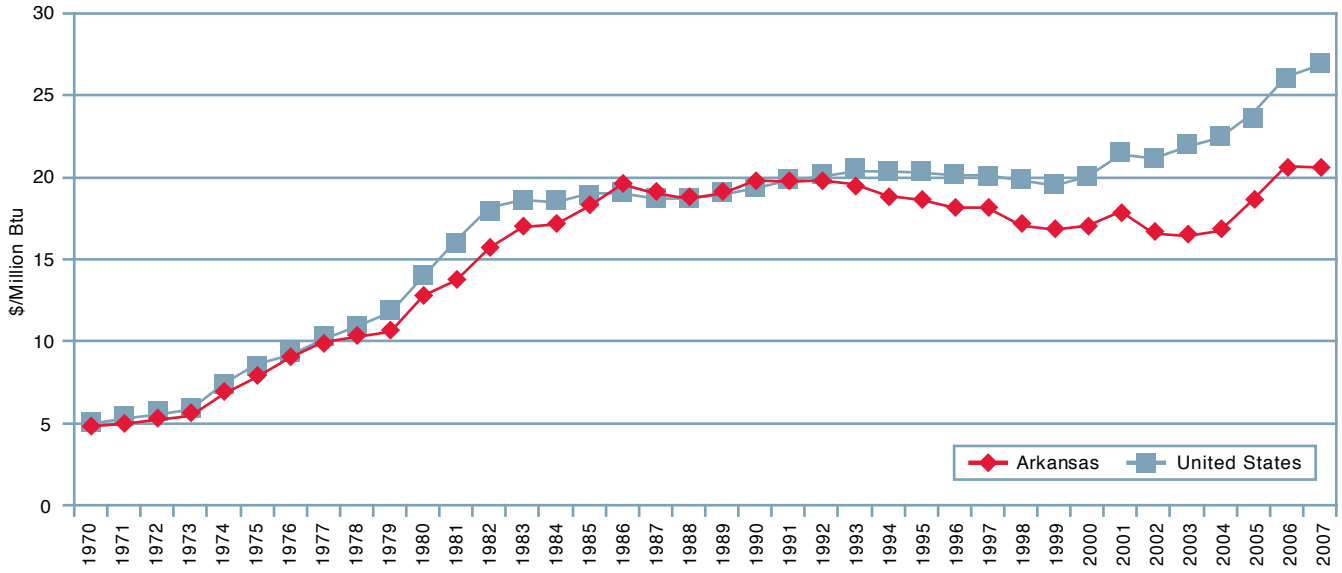
Source: U.S. Energy Information Administration. Table R4. Coal and Retail Electricity Prices and Expenditures Ranked by State, 2007. State Energy Data 2007: Prices and Expenditures.

Over time, Arkansas electricity prices have remained lower than the U.S. average, with one period between 1986 and 1990 as an exception. In July 1985 Entergy Arkansas became responsible for purchasing 36% of the electricity produced at the Grand Gulf nuclear plant in Mississippi, resulting in rate increases for Entergy Arkansas customers in the following years. By 1992 increasing demand in Arkansas and lower production costs for power produced in Arkansas brought prices back down to a level below the U.S. average. Since that time, the gap between Arkansas and U.S. prices has increased to its 2007 level of 76.7%, as shown in Figure 6.3.1.

Prices and expenditures among the different economic sectors in Arkansas have been consistently lower than in the U.S. In 2007 for example, the residential and industrial sector prices were nearly identical at 82.0% and 82.2%, respectively, of the U.S. averages. The commercial sector in Arkansas has consistently enjoyed pricing levels well below the U.S. average; in 2007 it stood at 71.7%. Even during the years between 1986 and 1990 for the industrial sector, and 1983 to 1992 for the residential sector when sector pricing in Arkansas rose above national levels, commercial sector pricing in the state never reached its comparable national level. Figure 6.4.2 traces the prices for electric power by sector as a percent of U.S. average sector pricing. Since the early 1990s Arkansas electricity prices have followed a striking downward trend compared to their national counterpart prices. (Note: sales of electricity to the transportation sector in Arkansas are so small as to be inconsequential, and are thus excluded from this analysis.)

Although Arkansas pricing has remained relatively constant while the average U.S. prices have increased, total electricity expenditures by sector in Arkansas have been steadily increasing in each sector, with the residential sector displaying the

Figure 6.4.1 1970-2007 Arkansas and United States Average Price of Electricity (Dollar per Million Btu)



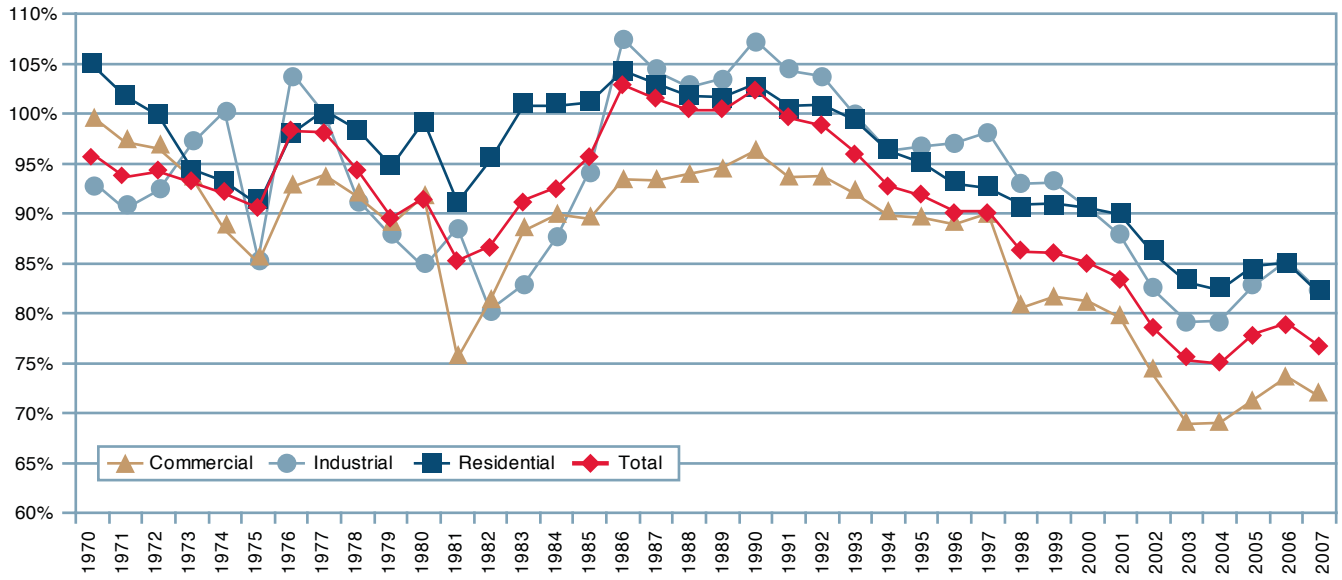
Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

steepest rate of increase. Between 1970 and 2007 expenditures by the commercial sector increased at an average annual rate of 35.4%, industrial expenditures at 36.0% per year, and total residential expenditures by 38.2% per year. The reasons behind the increases may be traced to a combination of three possible factors: the increasing size of each sector, increasing consumption rates within each sector, and fluctuating prices of electricity.

The extent to which each factor is responsible for increasing expenditures cannot be determined with currently available data. Figure 6.4.3 shows the total annual expenditures for electricity by each sector in Arkansas during that period.

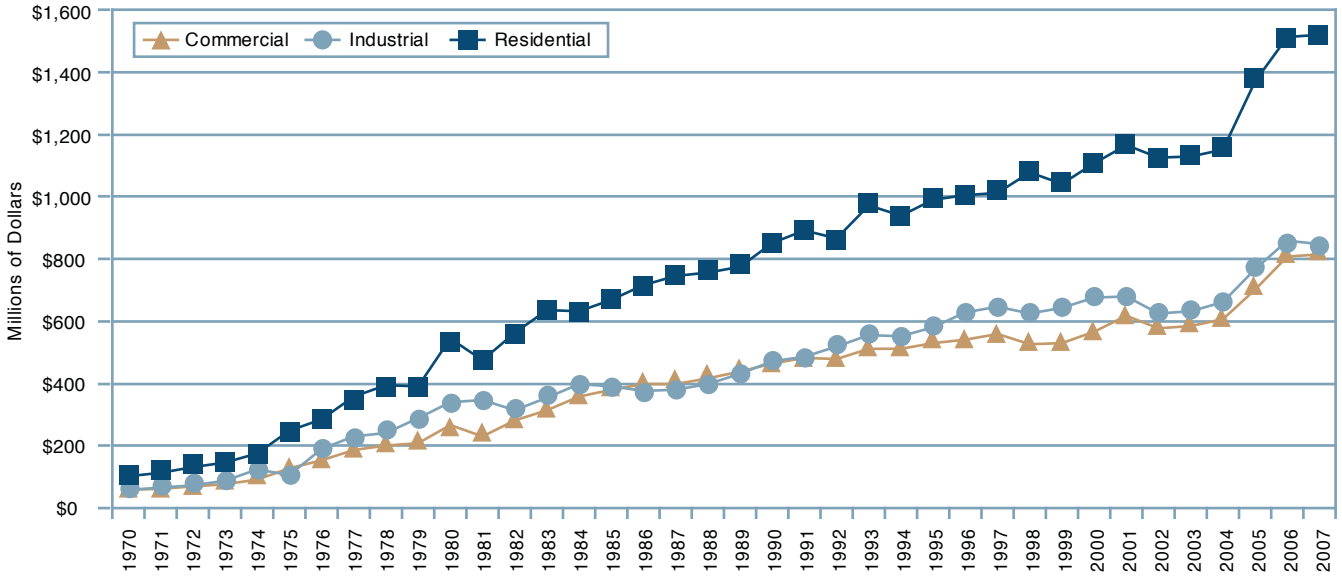
By 2007 the prices and expenditures by sector in Arkansas and their U.S. counterparts were as follows in Table 6.4.2.

Figure 6.4.2 1970-2007 Arkansas Electricity Prices by End-Use Sector
(Percent of U.S. Average Prices)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure 6.4.3 1970-2007 Arkansas Electricity Expenditures by End-Use Sector
(Millions of Dollars)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Table 6.4.4 2007 Arkansas and United States Prices and Expenditures by End-Use Sector for Electricity

	Arkansas	United States
Average Price ($ Per Million Btu)		
Commercial Sector	$20.27	$28.27
Industrial Sector	$15.39	$18.71
Residential Sector	$25.59	$31.22
Total, All Sectors	**$20.57**	**$26.84**
Expenditures (Millions of Dollars)		
Commercial Sector	$816.05	$128,903.24
Industrial Sector	$846.72	$62,934.06
Residential Sector	$1,520.51	$148,294.91
Total, All Sectors	**$3,183.30**	**$340,927.62**

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

section 7

Renewable Energy

7.1 General Information

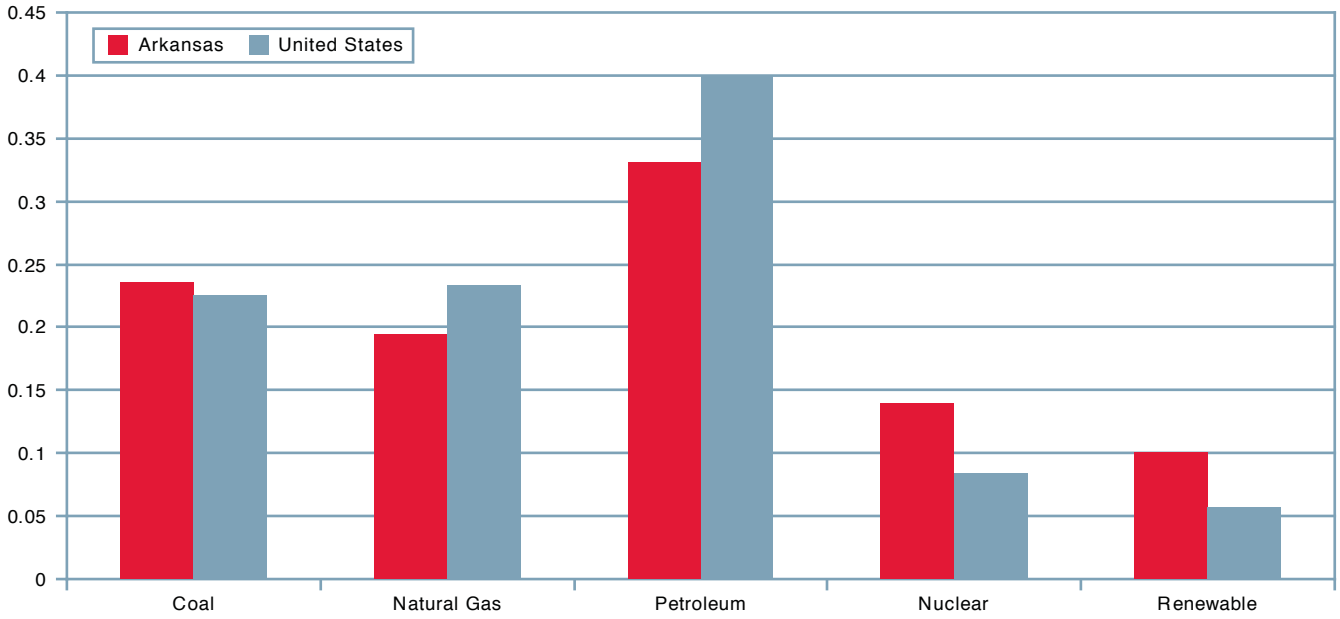
2007 Arkansas Production and Consumption of Renewable Energy (Trillion Btu)

AR Production 2007		
Total Energy Production	**588.7**	**100.0%**
Renewable Energy	117.4	19.9%
Production	**Physical**	**Units**
Renewable Energy	11,195,002	Megawatt Hours
AR Consumption 2007		
Total Resource Energy Consumption	**1149.3**	**100.0%**
Renewable Energy	117.4	10.2%
Electric Power Consumption	**527.4**	**100.0%**
Renewable Energy	117.4	10.2%
Total End-Use Sector Consumption	**1,149.4**	**100.0%**
Residential	228.6	19.9%
Renewable Energy	3.3	1.4%
Commercial	162.0	14.1%
Renewable Energy	0.5	0.3%
Industrial	463.7	40.3%
Renewable Energy	79.9	17.2%
Transportation	295.1	25.7%
Renewable Energy	0.0	0.0%

Renewable resources are a small but growing source of energy in Arkansas. They are of exceptional interest because of increasing concern about the availability, cost, and environmental and geopolitical implications of petroleum use. In 2007 renewable resources accounted for 10% of the Btu consumed in Arkansas, almost double the U.S. renewable resource consumption of 5.7%, as shown in Figure 7.1.1

There are several different renewable resources that are used for this purpose: hydropower and wind are used almost exclusively to generate electricity (with the exception of a few grain mills operated by water); biomass is used for heat and power to produce alternative liquid fuels; geothermal and solar energy can be used as direct energy sources for heating as well as to produce electricity. Hydropower and biomass account for nearly all of the renewable fuels used in Arkansas, with small contributions made by wind, geothermal, and solar energy. Each type of renewable energy is examined in this section of the report.

Figure 7.1.1 2007 Arkansas and United States Consumption of Energy by Primary Energy Source (Percent of Total)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Table 7.2.1 2007 Arkansas Hydroelectric Generating Units

Company/Plant	Unit	Generator Nameplate Capacity (Megawatts)
Arkansas Electric Cooperative Corporation		
Dam 2	1	34.2
	2	34.2
	3	34.2
Ellis	1	10.8
	2	10.8
	3	10.8
Whillock	1	10.8
	2	10.8
	3	10.8
City of North Little Rock		
Murray	1	22.7
	2	22.7
Entergy Arkansas Inc		
Carpenter	1	28.0
	2	28.0
Remmel	1	3.0
	2	3.0
	3	3.0
City of Fort Smith		
Lee Creek	0209	1.3
USCE - Vickburg District		
Blakely Mountain	1	37.5
	2	37.5
Degray	1	40.0
	2	28.0
Narrows	1	8.5
	2	8.5
	3	8.5
USCE - Little Rock District		
Beaver	1	56.0
	2	56.0
Bull Shoals	1	40.0
	2	40.0
	3	40.0
	4	40.0
	5	45.0
	6	45.0
	7	45.0
	8	45.0
Dardanelle	1	40.2
	2	40.2
	3	40.2
	4	40.2
Greers Ferry Lake	1	48.0
	2	48.0
Norfork	1	40.2
	2	40.2
Ozark	1	20.0
	2	20.0
	3	20.0
	4	20.0
	5	20.0
Total 6 Companies, 16 Plants	**47 Units**	**1,336.8**

Source: U.S. Energy Information Administration, Electricity Generating Capacity Existing Electric Generating Units in the United States, 2007.

7.2 Hydropower

Hydropower, the energy generated by moving water, is the most readily available and most consumed renewable resource in Arkansas. Hydropower is captured by using moving water to turn a turbine, thus generating electric power. The rivers and lakes in Arkansas afford the state an exceptional resource for capturing the energy of the water moving through the rivers. Currently, there are six electric power companies that operate 47 generating units at 16 hydroelectric power plants in Arkansas, with a total nameplate capacity of 1,337 megawatts (MW) of electricity. A list of these plants is in Table 7.2.1.

A study published by the Idaho National Laboratory in 2006 indicated that the hydroelectric power developed in Arkansas amounts to only 6% of the energy available in Arkansas rivers.[28] The study assessed the potential for hydroelectric power production for each state throughout the U.S. According to their findings, Arkansas rivers have enough hydrokinetic energy to create 5,697 megawatt hours (MWh) of electricity. Out of this, the state has developed areas capable of producing 347 MWh. Areas excluded from power production (either because they are federally excluded or for some other reason) account for an additional 464 MWh. This means that the potential power available through hydroelectric applications in Arkansas amounts to 4,886 MWh, at 3,270 sites throughout the state.

The Idaho study further examined the feasibility of taking advantage of the available hydroelectric potential in Arkansas, and determined that the total hydropower potential of feasible projects amounted to 2,224 MWh. Feasible sites and feasible projects take into account factors such as realistic levels of available “penstocks” (the water passing to the turbine to produce electricity); cost of development, and other limiting conditions. See Table 7.2.2 for a summary of the water energy resource assessment of Arkansas performed by the Idaho National Laboratory.

28 Idaho National Laboratory, U.S. Department of Energy. Feasibility Assessment of the Water Energy Resources of the United States for New Low Power and Small Hydro Classes of Hydroelectric Plants, January 2006.

Table 7.2.2 2006 Arkansas Water Energy Resource Assessment

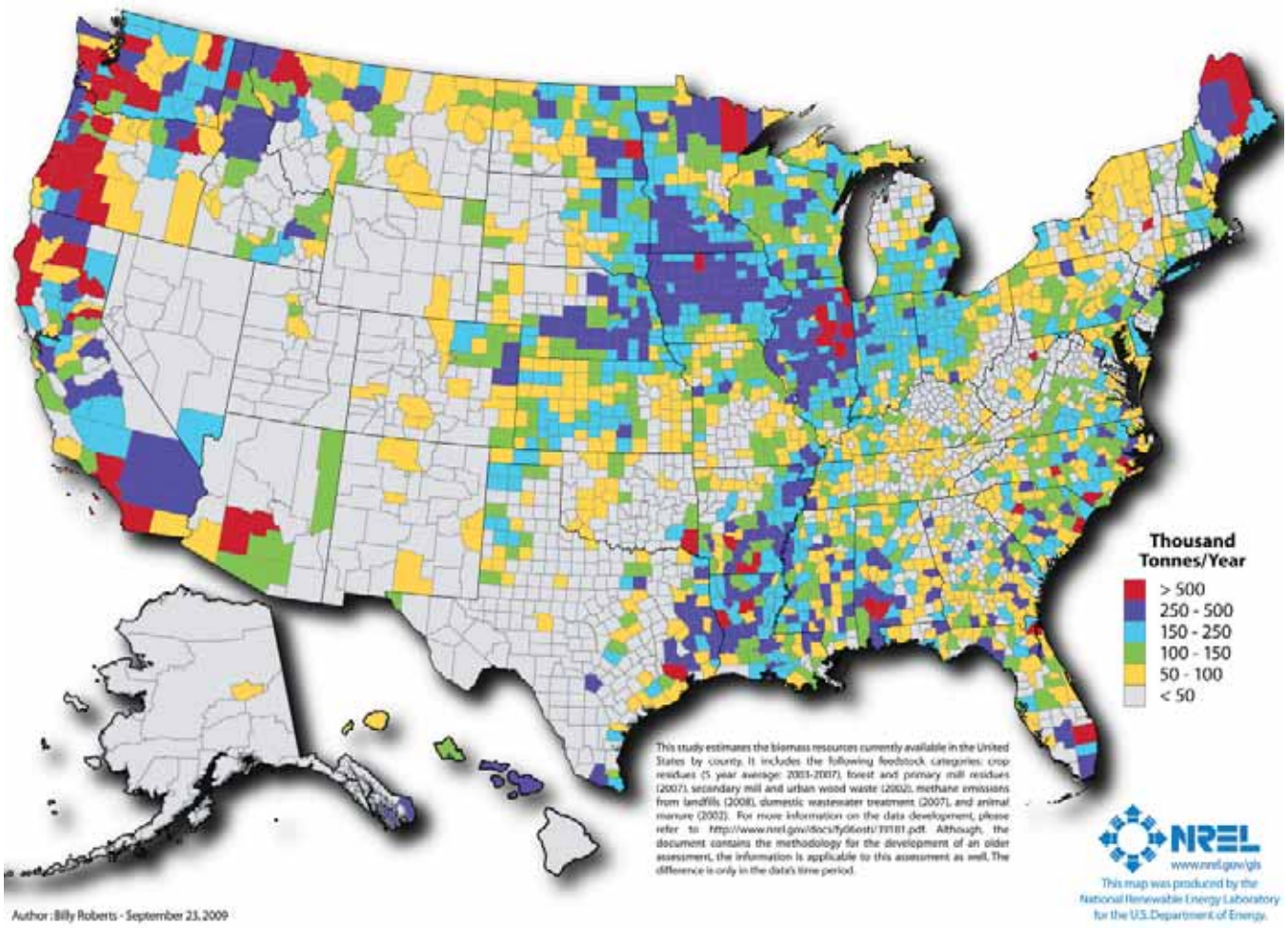
	Potential MWh	Potential Btu (Trillion Btu)	Percent of Total
Total	5,697	19.44	100.0%
Excluded	464	1.58	8.1%
Developed	347	1.18	6.1%
Available	4,886	16.67	85.8%
Feasible Sites	2,224	7.59	39.0%

Source: Idaho National Laboratory, U.S. Department of Energy. Feasibility Assessment of the Water Energy Resources of the United States for New Low Power and Small Hydro Classes of Hydroelectric Plants. January 2006.

7.3 Biomass

Another important renewable energy source used in Arkansas is biomass. Biomass consists of organic plant and animal products that can be used as a source of energy. It can come from agricultural and forestry waste, municipal solid wastes, industrial wastes, and crops grown solely for energy purposes. Because agriculture and forestry are important industries in Arkansas with large swathes of acreage devoted to them, a significant quantity of biomass is available in the state. Eastern and southern Arkansas are particularly well positioned to take advantage of biomass resources: eastern Arkansas through agricultural products and southern parts of the

Figure 7.3.1 Biomass Resources Available in the United States



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory, NREL GIS, Biomass, http://www.nrel.gov/gis/biomass.html.

state through forestry and the waste from wood products manufacturing. Additionally, the metropolitan areas of the state can benefit from the potential of wastewater and landfills to produce methane that can be used directly or converted into electricity. Figure 7.3.1 illustrates the potential in metric tons of biomass throughout the U.S. Arkansas' use of biomass as a resource is nearly triple the use in the U.S. In 2007 biomass provided 7.3% of the Btu consumed in Arkansas, while in the U.S., total biomass consumption accounted for only 2.5% of all fuels (see Figure 7.3.2).

Biomass resources are used to produce heat and electricity and to produce liquid fuels like ethanol and biodiesel. The biofuels markets are currently evolving, and access to as well as demand for, ethanol in gasoline or as E-85 and biodiesel in diesel fuels are still limited in Arkansas. According to the Alternative Fuels Data Center of the U.S. Department of Energy in 2007, the general public could access only four fueling centers in Arkansas that provided E-85 and three that provided biodiesel.[29]

Figure 7.3.2 Biomass Sources

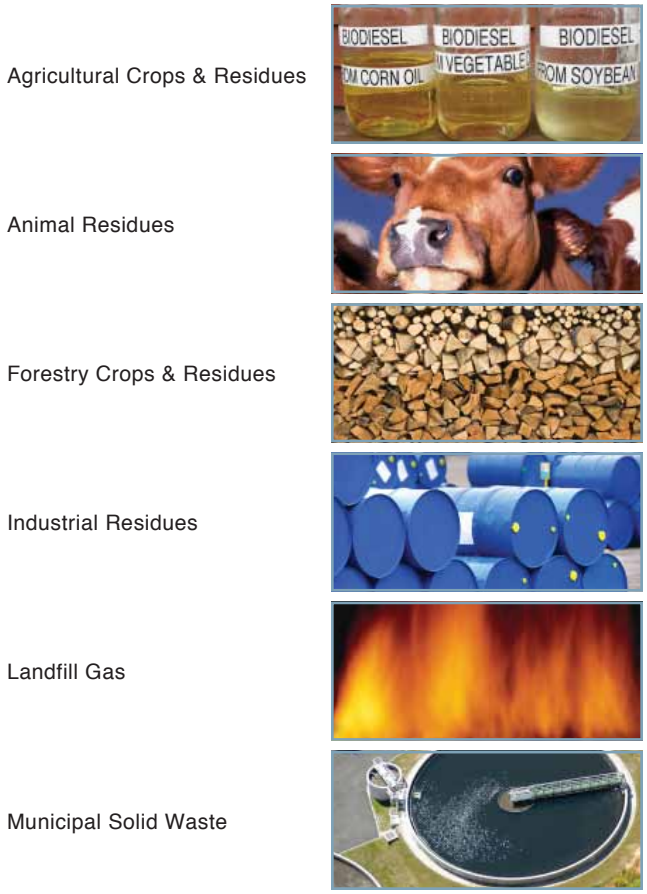
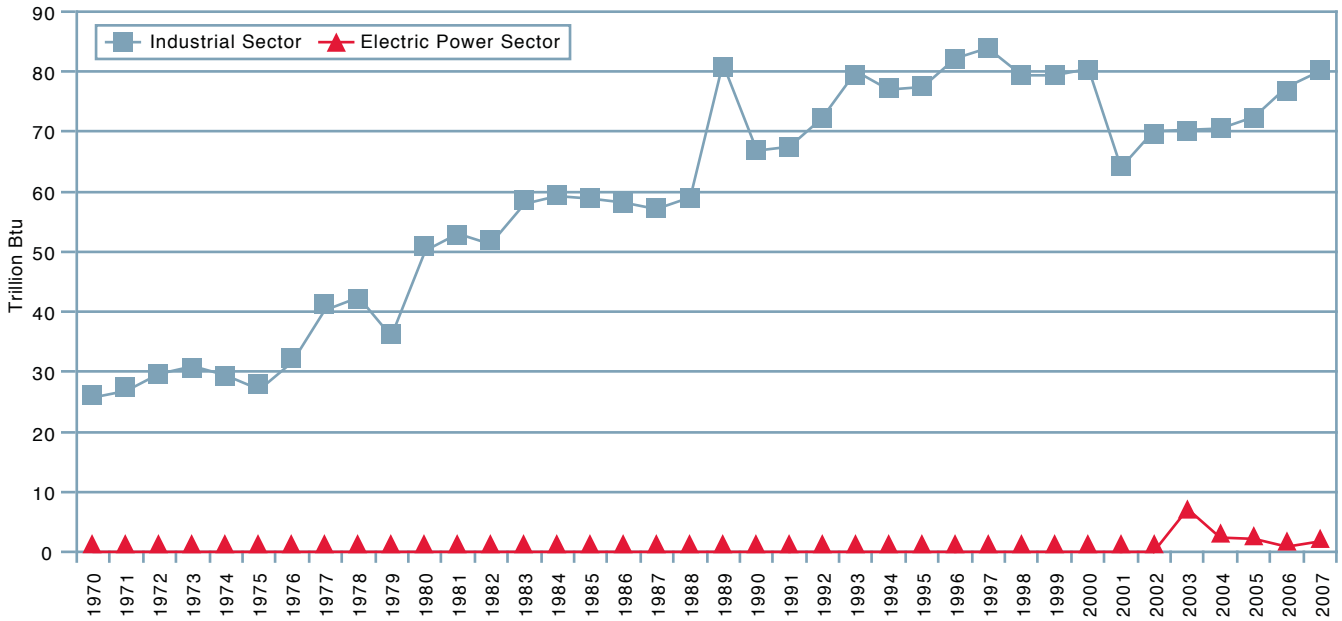


Figure 7.3.3 1970-2007 Arkansas Biomass Usage



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory, NREL GIS, Biomass, http://www.nrel.gov/gis/biomass.html.

29 U.S. Department of Energy, Energy Efficiency & Renewable Energy, Alternative Fueling State Locator, http://www.afdc.energy.gov/afdc/locator/m/stations/, August 2010.

7.4 Biodiesel

Biodiesel is a diesel replacement fuel, since it has physical properties similar to those of petroleum diesel. It is manufactured from plant oils (soybean oil, cottonseed oil, canola oil), recycled cooking greases or oils (e.g., yellow grease), or animal fats (beef tallow, pork lard). Because plants produce oils from sunlight and air, and can do so year after year on cropland, these oils are renewable. Animal fats are produced when the animal consumes plants or animals, and these too are renewable. Used cooking oils are mostly plant based, but may also contain animal fats. Used cooking oils are both recycled and renewable.[30] Biodiesel is usually used as a blend with traditional diesel fuels, ranging from 2 percent to 20 percent biodiesel content.

7.4.1 U.S. Biodiesel Industry

The U.S. biodiesel industry has grown significantly over the past several years, as displayed in Table 7.4.1.1 and Figure 7.4.1.1. The U.S. Energy Information Administration reports that biodiesel

Table 7.4.1.1 1970-2007 Arkansas Biomass Usage

	Production		Trade			Consumption	
			Imports	Exports	Net Imports		
Year	Thousand Barrels	Trillion Btu	Thousand Barrels	Thousand Barrels	Thousand Barrels	Thousand Barrels	Trillion Btu
2001	204	1	78	39	39	243	1
2002	250	1	191	56	135	385	2
2003	338	2	94	110	-16	322	2
2004	666	4	97	124	-26	640	3
2005	2162	12	207	206	1	2163	12
2006	5963	32	1069	828	242	6204	33
2007	11662	62	3342	6477	-3135	8528	46

Source: U.S. Energy Information Administration, Biodiesel Overview, http://www.eia.doe.gov/emeu/aer/txt/ptb1004.html, July 2010.

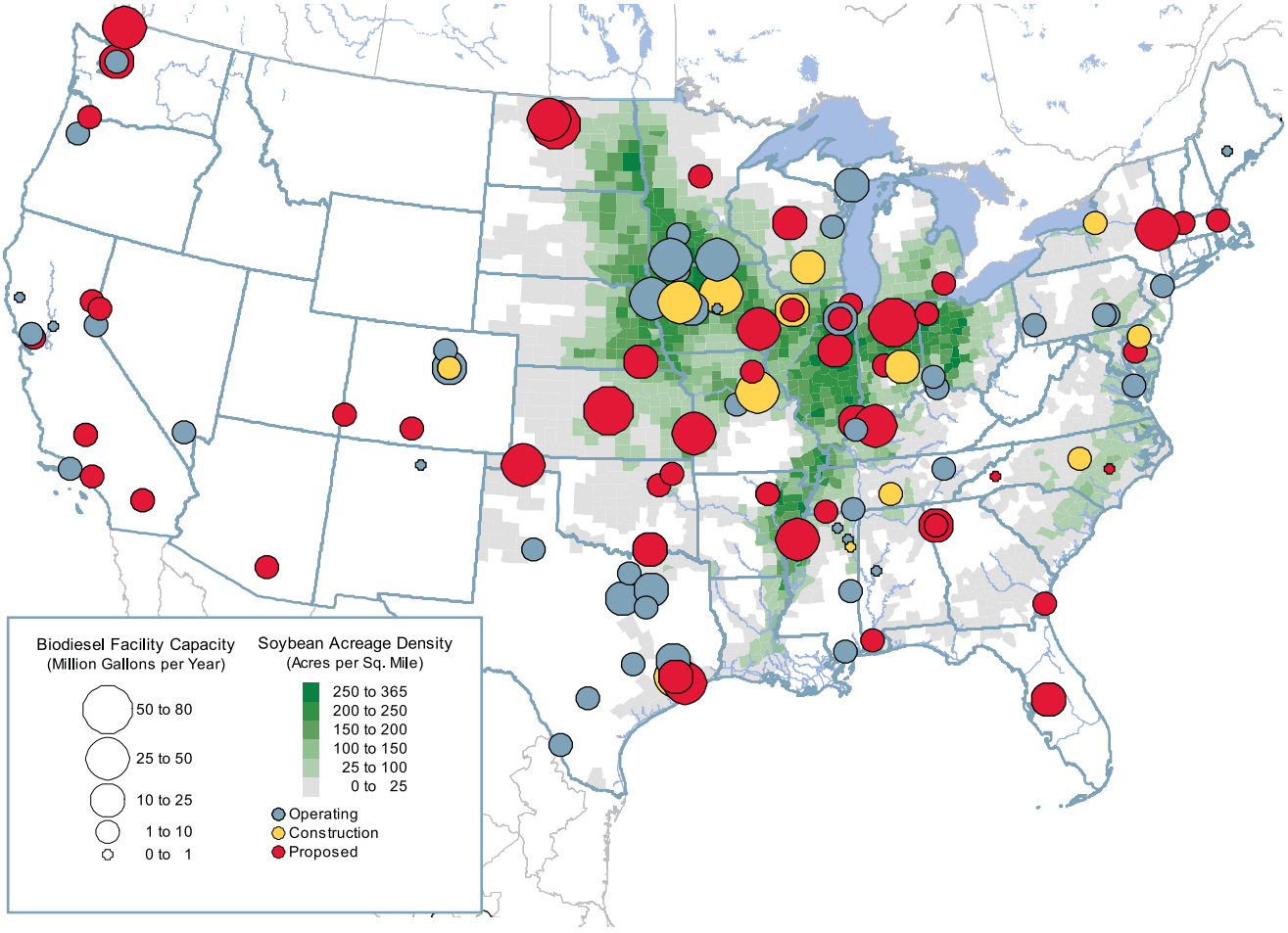
30 National Renewable Energy Laboratory, *Biodiesel Handling and Use Guide*, Fourth Edition, Revised January 2009. http://www.nrel.gov/vehiclesandfuels/pdfs/43672.pdf.

production for 2007 totaled 11,662 thousand barrels (62 Trillion Btu), nearly 96 percent above the 2006 production. Biodiesel consumption increased by approximately 37 percent, totaling 8,528 thousand barrels (46 Btu) in 2007. Biodiesel imports increased by roughly 213 percent, from 1,069 thousand barrels in 2006 to 3,342 thousand barrels in 2007. Biodiesel exports increased by 682 percent, from 828 thousand barrels in 2006 to 6,477 thousand barrels in 2007. While both biodiesel imports and exports experienced an increase from 2006, biodiesel exports increased at a much higher rate, making United States a net exporter of biodiesel.

The biodiesel industry is largely concentrated in the Midwest where most soybean oil is produced, but there are many plants in the Northeast, South Central, and West Coast states (Figure 7.4.1.1).[31]

The biodiesel industry is emerging as something of a hybrid between destination and localized processing. Figure 7.4.1.2 highlights the geographic dispersion of biodiesel production relative to the type of feedstocks being used and soybean production density.[32]

Figure 7.4.1.1 2006 Major Biodiesel Facilities Currently Operating, Under Construction, or Proposed Relative to United States Soybean Production



Source: United States Department of Agriculture, *U.S. Biobased Products – Market Potential and Projections Through 2025,* February 2008. Accessed at http://www.usda.gov/oce/reports/energy/BiobasedReport2008.pdf, June 2010.

31 United States Department of Agriculture, *U.S. Biobased Products – Market Potential and Projections Through 2025,* February 2008; Accessed at http://www.usda.gov/oce/reports/energy/BiobasedReport2008.pdf on June 2010.

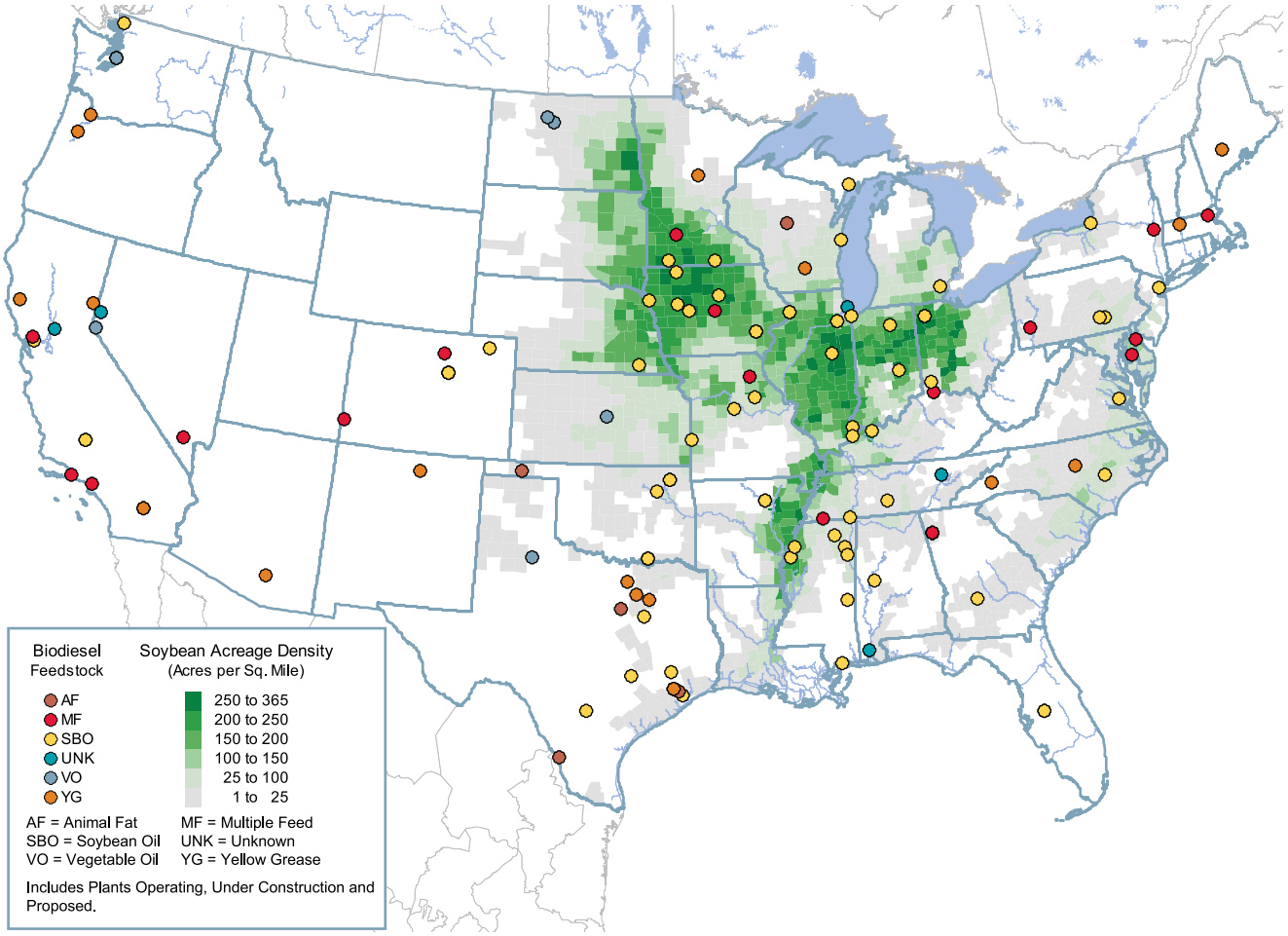
32 United States Department of Agriculture, *U.S. Biobased Products – Market Potential and Projections Through 2025,* February 2008; Accessed at http://www.usda.gov/oce/reports/energy/BiobasedReport2008.pdf on June 2010.

7.4.2 Biodiesel in Arkansas

At the end of 2007 the biodiesel industry was growing rapidly, but it is still a very young industry. Arkansas appeared to have the potential to build and further develop an in-state biodiesel industry, as it ranks in the top 10 soybean producing states annually. Biodiesel firms in Arkansas faced a number of challenges in the 2007 economic environment, however. On the revenue side, biodiesel must compete directly with petroleum diesel, leading to highly volatile prices. Before their expiration, federal and state tax credits helped to make biodiesel competitive with petroleum diesel. On the production side, biodiesel producers using soybean oil and other fats have seen their production costs increasing. Markets for soybean and other fats have been very volatile, adding to uncertainty for producers (see Appendix L for a discussion of soybean production in Arkansas).[33]

In 2007 Arkansas had four operating biodiesel manufacturers. Arkansas Soy Energy Group LLC operated a soybean-crushing facility and biodiesel plant in DeWitt; Pinnacle Biofuels Inc. converts chicken fat to biodiesel in Crossett; and Future Fuel Chemical Co. in Batesville converts beef tallow into biodiesel as a part of its larger chemical operations. The fourth company producing biodiesel in 2007 was Patriot Biofuels in Stuttgart.[34]

Figure 7.4.1.2 United States Biodiesel Facilities by Type of Feedstock Versus Soybean Acreage Production Density



Source: United States Department of Agriculture, *U.S. Biobased Products – Market Potential and Projections Through 2025,* February 2008. Accessed at http://www.usda.gov/oce/reports/energy/BiobasedReport2008.pdf on June 2010.

33 Institute for Economic Advancement, University of Arkansas at Little Rock, Nona French and Gregory L. Hamilton, *Economic Impacts of a B5 Biodiesel Standard for Arkansas*, Publication Number 08-11, December 3, 2008.

34 Patriot Biofuels plant in Stuttgart was destroyed by a tornado in May, 2008.

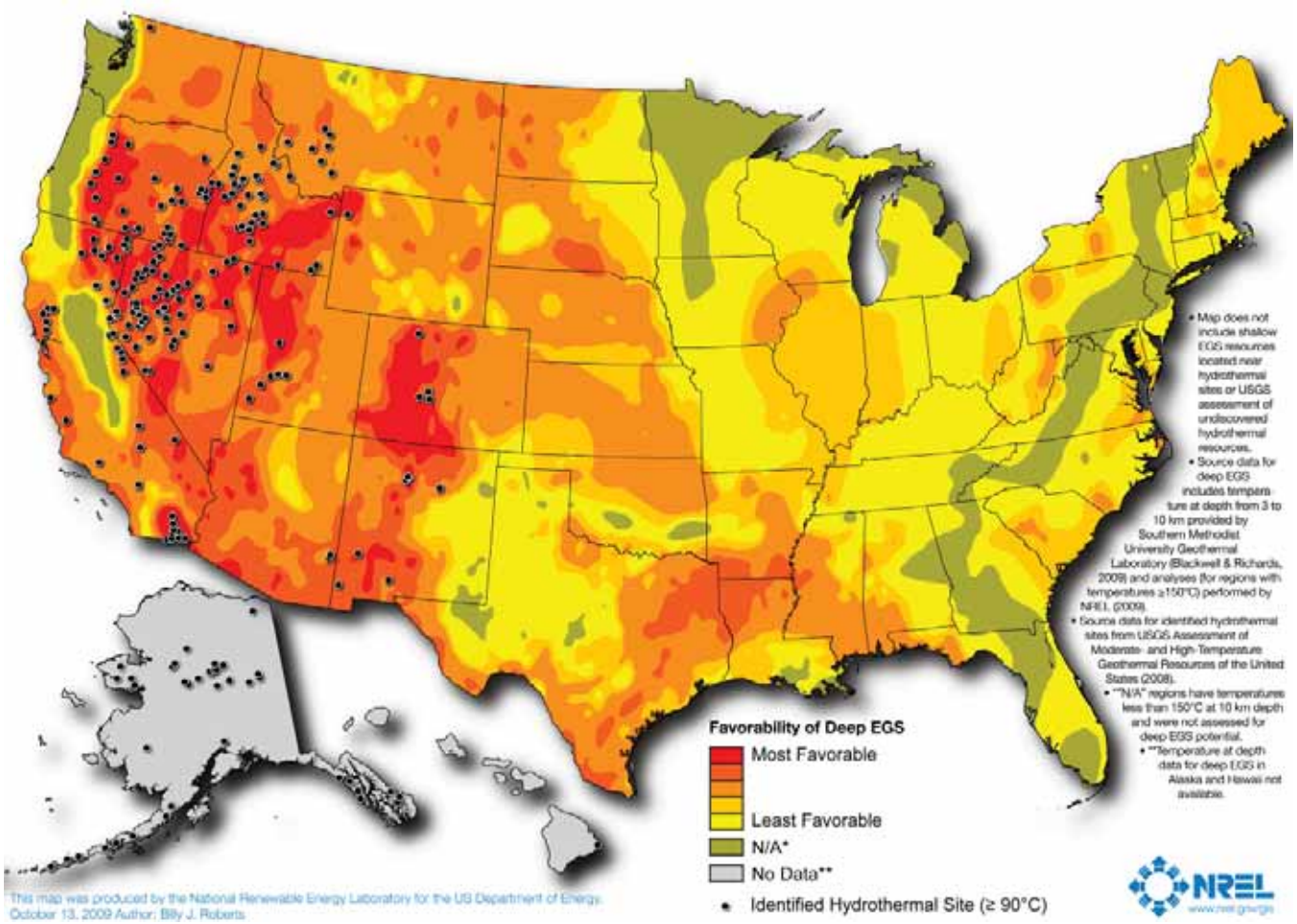
7.5 Geothermal, Solar, and Wind Energy

The other three renewable sources of energy are geothermal, solar, and wind. None of the three are used to any great extent in Arkansas, though there are efforts to increase usage in the state. It is estimated that consumption of these three sources of energy in Arkansas amounted to only 0.05% of total energy consumption in 2007. Maps of the potential for these energy sources, created by the National Renewable Energy Laboratory (NREL), are shown in Figures 7.5.1.1 through 7.5.4.1. Reliable statistics on usage of each individual source in Arkansas are quite limited at this time.

7.5.1 Geothermal Energy

Geothermal energy consists of energy that comes from the ground. In Arkansas there are two potential uses for geothermal energy. One is the use of heat pumps in Arkansas buildings, which pump heat from the ground into the building to warm it in winter, and pump heat out of the building in the summer to cool it. Although there are currently heat pumps in use in Arkansas, there are few statistics available on their use. New shipments of heat pumps to Arkansas amounted to 2,897 in 2006 and 3,028 in 2007. This placed Arkansas 21st in the nation in 2006 and 26th in 2007 in heat pump shipments received.

Figure 7.5.1.1 Geothermal Resource of the United States
Locations of Identified Hydrothermal Sites and Formability of Deep Enhanced Geothermal Systems (EGS)



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory, NREL GIS, Geothermal, http://www.nrel.gov/gis/geothermal.html.

The other potential source of geothermal energy in Arkansas consists of deep enhanced geothermal systems, which are located primarily in south and southwest Arkansas. Figure 7.5.1.1 shows the geothermal resources of the U.S. In Arkansas these systems are not considered likely sources of energy.

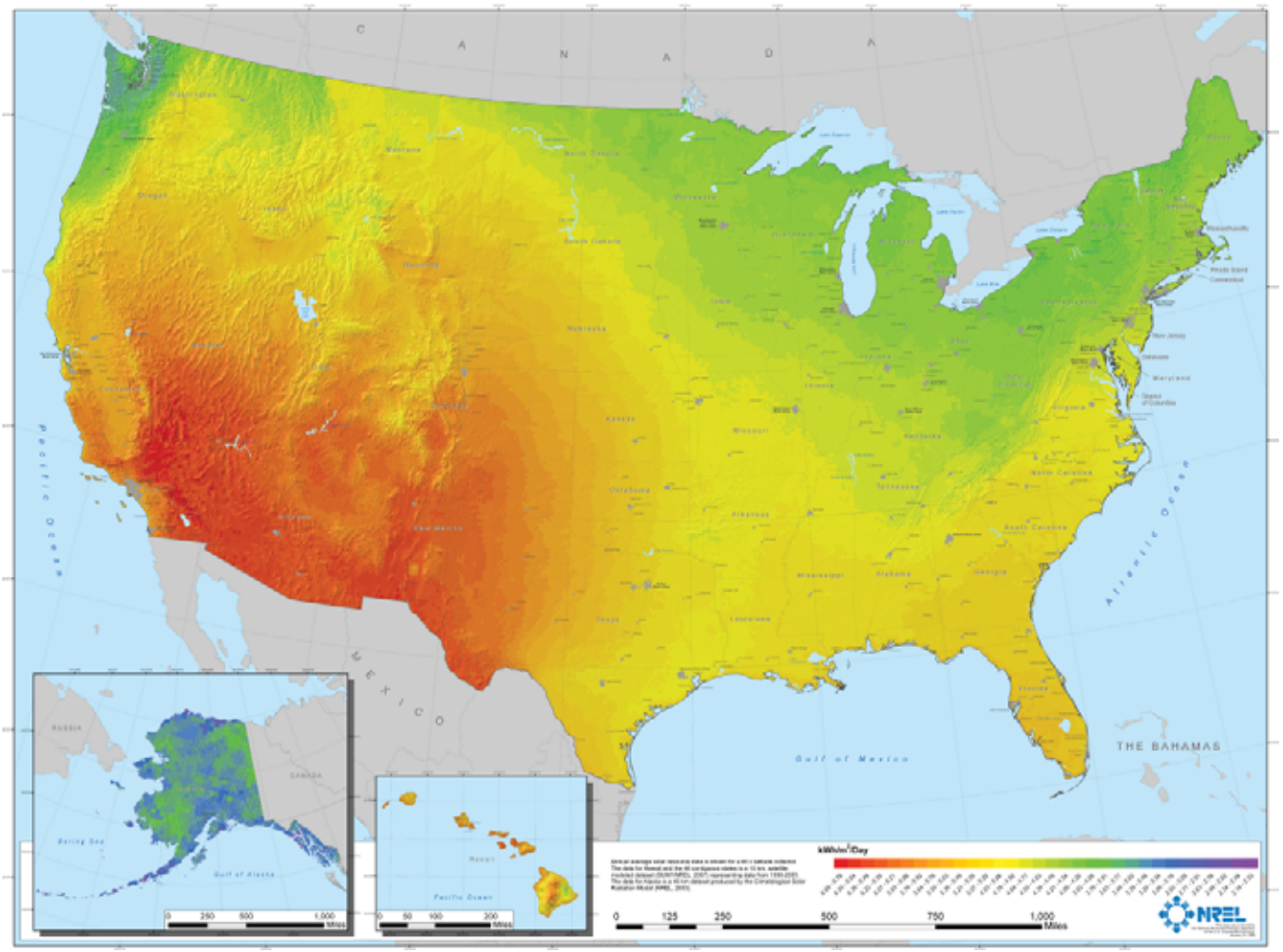
7.5.2 Solar Energy

Solar energy is used in two ways: as solar thermal energy, i.e., using the sun as a source of heat and using it to power photovoltaic cells. These cells convert solar energy into electricity that can be used or stored in batteries for later use. Maps of solar energy potential are shown in Figures 7.5.2.1 and 7.5.2.2. The NREL has identified the northeast half of Arkansas as receiving four to five kWh of solar radiation per square meter per day. The southwest half of the state is classified by the NREL as receiving five to six kWh of solar radiation per square meter per day. Arkansas can thus be categorized as having average to higher than average potential for solar power in the state.

7.5.3 Wind Energy

Wind energy captures the kinetic energy in moving air by using the energy to turn a turbine. This energy can then be used directly (e.g., to turn a millstone in a windmill used to grind grain), or it

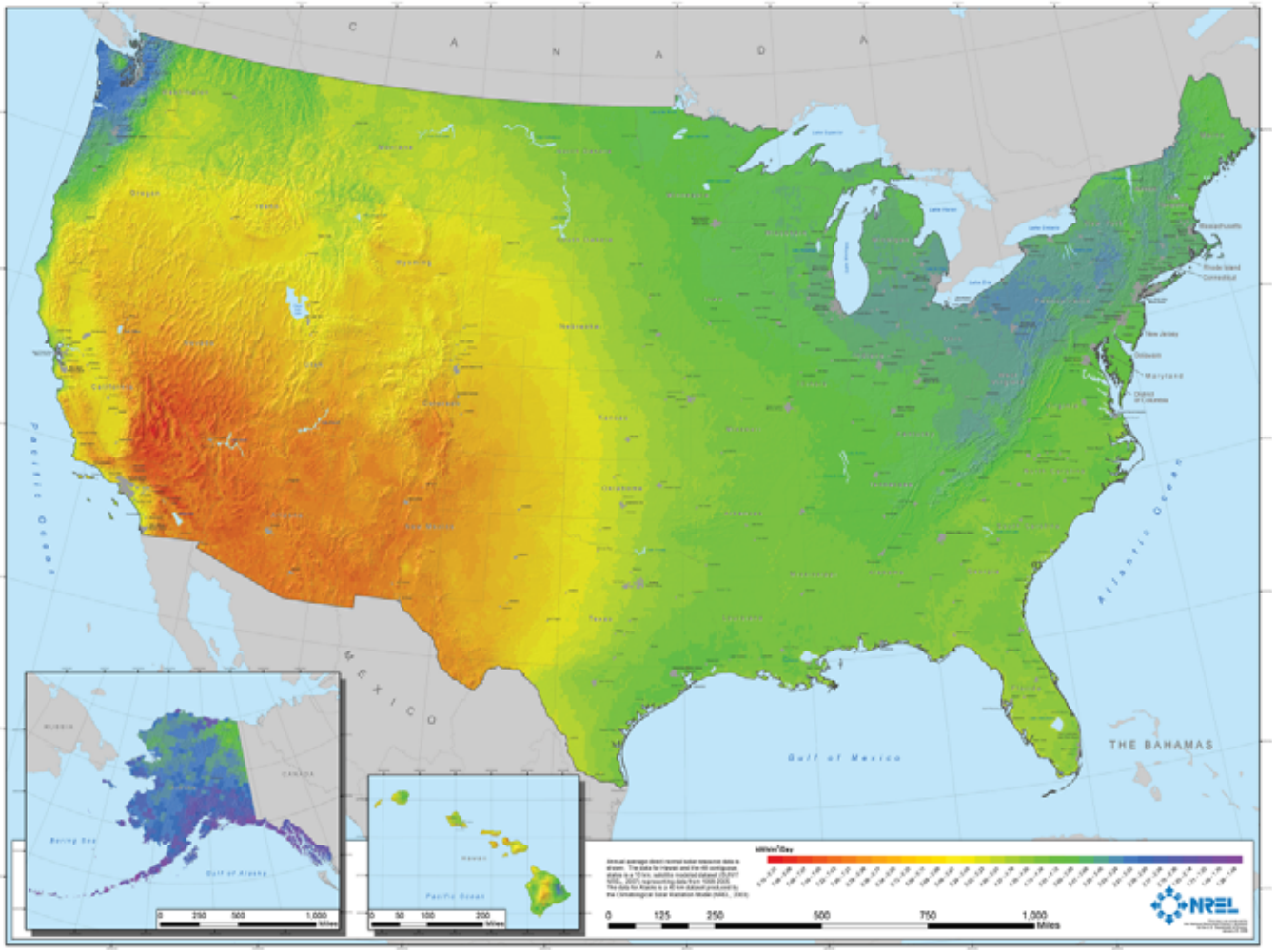
Figure 7.5.2.1 United States Photovoltaic Solar Resource: Flat Plate Tilted at Latitude



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory, NREL GIS, Solar Maps, http://www.nrel.gov/gis/solar.html.

can be converted into electricity for other uses. Arkansas falls into the midrange of states in terms of the amount of wind energy available as a potential energy resource. Table 7.5.3.1 details the estimated capacity that could be installed and the amount of electricity that could then be generated, based on the amount of windy land available in Arkansas. Estimates are given for areas with a gross capacity of 30%, 35%, and 40% and higher; and installations reaching 80 and 100 meters.[36] A map of wind energy resources is available in Figure 7.5.3.1.

Figure 7.5.2.2 United States Concentrating Solat Power Resource: Direct Normal



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory, NREL GIS, Solar Maps, http://www.nrel.gov/gis/solar.html.

35 Gross capacity refers to the percent of maximum operating potential of the installation. A gross capacity of 30% or more indicates the wattage that could be generated if the installation was operating at a minimum of 30% of its full potential.

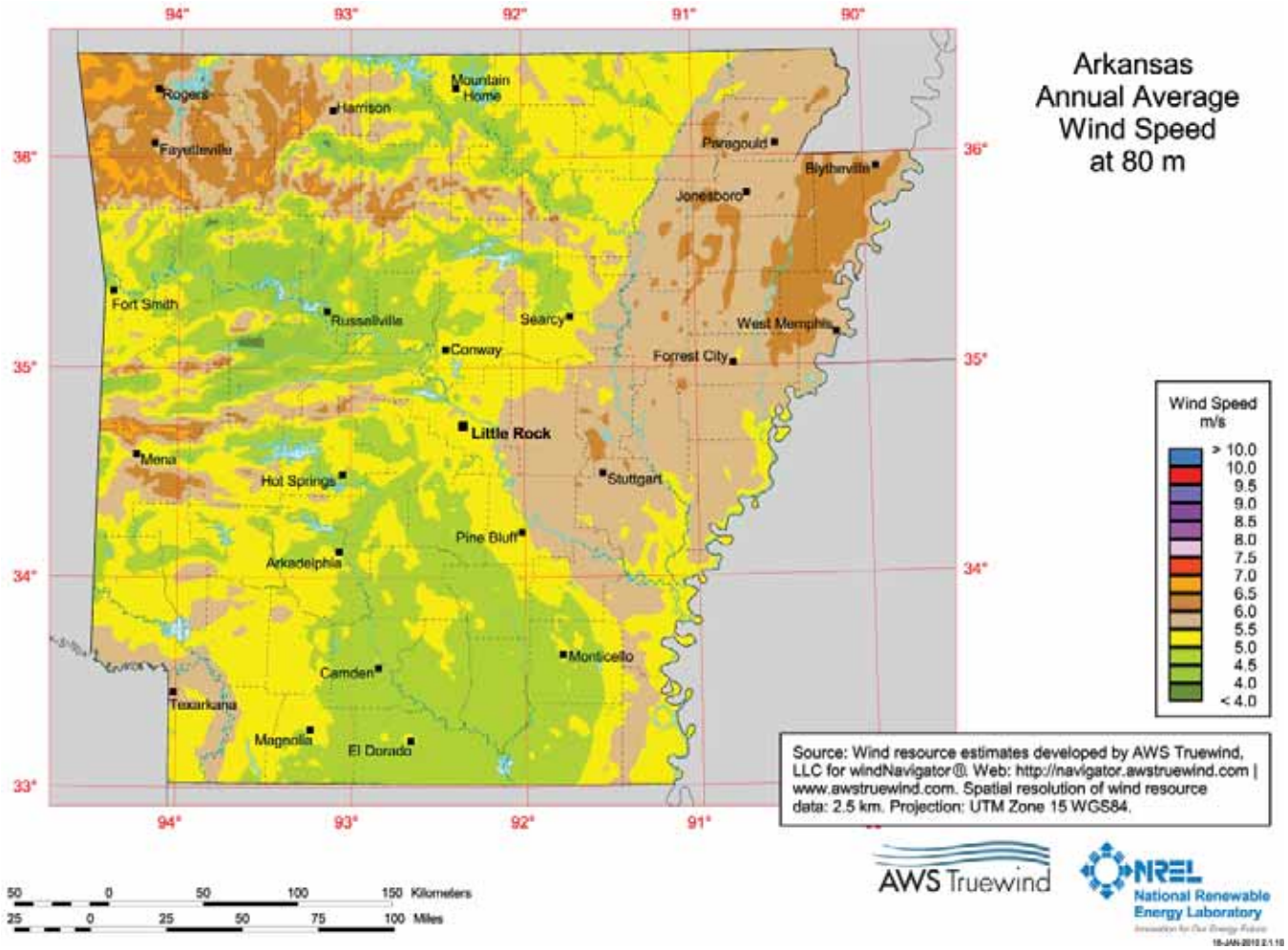
Table 7.5.3.1 Estimated Amount of Windy Land and Wind Energy Potential in Arkansas

Estimated Wind Capacity	Windy Land Area				Wind Energy Potential				State Rank
	Total (km²)	Excluded[1] (km²)	Available (km²)	Available % of State	% of Total Windy Land Excluded	Installed Capacity[2] (MW)	Annual Generation (GWh)	Annual Generation (Billion Btu)	
>= 30% Gross Capacity Factor at 80m	4,663.2	2,823.2	1,840.1	1.34%	60.5%	9,200.3	26,906	91,805	27
>= 35% Gross Capacity Factor at 80m	1,130.0	687.5	442.5	0.32%	60.8%	2,212.5	7,215	24,617	24
>= 40% Gross Capacity Factor at 80m	194.6	145.7	48.9	0.04%	74.9%	244.4	901	3,073	22
>= 30% Gross Capacity Factor at 100m	18,041.9	8,049.5	9,992.3	7.25%	44.6%	49,961.7	141,856	484,013	21
>= 35% Gross Capacity Factor at 100m	4,148.2	2,510.6	1,637.6	1.19%	60.5%	8,187.9	27,217	92,866	24
>= 40% Gross Capacity Factor at 100m	824.8	530.0	294.8	0.21%	64.3%	1,473.8	5,430	18,526	24

1 Excluded lands include protected lands (national parks, wilderness, etc.), incompatible land use (urban, airports, wetland, and water features), etc.
2 Assumes 5 MW/km2 of installed nameplate capacity.

Source: National Renewable Energy Laboratory and AWS Truewind, Wind, and Water Program, U.S. Department of Energy. Wind Maps and Wind Resource Potential Estimates. http://www.windpoweringamerica.gov/wind_maps.asp.

Figure 7.5.3.1 Arkansas Annual Average Wind Speed at 80 Meters



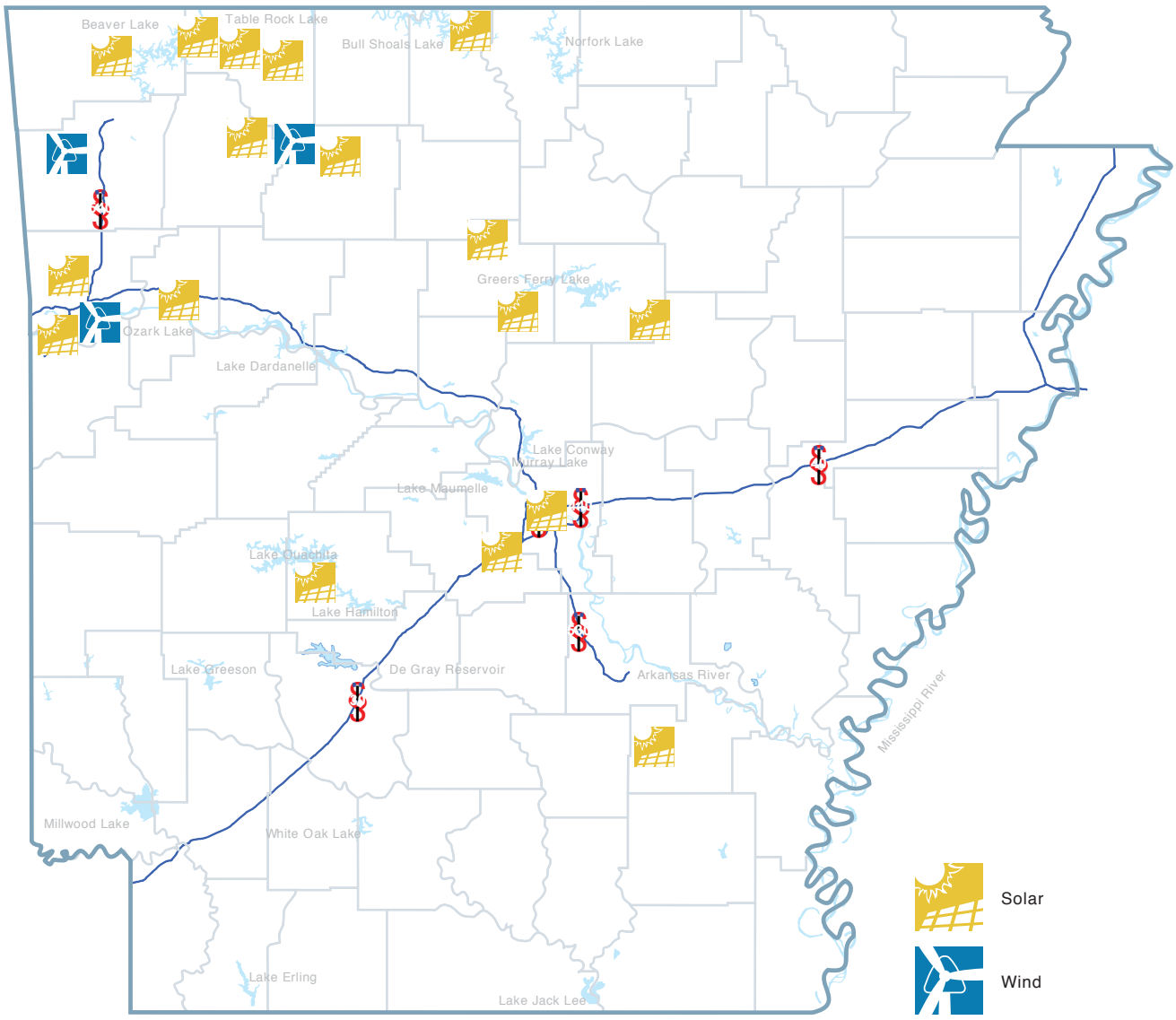
Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory, NREL GIS, Wind Maps, http://www.windpoweringamerica.gov/images/windmaps/ar_80m.jpg.

7.6 Net Metering in Arkansas

Net metering is a process by which electric customers are given credit for electric power that they generate using renewable sources of energy. The net metering program in Arkansas was established by the Arkansas Legislature in 2001, giving rule-making and enforcement control of the program to the Arkansas Public Service Commission.

"Residential renewable-energy systems up to 25 kilowatts (kW) in capacity and nonresidential systems up to 300 kW in capacity are eligible for net metering. Eligible technologies include solar, wind, hydroelectric, geothermal and biomass systems, as well as fuel cells and microturbines using renewable fuels. There is no limit on the aggregate capacity of all net-metered systems."[36]

Figure 7.6.1 2007 Arkansas Net Metering Customers



Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, National Renewable Energy Laboratory, NREL GIS, Solar Maps, http://www.nrel.gov/gis/solar.html.

36 Arkansas Economic Development Commission Energy Office. "Energy Policy & Legislation," http://arkansasenergy.org/energy-in-arkansas/energy-policy-and-legislation.aspx (July 28, 2010).

By the end of 2007 there were 23 net metering customers in Arkansas, 20 of whom used solar energy, while three used wind energy. Figure 7.6.1 is a map showing the locations of the 23 net metering customers in Arkansas in 2007.

section 8

Emissions

8.1 Air Quality and the Air Quality Index[37]

The Air Quality Index (AQI) is an index for reporting daily air quality. The AQI is calculated for four major air pollutants regulated by the Clean Air Act: groundlevel ozone, particle pollution, carbon monoxide, and sulfur dioxide. The higher the AQI value, the greater the level of air pollution. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant. AQI value at or below 100 are generally thought of as satisfactory. The AQI is divided into six levels of health concern:

Table 8.1.1 Air Quality Index (AQI)

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	*...air quality conditions are:*	*...as symbolized by this color:*
0 to 50	Good	Green
51 to 10	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Source: AirNow, Air Quality Index (AQI), http://www.airnow.gov/index.cfm?action=aqibasics.aqi, May 2010.

8.2 Arkansas Air Quality[38]

Arkansas typically ranks in the top 1/3 of the states for quality air. The Environmental Protection Agency (EPA) ranks regions and enforces air code violations by attainment or nonattainment zones throughout the United States. The best regional air quality in Arkansas was measured in the Ozark and Ouachita regions, especially from Ashley to Pike Counties. Arkansas is one of only a few states in the United States that has consistently met all federal air quality standards for criteria pollutants such as sulfur dioxide, particulates, nitrogen oxides, hydrocarbons, and lead.

Areas of concentrated population typically have more ambient air pollutants. Some sources that discharge emissions that reduce air quality ratings include motor vehicles, coal power generation, concentrated industries, and fires. Benton, Crittenden, Garland, Independence, Jefferson, and Pulaski Counties in Arkansas are likely to have the greatest air quality concern. EPA ranks Arkansas high among states on ammonia discharges and relatively low on carbon monoxide, lead, and nitrogen oxide pollutants.

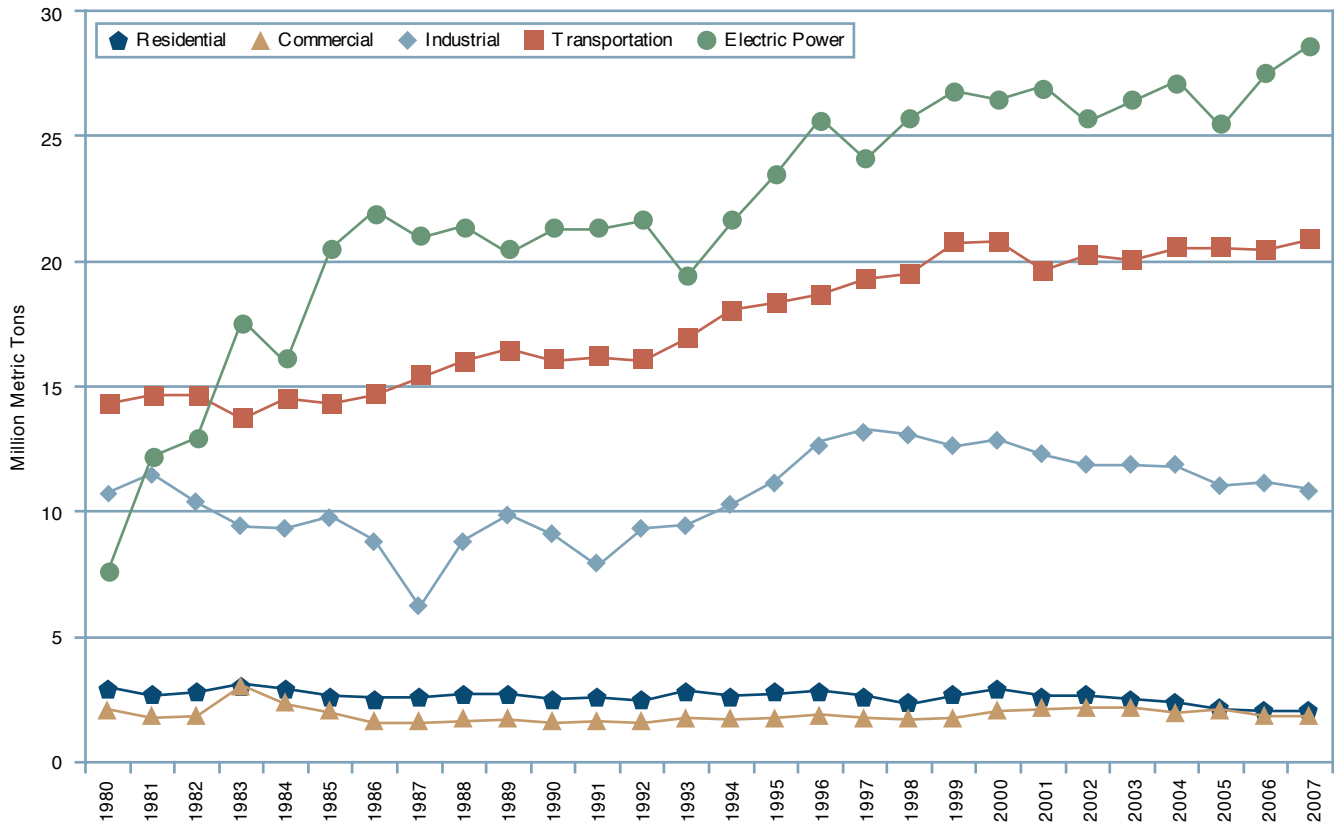
37 U.S. Environmental Protection Agency, AQI – AIR QUALITY INDEX: A Guide to Air Quality and Your Health, August 2009, http://www.epa.gov/airnow/aqi_brochure_08-09.pdf.

38 University of Arkansas, Division of Agriculture, http://www.aragriculture.org/air/default.htm.

8.2.1 Arkansas Carbon Dioxide (CO_2) Emissions

CO_2 is one of several greenhouse gases that trap heat in the atmosphere. With respect to the production of energy, it enters the atmosphere through the burning of fossils fuels and wood products.[39] All end-use sectors contribute CO_2 emissions in Arkansas. Figure 8.2.1.1 reports these emissions by end-use sector and associated with the production of electric power for the 1980-2007 periods. The generation of electric power is the major source of CO_2 emissions in Arkansas followed by activities of the transportation and industrial sectors (see Table J.1 in Appendix J).

Figure 8.2.1.1 1980-2007 Arkansas CO_2 Emissions by End-Use and Electric Power Sectors



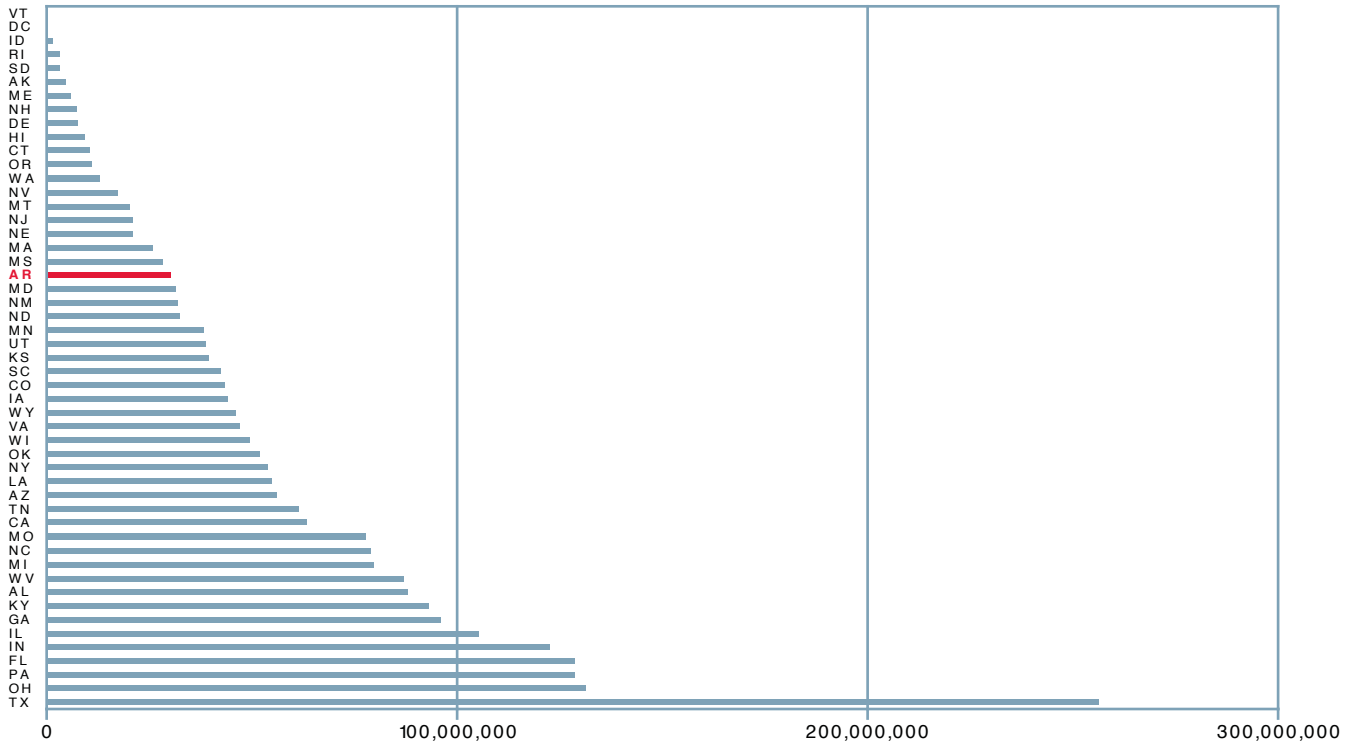
Source: U.S. Energy Information Administration, Nuclear, Arkansas Nuclear Industry, May 2010.

39 U.S. Environmental Protection Agency, Climate Change-Greenhouse Gas Emissions, http://www.epa.gov/climatechange/emissions/index.html#ggo, July 2010.

8.2.2 Emissions from the Production of Electric Power

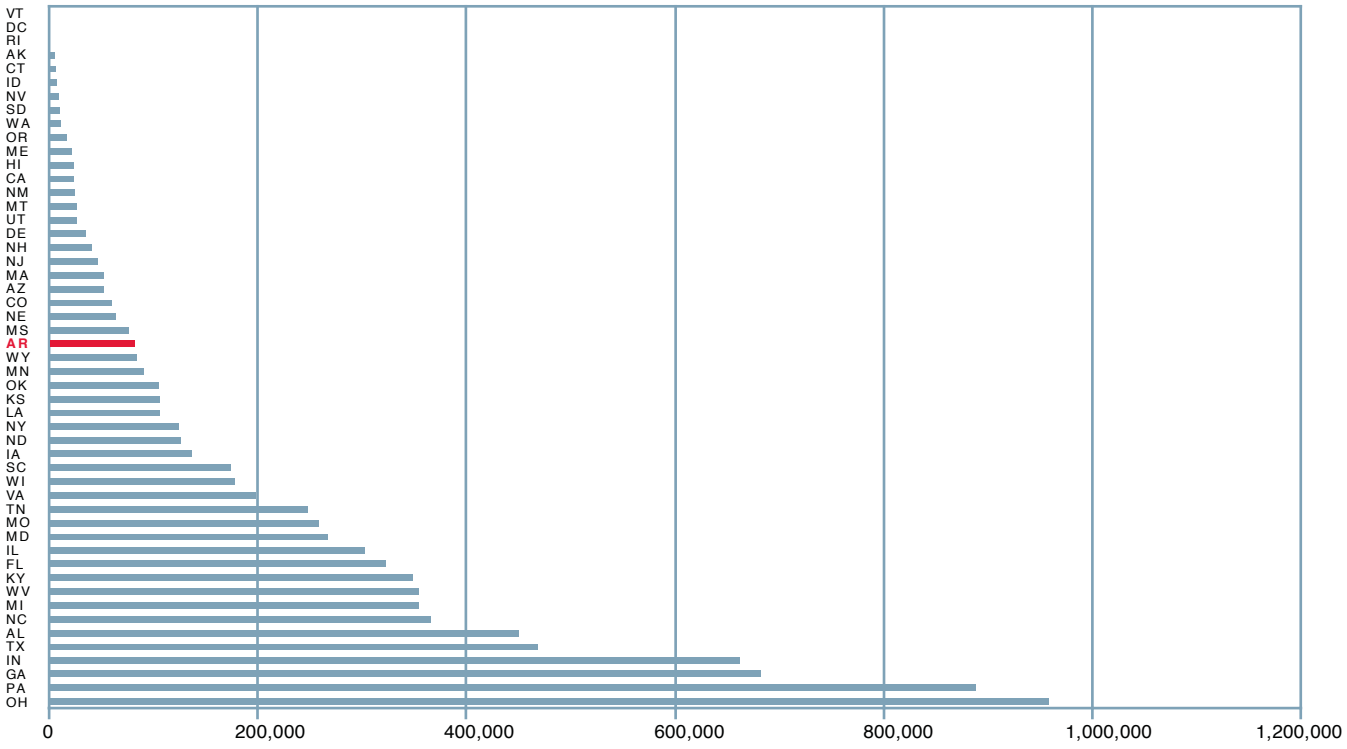
Two major greenhouse gases that are emitted by the burning of fossil fuels in the production of electric power are CO_2 and Nitrous Oxides (NOx). In addition, when the fuels contain sulfur compounds, burning these fuels can generate sulfur dioxide (SO_2) emissions. SO_2 is a precursor for acid rain and atmospheric particulates. Emissions of CO_2, NOx, and SO_2 from the electric power industry of each of the 50 States and the District of Columbia are reported for the year 2007 in Figures 8.2.2.1-8.2.2.3. The Arkansas electric power industry ranked 32nd highest in carbon dioxide (CO_2) emissions in 2007. The state's electric industry ranked 27th highest in sulfur dioxide (SO_2) emissions and 33rd highest in nitrogen oxide (NOx) emissions (see Appendix J Table J.2).

Figure 8.2.2.1 2007 Emissions of the Electric Power Industry, Ranked by State (CO_2 Metric Tons)



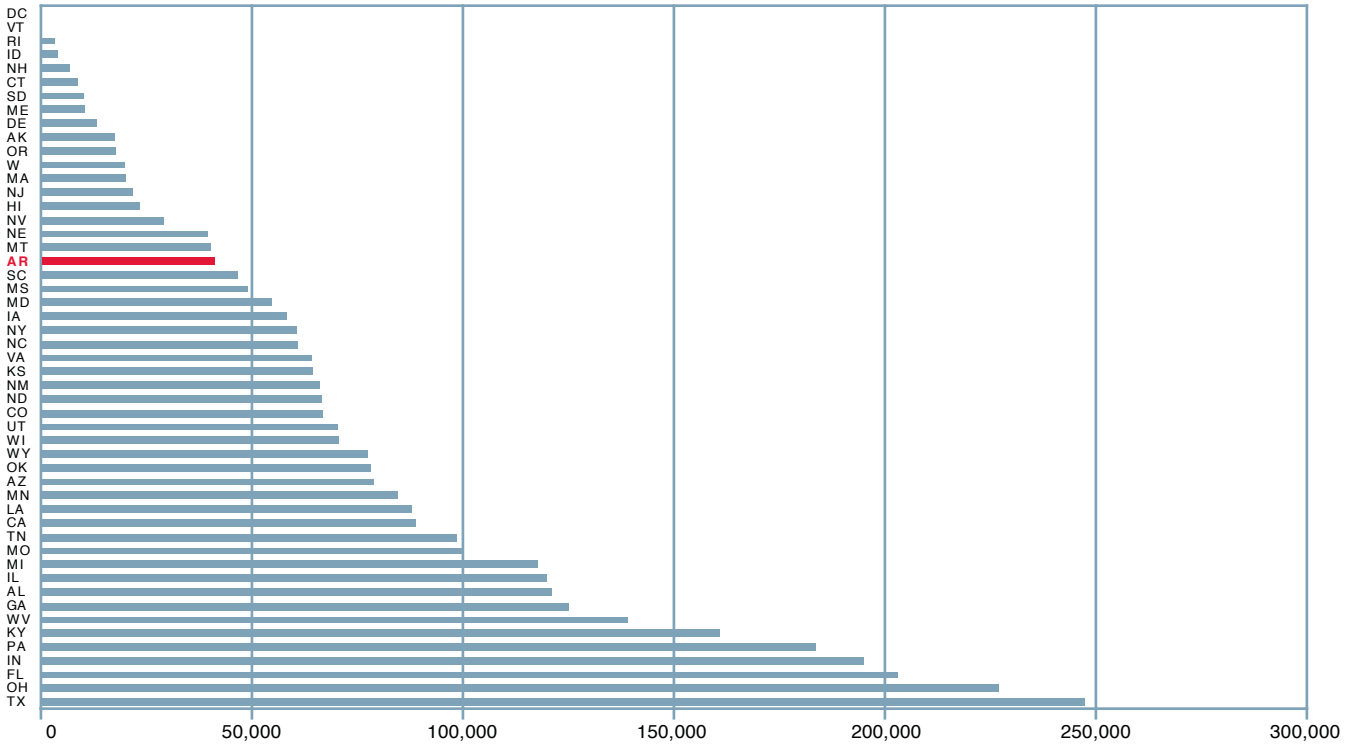
Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure 8.2.2.2 2007 Emissions of the Electric Power Industry, Ranked by State (SO_2 Metric Tons)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure 8.2.2.3 2007 Emissions of the Electric Power Industry, Ranked by State (NOx Metric Tons)

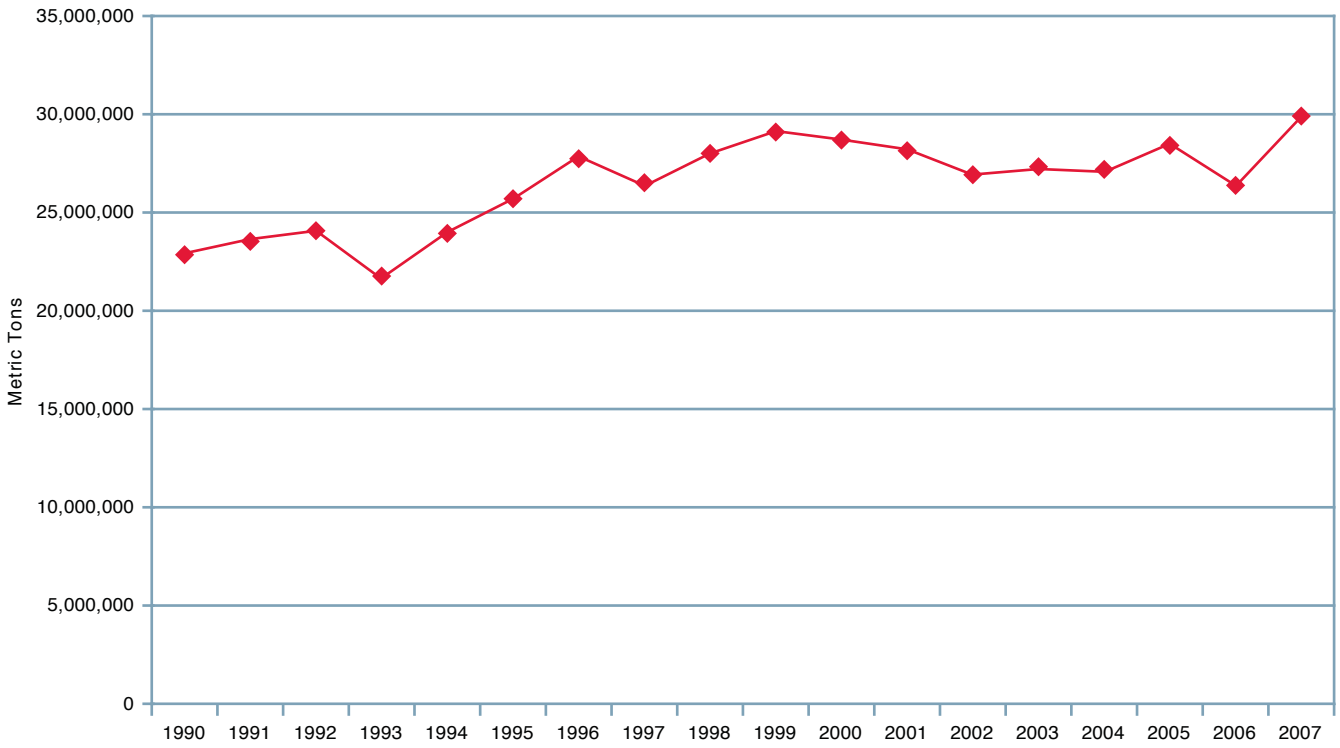


Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

8.2.3 Historic Emissions in Arkansas from Electric Power Generation

Figures 8.2.3.1 to 8.2.3.6 show historic amounts of airborne emissions by type for Arkansas (see Table J.3 in Appendix J). Carbon dioxide emissions increased approximately 13% in 2007, from 26 million metric tons to 29, million metric tons. Sulfur dioxide emissions decreased roughly 15%, from 96.8 thousand metric tons to 81.9 thousand metric tons. Nitrogen oxide emissions decreased approximately 7%, from 44.1 thousand metric tons to 41.0 thousand metric tons. Some policymakers suggest limiting` cumulative carbon emissions to no more than 1 trillion metric tons.[40]

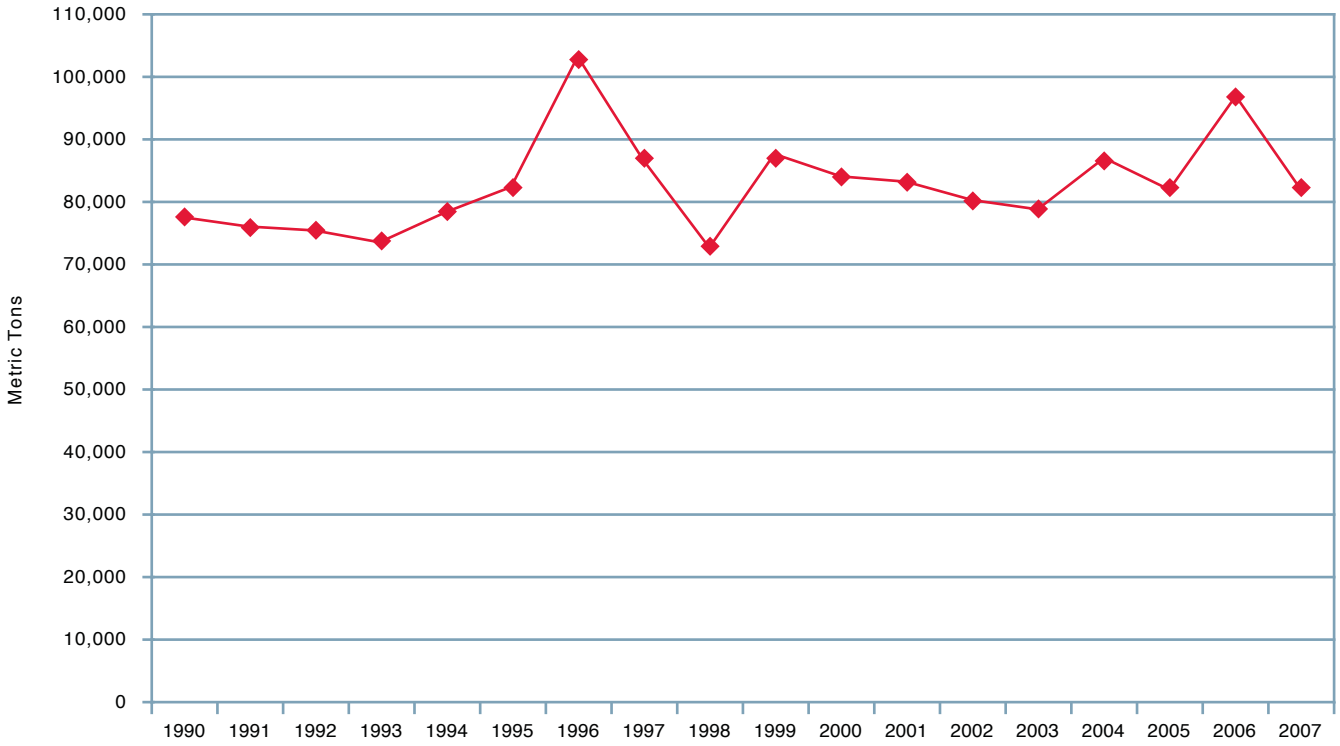
Figure 8.2.3.1 1990-2007 Arkansas Carbon Dioxide Emissions from Electricity Generation



Source: U.S. Energy Information Administration, Nuclear, Arkansas Nuclear Industry, May 2010.

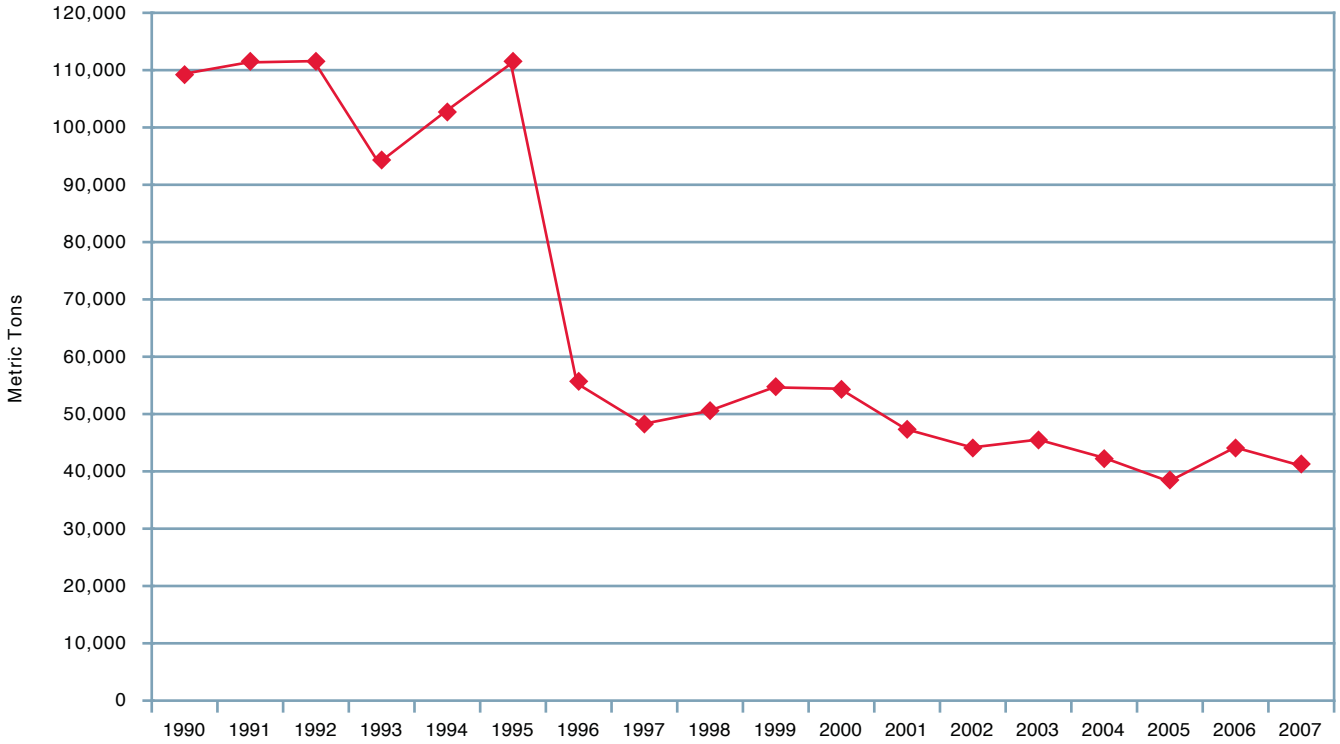
40 Perkins S., *A Limit for Carbon Emissions: 1 Trillion Metric Tons*, Science News: Magazine of the Society for Science & The Public, April 29, 2009, http://www.sciencenews.org/view/generic/id/43294.

Figure 8.2.3.2 1990-2007 Arkansas Sulfur Dioxide Emissions from Electricity Generation



Source: U.S. Energy Information Administration, Nuclear, Arkansas Nuclear Industry, May 2010.

Figure 8.2.3.3 1990-2007 Arkansas Nitrogen Oxide Emissions from Electricity Generation

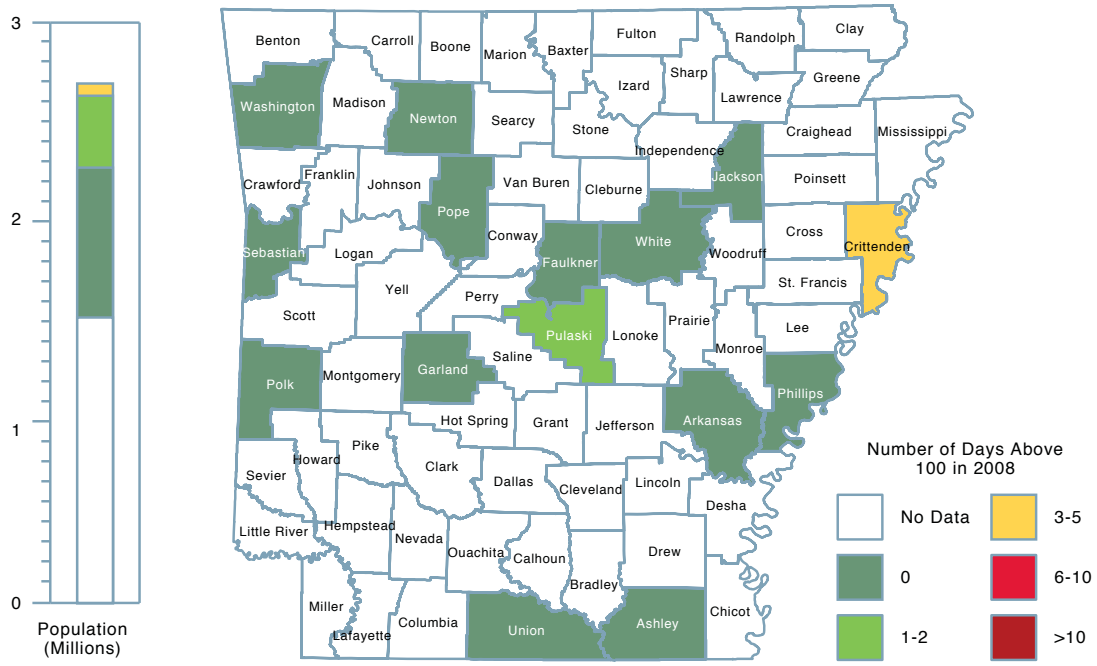


Source: U.S. Energy Information Administration, Nuclear, Arkansas Nuclear Industry, May 2010.

8.2.4 Air Quality by County

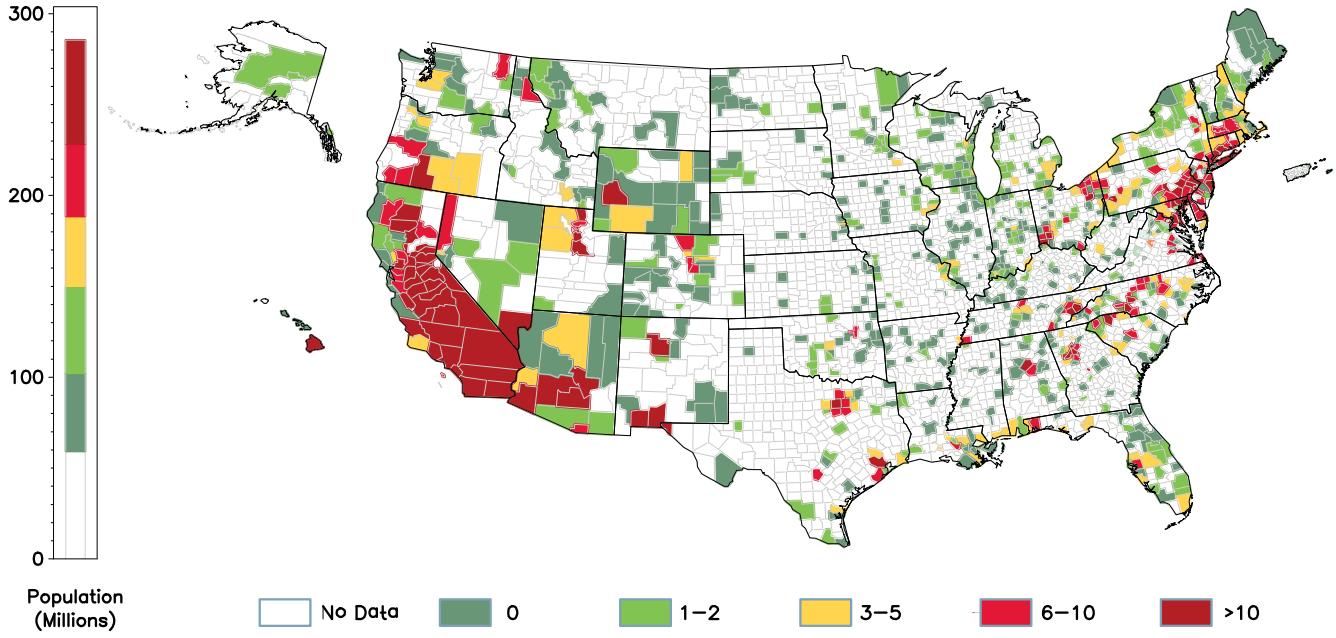
Figures 8.2.4.1 and 8.2.48 present AQI maps for counties in Arkansas and the United States. The maps show the number of days above an AQI value of 100 in 2008. An AQI in excess of 100 indicates an air quality below the national air quality standard.

Figure 8.2.4.1 2008 Arkansas County Air Quality Index



Source: US EPA Office of Air and Radiation, AQS Database, May 2010.

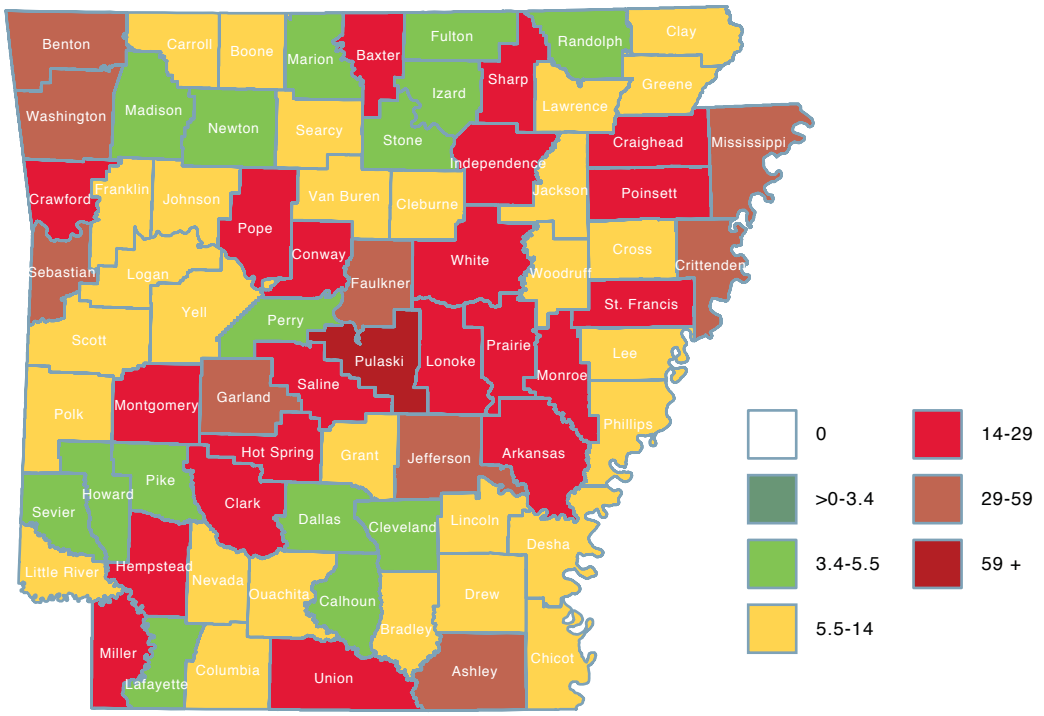
Figure 8.2.4.2 2008 U.S. County Air Quality Index



Source: U.S. EPA Office of Air and Radiation, AQS Database, May 2010.

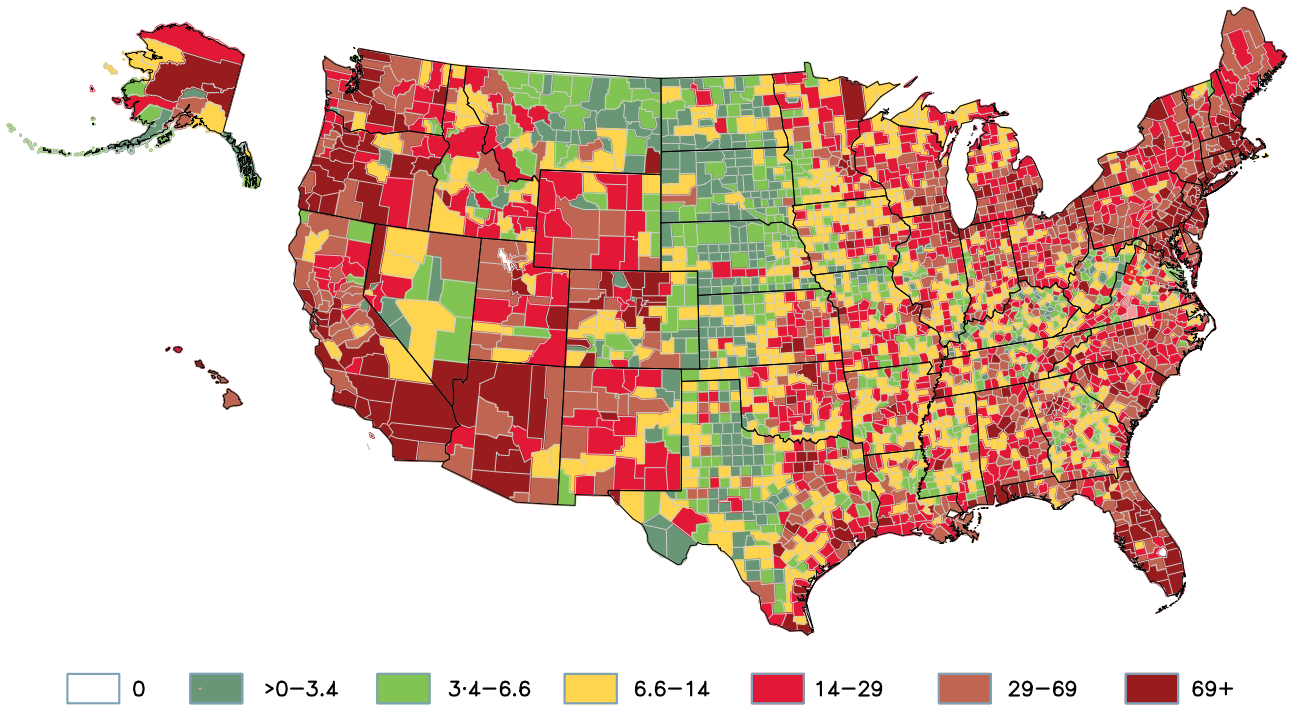
Figure 8.2.4.3 shows the state's county emissions map of carbon monoxide in 2002. All emissions categories are stated as 1,000 tons per year. Likewise, Figure 8.2.4.4 shows the nation's county emissions map of carbon monoxide.

Figure 8.2.4.3 2002 Arkansas County Emissions of Carbon Monoxide (1000 Tons per Year)



Source: U.S. EPA Office of Air and Radiation, NEI Database, May 2010.

Figure 8.2.4.4 2002 U.S. County Emissions of Carbon Monoxide (1000 Tons per Year)



Source: U.S. EPA Office of Air and Radiation, NEI Database, May 2010.

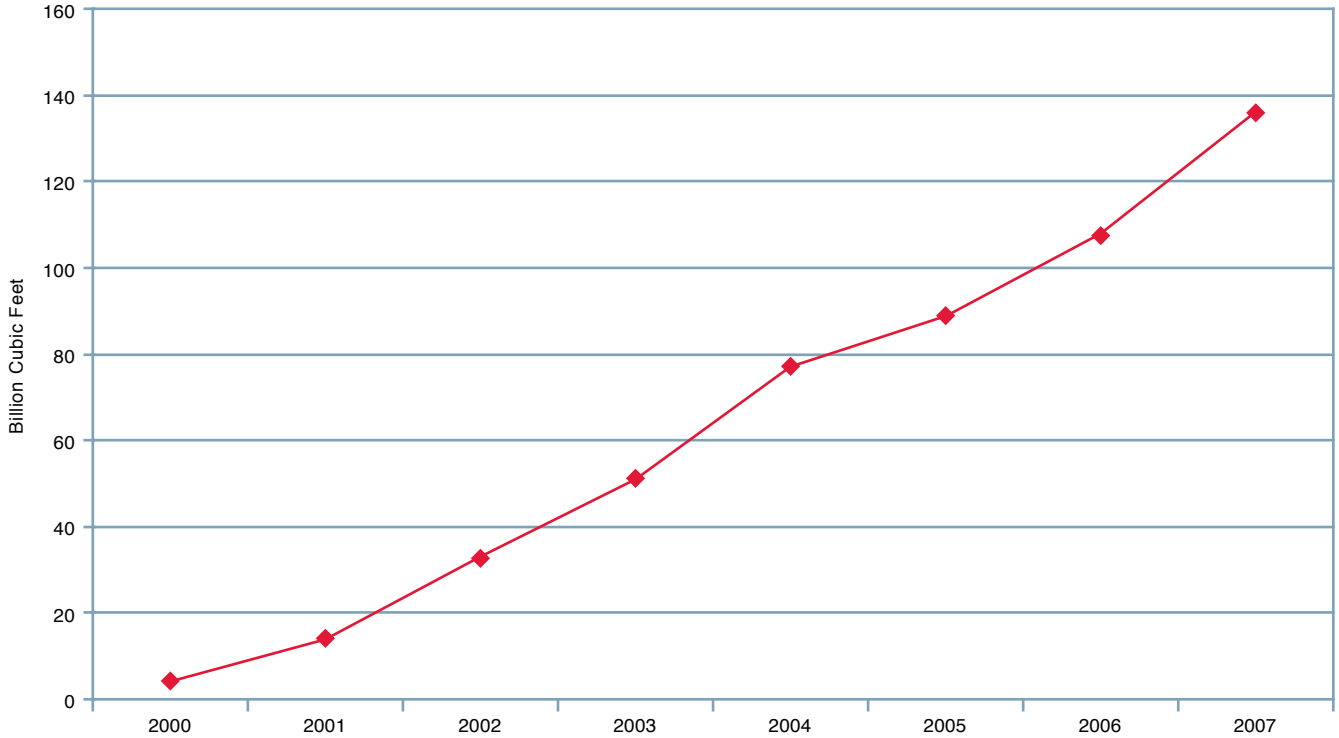
8.3 Coalbed Natural Gas Methane[41]

Coalbed natural gas or coalbed methane (CBM) is the methane gas contained in coal seams. The coalification process begins with plant material that is progressively converted to coal and results in large quantities of methane-rich gas generated and stored within the coal. The development of Arkansas' coalbed natural gas resources began in 2001 and has yielded an approximate cumulative production of 10 Bcf. Estimated 2007 annual production of CBM is approximately 3 Bcf. CDX Gas LLC, a Texas based energy company, is currently the only producer of this resource and has drilled approximately 37 Z-pinnate horizontal wells and 15 vertical wells in Sebastian County, Arkansas. The wells are completed in the Pennsylvanian Lower Hartshorne coal and approximately 564,238 feet of horizontal pinnate lateral has been drilled in Arkansas. On average, approximately 15,000 feet of horizontal lateral is drilled for each of CDX's Z-pinnate wells in the Lower Hartshorne coal.

8.4 Coalbed Methane Production and Reserves

As shown in Figure 8.4.1, Western States include Arkansas, Kansas, Louisiana, Montana, and Oklahoma (see Appendix J Table J.4. for details). Coalbed methane production by these states increased approximately 30%, from 108 Bcf in 2006 to 136 Bcf in 2007. Coalbed methane proved reserves increased approximately 66%, from 1030 Bcf in 2006 to 1709 Bcf in 2007 (Figure 8.4.2).

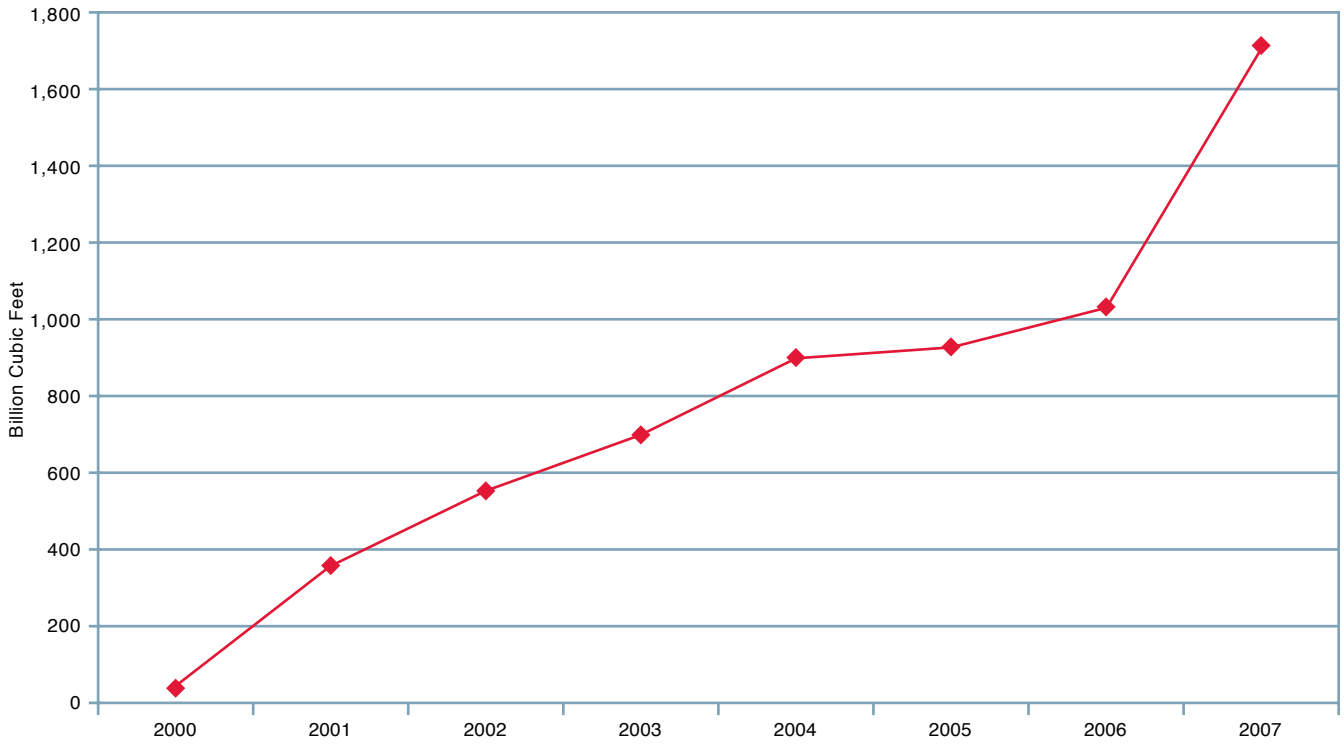
Figure 8.4.1 2000-2007 Western States Coalbed Methane Production



Source: U.S. Energy Information Administration, Natural Gas, Natural Gas Navigator, Exploration & Reserves, May 2010.

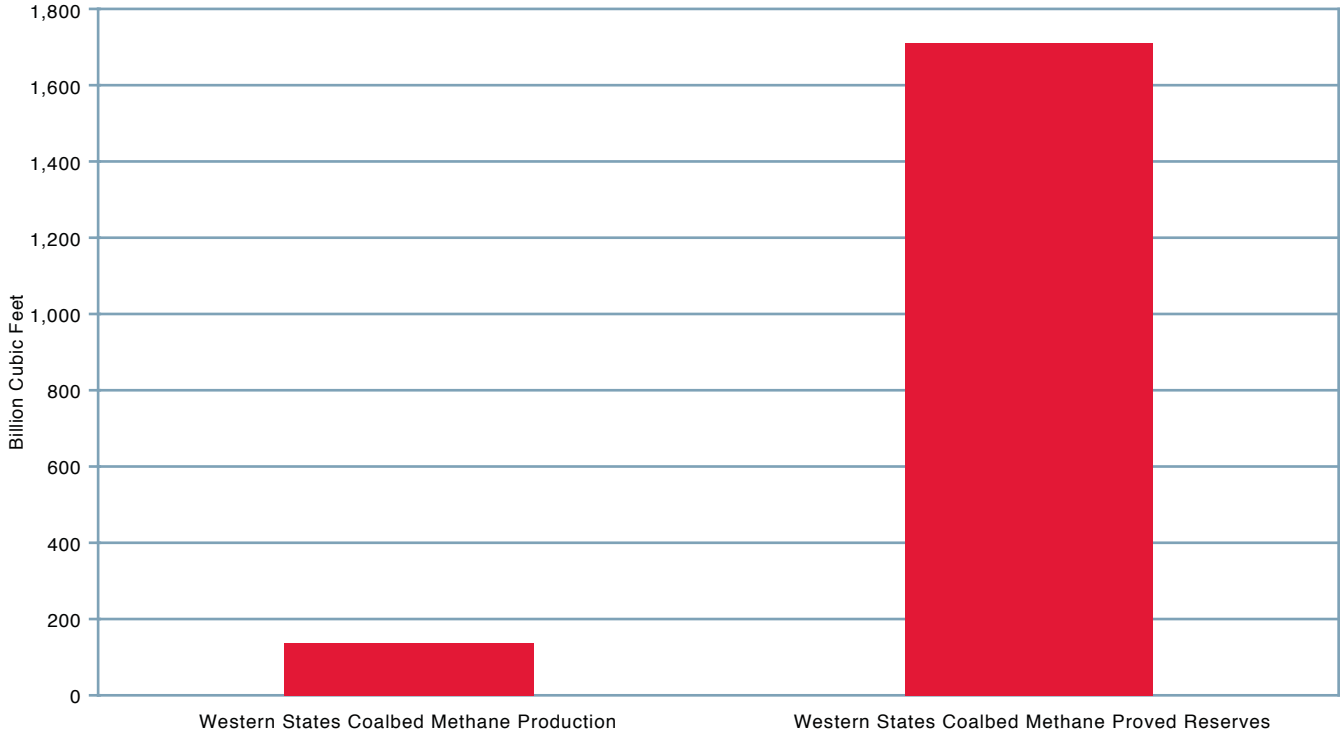
41 Arkansas Geological Survey, Fossil Fuels, Gas, http://www.geology.ar.gov/fossil_fuels/gas.htm.

Figure 8.4.2 2000-2007 Western States Coalbed Methane Proved Reserves



Source: U.S. Energy Information Administration, Natural Gas, Natural Gas Navigator, Exploration & Reserves, May 2010.

Figure 8.4.3 2000-2007 Western States Coalbed Methane Production and Reserves



Source: U.S. Energy Information Administration, Natural Gas, Natural Gas Navigator, Exploration & Reserves, May 2010.

8.5 Ground-level Ozone in Arkansas

According to EPA, ozone (O_3) is a gas composed of three oxygen atoms.[42] At ground-level chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight create ozone. Depending on its location in the atmosphere ozone can be "good" when it occurs miles above the earth or at ground-level it is "bad."[43] Ground-level ozone affects the respiratory system, especially lung functions. Factors that influence the health risk of ground-level ozone include its concentration in the atmosphere, duration of exposure, average volume of air breathed per minute (ventilation rate), and the length of intervals between short-term exposures. In addition, exposure to elevated levels of ground-level ozone affects agricultural crops and trees, especially slow-growing crops and long-lived trees. Leaves and needles of sensitive plants are damaged by ozone exposure causing visible alterations such as defoliation and change of leaf color.[44]

The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants. The Clean Air Act established two types of national air quality standards and set limits for ground-level ozone.[45] Primary standards are designed to protect the public health of sensitive populations including asthmatics, children, and the elderly. Secondary standards are designed to protect public welfare which includes protection against visibility impairment, damage to animals, crops, vegetation, and buildings. Table 8.5.1 summarizes the NAAQS and list counties in Arkansas that violated the standards during the 2006-2008 period.

Table 8.5.1 National Ambient Air Quality Standards for Ground-level Ozone

	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Ozone	0.075 ppm (2008 std)	8-hour	Same as Primary	
	0.08 ppm (1997 std)	8-hour	Same as Primary	

To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 parts per million (ppm) for the 2008 standard and 0.08 ppm for the 1997 standard.

Arkansas Counties Violating the Primary Ground-level Ozone Standard 2006-2008

County	Ozone Concentration (ppm) 2006-2008
Crittenden	0.082
Newton	0.071
Polk	0.074
Pulaski	0.08

Sources: U.S. Environmental Protection Agency, Ground-level Ozone, Ozone Air Quality Standards, http://www.epa.gov/glo/standards.html, August 2010.
U.S. Environmental Protection Agency, Area Designations for 2008 Ground-level Ozone Standards, Region 6 Recommendations and EPA Responses, http://www.epa.gov/ozonedesignations/2008standards/rec/region6R.htm, August 2010.

42 U.S. Environmental Protection Agency, Ground-level Ozone, http://www.epa.gov/glo, August 2010.

43 "Good" ozone occurs naturally in the stratosphere approximately 10 to 30 miles above the earth's surface and forms a layer that protects life on earth from the sun's harmful rays. In the earth's lower atmosphere, ground-level ozone is considered "bad." Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents as well as natural sources emit NOx and VOC that help form ozone. Ground-level ozone is the primary constituent of smog. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air. As a result, it is known as a summertime air pollutant.

44 Anonymous. "Ground-Level Ozone." Pollution Prevention and Abatement Handbook, World Bank Group, Effective July 1998, http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/p_ppah_pguiGroundLevelOzone/$FILE/HandbookGroundLevelOzone.pdf, August 2010.

45 U.S. Environmental Protection Agency, Ground-level Ozone, Ozone Air Quality Standards, http://www.epa.gov/glo/standards.html, August 2010.

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Abbreviations

B	Billion
bbl	Barrel
Btu	British Thermal Unit
cf.	Cubic Feet
Gal	Gallon
GDP	Gross Domestic Product
GSP	Gross State Product
gWh	Gigawatt Hour or Million kWh
kWh	Kilowatt-hour
LPG	Liquefied Petroleum Gas
M	Thousand
MCF	Million Cubic Feet
MM	Million
MW	Megawatts
MWh	Megawatt-Hours
Q	Quadrillion
T	Trillion
Ton	Short Tons

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Glossary

Barrel
Liquid volume measure equal to 42 gallons, commonly used in expressing quantities of petroleum or petroleum products.

Bituminous Coal
Often referred to as “soft coal.” It is more volatile than anthracite and has a higher heat content than lignite. It is the most predominantly used coal. It has a heating value of 11,450 to 13,010 Btu per pound.

British Thermal Unit (Btu)
The quantity of heat necessary to raise the temperature of one pound of water one degree Fahrenheit. Because the different energy types use different standards of measurement, they are often converted into Btu to allow comparison. One Btu is equal to 252 calories of heat.

Chained Dollars
Chained dollars is a method adopted in 1996 to adjust nominal dollar amounts for inflation over time to allow price comparison from different years. Chained dollars are weighted by a market basket of goods and services that changes from year to year so as to more accurately reflect spending.

Commercial Sector
That sector of the economy which engages primarily in the sale of services and for uses other than those involving industrial uses, electric utilities, and residential uses. Included are apartment buildings, office buildings, governmental units, schools, institutions, and churches.

Crude Oil
A mixture of hydrocarbons that exist in the liquid phase in natural under-ground reservoirs. Refined crude oil produces a number of different fuels, such as residual fuel, motor gasoline, and distillate.

Degree Days, Cooling
This statistic is a measure of temperature as it affects energy demand for space cooling. If the average of a day’s high and low temperature extremes is above 65 degrees F, then the number of cooling degree days is equal to the day’s average minus 65.

Degree Days, Heating
This statistic is a measure of temperature as it affects energy demand for space heating. It is based on the fact that most buildings require no heat to maintain an inside temperature of at least 70 degrees F when the daily mean is 65 degrees F. If the average of a day’s high and low temperature extremes is below 65 degrees F, then the number of heating degree days is equal to the 65 minus day’s average.

Distillate Fuel Oil
Usually means “home heating oil.” Its products are actually No. 1 and No. 2 heating oils, diesel fuels and No. 4 fuel oil. These products are used primarily for space heating, on-and off-highway diesel engine fuel (including railroad engine fuel), and electric power generation.

Electric Utility
Includes both public and privately owned utilities located within state lines.

Glossary (continued)

Electrical Generation with Nonfossil Fuels

Includes all electrical generation produced by nuclear, hydroelectric, and other sources such as wood, waste products, geothermal, and solar sources.

End-Use

Any ultimate consumption of any type of fossil fuel (petroleum, coal, natural gas) or electricity whether generated by fossil fuel or other energy sources. End users are often classified by economic sector, such as residential, commercial, industrial, and transportation.

Ethane

A normally gaseous and colorless compound recovered as a liquid at natural gas processing plants and refineries. It is used primarily as a petrochemical feedstock for the eventual production of chemicals and plastic materials.

Feedstock

The raw material furnished to a machine or process. Fossil fuels are used for their chemical properties rather than their values as fuel, e.g. oil used to produce plastics and synthetic fabrics.

Fossil Fuels

Any naturally occurring fuel of an organic nature such as coal, oil, and natural gas derived from the remains of ancient plants and animals. These sometimes are called conventional energy sources (as compared with solar power, wind energy, etc.) because the bulk of today's energy is derived from them and most of the industrial economy is based upon them.

Gallon

A unit of volume. A U.S. gallon contains 3.785 liters and it is 0.83 times the imperial gallon. One U.S. gallon of water weighs 8.3 pounds.

Hydro

A prefix used to identify a type of generating station, or power, or energy output in which the prime motor is driven by water power.

Industrial Sector

That section of the economy involved in either mining, construction, or manufacturing.

Jet Fuel

Includes both naphtha-type and kerosene-type jet fuel meeting standards for use in aircraft turbine engines. Some jet fuel is used for generating electricity in gas turbines.

Kerosene

A petroleum middle distillate having burning properties suitable for use as an illuminate when burned in wick lamps. Kerosene is also used in space heaters, cooking stoves, and water heaters.

Kilowatt-Hours (kWh)

The amount of electrical energy involved with a 1-kilowatt demand over a period of one hour. One kilowatt-hour is equivalent to 3,412 Btu of heat energy.

Glossary (continued)

Lignite

A brownish-black coal of low quality with high inherent moisture and volatile matter (used almost exclusively for electric power generation).

Liquified Gases

Propane, propylene, butane, and propane-butane mixtures produced at a refinery or natural gas processing plant, including plants that fractionate raw natural gas processing plant liquids. These are derived by refining and processing natural gas, crude oil, or unfinished oil.

Megawatt (MW)

1,000 kilowatts, 1 million watts.

Megawatt Hours (MWh)

1,000 kilowatt-hours.

Motor Gasoline

A complex mixture of relatively volatile hydrocarbons, with or without small quantities of additives that have been blended to form a fuel suitable for use in spark ignition engines.

Nameplate Capacity

The maximum rated output of a generator under specific conditions designated by the manufacturer. Generator nameplate capacity is usually indicated in units of kilovolt-amperes (kVA) and in kilowatts (kW) on a nameplate physically attached to the generator.

Natural Gas

A mixture of hydrocarbon compounds and small quantities of various nonhydrocarbons existing in the gaseous phase (“gas well” gas) or in a solution with crude oil (“oil well” gas) in natural underground reservoirs at reservoir conditions. It comes from the ground with or without accompanying crude oil and is generally much higher in heat content than manufactured gas. It is used as the raw material in the petrochemical industry for the manufacturing of fertilizer and cellophane.

Natural Gas Plant Liquids

Products obtained from processing natural gas at natural gas processing plants, including natural gasoline plants, cycling plants, and fractionators. Products obtained include ethane, liquefied petroleum gases (propane, butane and propane-butane mixtures), isopentane, natural gasoline, plant condensate, and other minor quantities of finished products, such as motor gasoline, special naphtha, jet fuel, kerosene, and distillate fuel oil.

Nominal Dollars

Dollars that are current and not adjusted for inflation.

No. 1 Diesel Fuel

A light distillate having ignition properties suitable for use in compression ignition engines. City buses use this product extensively.

Glossary (continued)

No. 1 Fuel Oil

A distillate fuel oil intended for use in vaporizing pot-type burners.

No. 2 Diesel Fuel

A heavier distillate for use in compression ignition engines less sensitive than those requiring No. 1 diesel fuel. Highway transport trucks are large consumers of this product.

No. 2 Fuel Oil

A distillate fuel oil for general purpose domestic heating in burners not requiring No. 1 fuel oil.

No. 4 Fuel Oil

An oil for commercial burner installations with preheating facilities. It is extensively used in industrial plants. This grade is a blend of distillate fuel oil and residual fuel oil stocks.

Nuclear

The energy liberated by fission, fusion, or by radioactive decay.

Petroleum

A generic term applied to oil and oil products in all forms, such as crude oil, lease condensate, unfinished oil, refined petroleum products, natural gas plants liquids, and nonhydrocarbon compounds blended into finished petroleum products.

Primary Fuel

Energy in its naturally occurring form (coal, oil, uranium) before conversion to end-use forms.

Propane

A colorless, highly volatile hydrocarbon that is readily recovered as a liquefied gas at natural gas processing plants and refineries. It is used primarily for residential and commercial heating and cooling, and also as a fuel for transportation and industrial uses, including petrochemical feedstocks. Propane is the first product refined from crude petroleum.

Proved Reserves

In the context of crude oil and natural gas, proved reserves are the estimated quantities that analysis of geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions. Reservoirs are considered proved if economic producibility is supported by actual production or conclusive formation test or if economic producibility is supported by core analysis and or electric or other log interpretations.

Real Dollars

Dollars that are adjusted for inflation.

Recoverable Reserves

Relates to that portion of demonstrated resources that can be recovered economically with the application of extraction technology available currently or in the foreseeable future.

Glossary (continued)

Refined Petroleum

Products obtained from the processing of crude oil, unfinished oils, natural gas liquids, and other miscellaneous hydrocarbon compounds. Includes aviation gasoline, motor gasoline, naphthatype jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, ethane, liquefied petroleum gases, petrochemical feedstocks, special naphtha, lubricants, paraffin wax, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

Residential Sector

Includes private households. Specifically included are the following end-uses: space heating, space cooling, water heating, cooking, lighting, clothes drying, and refrigeration.

Residual Fuel

The heavier oils that remain after the distillate fuel oils and lighter hydrocarbons are boiled off in refinery operations. Included are products known as No. 5 and No. 6 fuel oil, heavy diesel oil, Navy Special Fuel Oil, Bunker C oil, and acid sludge and pitch used as refinery fuels. Residual fuel oil is used for production of electric power, space heating, vessel bunkering, and various industrial purposes.

Subbituminous Coal

A coal whose properties range from those of lignite to those of bituminous coal and used primarily as fuel for steam-electric power generation. It may be dull, dark brown to black, soft and crumbly, at the lower end of the range, to bright, jet black, hard, and relatively strong, at the upper end. Subbituminous coal contains 20 to 30 percent inherent moisture by weight. The heat content of subbituminous coal ranges from 17 to 24 million Btu. per ton on a moist, mineral-matter-free basis. The heat content of subbituminous coal consumed in the United States averages 17 to 18 million Btu per ton, on the as-received basis (i.e., containing both inherent moisture and mineral matter).

Ton

In the United States, Canada, and Union of South Africa, a unit of weight equal to 2,000 pounds. The American ton is often called the short ton. The metric ton is equal 2,204.62 pounds.

Total Resource Base

Total recoverable and demonstrated reserves, and identified and undiscovered resources.

Trillion

1,000,000,000,000 or 1012.

Watt

The unit of measure for electric power or rate of doing work. The rate of energy transfer equivalent to 1 ampere flowing under a pressure of 1 volt at unity power factor. It is analogous to horsepower or foot-pounds per minute or mechanical power. One horsepower is equivalent to approximately 746 watts.

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Overview of the Energy Economy

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Table C.1 2007 Travel Statistics for Arkansas and the United States

2007 Statistics	Arkansas	United States
Population	2,834,797	301,621,157
Population Driving Age (16 and Over)	2,215,834	236,468,212
Licensed Drivers	2,046,039	205,741,845
Number of Registered Vehicles	2,010,301	247,264,605
Number of Registered Vehicles (per Capita)	0.71	0.82
Number of Registered Vehicles per Capita (Driving Age)	0.91	1.05
No. Vehicles per Licensed Drivers	0.98	1.20
Fuel Consumed (Thousands of Gallons)	2,004,952	175,022,559
Gasoline Highway Use	1,377,803	135,417,561
Gasoline Non-Highway Use	67,510	4,479,695
Special Fuel	673,731	40,785,107
Vehicle Miles Travelled (Millions)	33,171	3,029,822
Average Miles Travelled per Registered Vehicle	16,501	12,253
Average Miles per Gallon	16.5	17.3
Average Fuel Consumption per Registered Vehicle (Gallons)	997.3	707.8

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, http://www.fhwa.dot.gov/policyinformation/statistics/2007/2007_hwy_statistics.pdf, June 2010.

Table C.2 2007 Average Gallons Used Per Registered Vehicle

Rank	State	Gallons/Vehicle
1	Colorado	1,188.8
2	Mississippi	830.9
3	Nevada	792.6
4	**ARKANSAS**	**703.8**
5	South Carolina	699.8
6	North Carolina	698.0
7	New Jersey	682.2
8	Texas	652.5
9	Missouri	647.2
10	Arizona	642.6
11	Indiana	631.3
12	Kentucky	618.4
13	Maryland	616.9
14	Maine	615.9
15	Virginia	610.5
16	Louisiana	601.4
17	Vermont	585.0
18	New Hampshire	578.7
19	Tennessee	577.8
20	District of Columbia	576.4
21	New Mexico	575.1
22	Georgia	574.8
23	West Virginia	571.8
24	Michigan	565.1
25	Oklahoma	562.5
26	Alabama	554.3
27	Minnesota	539.9
28	Kansas	534.3
29	Delaware	532.1
30	Wyoming	529.3
31	Massachusetts	528.5
32	Montana	517.3
33	Idaho	510.5
34	Illinois	508.4
35	Florida	503.8
36	Connecticut	503.6
37	Pennsylvania	498.8
38	Oregon	492.3
39	Rhode Island	491.2
40	North Dakota	486.4
41	New York	486.0
42	Wisconsin	485.2
43	Nebraska	472.9
44	Iowa	471.2
45	South Dakota	468.4
46	Hawaii	463.4
47	Ohio	462.6
48	Washington	458.5
49	Utah	458.1
50	California	452.4
51	Alaska	424.2
	United States	**552.0**

Source: U.S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, http://www.fhwa.dot.gov/policyinformation/statistics/2007/2007_hwy_statistics.pdf, June 2010.

Table C.3 2007 Average Petroleum Prices by State

Rank	State	$/Million Btu
1	District of Columbia	$22.45
2	Rhode Island	$21.45
3	Vermont	$21.31
4	Michigan	$21.07
5	Idaho	$21.00
6	Oregon	$20.87
7	Nebraska	$20.87
8	Maryland	$20.78
9	Connecticut	$20.76
10	Kansas	$20.76
11	Wyoming	$20.73
12	Utah	$20.73
13	Wisconsin	$20.65
14	Colorado	$20.62
15	Pennsylvania	$20.62
16	Nevada	$20.61
17	North Dakota	$20.59
18	Illinois	$20.58
19	New Mexico	$20.54
20	Arizona	$20.50
21	**ARKANSAS**	**$20.42**
22	Ohio	$20.34
23	North Carolina	$20.32
24	Iowa	$20.30
25	Massachusetts	$20.29
26	South Dakota	$20.28
27	New Hampshire	$20.26
28	Minnesota	$20.18
29	California	$20.04
30	Oklahoma	$19.89
31	Maine	$19.86
32	Washington	$19.69
33	Virginia	$19.64
34	Alabama	$19.62
35	Missouri	$19.56
36	Indiana	$19.52
37	West Virginia	$19.36
38	Delaware	$19.32
39	Tennessee	$19.28
40	Mississippi	$19.15
41	Montana	$19.05
42	New York	$18.95
43	South Carolina	$18.61
44	Georgia	$18.56
45	Florida	$18.37
46	New Jersey	$18.12
47	Kentucky	$18.08
48	Texas	$18.08
49	Alaska	$17.97
50	Louisiana	$17.41
51	Hawaii	$16.95
	United States	**$19.45**

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

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Table C.4 2007 Petroleum Expenditures by State

Rank	State	Million Dollars
1	Texas	$94,946
2	California	$73,781
3	Florida	$36,406
4	New York	$30,892
5	Pennsylvania	$27,798
6	Illinois	$26,834
7	Ohio	$26,242
8	New Jersey	$23,080
9	Louisiana	$20,978
10	Michigan	$20,456
11	Georgia	$20,353
12	Virginia	$19,689
13	North Carolina	$19,639
14	Indiana	$16,051
15	Tennessee	$15,438
16	Washington	$15,212
17	Missouri	$14,830
18	Massachusetts	$13,868
19	Minnesota	$13,389
20	Kentucky	$12,912
21	Wisconsin	$12,673
22	Arizona	$12,199
23	Alabama	$12,009
24	Maryland	$11,579
25	South Carolina	$10,653
26	Colorado	$10,593
27	Oklahoma	$10,316
28	Iowa	$8,939
29	Connecticut	$8,227
30	Mississippi	$8,221
31	Kansas	$8,026
32	Oregon	$8,026
33	**ARKANSAS**	**$7,664**
34	Nevada	$6,016
35	Utah	$5,890
36	New Mexico	$5,536
37	West Virginia	$5,422
38	Alaska	$5,198
39	Nebraska	$4,903
40	Hawaii	$4,877
41	Maine	$4,680
42	Montana	$3,573
43	Idaho	$3,480
44	New Hampshire	$3,436
45	Wyoming	$3,248
46	North Dakota	$2,780
47	South Dakota	$2,459
48	Delaware	$2,104
49	Rhode Island	$1,963
50	Vermont	$1,865
51	District of Columbia	$505
	United States	**$739,856**

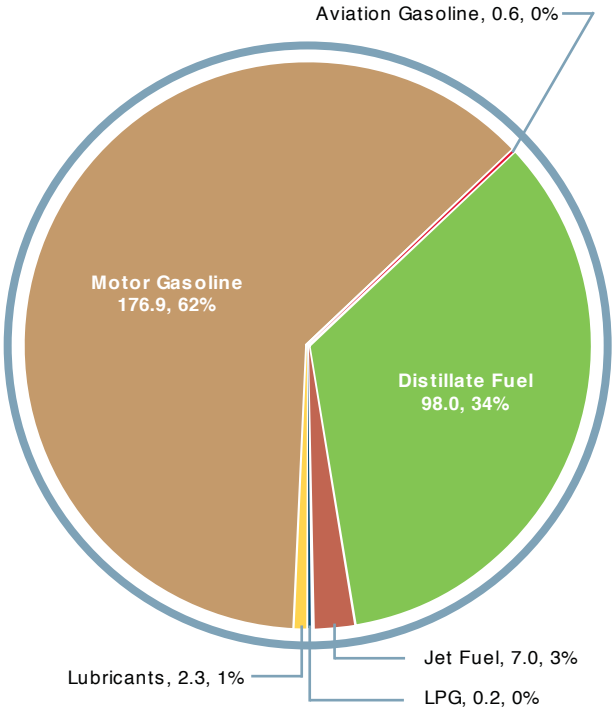
Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Table C.5 2007 Natural Gas Expenditures by State

Rank	State	Million Dollars
1	Texas	$21,460
2	California	$19,816
3	New York	$13,779
4	Illinois	$9,377
5	Ohio	$9,139
6	Florida	$8,910
7	Pennsylvania	$8,283
8	Michigan	$7,657
9	Louisiana	$7,571
10	New Jersey	$7,196
11	Massachusetts	$5,068
12	Georgia	$4,889
13	Indiana	$4,818
14	Oklahoma	$4,560
15	Wisconsin	$3,999
16	Virginia	$3,427
17	Minnesota	$3,425
18	Alabama	$3,399
19	Arizona	$3,218
20	Missouri	$3,112
21	Colorado	$2,971
22	Washington	$2,770
23	North Carolina	$2,702
24	Mississippi	$2,622
25	Maryland	$2,567
26	Iowa	$2,373
27	Tennessee	$2,283
28	Oregon	$2,247
29	Kansas	$2,190
30	Nevada	$2,104
31	Kentucky	$2,013
32	Connecticut	$1,981
33	**ARKANSAS**	**$1,919**
34	South Carolina	$1,782
35	Utah	$1,356
36	Nebraska	$1,271
37	New Mexico	$1,079
38	West Virginia	$981
39	Rhode Island	$962
40	Idaho	$726
41	New Hampshire	$662
42	Montana	$572
43	Delaware	$526
44	District of Columbia	$471
45	Alaska	$461
46	Wyoming	$454
47	South Dakota	$426
48	Maine	$420
49	North Dakota	$298
50	Vermont	$112
51	Hawaii	$78
	United States	**$196,482**

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure C.1 2007 Arkansas Transportation Sector Petroleum Consumption by Fuel Type (Trillion Btu, Percent of Total)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

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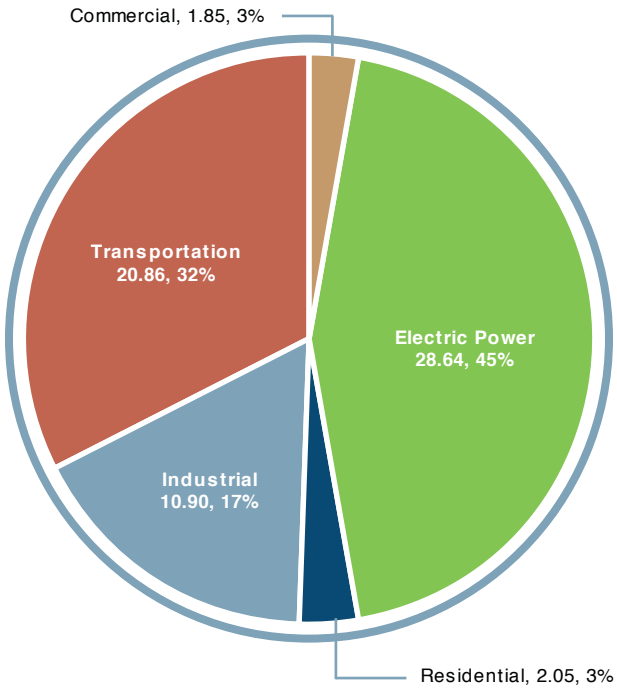
Table C.6 2007 Energy Consumption by End-Use Sector, Ranked by State

	Residential Sector		Commercial Sector		Industrial Sector		Transportation Sector		Total Consumption	
Rank	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu
1	Texas	1,594.1	California	1,613.9	Texas	5,950.9	California	3,386.8	Texas	11,834.5
2	California	1,535.2	Texas	1,381.6	Louisiana	2,403.8	Texas	2,907.9	California	8,491.5
3	Florida	1,339.5	New York	1,257.4	California	1,955.7	Florida	1,614.3	Florida	4,601.9
4	New York	1,201.8	Florida	1,089.2	Ohio	1,347.8	New York	1,100.5	New York	4,064.3
5	Illinois	997.1	Illinois	780.1	Indiana	1,345.8	Illinois	1,063.5	Ohio	4,048.9
6	Pennsylvania	966.6	Pennsylvania	718.9	Pennsylvania	1,288.8	Ohio	1,037.8	Illinois	4,043.2
7	Ohio	955.6	Ohio	707.8	Illinois	1,202.5	New Jersey	1,037.0	Pennsylvania	4,006.2
8	Michigan	786.0	New Jersey	639.1	Alabama	941.6	Pennsylvania	1,031.8	Louisiana	3,766.2
9	Georgia	744.4	Michigan	624.5	Kentucky	891.6	Georgia	935.5	Georgia	3,133.0
10	North Carolina	715.9	Virginia	600.5	Georgia	887.4	Virginia	814.5	Michigan	3,026.9
11	Virginia	628.4	North Carolina	573.5	Michigan	818.6	Michigan	797.9	Indiana	2,904.0
12	New Jersey	615.5	Georgia	565.7	Tennessee	740.1	North Carolina	766.9	New Jersey	2,743.7
13	Indiana	551.5	Maryland	416.4	North Carolina	643.7	Louisiana	713.8	North Carolina	2,700.0
14	Tennessee	546.2	Missouri	406.8	Wisconsin	623.5	Washington	672.2	Virginia	2,610.9
15	Missouri	521.1	Tennessee	386.7	South Carolina	620.9	Tennessee	657.5	Tennessee	2,330.5
16	Washington	490.1	Massachusetts	384.0	Oklahoma	588.3	Indiana	646.6	Alabama	2,132.0
17	Massachusetts	443.1	Washington	383.9	Minnesota	578.4	Missouri	607.3	Washington	2,067.2
18	Arizona	430.1	Arizona	368.5	Virginia	567.4	Arizona	547.4	Kentucky	2,023.0
19	Maryland	425.6	Indiana	360.1	Florida	558.9	Minnesota	530.8	Missouri	1,964.1
20	Wisconsin	419.0	Wisconsin	356.8	Washington	521.0	Alabama	504.4	Minnesota	1,874.6
21	Minnesota	413.5	Minnesota	351.9	New York	504.6	Kentucky	497.9	Wisconsin	1,846.3
22	Alabama	405.5	Louisiana	292.3	Iowa	492.2	Massachusetts	491.7	South Carolina	1,692.3
23	Kentucky	372.6	Colorado	291.1	**ARKANSAS**	**463.7**	Oklahoma	463.8	Oklahoma	1,608.5
24	South Carolina	359.0	Alabama	280.6	Mississippi	454.1	Maryland	462.7	Arizona	1,577.8
25	Louisiana	356.4	South Carolina	263.5	New Jersey	452.1	South Carolina	448.9	Massachusetts	1,514.6
26	Colorado	342.9	Kentucky	260.9	Missouri	428.9	Wisconsin	446.9	Maryland	1,488.7
27	Oklahoma	306.2	Oklahoma	250.3	Kansas	426.0	Colorado	446.3	Colorado	1,479.3
28	Connecticut	276.5	Connecticut	218.5	Colorado	399.0	Mississippi	375.9	Mississippi	1,239.5
29	Oregon	267.6	Oregon	209.4	West Virginia	396.1	Oregon	347.0	Iowa	1,235.2
30	Iowa	234.5	Kansas	202.5	Alaska	356.3	Iowa	316.0	**ARKANSAS**	**1,149.3**
31	Mississippi	234.4	Iowa	192.4	Oregon	284.2	**ARKANSAS**	**295.2**	Kansas	1,136.2
32	**ARKANSAS**	**228.6**	Mississippi	175.0	Wyoming	263.4	Kansas	281.7	Oregon	1,108.2
33	Kansas	226.0	**ARKANSAS**	**161.9**	New Mexico	251.9	Utah	262.4	Connecticut	870.7
34	Nevada	183.3	Utah	151.8	Arizona	231.7	Connecticut	260.5	West Virginia	850.5
35	Utah	166.4	Nebraska	136.0	Utah	224.9	Nevada	258.5	Utah	805.5
36	West Virginia	163.6	Nevada	134.2	Nebraska	224.2	Alaska	250.5	Nevada	777.4
37	Nebraska	154.5	New Mexico	124.9	Nevada	201.4	New Mexico	219.6	Alaska	723.6
38	Idaho	122.3	D.C.	124.6	NorthDakota	198.8	Hawaii	195.3	New Mexico	710.7
39	New Mexico	114.3	West Virginia	111.5	Massachusetts	195.6	West Virginia	179.2	Nebraska	692.9
40	Maine	106.6	Idaho	83.6	Idaho	186.9	Nebraska	178.3	Idaho	529.6
41	New Hampshire	92.2	Maine	75.7	Montana	186.4	Idaho	136.9	Wyoming	496.4
42	Montana	79.4	New Hampshire	70.4	Maryland	184.0	Montana	128.1	Montana	462.1
43	Rhode Island	71.9	Montana	68.3	Maine	146.7	Wyoming	126.9	Maine	455.6
44	Delaware	66.8	Alaska	62.4	Connecticut	115.2	Maine	126.5	NorthDakota	428.1
45	South Dakota	66.0	North Dakota	60.9	Delaware	101.1	New Hampshire	107.1	Hawaii	343.7
46	North Dakota	63.8	Wyoming	60.3	South Dakota	74.8	North Dakota	104.5	New Hampshire	314.2
47	Alaska	54.4	South Dakota	58.7	Hawaii	68.3	South Dakota	92.7	Delaware	302.0
48	Vermont	47.5	Delaware	58.4	New Hampshire	44.6	Delaware	75.7	South Dakota	292.2
49	Wyoming	45.8	Rhode Island	57.6	Vermont	29.4	Rhode Island	64.6	Rhode Island	217.6
50	Hawaii	37.7	Hawaii	42.4	Rhode Island	23.5	Vermont	54.0	D.C.	187.2
51	D.C.	37.1	Vermont	31.2	D.C.	4.0	D.C.	21.5	Vermont	162.1
	United States	**21,604.3**	**United States**	**18,278.7**	**United States**	**32,494.1**	**United States**	**29,091.0**	**United States**	**101,468.0**

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure C.2 2007 Arkansas CO_2 Emissions by Economic Sector (Million Metric Tons, Percent of Total)



Source: U.S. Energy Information Administration, State Carbon Emission, http://www.eia.doe.gov/environment.html, June 2010.

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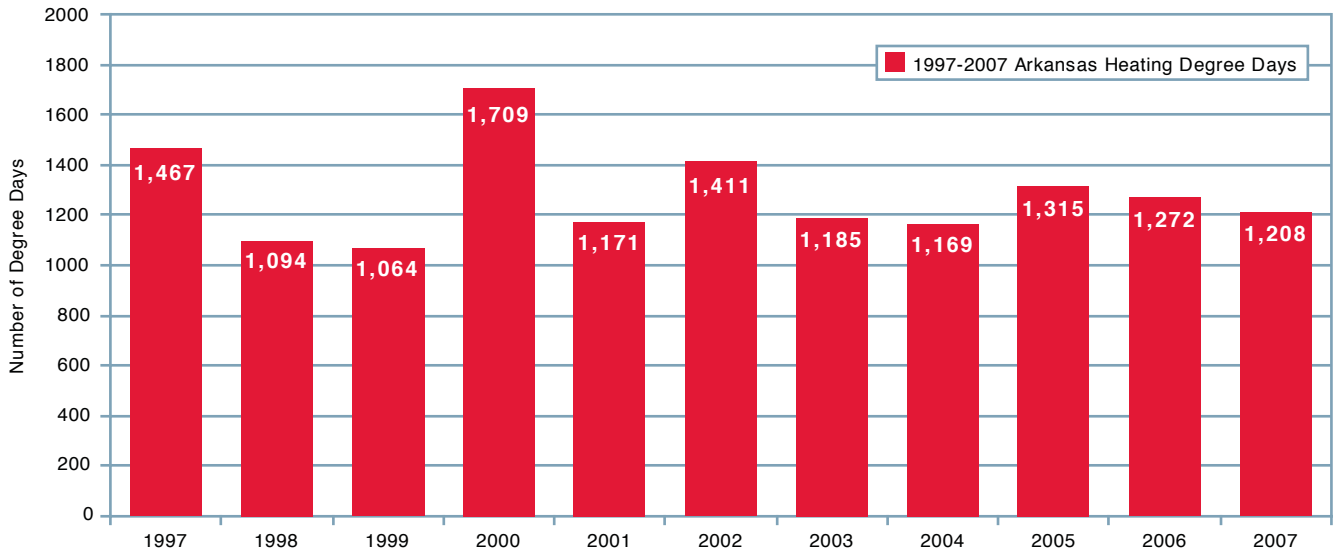
2007 Arkansas Heating and Cooling Days

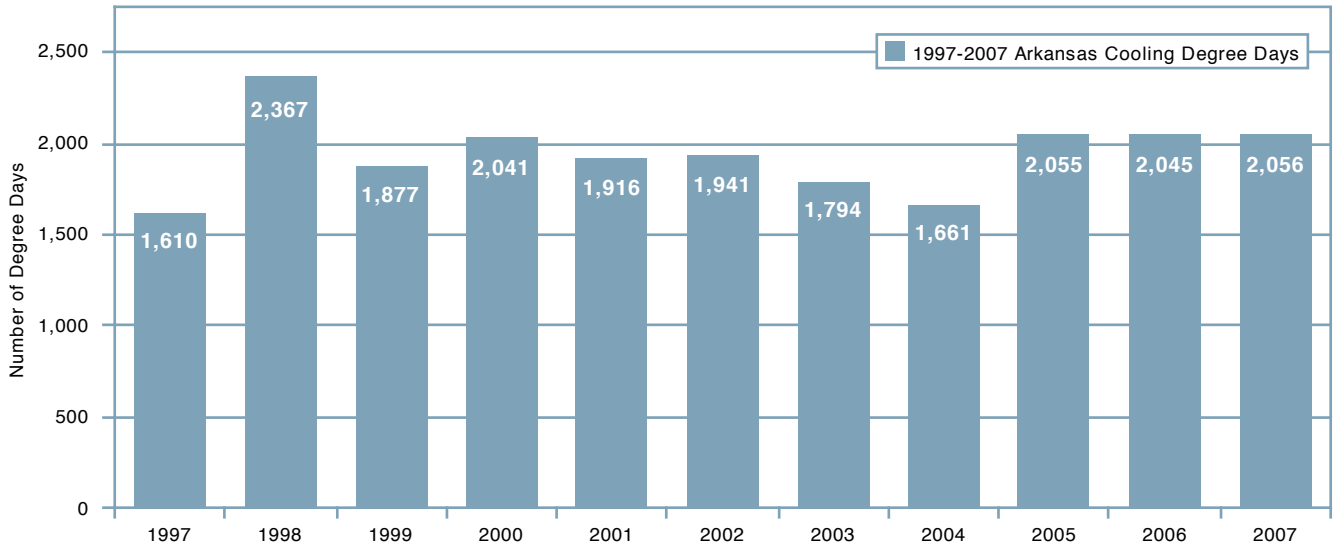
Heating degree days (HDD) and cooling degree days (CDD) are a measure of the demand for energy to heat or to cool. Degree days are an average temperature computed by averaging the daily high and daily low. The average daily temperature is then subtracted from a base temperature (Base 65 degrees). If the differences is positive then it is called a HDD, otherwise if the differences is negative, it is called a CDD. Weighted state average degree days are computed by dividing the state into regions, calculated HDD and CDD by region, and summing either the weighted regional values (HDD or CDD) where the weights are the region percent of the total state population (Census 2000 population)

Figure C.3 1997-2007 Arkansas Number of Heating Degree Days (Base 65)



Source: Heating and Cooling Degree Days Monthly Summary, Climate Prediction Center, National Weather Services, NOAA, December Monthly data various years.

Figure C.4 1997-2007 Arkansas Number of Cooling Degree Days (Base 65)



Source: Heating and Cooling Degree Days Monthly Summary, Climate Prediction Center, National Weather Services, NOAA, December Monthly data various years.

Historic Energy Trends in Arkansas 1970-2007

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APPENDIX D

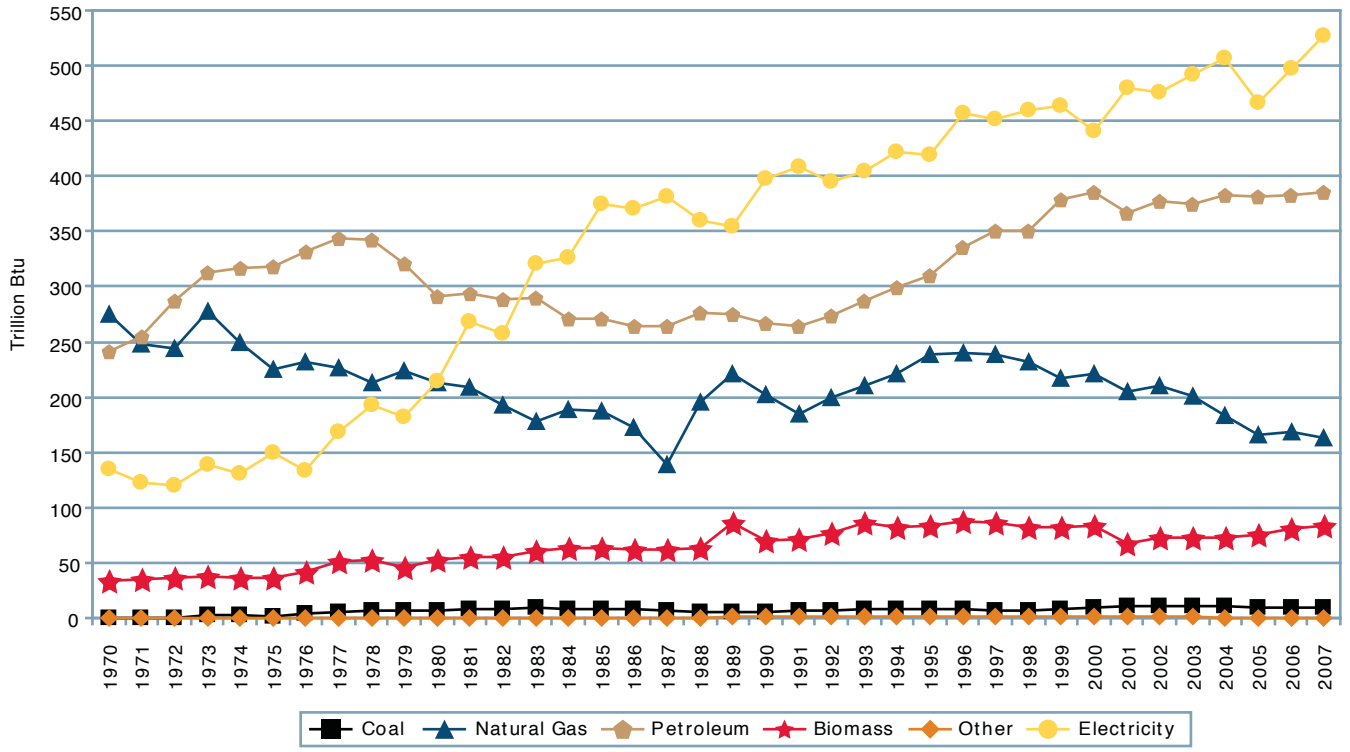
Table D.1 1970-2007 Arkansas End-Use Energy Consumption by Fuel Type and Electricity (Trillion Btu)

Year	Coal	% of Total	Natural Gas	% of Total	Petroleum	% of Total	Biomass	% of Total	Other	% of Total	Electricity*	% of Total	Total
1970	0.0	0%	275.6	40%	241.9	35%	34.3	5%	0.0	0%	135.0	20%	686.8
1971	0.1	0%	248.2	38%	255.3	39%	34.7	5%	0.0	0%	122.9	19%	661.2
1972	0.1	0%	244.1	36%	286.6	42%	36.9	5%	0.0	0%	119.4	17%	687.0
1973	2.3	0%	278.2	36%	312.4	41%	37.6	5%	0.0	0%	138.3	18%	768.7
1974	2.7	0%	250.0	34%	316.3	43%	36.7	5%	0.0	0%	131.3	18%	737.0
1975	0.9	0%	225.3	31%	317.6	44%	35.9	5%	0.0	0%	149.4	20%	729.0
1976	3.6	0%	232.0	31%	331.0	45%	41.3	6%	0.0	0%	134.0	18%	741.9
1977	5.2	1%	227.1	29%	343.5	43%	51.1	6%	0.0	0%	168.3	21%	795.2
1978	6.7	1%	213.5	26%	342.6	42%	52.0	6%	0.0	0%	192.1	24%	807.0
1979	7.3	1%	224.0	29%	320.5	41%	45.8	6%	0.0	0%	181.5	23%	779.1
1980	6.5	1%	213.6	27%	290.8	37%	52.4	7%	0.0	0%	214.2	28%	777.4
1981	7.7	1%	208.9	25%	294.5	35%	55.3	7%	0.0	0%	268.1	32%	834.5
1982	7.6	1%	192.9	24%	288.2	36%	55.6	7%	0.0	0%	257.9	32%	802.1
1983	9.3	1%	177.3	21%	290.2	34%	60.4	7%	0.0	0%	321.4	37%	858.7
1984	8.6	1%	188.5	22%	270.4	32%	63.0	7%	0.0	0%	326.9	38%	857.4
1985	8.1	1%	187.3	21%	270.4	30%	62.9	7%	0.0	0%	375.2	42%	903.9
1986	7.7	1%	173.1	20%	264.7	30%	61.8	7%	0.0	0%	370.4	42%	877.7
1987	6.7	1%	139.3	16%	264.9	31%	61.6	7%	0.0	0%	381.2	45%	853.7
1988	5.8	1%	196.1	22%	276.6	31%	63.8	7%	0.0	0%	360.4	40%	902.7
1989	6.1	1%	221.1	23%	275.3	29%	86.2	9%	1.4	0%	354.8	38%	944.9
1990	5.8	1%	201.8	21%	267.0	28%	70.6	7%	1.4	0%	397.8	42%	944.5
1991	6.8	1%	184.2	20%	263.8	28%	71.4	8%	1.4	0%	408.1	44%	935.8
1992	7.1	1%	198.9	21%	273.9	29%	76.3	8%	1.4	0%	395.3	41%	953.0
1993	7.8	1%	210.9	21%	287.6	29%	85.8	9%	1.4	0%	403.8	40%	997.3
1994	8.6	1%	221.6	21%	299.7	29%	82.5	8%	1.4	0%	421.4	41%	1035.3
1995	7.8	1%	238.6	23%	309.4	29%	82.9	8%	1.4	0%	419.2	40%	1059.4
1996	8.4	1%	240.2	21%	336.1	30%	87.8	8%	1.4	0%	456.8	40%	1130.6
1997	7.0	1%	238.6	21%	350.9	31%	86.9	8%	1.3	0%	451.0	40%	1135.7
1998	7.0	1%	231.5	20%	350.7	31%	82.0	7%	1.2	0%	459.9	41%	1132.3
1999	7.9	1%	216.6	19%	379.1	33%	82.2	7%	1.2	0%	464.3	40%	1151.3
2000	9.6	1%	220.8	19%	385.9	34%	83.5	7%	1.0	0%	441.2	39%	1142.1
2001	10.9	1%	204.5	18%	366.5	32%	66.8	6%	0.9	0%	479.8	42%	1129.5
2002	10.5	1%	210.6	18%	377.1	33%	72.9	6%	0.8	0%	476.4	41%	1148.2
2003	10.1	1%	200.3	17%	374.5	33%	73.3	6%	0.7	0%	491.9	43%	1150.8
2004	10.1	1%	182.8	16%	383.3	33%	73.5	6%	0.6	0%	506.5	44%	1156.8
2005	9.3	1%	165.6	15%	381.9	35%	75.7	7%	0.5	0%	465.9	42%	1098.8
2006	9.1	1%	168.5	15%	383.0	34%	80.3	7%	0.5	0%	497.6	44%	1139.2
2007	9.8	1%	162.8	14%	386.1	33%	83.1	7%	0.6	0%	527.4	45%	1169.8

*Electricity consumption incorporates the net interstate flow of electricity.

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure D.1 1970-2007 Arkansas End-Use Energy Consumption by Fuel Type and Electricity (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

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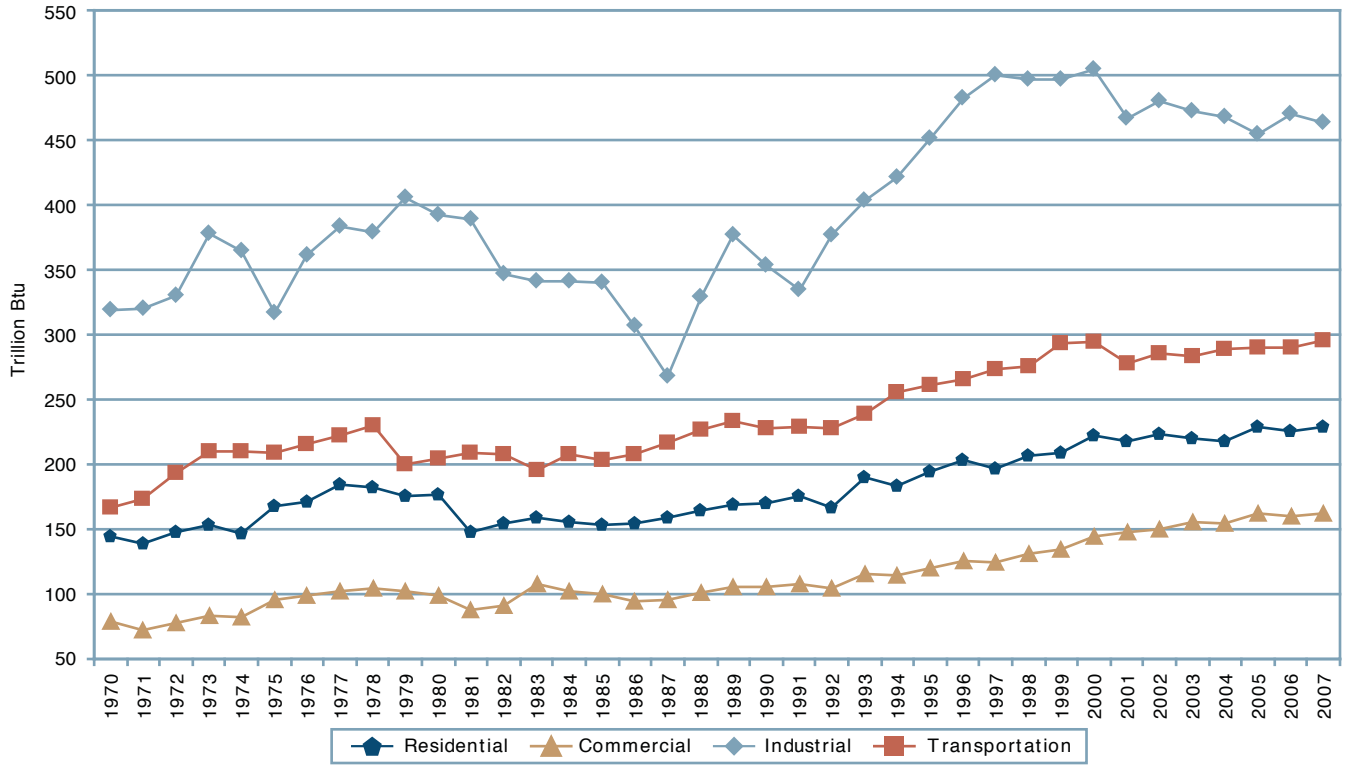
Table D.2 1970-2007 Arkansas Energy Consumption by End-Use Sector (Trillion Btu)

Year	Transportation	% of Total	Commercial	% of Total	Industrial	% of Total	Residential	% of Total	Total
1970	166.51	23.50%	78.36	11.06%	319.01	45.01%	144.80	20.43%	708.67
1971	173.32	24.61%	72.04	10.23%	319.96	45.43%	139.04	19.74%	704.36
1972	193.01	25.77%	77.66	10.37%	330.35	44.11%	147.89	19.75%	748.91
1973	209.78	25.43%	83.22	10.09%	378.10	45.84%	153.74	18.64%	824.84
1974	210.04	26.15%	82.40	10.26%	364.20	45.34%	146.70	18.26%	803.35
1975	209.44	26.50%	96.09	12.16%	316.91	40.10%	167.79	21.23%	790.23
1976	215.95	25.51%	98.64	11.65%	361.27	42.68%	170.69	20.16%	846.55
1977	222.47	24.90%	102.63	11.49%	383.72	42.95%	184.58	20.66%	893.41
1978	229.45	25.63%	104.46	11.67%	378.98	42.33%	182.49	20.38%	895.38
1979	200.01	22.63%	102.38	11.58%	405.31	45.86%	176.10	19.93%	883.80
1980	204.24	23.43%	99.04	11.36%	391.91	44.97%	176.39	20.24%	871.58
1981	208.93	25.09%	87.53	10.51%	388.52	46.66%	147.75	17.74%	832.73
1982	208.25	26.01%	91.45	11.42%	346.54	43.29%	154.30	19.27%	800.55
1983	195.33	24.31%	108.08	13.45%	340.96	42.44%	159.05	19.80%	803.41
1984	207.44	25.71%	102.71	12.73%	340.82	42.24%	155.92	19.32%	806.89
1985	203.41	25.51%	100.45	12.60%	340.41	42.69%	153.11	19.20%	797.38
1986	207.71	27.25%	94.08	12.34%	306.45	40.21%	153.91	20.19%	762.14
1987	216.89	29.35%	95.83	12.97%	267.36	36.18%	158.86	21.50%	738.95
1988	226.67	27.63%	101.07	12.32%	328.51	40.04%	164.21	20.01%	820.47
1989	233.70	26.37%	106.05	11.97%	377.19	42.57%	169.16	19.09%	886.10
1990	228.09	26.63%	105.04	12.27%	353.09	41.23%	170.21	19.87%	856.44
1991	229.42	27.06%	107.77	12.71%	334.68	39.48%	175.82	20.74%	847.67
1992	227.66	25.99%	104.74	11.96%	376.74	43.00%	166.95	19.06%	876.09
1993	239.26	25.24%	115.19	12.15%	403.23	42.54%	190.27	20.07%	947.94
1994	255.69	26.20%	114.99	11.78%	421.47	43.19%	183.76	18.83%	975.90
1995	260.82	25.39%	120.18	11.70%	451.41	43.95%	194.66	18.95%	1027.07
1996	265.77	24.67%	125.56	11.65%	482.57	44.79%	203.58	18.89%	1077.48
1997	273.49	24.97%	124.93	11.41%	499.74	45.62%	197.22	18.00%	1095.38
1998	276.07	24.85%	131.62	11.85%	496.42	44.69%	206.65	18.60%	1110.77
1999	293.32	25.88%	134.26	11.85%	496.76	43.83%	208.94	18.44%	1133.28
2000	294.20	25.24%	144.30	12.38%	504.78	43.30%	222.52	19.09%	1165.80
2001	277.78	25.04%	147.51	13.30%	466.53	42.05%	217.54	19.61%	1109.36
2002	285.94	25.09%	150.37	13.20%	480.11	42.13%	223.12	19.58%	1139.54
2003	282.97	25.03%	155.44	13.75%	472.05	41.75%	220.11	19.47%	1130.58
2004	289.18	25.61%	154.20	13.66%	468.00	41.45%	217.63	19.28%	1129.02
2005	289.48	25.51%	161.78	14.25%	454.93	40.09%	228.71	20.15%	1134.90
2006	289.71	25.31%	160.11	13.99%	469.91	41.05%	225.02	19.66%	1144.74
2007	295.16	25.68%	161.92	14.09%	463.70	40.34%	228.57	19.89%	1149.35

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure D.2 1970-2007 Arkansas Energy Consumption by End-Use Sector (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

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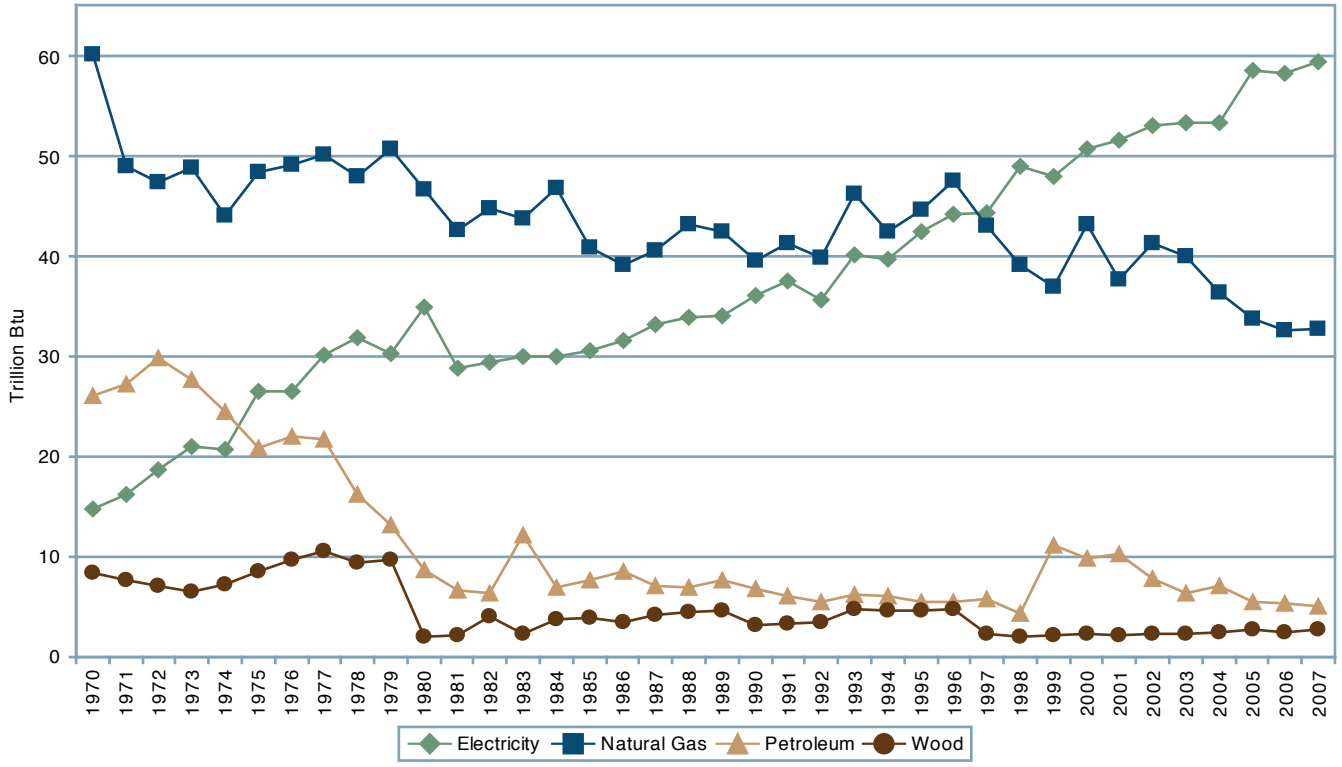
Table D.3 1970-2007 Arkansas Residential Sector End-Use Energy Consumption
(Trillion Btu)

Year	Electricity	% of Total	Natural Gas	% of Total	Petroleum	% of Total	Wood	% of Total	Total
1970	14.74	13.51%	60.03	55.02%	26.00	23.83%	8.34	7.65%	109.12
1971	16.16	16.16%	48.93	48.91%	27.28	27.27%	7.67	7.67%	100.05
1972	18.71	18.16%	47.39	45.99%	29.79	28.91%	7.16	6.94%	103.04
1973	20.96	20.16%	48.78	46.94%	27.68	26.63%	6.52	6.27%	103.93
1974	20.75	21.52%	43.98	45.61%	24.44	25.35%	7.24	7.51%	96.42
1975	26.45	25.38%	48.30	46.36%	20.84	20.00%	8.60	8.25%	104.19
1976	26.43	24.64%	49.15	45.81%	22.05	20.55%	9.65	8.99%	107.27
1977	30.08	26.74%	50.04	44.49%	21.77	19.35%	10.60	9.42%	112.49
1978	31.81	30.21%	47.90	45.49%	16.19	15.38%	9.39	8.92%	105.29
1979	30.24	29.15%	50.68	48.85%	13.14	12.67%	9.68	9.33%	103.74
1980	34.89	37.82%	46.56	50.47%	8.75	9.49%	2.05	2.22%	92.26
1981	28.75	35.86%	42.59	53.12%	6.69	8.34%	2.15	2.68%	80.18
1982	29.40	34.77%	44.69	52.85%	6.35	7.51%	4.12	4.87%	84.56
1983	30.02	34.04%	43.67	49.52%	12.12	13.74%	2.38	2.70%	88.19
1984	29.90	34.22%	46.77	53.52%	6.98	7.99%	3.74	4.28%	87.39
1985	30.49	36.79%	40.86	49.30%	7.68	9.27%	3.85	4.64%	82.88
1986	31.57	38.21%	39.04	47.25%	8.52	10.31%	3.51	4.24%	82.64
1987	33.12	38.93%	40.56	47.66%	7.15	8.40%	4.27	5.01%	85.09
1988	33.93	38.28%	43.16	48.68%	7.01	7.90%	4.55	5.14%	88.65
1989	33.97	38.28%	42.49	47.87%	7.69	8.66%	4.60	5.19%	88.75
1990	36.02	42.14%	39.49	46.19%	6.82	7.98%	3.16	3.70%	85.49
1991	37.53	42.51%	41.31	46.79%	6.13	6.94%	3.31	3.75%	88.29
1992	35.62	42.22%	39.74	47.11%	5.53	6.55%	3.48	4.12%	84.37
1993	40.13	41.25%	46.12	47.40%	6.22	6.39%	4.83	4.96%	97.30
1994	39.72	42.78%	42.43	45.70%	6.11	6.58%	4.58	4.94%	92.85
1995	42.37	43.66%	44.58	45.94%	5.51	5.68%	4.58	4.72%	97.05
1996	44.13	43.33%	47.51	46.64%	5.46	5.36%	4.76	4.67%	101.86
1997	44.32	46.41%	43.02	45.05%	5.81	6.09%	2.35	2.46%	95.50
1998	48.93	51.79%	39.14	41.43%	4.31	4.56%	2.09	2.21%	94.46
1999	47.92	48.82%	36.89	37.58%	11.15	11.36%	2.20	2.24%	98.17
2000	50.74	47.83%	43.16	40.68%	9.83	9.27%	2.36	2.22%	106.09
2001	51.53	50.62%	37.70	37.03%	10.35	10.16%	2.23	2.19%	101.80
2002	52.98	50.82%	41.22	39.54%	7.79	7.47%	2.26	2.17%	104.26
2003	53.22	52.18%	39.95	39.17%	6.44	6.31%	2.38	2.33%	101.99
2004	53.29	53.75%	36.32	36.63%	7.09	7.15%	2.44	2.46%	99.14
2005	58.46	58.23%	33.80	33.66%	5.46	5.44%	2.68	2.67%	100.40
2006	58.23	59.05%	32.60	33.06%	5.34	5.41%	2.44	2.48%	98.61
2007	59.42	59.52%	32.72	32.78%	5.00	5.01%	2.69	2.70%	99.83

Note: This data do not include electric generation, transmission, and distribution losses.

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure D.3 1970-2007 Arkansas Residential Sector End-Use Energy Consumption
(Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS).
http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

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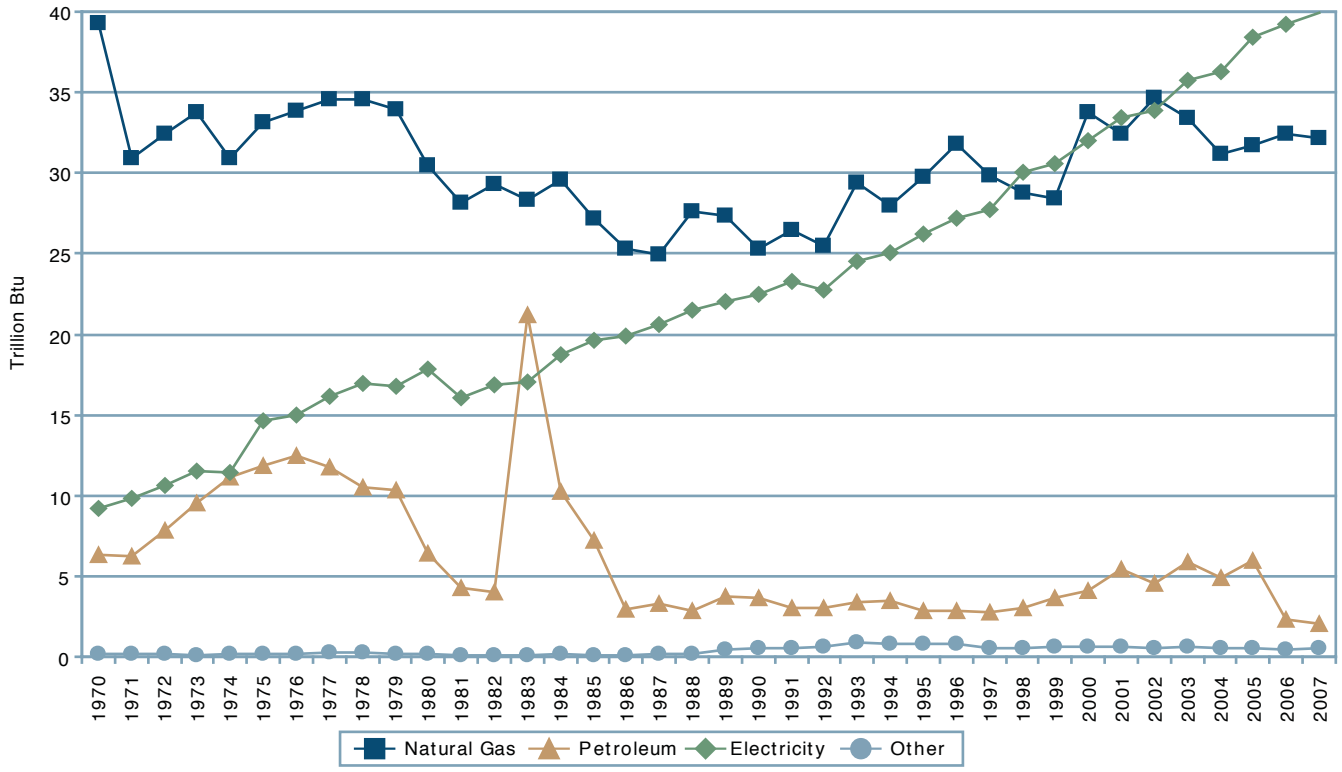
Table D.4 1970-2007 Arkansas Commercial Sector End-Use Energy Consumption
(Trillion Btu)

Year	Natural Gas	% of Total	Petroleum	% of Total	Electricity	% of Total	Other	% of Total	Total
1970	39.33	71.09%	6.32	11.43%	9.52	17.20%	0.16	0.28%	55.32
1971	30.96	65.18%	6.22	13.09%	10.17	21.42%	0.14	0.30%	47.49
1972	32.46	63.19%	7.80	15.19%	10.97	21.35%	0.14	0.26%	51.37
1973	33.72	61.13%	9.51	17.24%	11.81	21.40%	0.12	0.22%	55.16
1974	30.95	57.34%	11.16	20.67%	11.73	21.73%	0.14	0.25%	53.98
1975	33.13	55.09%	11.89	19.77%	14.95	24.87%	0.16	0.27%	60.13
1976	33.87	54.74%	12.49	20.19%	15.32	24.77%	0.18	0.29%	61.87
1977	34.59	54.86%	11.72	18.58%	16.51	26.18%	0.24	0.38%	63.06
1978	34.58	55.26%	10.49	16.76%	17.26	27.58%	0.25	0.40%	62.58
1979	33.97	55.20%	10.32	16.77%	17.06	27.73%	0.18	0.30%	61.54
1980	30.51	55.24%	6.39	11.57%	18.17	32.90%	0.16	0.30%	55.24
1981	28.15	57.53%	4.30	8.79%	16.43	33.57%	0.06	0.11%	48.93
1982	29.34	57.87%	4.05	7.99%	17.18	33.87%	0.13	0.26%	50.70
1983	28.31	42.25%	21.24	31.70%	17.40	25.97%	0.06	0.08%	67.01
1984	29.54	50.08%	10.22	17.32%	19.08	32.34%	0.16	0.26%	58.99
1985	27.18	49.87%	7.25	13.31%	19.95	36.61%	0.11	0.20%	54.50
1986	25.28	52.10%	2.95	6.09%	20.18	41.60%	0.10	0.21%	48.52
1987	24.91	50.59%	3.26	6.62%	20.92	42.48%	0.15	0.31%	49.24
1988	27.64	52.67%	2.85	5.44%	21.82	41.58%	0.16	0.31%	52.48
1989	27.38	50.76%	3.72	6.89%	22.40	41.53%	0.44	0.81%	53.94
1990	25.32	48.39%	3.68	7.03%	22.80	43.57%	0.53	1.01%	52.32
1991	26.42	49.30%	3.00	5.60%	23.62	44.07%	0.55	1.03%	53.59
1992	25.49	48.83%	3.04	5.83%	23.06	44.18%	0.60	1.16%	52.20
1993	29.36	50.24%	3.34	5.72%	24.88	42.58%	0.85	1.46%	58.44
1994	28.00	48.52%	3.47	6.01%	25.42	44.05%	0.82	1.42%	57.71
1995	29.72	49.58%	2.89	4.82%	26.52	44.22%	0.83	1.39%	59.96
1996	31.82	50.51%	2.83	4.48%	27.51	43.67%	0.84	1.33%	63.00
1997	29.85	48.72%	2.76	4.50%	28.10	45.86%	0.56	0.91%	61.27
1998	28.76	45.88%	3.02	4.82%	30.40	48.50%	0.50	0.80%	62.68
1999	28.40	44.71%	3.62	5.70%	30.93	48.69%	0.58	0.91%	63.52
2000	33.81	47.76%	4.07	5.75%	32.32	45.66%	0.59	0.84%	70.79
2001	32.46	44.91%	5.47	7.56%	33.76	46.71%	0.59	0.82%	72.27
2002	34.69	46.85%	4.54	6.13%	34.24	46.24%	0.57	0.77%	74.04
2003	33.38	43.99%	5.86	7.72%	36.06	47.52%	0.58	0.77%	75.88
2004	31.16	42.57%	4.87	6.66%	36.61	50.03%	0.54	0.74%	73.19
2005	31.70	41.19%	5.96	7.74%	38.78	50.40%	0.51	0.67%	76.95
2006	32.39	43.38%	2.30	3.07%	39.51	52.92%	0.47	0.63%	74.66
2007	32.18	42.88%	2.09	2.78%	40.27	53.66%	0.50	0.67%	75.04

Note: This data do not include electric generation, transmission, and distribution losses.

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure D.4 1970-2007 Arkansas Commercial Sector End-Use Energy Consumption (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

APPENDIX D

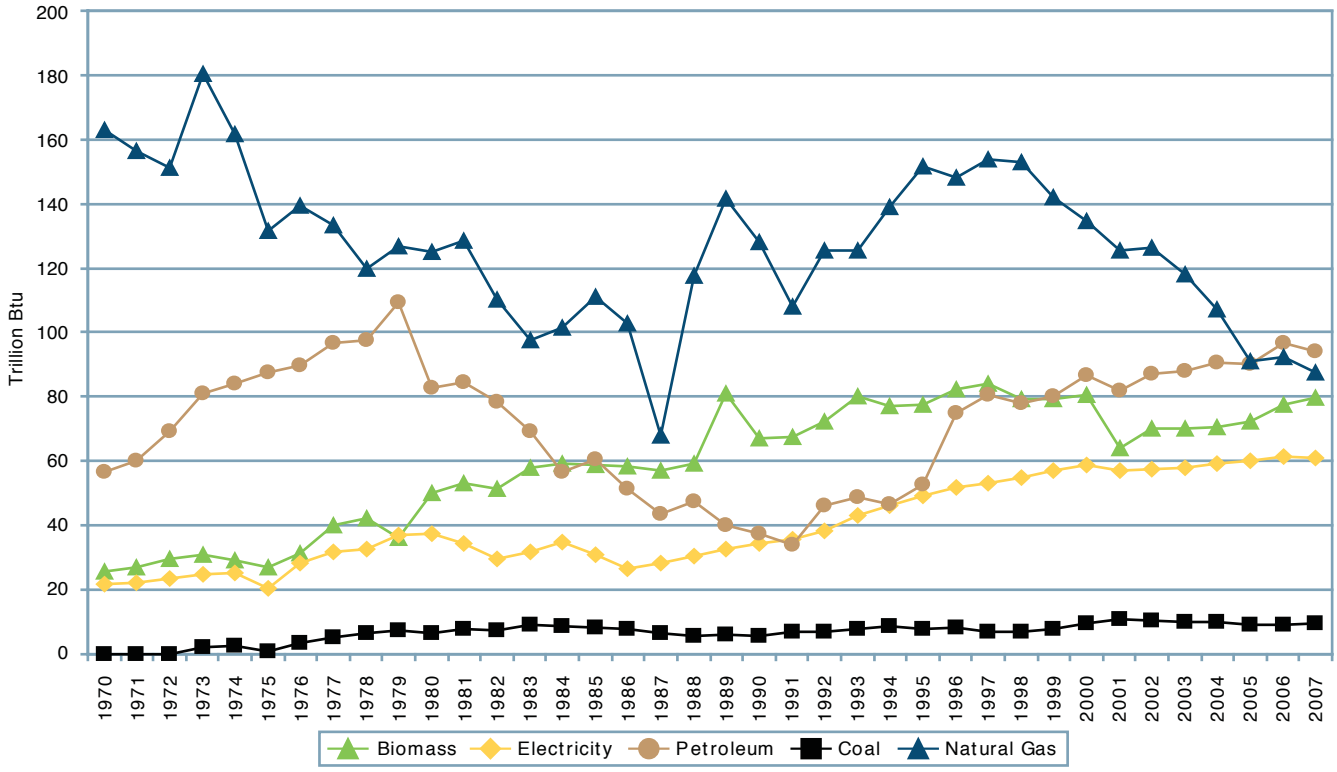
Table D.5 1970-2007 Arkansas Industrial Sector End-Use Energy Consumption
(Trillion Btu)

Year	Biomass	% of Total	Electricity	% of Total	Petroleum	% of Total	Coal	% of Total	Natural Gas	% of Total	Total
1970	25.77	9.66%	21.61	8.10%	56.57	21.21%	0.00	0.00%	162.76	61.03%	266.71
1971	26.87	10.10%	22.34	8.39%	60.27	22.65%	0.05	0.02%	156.55	58.84%	266.07
1972	29.57	10.81%	23.71	8.67%	69.11	25.27%	0.05	0.02%	151.07	55.23%	273.51
1973	30.91	9.68%	24.80	7.77%	80.85	25.33%	2.26	0.71%	180.32	56.50%	319.15
1974	29.36	9.69%	25.24	8.33%	84.22	27.79%	2.66	0.88%	161.57	53.31%	303.05
1975	27.11	10.13%	20.45	7.64%	87.60	32.72%	0.86	0.32%	131.69	49.19%	267.72
1976	31.49	10.75%	28.45	9.71%	89.90	30.68%	3.58	1.22%	139.58	47.64%	293.01
1977	40.27	13.10%	31.87	10.37%	96.75	31.48%	5.19	1.69%	133.26	43.36%	307.34
1978	42.43	14.17%	32.80	10.96%	97.73	32.64%	6.62	2.21%	119.80	40.02%	299.39
1979	35.97	11.36%	37.03	11.69%	109.50	34.58%	7.33	2.31%	126.85	40.06%	316.68
1980	50.29	16.66%	37.35	12.37%	82.77	27.42%	6.34	2.10%	125.14	41.45%	301.89
1981	53.08	17.24%	34.31	11.14%	84.31	27.38%	7.69	2.50%	128.49	41.73%	307.89
1982	51.35	18.56%	29.43	10.64%	78.22	28.27%	7.50	2.71%	110.22	39.83%	276.73
1983	58.00	21.80%	31.74	11.93%	69.32	26.06%	9.34	3.51%	97.65	36.70%	266.04
1984	59.17	22.69%	34.92	13.39%	56.54	21.68%	8.53	3.27%	101.64	38.97%	260.80
1985	58.92	21.88%	30.88	11.47%	60.49	22.46%	8.08	3.00%	110.93	41.19%	269.30
1986	58.24	23.61%	26.49	10.74%	51.55	20.90%	7.73	3.13%	102.66	41.62%	246.66
1987	57.20	28.06%	28.52	13.99%	43.42	21.30%	6.74	3.31%	67.97	33.34%	203.84
1988	59.08	22.67%	30.47	11.69%	47.62	18.27%	5.77	2.21%	117.71	45.16%	260.65
1989	81.26	26.97%	32.62	10.83%	39.96	13.26%	5.97	1.98%	141.50	46.96%	301.31
1990	66.91	24.49%	34.55	12.65%	37.59	13.76%	5.84	2.14%	128.29	46.96%	273.18
1991	67.56	26.77%	35.89	14.22%	34.05	13.49%	6.84	2.71%	108.02	42.80%	252.35
1992	72.22	24.97%	38.39	13.27%	46.06	15.92%	7.08	2.45%	125.54	43.40%	289.29
1993	80.09	26.25%	43.02	14.10%	48.61	15.93%	7.75	2.54%	125.63	41.18%	305.11
1994	77.09	24.28%	46.15	14.54%	46.60	14.68%	8.60	2.71%	139.05	43.80%	317.49
1995	77.52	22.85%	49.42	14.57%	52.64	15.52%	7.78	2.29%	151.82	44.76%	339.19
1996	82.17	22.51%	51.66	14.15%	74.94	20.53%	8.36	2.29%	147.98	40.53%	365.11
1997	83.98	22.17%	53.34	14.08%	80.68	21.29%	6.98	1.84%	153.91	40.62%	378.90
1998	79.38	21.33%	54.82	14.73%	77.81	20.91%	7.00	1.88%	153.11	41.15%	372.11
1999	79.43	21.67%	56.91	15.53%	80.24	21.89%	7.93	2.16%	142.05	38.75%	366.56
2000	80.57	21.73%	58.92	15.89%	86.81	23.41%	9.62	2.59%	134.83	36.37%	370.74
2001	64.00	18.86%	57.10	16.83%	81.82	24.12%	10.90	3.21%	125.45	36.98%	339.27
2002	70.10	19.94%	57.62	16.38%	87.20	24.80%	10.46	2.97%	126.27	35.91%	351.65
2003	70.34	20.42%	57.81	16.78%	88.15	25.59%	10.13	2.94%	118.06	34.27%	344.48
2004	70.47	20.90%	59.10	17.53%	90.47	26.83%	10.13	3.00%	107.04	31.74%	337.21
2005	72.49	22.44%	60.27	18.66%	89.99	27.85%	9.27	2.87%	91.06	28.18%	323.08
2006	77.43	22.96%	61.38	18.21%	96.73	28.69%	9.08	2.69%	92.54	27.45%	337.16
2007	79.94	24.05%	60.87	18.31%	94.13	28.32%	9.75	2.93%	87.66	26.37%	332.35

Note: This data do not include electric generation, transmission, and distribution losses.

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure D.5 1970-2007 Arkansas Industrial Sector End-Use Energy Consumption (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

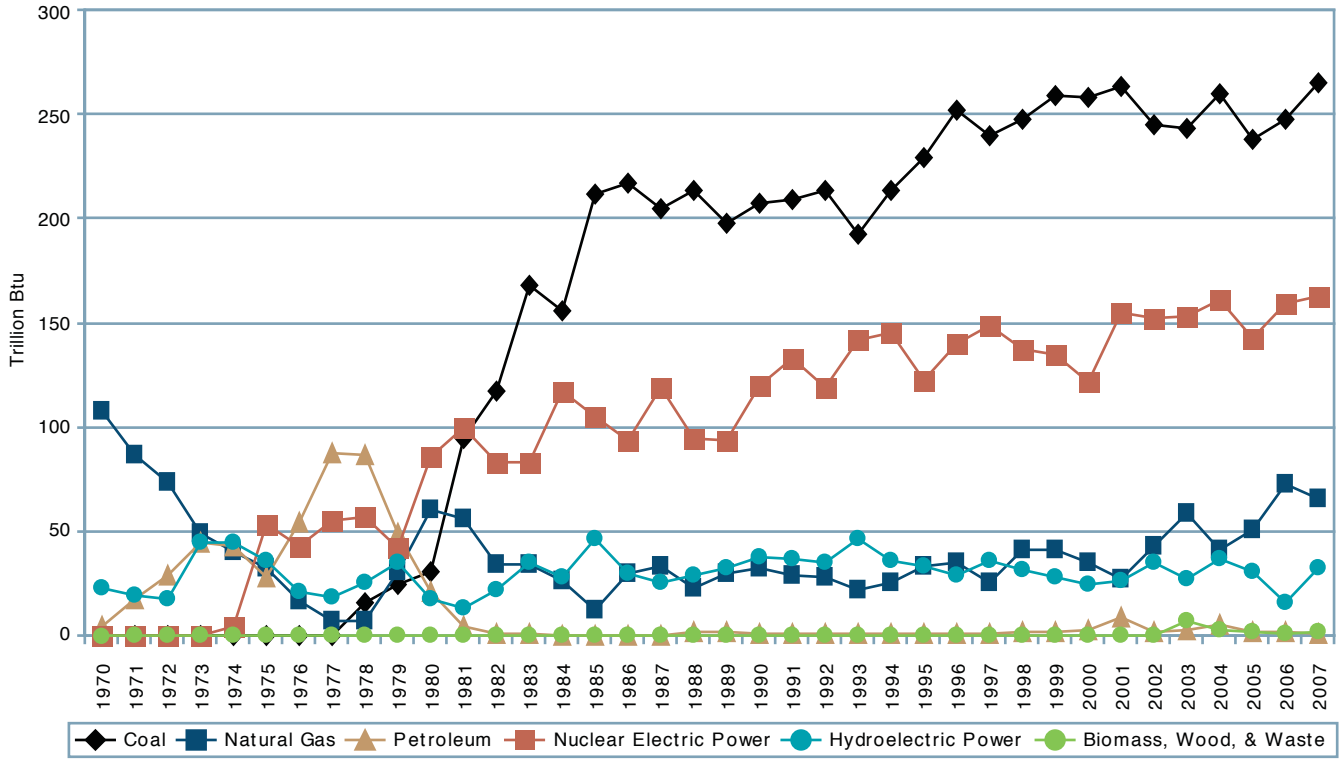
APPENDIX D

Table D.6 1970-2007 Arkansas Electric Power Sector Energy Consumption
(Trillion Btu)

Year	Coal	% of Total	Natural Gas	% of Total	Petroleum	% of Total	Electricity	% of Total	Hydroelectric Power	% of Total	Wood	% of Total	Total
1970	0.00	0%	107.90	80%	4.40	3%	0.00	0%	22.70	17%	0.00	0.0%	135.00
1971	0.00	0%	86.80	71%	17.20	14%	0.00	0%	18.90	15%	0.00	0.0%	122.90
1972	0.00	0%	73.60	62%	28.80	24%	0.00	0%	17.10	14%	0.00	0.0%	119.40
1973	0.00	0%	49.30	36%	44.90	32%	0.00	0%	44.20	32%	0.00	0.0%	138.30
1974	0.00	0%	40.10	31%	42.60	32%	4.00	3%	44.60	34%	0.00	0.0%	131.30
1975	0.00	0%	32.20	22%	27.80	19%	53.70	36%	35.70	24%	0.00	0.0%	149.40
1976	0.00	0%	16.20	12%	54.20	40%	42.60	32%	21.00	16%	0.00	0.0%	134.00
1977	0.00	0%	7.30	4%	87.60	52%	54.80	33%	18.70	11%	0.00	0.0%	168.30
1978	16.10	8%	7.40	4%	86.40	45%	57.10	30%	25.10	13%	0.00	0.0%	192.10
1979	24.40	13%	31.00	17%	49.00	27%	42.10	23%	34.90	19%	0.00	0.0%	181.50
1980	30.20	14%	60.40	28%	20.60	10%	85.40	40%	17.60	8%	0.00	0.0%	214.20
1981	94.20	35%	56.20	21%	4.70	2%	100.10	37%	12.90	5%	0.00	0.0%	268.10
1982	117.60	46%	34.50	13%	0.90	0%	82.90	32%	22.00	9%	0.00	0.0%	257.90
1983	168.10	52%	34.40	11%	0.60	0%	83.40	26%	34.90	11%	0.00	0.0%	321.40
1984	155.30	48%	25.90	8%	0.10	0%	117.20	36%	28.40	9%	0.00	0.0%	326.90
1985	211.70	56%	12.00	3%	0.10	0%	105.00	28%	46.30	12%	0.00	0.0%	375.20
1986	216.80	59%	29.90	8%	0.40	0%	93.90	25%	29.40	8%	0.00	0.0%	370.40
1987	204.30	54%	33.10	9%	0.10	0%	118.70	31%	25.10	7%	0.00	0.0%	381.20
1988	213.00	59%	22.70	6%	1.60	0%	94.30	26%	28.80	8%	0.00	0.0%	360.40
1989	197.30	56%	30.10	8%	1.70	0%	93.60	26%	32.20	9%	0.00	0.0%	354.80
1990	206.90	52%	32.70	8%	0.90	0%	119.40	30%	38.00	10%	0.00	0.0%	397.80
1991	209.10	51%	28.50	7%	0.70	0%	132.70	33%	37.00	9%	0.00	0.0%	408.10
1992	213.60	54%	27.70	7%	0.60	0%	118.60	30%	34.90	9%	0.00	0.0%	395.30
1993	192.70	48%	21.80	5%	0.80	0%	142.00	35%	46.50	12%	0.00	0.0%	403.80
1994	213.60	51%	25.60	6%	1.00	0%	145.50	35%	35.70	8%	0.00	0.0%	421.40
1995	229.50	55%	33.40	8%	0.60	0%	122.50	29%	33.20	8%	0.00	0.0%	419.20
1996	251.70	55%	34.80	8%	1.10	0%	140.30	31%	28.90	6%	0.00	0.0%	456.80
1997	239.80	53%	25.40	6%	0.80	0%	149.10	33%	35.90	8%	0.00	0.0%	451.00
1998	247.70	54%	41.40	9%	1.70	0%	137.40	30%	31.80	7%	0.00	0.0%	459.90
1999	259.10	56%	41.10	9%	1.60	0%	135.00	29%	27.60	6%	0.00	0.0%	464.30
2000	258.00	58%	35.30	8%	2.20	0%	121.50	28%	24.20	5%	0.00	0.0%	441.20
2001	263.10	55%	27.10	6%	8.90	2%	154.40	32%	26.30	5%	0.00	0.0%	479.80
2002	244.80	51%	43.10	9%	1.50	0%	152.00	32%	35.00	7%	0.00	0.0%	476.40
2003	243.50	50%	58.20	12%	2.80	1%	153.10	31%	27.20	6%	7.10	1.4%	491.90
2004	260.10	51%	41.30	8%	5.00	1%	161.10	32%	36.50	7%	2.40	0.5%	506.50
2005	237.90	51%	50.40	11%	1.90	0%	142.90	31%	30.80	7%	2.10	0.5%	465.90
2006	247.80	50%	73.00	15%	1.70	0%	158.90	32%	15.40	3%	0.80	0.2%	497.60
2007	265.20	50%	65.20	12%	0.80	0%	162.40	31%	32.00	6%	1.70	0.3%	527.40

Source: U.S. Energy Information Administration, State Energy Data System (SEDS).
http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure D.6 1970-2007 Arkansas Electric Power Sector Energy Consumption (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

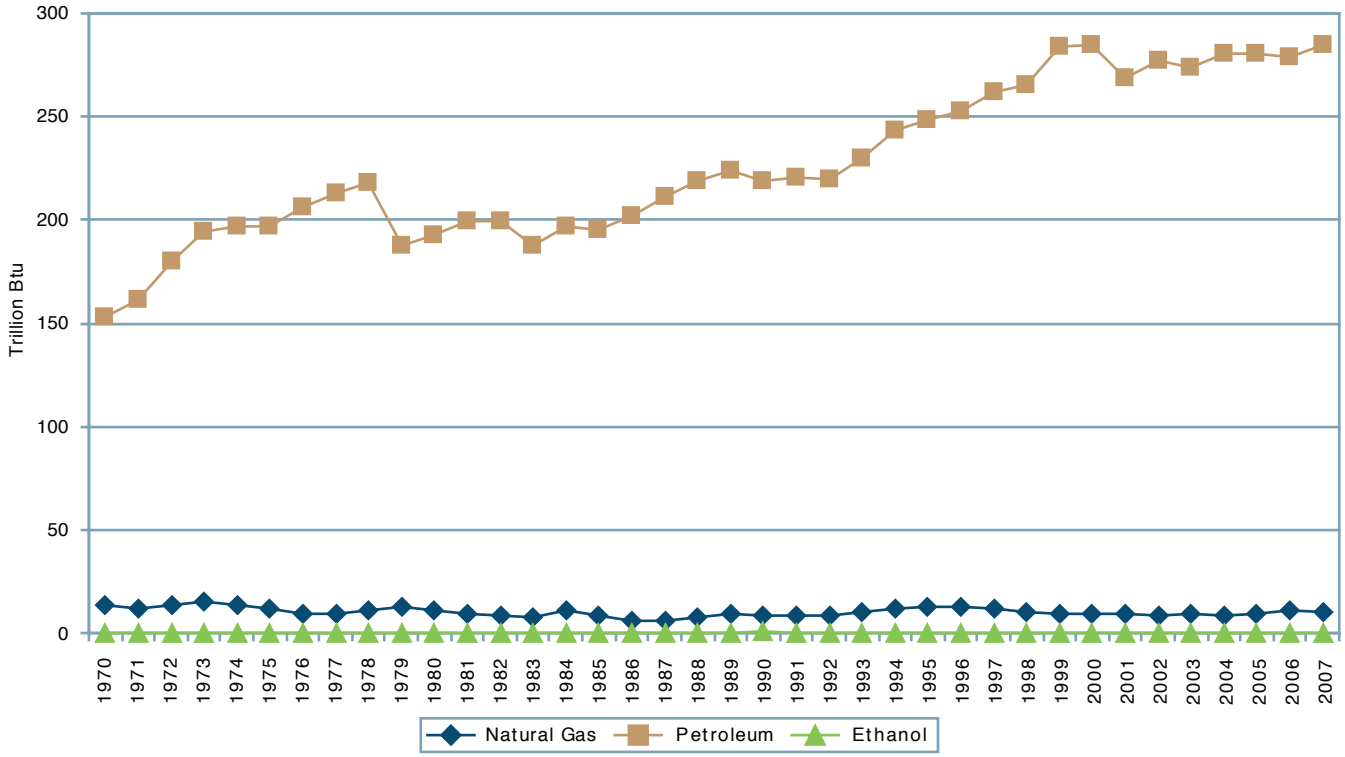
APPENDIX D

Table D.7 1970-2007 Arkansas Transportation Sector End-Use Energy Consumption (Trillion Btu)

Year	Natural Gas	% of Total	Petroleum	% of Total	Ethanol	% of Total	Total
1970	13.50	8%	153.00	92%	0.00	0.0%	166.50
1971	11.80	7%	161.60	93%	0.00	0.0%	173.30
1972	13.20	7%	179.90	93%	0.00	0.0%	193.00
1973	15.40	7%	194.40	93%	0.00	0.0%	209.80
1974	13.50	6%	196.50	94%	0.00	0.0%	210.00
1975	12.20	6%	197.30	94%	0.00	0.0%	209.40
1976	9.40	4%	206.50	96%	0.00	0.0%	216.00
1977	9.20	4%	213.30	96%	0.00	0.0%	222.50
1978	11.30	5%	218.20	95%	0.00	0.0%	229.40
1979	12.50	6%	187.50	94%	0.00	0.0%	200.00
1980	11.40	6%	192.90	94%	0.00	0.0%	204.20
1981	9.60	5%	199.20	95%	0.10	0.0%	208.90
1982	8.60	4%	199.60	96%	0.10	0.0%	208.30
1983	7.70	4%	187.60	96%	0.10	0.1%	195.30
1984	10.60	5%	196.60	95%	0.20	0.1%	207.40
1985	8.30	4%	195.00	96%	0.10	0.0%	203.40
1986	6.10	3%	201.60	97%	0.00	0.0%	207.70
1987	5.90	3%	211.00	97%	0.00	0.0%	216.90
1988	7.60	3%	219.10	97%	0.00	0.0%	226.70
1989	9.70	4%	224.00	96%	0.00	0.0%	233.70
1990	8.70	4%	218.90	96%	0.50	0.2%	228.10
1991	8.50	4%	220.60	96%	0.30	0.1%	229.40
1992	8.10	4%	219.30	96%	0.20	0.1%	227.70
1993	9.80	4%	229.50	96%	0.20	0.1%	239.30
1994	12.10	5%	243.60	95%	0.00	0.0%	255.70
1995	12.50	5%	248.40	95%	0.00	0.0%	260.80
1996	12.90	5%	252.90	95%	0.00	0.0%	265.80
1997	11.80	4%	261.70	96%	0.00	0.0%	273.50
1998	10.50	4%	265.50	96%	0.00	0.0%	276.10
1999	9.20	3%	284.10	97%	0.00	0.0%	293.30
2000	9.00	3%	285.20	97%	0.00	0.0%	294.20
2001	8.90	3%	268.90	97%	0.00	0.0%	277.80
2002	8.40	3%	277.50	97%	0.00	0.0%	285.90
2003	9.00	3%	274.00	97%	0.00	0.0%	283.00
2004	8.30	3%	280.90	97%	0.00	0.0%	289.20
2005	9.00	3%	280.50	97%	0.10	0.0%	289.50
2006	11.00	4%	278.70	96%	0.10	0.0%	289.70
2007	10.20	3%	284.90	97%	0.30	0.1%	295.20

Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure D.7 1970-2007 Arkansas Transportation Sector End-Use Energy Consumption (Trillion Btu)



Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

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Coal

Contents

APPENDIX E

Table E.1 1970-2007 Arkansas Coal Production Estimates

Year	Trillion Btu	Thousand Short Tons
1970	6.00	268
1971	6.20	276
1972	9.60	428
1973	9.10	434
1974	10.20	455
1975	10.80	488
1976	12.00	534
1977	12.60	563
1978	12.60	519
1979	5.60	251
1980	7.20	319
1981	5.10	229
1982	3.60	161
1983	2.00	88
1984	1.80	82
1985	1.80	80
1986	3.70	167
1987	1.90	84
1988	6.20	276
1989	1.60	70
1990	1.30	59
1991	1.20	52
1992	1.30	58
1993	1.00	44
1994	1.10	51
1995	0.70	29
1996	0.50	21
1997	0.40	18
1998	0.50	24
1999	0.50	22
2000	0.30	12
2001	0.40	17
2002	0.30	14
2003	0.20	8
2004	0.20	7
2005	0.10	3
2006	0.50	23
2007	1.90	83

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

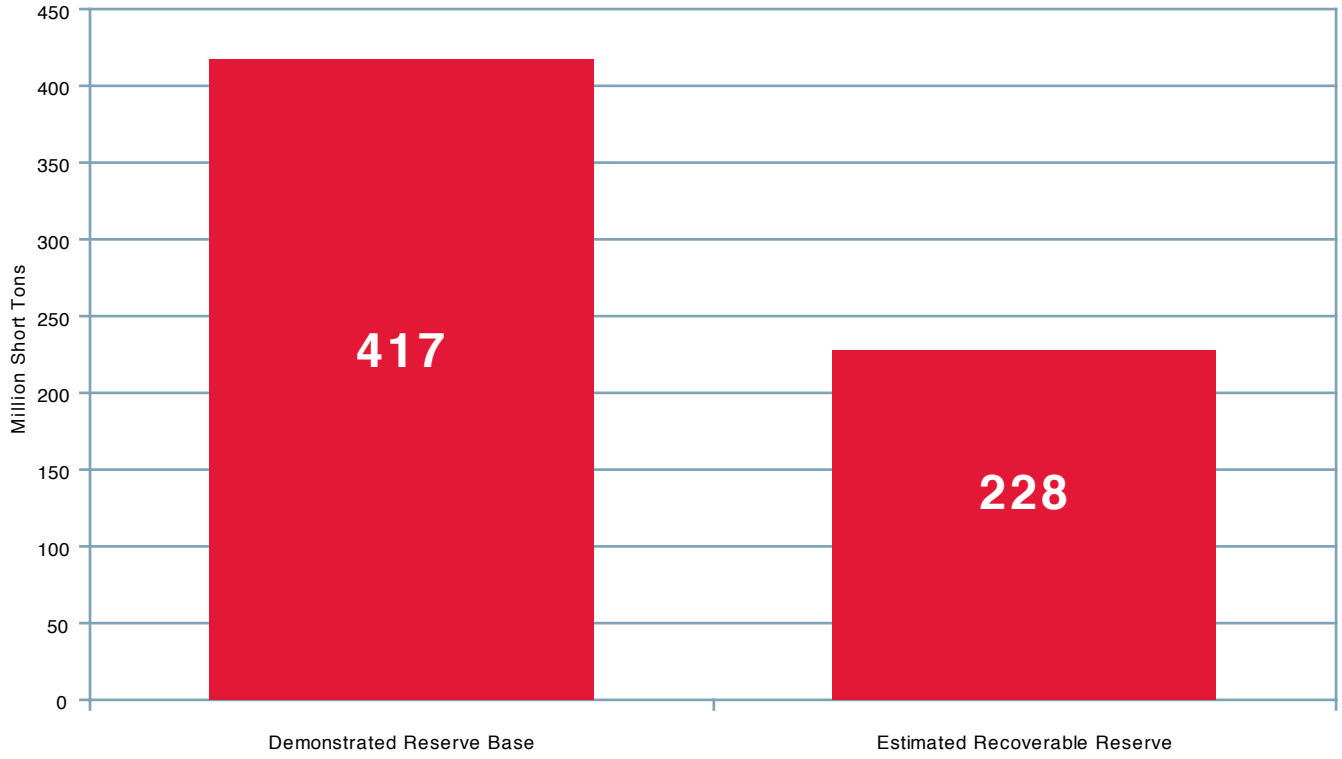
Table E.2 1970-2007 Arkansas Coal Consumption Estimates by Sector, Selected Years

Year	Residential		Commercial		Industrial		Transportation		Electric Utility		Total	
	Trillion Btu	Thousand Short Tons	Trillion Btu	Thousand Short Tons	Trillion Btu	Thousand Short Tons	Trillion Btu	Thousand Short Tons	Trillion Btu	Thousand Short Tons	Trillion Btu	Thousand Short Tons
1970	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	1	40	0	0	0	0	41	40
1980	0	1	0	5	6	296	0	0	30	1,774	339	2,076
1985	0	0	0	1	8	379	0	0	212	12,302	600	12,682
1990	0	0	0	0	6	256	0	0	207	11,836	469	12,092
1995	0	0	0	0	8	325	0	0	230	13,216	562	13,541
1996	0	0	0	0	8	348	0	0	252	14,467	608	14,815
1997	0	0	0	0	7	296	0	0	240	13,772	543	14,068
1998	0	0	0	0	7	287	0	0	248	14,276	542	14,563
1999	0	0	0	0	8	324	0	0	259	14,974	591	15,298
2000	0	0	0	0	10	382	0	0	258	14,866	650	15,248
2001	0	0	0	0	11	437	0	0	263	15,110	711	15,547
2002	0	0	0	0	11	422	0	0	245	14,165	677	14,587
2003	0	0	0	0	10	417	0	0	244	14,310	671	14,727
2004	0	0	0	0	10	415	0	0	260	15,318	685	15,733
2005	0	0	0	0	9	368	0	0	238	14,031	615	14,399
2006	0	0	0	0	9	365	0	0	248	14,614	622	14,979
2007	0	0	0	1	10	397	0	0	265	15,629	673	16,027

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

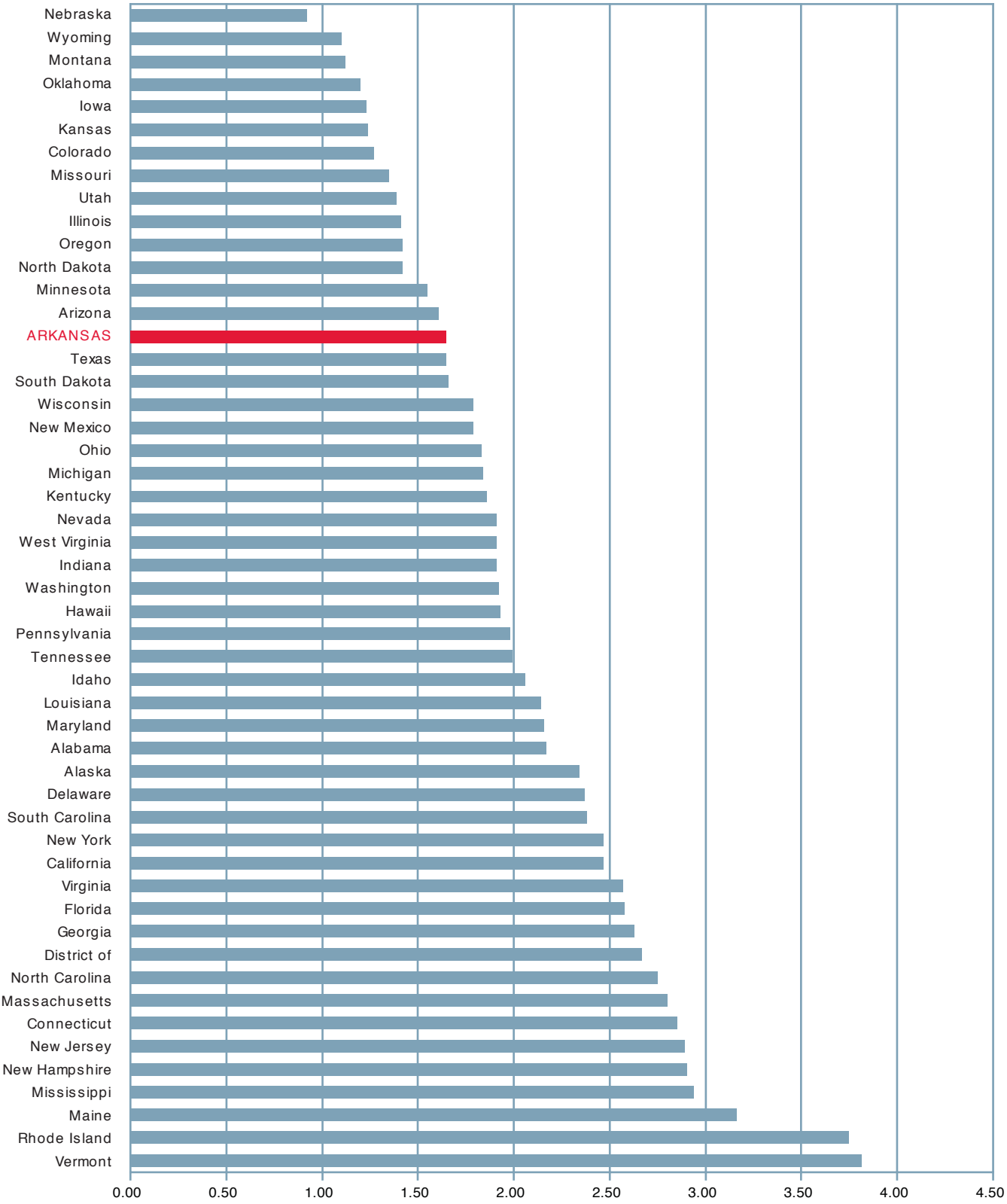
APPENDIX E

Figure E.1 2007 Arkansas Coal Reserves



Source: Energy Information Administration, Annual Coal Report 2007, Coal Reserves Current and Back Issues, February 2010.

Figure E.2 2007 Coal Prices, Ranked by State
(Nominal Dollars Per Million Btu)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

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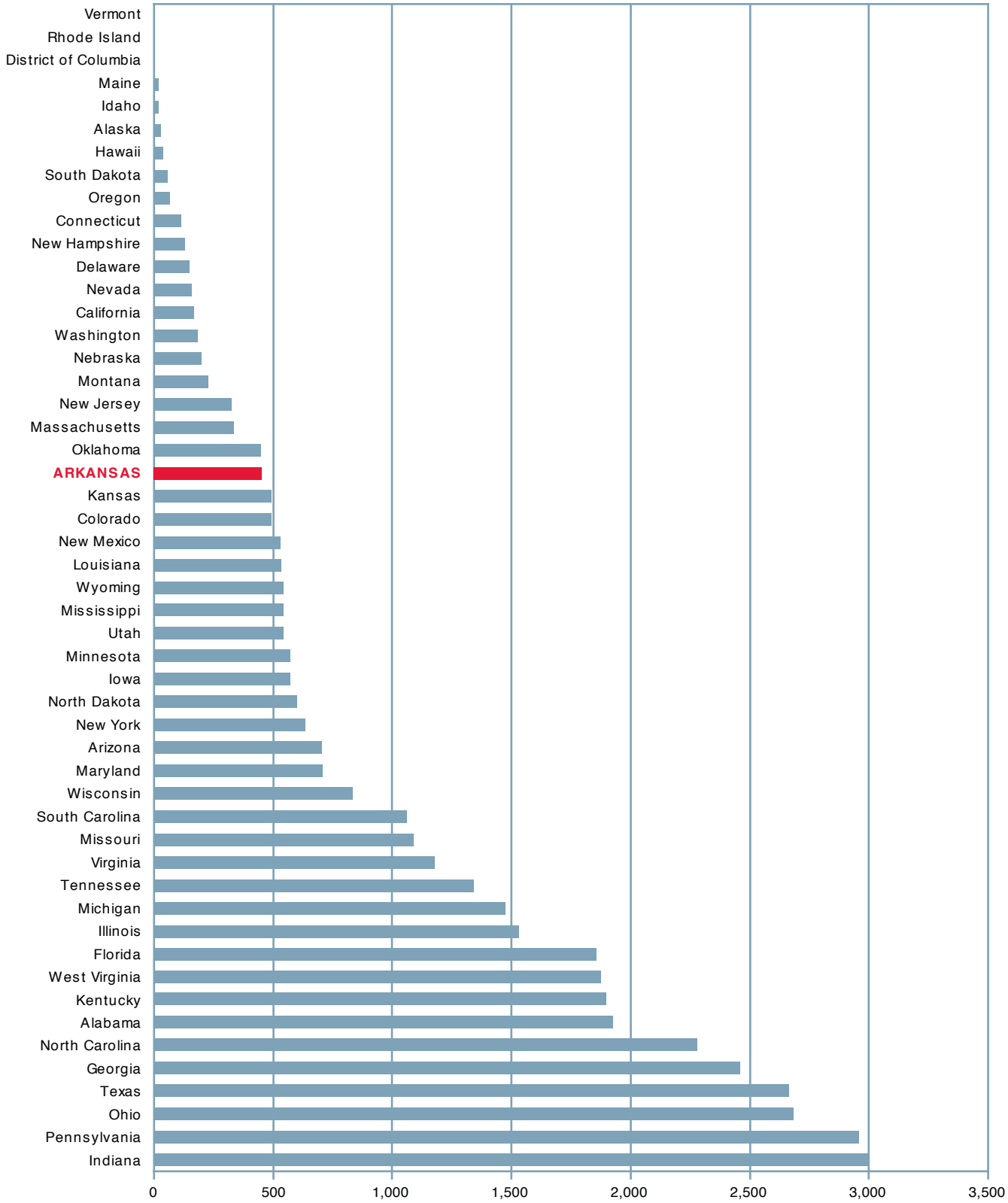
Figure E.3 2007 Coal Expenditures Ranked by State
(Million Nominal Dollars)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Natural Gas

Contents

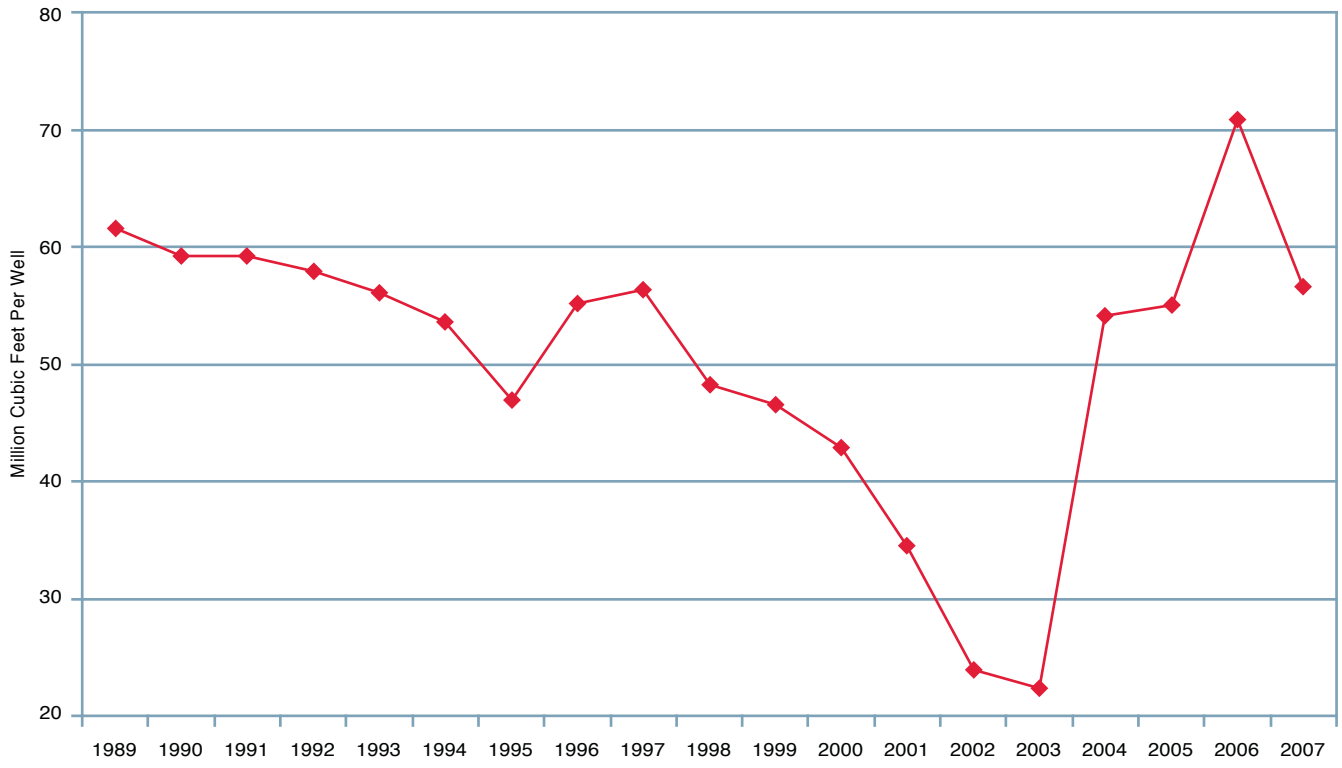
APPENDIX F

Table F.1 1970-2007 Arkansas Natural Gas Production Estimates

Year	Trillion Btu	Million Cubic Feet
1970	187.7	181,351.0
1971	177.6	172,154.0
1972	169.4	166,522.0
1973	159.3	157,529.0
1974	125.5	123,975.0
1975	117.4	116,237.0
1976	110.6	109,533.0
1977	107.4	104,096.0
1978	108.3	106,792.0
1979	113.6	109,452.0
1980	114.5	111,808.0
1981	95.6	92,986.0
1982	127.2	124,611.0
1983	132.6	127,561.0
1984	140.0	135,161.0
1985	160.0	155,099.0
1986	135.8	131,075.0
1987	145.6	141,151.0
1988	169.9	166,573.0
1989	176.7	174,158.0
1990	177.9	174,956.0
1991	168.0	164,702.0
1992	205.0	202,479.0
1993	200.0	196,370.0
1994	192.7	187,673.0
1995	202.3	187,242.0
1996	228.4	221,822.0
1997	212.5	208,514.0
1998	193.6	188,372.0
1999	173.9	170,006.0
2000	175.5	171,642.0
2001	170.2	166,804.0
2002	170.1	161,871.0
2003	178.1	169,599.0
2004	195.3	187,069.0
2005	193.0	190,533.0
2006	279.5	270,293.0
2007	272.0	269,886.0

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Figure F.1 1989-2007 Arkansas Average Gas Production Per Well



Sources: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010. U.S. Energy Information Administration, Natural Gas Navigator, February 2010.

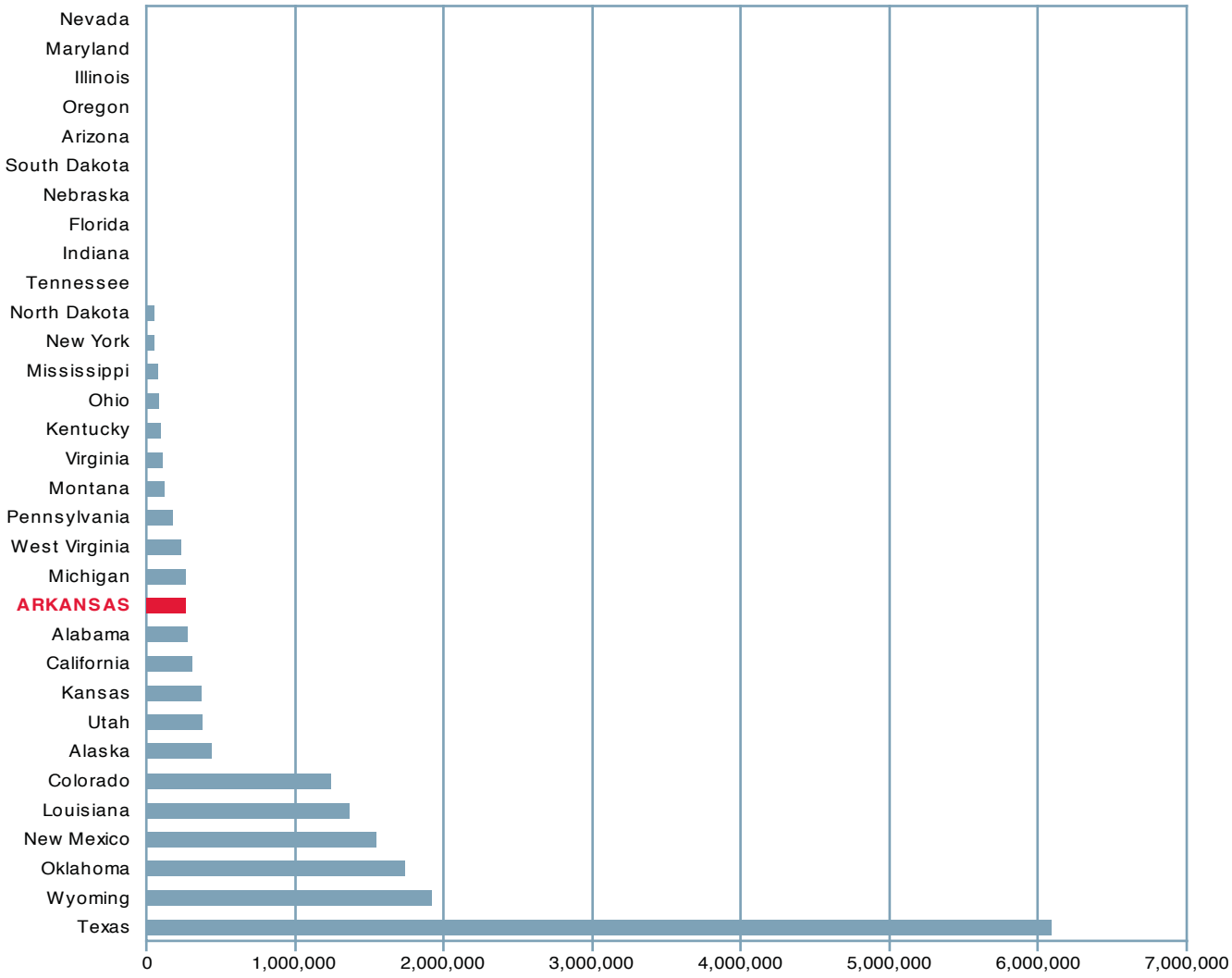
APPENDIX F

Table F.2 2003-2007 Marketed Production of Natural Gas

Rank	State	2003 Bcf	2003 % of U.S. Total	2004 Bcf	2004 % of U.S. Total	2005 Bcf	2005 % of U.S. Total	2006 Bcf	2006 % of U.S. Total	2007 Bcf	2007 % of U.S. Total
1	Texas	5,243,567	26.25%	5,067,315	25.96%	5,276,401	27.88%	5,548,022	28.58%	6,091,724	30.43%
2	Wyoming	1,539,318	7.71%	1,592,203	8.16%	1,639,317	8.66%	1,816,201	9.36%	1,923,224	9.61%
3	Oklahoma	1,558,155	7.80%	1,655,769	8.48%	1,639,310	8.66%	1,688,985	8.70%	1,744,393	8.71%
4	New Mexico	1,604,015	8.03%	1,632,539	8.36%	1,645,166	8.69%	1,609,223	8.29%	1,544,830	7.72%
5	Louisiana	1,350,399	6.76%	1,353,249	6.93%	1,296,048	6.85%	1,361,119	7.01%	1,363,538	6.81%
6	Colorado	1,011,285	5.06%	1,079,235	5.53%	1,133,086	5.99%	1,202,821	6.20%	1,242,571	6.21%
7	Alaska	489,757	2.45%	471,899	2.42%	487,282	2.57%	444,724	2.29%	433,485	2.17%
8	Utah	268,058	1.34%	277,969	1.42%	301,223	1.59%	348,320	1.79%	376,409	1.88%
9	Kansas	418,893	2.10%	397,121	2.03%	377,229	1.99%	371,044	1.91%	365,877	1.83%
10	California	337,216	1.69%	319,919	1.64%	317,637	1.68%	315,209	1.62%	307,160	1.53%
11	Alabama	346,145	1.73%	316,021	1.62%	296,528	1.57%	286,220	1.47%	270,407	1.35%
12	**Arkansas**	**169,599**	**0.85%**	**187,069**	**0.96%**	**190,533**	**1.01%**	**270,293**	**1.39%**	**269,886**	**1.35%**
13	Michigan	236,987	1.19%	259,681	1.33%	261,112	1.38%	263,009	1.36%	264,907	1.32%
14	West Virginia	187,723	0.94%	197,217	1.01%	221,108	1.17%	225,530	1.16%	231,184	1.15%
15	Pennsylvania	159,827	0.80%	197,217	1.01%	168,501	0.89%	175,950	0.91%	182,277	0.91%
16	Montana	86,027	0.43%	96,762	0.50%	107,918	0.57%	112,845	0.58%	116,848	0.58%
17	Virginia	143,644	0.72%	85,508	0.44%	88,610	0.47%	103,027	0.53%	112,057	0.56%
18	Kentucky	87,608	0.44%	94,259	0.48%	92,795	0.49%	95,320	0.49%	95,437	0.48%
19	Ohio	93,641	0.47%	90,476	0.46%	83,523	0.44%	86,315	0.44%	88,095	0.44%
20	Mississippi	133,901	0.67%	63,353	0.32%	52,923	0.28%	60,531	0.31%	73,460	0.37%
21	New York	36,137	0.18%	46,050	0.24%	55,180	0.29%	55,980	0.29%	54,942	0.27%
22	North Dakota	55,693	0.28%	55,009	0.28%	52,557	0.28%	55,273	0.28%	54,745	0.27%
23	Tennessee	1,803	0.01%	2,100	0.01%	2,200	0.01%	2,663	0.01%	3,942	0.02%
24	Indiana	1,464	0.01%	3,401	0.02%	3,135	0.02%	2,921	0.02%	3,606	0.02%
25	Florida	3,087	0.02%	3,123	0.02%	2,616	0.01%	2,540	0.01%	1,778	0.01%
26	Nebraska	1,454	0.01%	1,476	0.01%	1,172	0.01%	1,200	0.01%	1,555	0.01%
27	South Dakota	1,103	0.01%	1,093	0.01%	992	0.01%	963	0.00%	995	0.00%
28	Arizona	443	0.00%	331	0.00%	233	0.00%	611	0.00%	655	0.00%
29	Oregon	731	0.00%	467	0.00%	454	0.00%	621	0.00%	409	0.00%
30	Illinois	174	0.00%	170	0.00%	166	0.00%	170	0.00%	169	0.00%
31	Maryland	48	0.00%	34	0.00%	46	0.00%	48	0.00%	35	0.00%
32	Nevada	6	0.00%	5	0.00%	5	0.00%	5	0.00%	5	0.00%
	U.S. Total	**19,974,360**	**100.00%**	**19,517,491**	**100.00%**	**18,927,095**	**100.00%**	**19,409,674**	**100.00%**	**20,019,321**	**100.00%**

Sources: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010. U.S. Energy Information Administration, Natural Gas Navigator, February 2010

Figure F.2 2007 Marketed Production of Natural Gas, Selected States
(Billion Cubic Feet)



Sources: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010. U.S. Energy Information Administration, Natural Gas Navigator, February 2010.

APPENDIX F

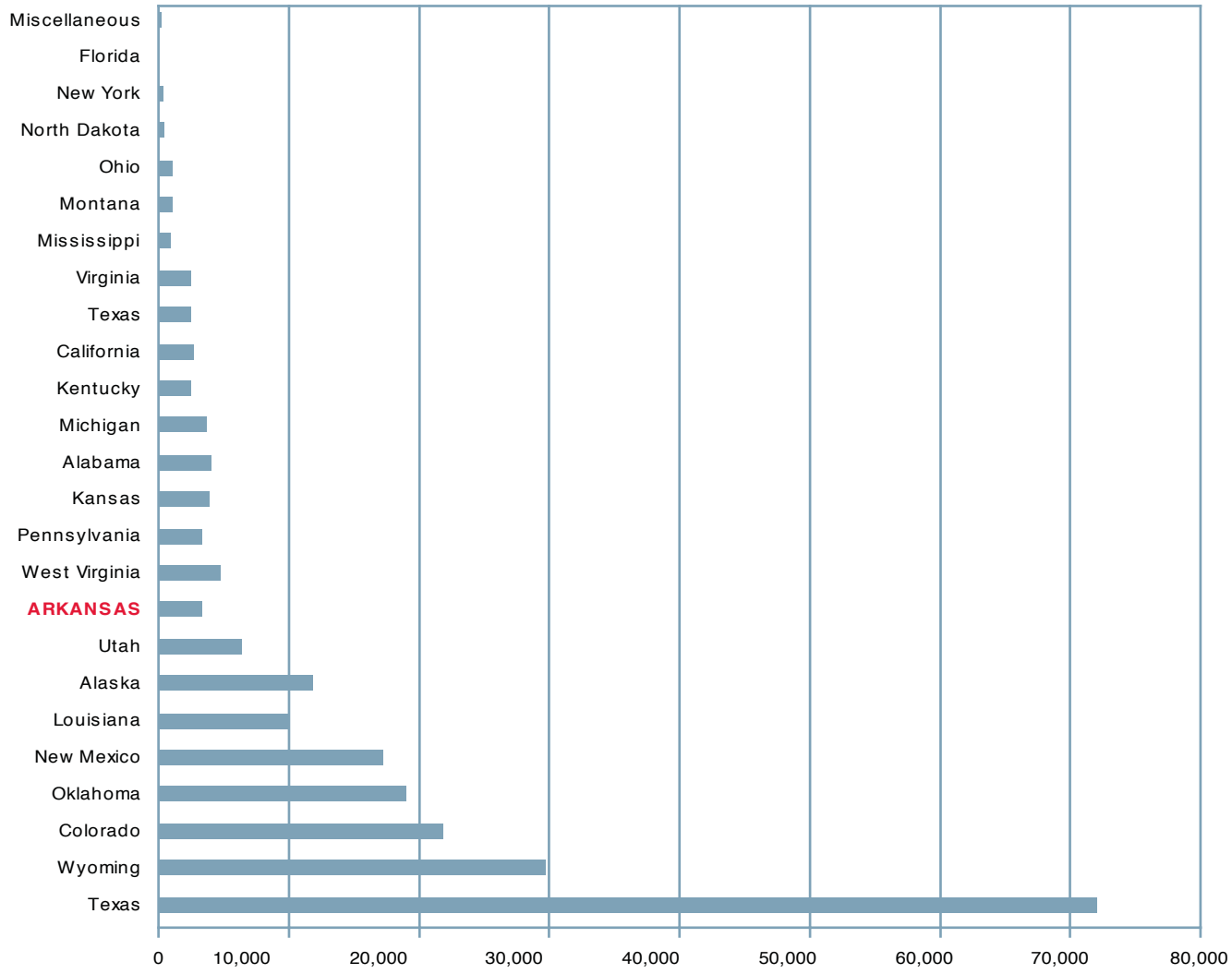
Table F.3 2003-2008 Proved Reserves of Natural Gas

Rank	State	2003 Bcf	2003 % of U.S. Total	2004 Bcf	2004 % of U.S. Total	2005 Bcf	2005 % of U.S. Total	2006 Bcf	2006 % of U.S. Total	2007 Bcf	2007 % of U.S. Total	2008 Bcf	2008 % of U.S. Total
1	Texas	45,730	24.19%	49,955	25.95%	56,507	27.65%	61,836	29.29%	72,091	30.33%	77,546	31.70%
2	Wyoming	21,744	11.50%	22,632	11.76%	23,774	11.63%	23,549	11.16%	29,710	12.50%	31,143	12.73%
3	Colorado	15,436	8.17%	14,743	7.66%	16,596	8.12%	17,149	8.12%	21,851	9.19%	23,302	9.52%
4	Oklahoma	15,401	8.15%	16,238	8.43%	17,123	8.38%	17,464	8.27%	19,031	8.01%	20,845	8.52%
5	New Mexico	17,020	9.00%	18,512	9.62%	18,201	8.91%	17,934	8.50%	17,245	7.25%	16,285	6.66%
6	Louisiana	9,325	4.93%	9,588	4.98%	10,447	5.11%	10,474	4.96%	10,045	4.23%	11,573	4.73%
7	Alaska	8,285	4.38%	8,407	4.37%	8,171	4.00%	10,245	4.85%	11,917	5.01%	7,699	3.15%
8	Utah	3,516	1.86%	3,866	2.01%	4,295	2.10%	5,146	2.44%	6,391	2.69%	6,643	2.72%
9	**ARKANSAS**	**1,663**	**0.88%**	**1,835**	**0.95%**	**1,964**	**0.96%**	**2,269**	**1.07%**	**3,305**	**1.39%**	**5,626**	**2.30%**
10	West Virginia	3,306	1.75%	3,397	1.76%	4,459	2.18%	4,509	2.14%	4,729	1.99%	5,136	2.10%
11	Pennsylvania	2,487	1.32%	2,361	1.23%	2,782	1.36%	3,050	1.44%	3,361	1.41%	3,577	1.46%
12	Kansas	4,819	2.55%	4,652	2.42%	4,314	2.11%	3,931	1.86%	3,982	1.68%	3,557	1.45%
13	Alabama	4,301	2.28%	4,120	2.14%	3,965	1.94%	3,911	1.85%	3,994	1.68%	3,290	1.34%
14	Michigan	3,428	1.81%	3,091	1.61%	2,910	1.42%	3,065	1.45%	3,630	1.53%	3,174	1.30%
15	Kentucky	1,889	1.00%	1,880	0.98%	2,151	1.05%	2,227	1.06%	2,469	1.04%	2,714	1.11%
16	California	2,450	1.30%	2,634	1.37%	3,228	1.58%	2,794	1.32%	2,740	1.15%	2,406	0.98%
17	Texas	5,331	2.82%	4,127	2.14%	3,342	1.64%	2,725	1.29%	2,544	1.07%	2,392	0.98%
18	Virginia	1,717	0.91%	1,742	0.90%	2,018	0.99%	2,302	1.09%	2,529	1.06%	2,378	0.97%
19	Mississippi	746	0.39%	691	0.36%	755	0.37%	813	0.39%	954	0.40%	1,030	0.42%
20	Montana	1,059	0.56%	995	0.52%	986	0.48%	1,057	0.50%	1,052	0.44%	1,000	0.41%
21	Ohio	1,126	0.60%	974	0.51%	898	0.44%	975	0.46%	1,027	0.43%	985	0.40%
22	North Dakota	448	0.24%	417	0.22%	453	0.22%	479	0.23%	511	0.21%	541	0.22%
23	New York	365	0.19%	324	0.17%	349	0.17%	363	0.17%	376	0.16%	389	0.16%
24	Florida	79	0.04%	78	0.04%	77	0.04%	45	0.02%	108	0.05%	1	0.00%
	Miscellaneous	134	0.07%	110	0.06%	131	0.06%	138	0.07%	239	0.10%	270	0.11%
	Federal Offshore	22,570	11.94%	19,271	10.01%	17,831	8.72%	15,360	7.28%	14,439	6.07%	13,546	5.54%
	U.S. Total	**189,044**	**100.00%**	**192,513**	**100.00%**	**204,385**	**100.00%**	**211,085**	**100.00%**	**237,726**	**100.00%**	**244,656**	**100.00%**

Notes: Miscellaneous states includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Sources: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010. U.S. Energy Information Administration, Natural Gas Navigator, February 2010.

Figure F.3 2007 Proven Reserves of Natural Gas, Selected States
(Billion Cubic Feet)



Notes: Numbers are Billion Cubic Feet; Miscellaneous states includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, Oregon, South Dakota, and Tennessee.

Sources: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), February 2010. U.S. Energy Information Administration, Natural Gas Navigator, February 2010.

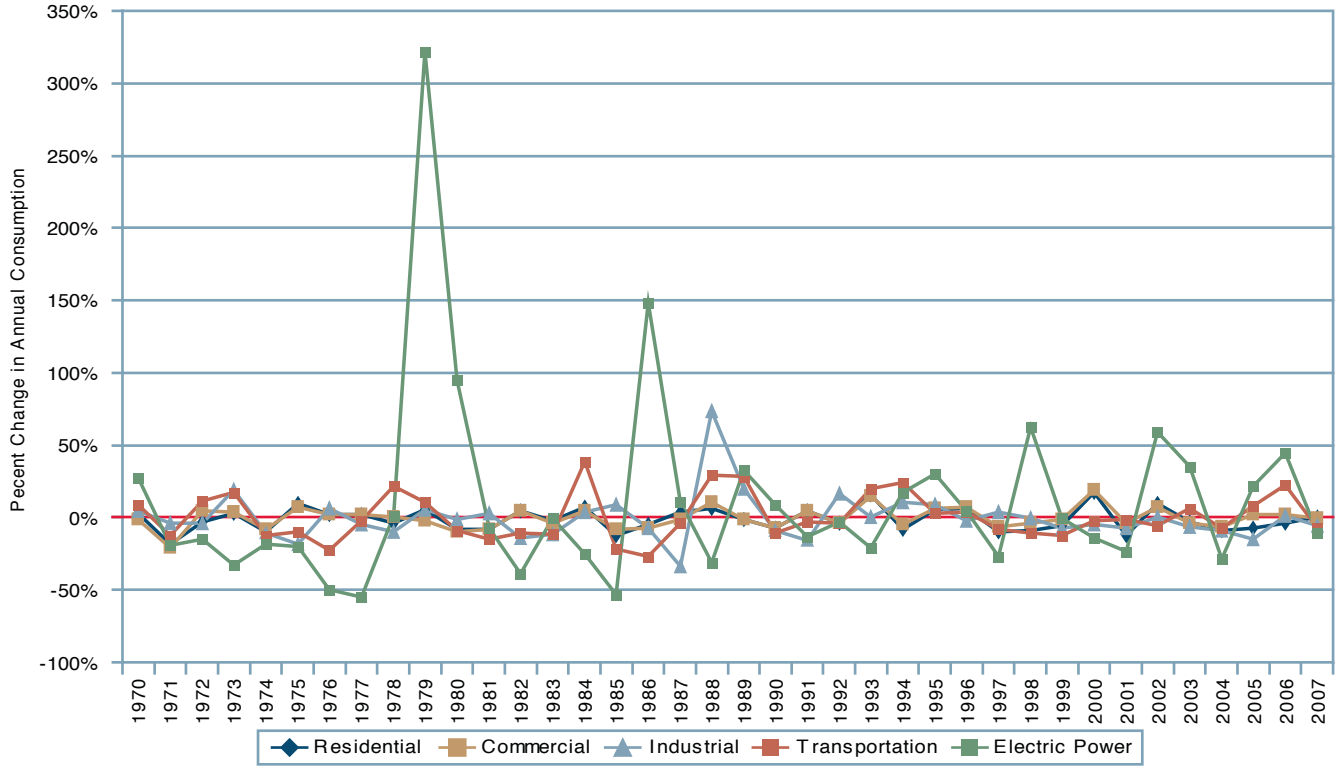
APPENDIX F

Table F.4 2001-2007 Natural Gas Delivered to Consumers in Arkansas (including vehicle fuel) (Mcf)

Year	2001	2002	2003	2004	2005	2006	2007
January	26,139	24,431	27,116	24,746	22,386	19,984	20,936
February	20,654	24,940	27,256	25,909	19,719	19,909	22,984
March	21,940	22,284	22,904	21,663	19,170	19,394	17,280
April	16,528	19,166	18,625	16,382	15,597	17,499	15,779
May	13,819	15,635	17,603	15,991	14,643	17,865	16,099
June	12,558	16,964	17,849	14,085	15,315	19,198	17,982
July	14,779	18,741	18,208	14,456	16,703	19,107	17,998
August	16,061	17,700	18,467	14,551	17,392	19,963	22,294
September	15,014	16,789	15,282	11,956	13,113	16,976	15,747
October	18,239	16,932	16,402	14,094	13,511	17,107	13,225
November	19,675	17,770	16,960	13,138	15,272	15,346	15,235
December	22,233	21,567	20,603	18,337	20,113	19,021	18,728
Annual Total	**217,639**	**232,919**	**237,275**	**205,308**	**202,934**	**221,369**	**214,287**

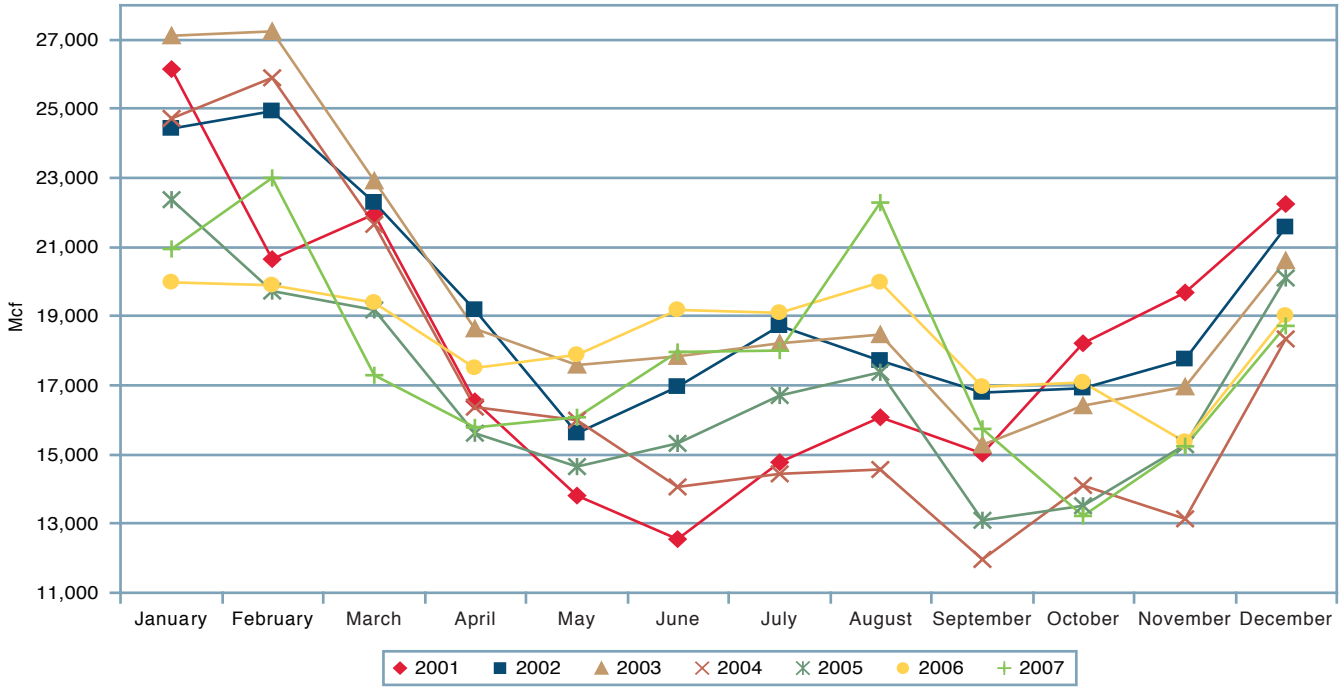
Source: U.S. Energy Information Administration, Natural Gas Navigator. http://tonto.eia.doe.gov/dnav/ng/hist/n3060ar2m.htm, June 2010.

Figure F.4 1970-2007 Arkansas Natural Gas Consumption by End-Use and Electric Power Sectors Annual Percent Change



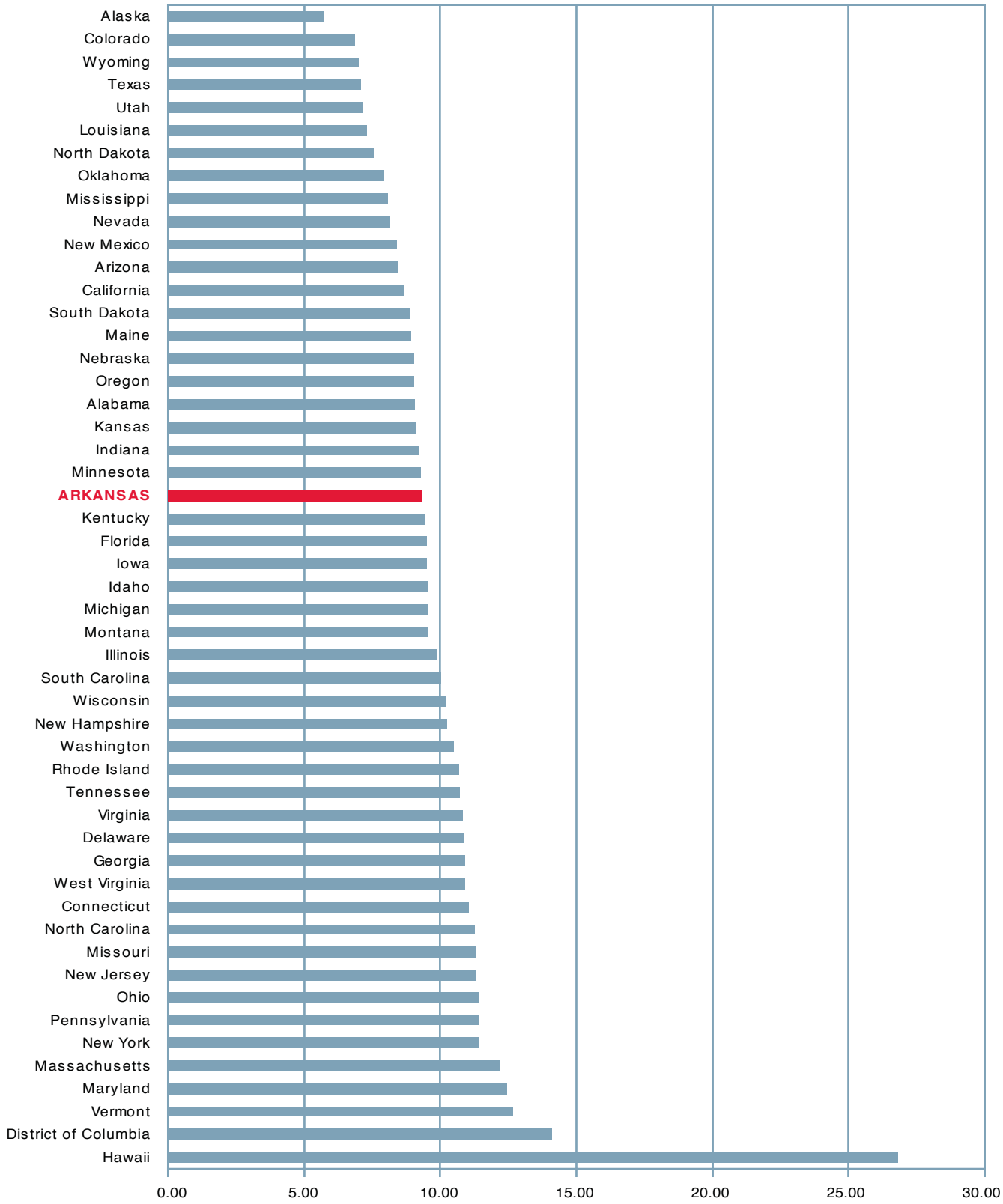
Source: U.S. Energy Information Administration, State Energy Data System (SEDS). http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure F.5 2001-2007 Arkansas Natural Gas Deliveries to Consumers



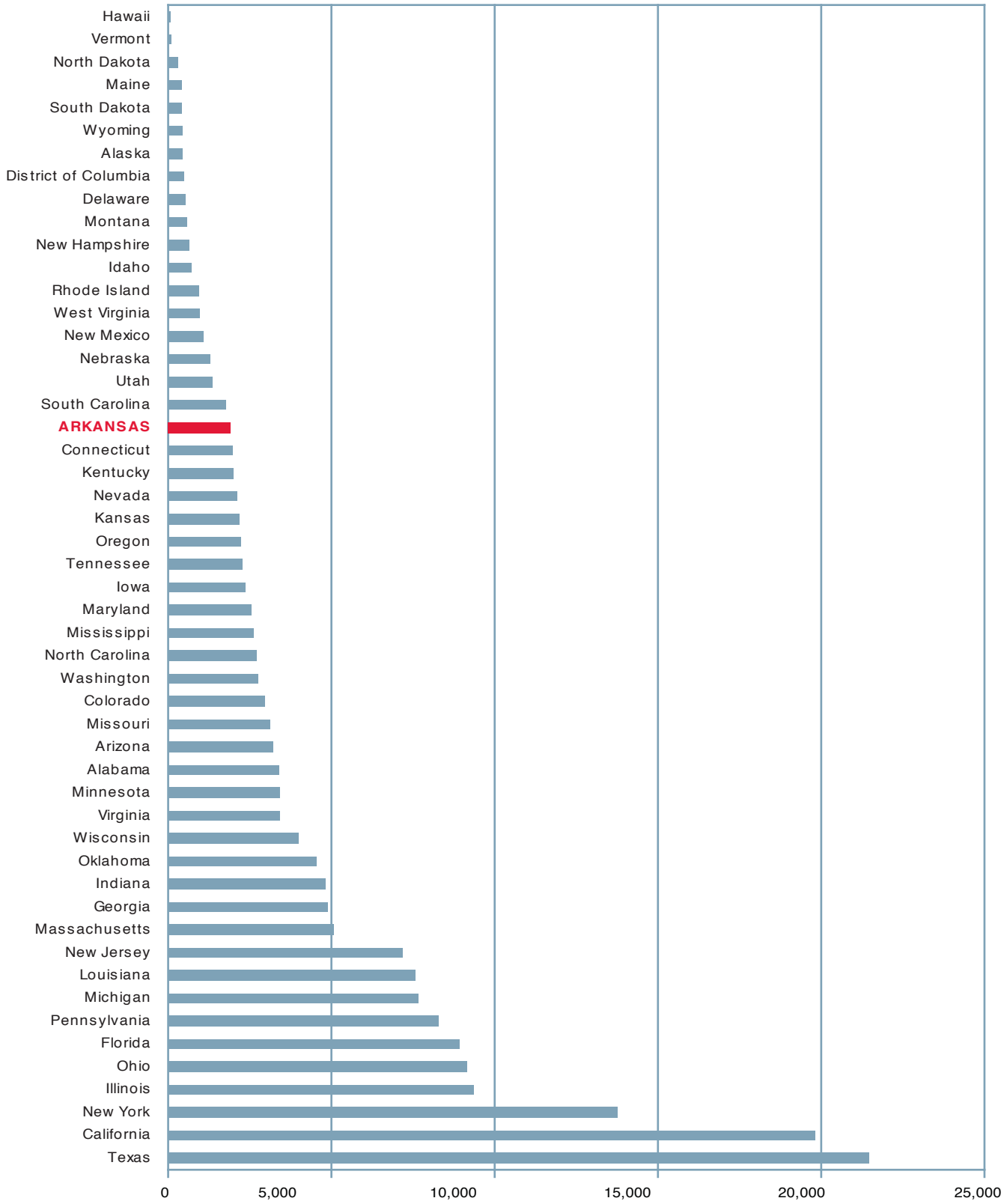
Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Figure F.6 2007 Natural Gas Prices, Ranked by State
(Dollars Per Million Btu)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Figure F.7 2007 Natural Gas Expenditures, Ranked by State (Million Dollars)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

APPENDIX F

Figure F.8 Shale Gas Plays, Lower 48 States

Source: U.S. Energy Information Administration based on data from various published studies.
U.S. Energy Information Administration, Independent Statistics and Analysis, August 2010.

Table F.5 2007 Arkansas Summary Statistics for Natural Gas

Number of Wells Producing at End of Year 2007	**4,773**
Production (million cubic feet)	
Gross Withdrawals	
From Gas Wells	259,708
From Oil Wells	7,509
From Coalbed Wells	3,198
Total	**270,414**
Repressuring	516
Vented & Flared	11
Nonhydrocarbon Gases Removed	0
Marketed Production	269,886
Extraction Loss	162
Total Dry Production	**269,724**

Source: U. S. Energy Information Administration, Natural Gas Annual 2008, May 2010.

Terminology[46]

Total gross withdrawals.

This is the full well stream volume of natural gas and associated gasses, excluding lease condensate[47]. This volume includes all natural gas plant liquids and all nonhydrocarbon gases. Total gross withdrawals also include amounts of natural gas delivered as royalty payments or consumed in field operations.

Repressuring.

This activity refers to natural gas being reinjected back into reservoirs to stimulate further crude oil production. It maintains pressure in the reservoir that helps move crude oil to the producing wells. In 2007, 516 million cubic feet or 0.19 percent of total gross production was used for repressuring.

Vented and flared.

Historically, natural gas was seen as a waste product of oil production and burned off or released into the atmosphere. As prices rose and the industry evolved, this changed. In Arkansas, only 11 million cubic feet or zero percent of total gross withdrawals were vented or flared in 2007.

Nonhydrocarbon gases removed.

Nonhydrocarbon gases are gases which include methane gas, carbon dioxide, hydrogen sulfide, nitrogen, and helium. These nonhydrocarbon gases are separated and removed from natural gas to meet pipeline requirements. Carbon dioxide and hydrogen sulfide are removed due to their corrosive effect on pipelines. These products generally have minimal economic value in comparison with hydrocarbon compounds. In Arkansas, the volume of removed nonhydrocarbon gases of the total gross withdrawals was zero in 2007.

Marketed production.

After vented and flared, repressuring, and nonhydrocarbon volumes have been removed from total gross withdrawals, the remaining volume of the natural gas stream is called marketed production. Marketed production in Arkansas accounted for 269,886 million cubic feet in 2007.

Extraction Loss.

Liquid hydrocarbons called natural gas liquids (NGLs) commonly found in natural gas include ethane, propane, and butane, among others. NGLs, which make up 162 million cubic feet or 0.06 percent of the total gross withdrawal volume, become liquid at atmospheric temperature and pressure. Economics drive decisions about the volume of NGLs to remove from the natural gas stream. Thus, NGLs will be removed if the net return from separating and selling the NGLs outweighs the value of the natural gas product. Otherwise the NGLs can be left in the natural gas.

Total Dry Production.

Once gas is treated for impurities and processed for NGLs, the remaining natural gas is known as total dry production and ready for shipment through the pipeline network and for final end-use. In 2007 total dry production in the state accounted for 269,724 million cubic feet or 99.75 percent.

46 U.S. Energy Information Administration, EIA's Natural Gas Production Data: http://www.eia.doe.gov/pub/oil_gas/natural_gas/feature_articles/2009/ngprod2009/ngprod2009.pdf (June 2010).

47 Lease condensate is a mix of pentane and heavier hydrocarbons that are recovered as a liquid in lease separation facilities.

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Petroleum

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APPENDIX G

Table G.1 1970-2007 Arkansas Crude Oil Production Estimates

Year	Trillion Btu	Thousand Barrels
1970	104.6	18,035
1971	105.9	18,263
1972	107.4	18,519
1973	104.5	18,016
1974	95.9	16,527
1975	93.6	16,133
1976	105	18,097
1977	117.2	20,202
1978	117.9	20,329
1979	109.4	18,869
1980	105.6	18,210
1981	106.4	18,352
1982	109.3	18,849
1983	109.3	18,849
1984	108.6	18,730
1985	110.5	19,044
1986	91.5	15,778
1987	82.5	14,232
1988	78.9	13,605
1989	65.3	11,261
1990	60.2	10,386
1991	59.8	10,305
1992	59.5	10,260
1993	57.9	9,975
1994	55.5	9,568
1995	51.7	8,910
1996	51.1	8,814
1997	48.9	8,429
1998	46.4	7,998
1999	41.5	7,150
2000	41.5	7,154
2001	44.0	7,592
2002	42.6	7,344
2003	41.9	7,226
2004	39.0	6,732
2005	36.8	6,344
2006	35.4	6,104
2007	35.0	6,031

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

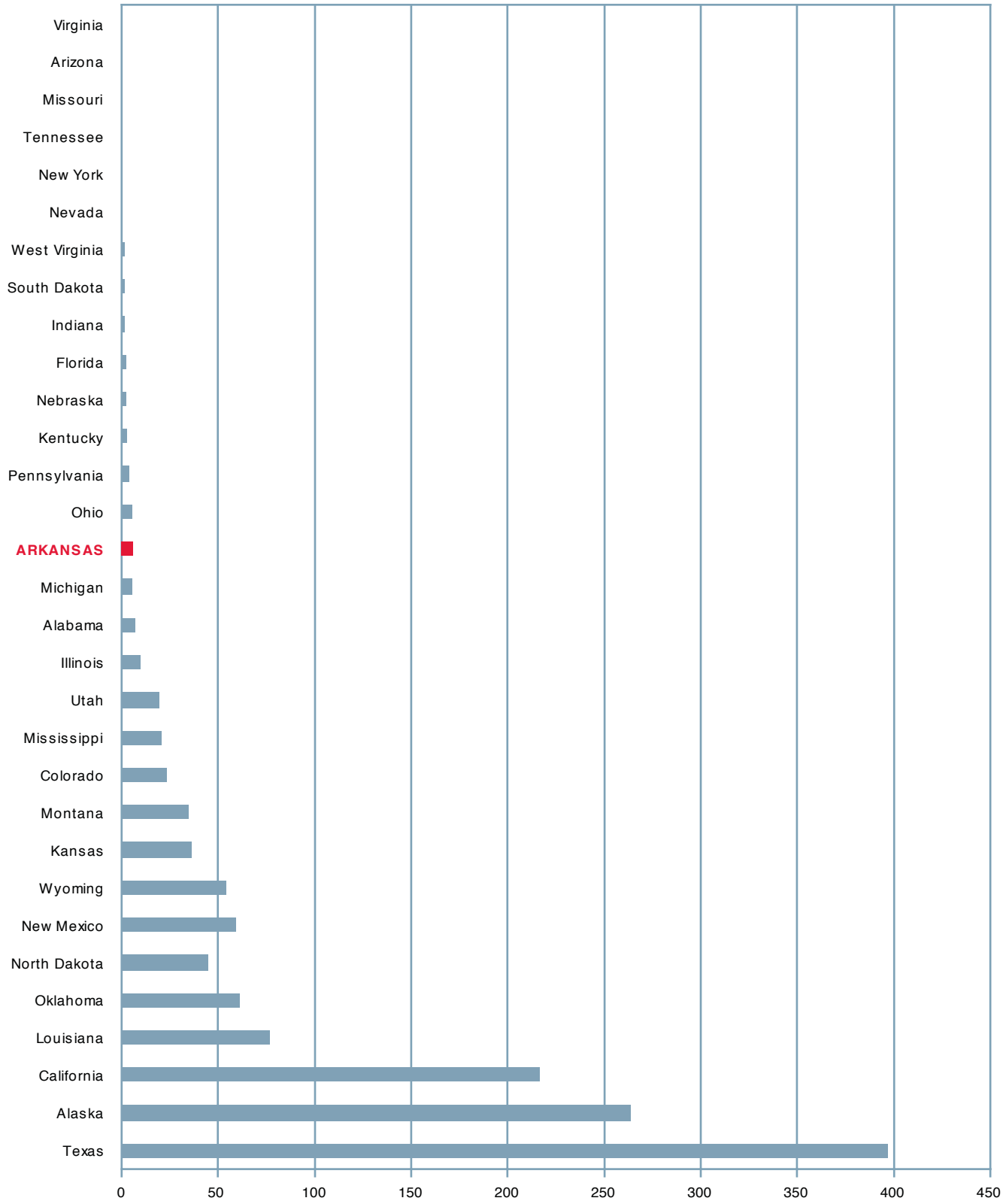
Table G.2 2000-2007 Annual Production of Crude Oil

Rank	State	2000 Millions of Barrels of 42 U.S. Gallons	2000 % of U.S. Total	2001 Millions of Barrels of 42 U.S. Gallons	2001 % of U.S. Total	2002 Millions of Barrels of 42 U.S. Gallons	2002 % of U.S. Total	2003 Millions of Barrels of 42 U.S. Gallons	2003 % of U.S. Total	2004 Millions of Barrels of 42 U.S. Gallons	2004 % of U.S. Total	2005 Millions of Barrels of 42 U.S. Gallons	2005 % of U.S. Total	2006 Millions of Barrels of 42 U.S. Gallons	2006 % of U.S. Total	2007 Millions of Barrels of 42 U.S. Gallons	2007 % of U.S. Total
1	Texas	443.40	20.81%	424.30	20.04%	411.99	19.65%	405.80	19.57%	392.87	19.81%	387.68	20.51%	397.22	21.33%	396.89	21.47%
2	Alaska	355.20	16.67%	351.41	16.60%	359.34	17.13%	355.58	17.15%	332.47	16.76%	315.42	16.69%	270.49	14.52%	263.60	14.26%
3	California	271.13	12.72%	260.66	12.31%	258.01	12.30%	250.00	12.06%	240.21	12.11%	230.29	12.18%	223.45	12.00%	216.78	11.73%
4	Louisiana	105.43	4.95%	104.61	4.94%	93.48	4.46%	90.11	4.35%	83.41	4.21%	75.48	3.99%	73.88	3.97%	76.65	4.15%
5	Oklahoma	69.98	3.28%	68.53	3.24%	66.64	3.18%	65.36	3.15%	62.50	3.15%	62.14	3.29%	62.84	3.37%	60.95	3.30%
6	North Dakota	32.72	1.54%	31.69	1.50%	30.99	1.48%	29.41	1.42%	31.15	1.57%	35.66	1.89%	39.91	2.14%	45.06	2.44%
7	New Mexico	67.20	3.15%	68.00	3.21%	67.04	3.20%	66.13	3.19%	64.24	3.24%	60.66	3.21%	59.82	3.21%	58.83	3.18%
8	Wyoming	60.73	2.85%	57.43	2.71%	54.72	2.61%	52.41	2.53%	51.62	2.60%	51.63	2.73%	52.90	2.84%	54.13	2.93%
9	Kansas	34.46	1.62%	33.94	1.60%	32.72	1.56%	33.94	1.64%	33.86	1.71%	33.82	1.79%	35.65	1.91%	36.49	1.97%
10	Montana	15.43	0.72%	15.92	0.75%	16.86	0.80%	19.32	0.93%	24.72	1.25%	32.86	1.74%	36.26	1.95%	34.83	1.88%
11	Colorado	18.48	0.87%	16.52	0.78%	17.73	0.85%	21.11	1.02%	22.10	1.11%	22.82	1.21%	23.39	1.26%	23.24	1.26%
12	Mississippi	19.84	0.93%	19.53	0.92%	18.02	0.86%	16.59	0.80%	17.15	0.86%	17.70	0.94%	17.36	0.93%	20.40	1.10%
13	Utah	15.64	0.73%	15.25	0.72%	13.68	0.65%	13.10	0.63%	14.63	0.74%	16.65	0.88%	17.91	0.96%	19.52	1.06%
14	Illinois	12.21	0.57%	10.09	0.48%	12.05	0.57%	11.70	0.56%	10.98	0.55%	10.21	0.54%	10.32	0.55%	9.61	0.52%
15	Alabama	10.46	0.49%	9.33	0.44%	8.63	0.41%	7.88	0.38%	7.44	0.38%	7.86	0.42%	7.53	0.40%	7.17	0.39%
16	Michigan	7.91	0.37%	7.38	0.35%	7.22	0.34%	6.52	0.31%	6.41	0.32%	5.55	0.29%	5.09	0.27%	5.20	0.28%
17	**ARKANSAS**	**7.15**	**0.34%**	**7.59**	**0.36%**	**7.34**	**0.35%**	**7.23**	**0.35%**	**6.73**	**0.34%**	**6.34**	**0.34%**	**6.10**	**0.33%**	**6.03**	**0.33%**
18	Ohio	6.58	0.31%	6.05	0.29%	6.00	0.29%	5.65	0.27%	5.79	0.29%	5.65	0.30%	5.42	0.29%	5.46	0.30%
19	Pennsylvania	1.50	0.07%	1.62	0.08%	2.23	0.11%	2.43	0.12%	2.54	0.13%	3.95	0.21%	3.63	0.19%	3.65	0.20%
20	Kentucky	3.47	0.16%	2.97	0.14%	2.68	0.13%	2.54	0.12%	2.55	0.13%	2.54	0.13%	2.34	0.13%	2.67	0.14%
21	Nebraska	2.96	0.14%	2.92	0.14%	2.78	0.13%	2.76	0.13%	2.51	0.13%	2.41	0.13%	2.31	0.12%	2.33	0.13%
22	Florida	4.63	0.22%	4.43	0.21%	3.66	0.17%	3.26	0.16%	2.88	0.14%	2.59	0.14%	2.36	0.13%	2.08	0.11%
23	Indiana	2.10	0.10%	2.02	0.10%	1.96	0.09%	1.87	0.09%	1.76	0.09%	1.73	0.09%	1.73	0.09%	1.73	0.09%
24	South Dakota	1.17	0.05%	1.26	0.06%	1.21	0.06%	1.24	0.06%	1.36	0.07%	1.47	0.08%	1.39	0.07%	1.67	0.09%
25	West Virginia	1.40	0.07%	1.23	0.06%	1.38	0.07%	1.33	0.06%	1.34	0.07%	1.56	0.08%	1.75	0.09%	1.57	0.09%
26	Nevada	0.62	0.03%	0.57	0.03%	0.55	0.03%	0.49	0.02%	0.46	0.02%	0.45	0.02%	0.43	0.02%	0.41	0.02%
27	New York	0.21	0.01%	0.17	0.01%	0.17	0.01%	0.14	0.01%	0.17	0.01%	0.20	0.01%	0.32	0.02%	0.38	0.02%
28	Tennessee	0.35	0.02%	0.35	0.02%	0.28	0.01%	0.31	0.01%	0.36	0.02%	0.32	0.02%	0.19	0.01%	0.28	0.02%
29	Missouri	0.09	0.00%	0.09	0.00%	0.10	0.00%	0.08	0.00%	0.09	0.00%	0.09	0.00%	0.09	0.00%	0.08	0.00%
30	Arizona	0.06	0.00%	0.06	0.00%	0.06	0.00%	0.05	0.00%	0.05	0.00%	0.05	0.00%	0.06	0.00%	0.04	0.00%
31	Virginia	0.01	0.00%	0.01	0.00%	0.02	0.00%	0.01	0.00%	0.02	0.00%	0.01	0.00%	0.01	0.00%	0.02	0.00%
	Federal Offshore	558.24	26.20%	591.59	27.94%	597.59	28.50%	599.13	28.90%	558.95	28.18%	494.33	26.15%	500.11	26.86%	490.71	26.55%
	U.S. Total	**2,130.71**	**100.00%**	**2,117.51**	**100.00%**	**2,097.12**	**100.00%**	**2,073.45**	**100.00%**	**1,983.30**	**100.00%**	**1,890.11**	**100.00%**	**1,862.26**	**100.00%**	**1,848.45**	**100.00%**

Sources: U.S. Energy Information Administration, Petroleum Navigator, April 2010.

APPENDIX G

Figure G.1 2007 Production of Crude Oil, Selected States
(Millions of Barrels of 42 U.S. Gallons)



Source: U.S. Energy Information Administration, Petroleum Navigator
http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Table G.3 1970-2007 Arkansas Petroleum Consumption by Fuel Type
(Trillion Btu)

Year	Distillate Fuel Oil	Jet Fuel	LPG	Motor Gasoline Excluding Ethanol	Residual Fuel Oil	Other*	Total
1970	32	12	38	118	6	40	246
1971	32	12	41	125	19	44	273
1972	46	12	45	135	36	41	315
1973	58	11	40	141	60	47	357
1974	60	11	37	142	66	43	359
1975	56	11	35	145	57	42	345
1976	59	10	36	153	83	44	385
1977	69	11	33	156	112	50	431
1978	72	10	25	161	108	53	429
1979	85	10	18	130	73	53	370
1980	62	11	18	139	31	50	311
1981	76	10	14	138	16	45	299
1982	76	11	15	136	11	40	289
1983	76	9	15	136	5	50	291
1984	71	11	11	144	3	30	270
1985	75	11	13	140	5	27	271
1986	68	10	14	147	6	20	265
1987	68	11	13	150	2	21	265
1988	72	12	13	155	2	24	278
1989	76	11	14	154	2	20	277
1990	73	9	13	152	1	19	268
1991	72	10	12	152	1	18	265
1992	79	6	11	154	[>0]	23	274
1993	84	6	12	160	1	25	288
1994	93	9	12	161	2	23	301
1995	99	7	12	168	1	24	310
1996	98	9	11	167	1	50	337
1997	105	9	11	173	[>0]	54	352
1998	109	9	8	173	1	52	352
1999	104	26	22	176	1	53	381
2000	110	28	24	174	2	52	388
2001	122	6	22	173	10	43	375
2002	126	4	15	178	1	54	379
2003	128	5	12	179	4	50	377
2004	136	4	13	181	8	48	388
2005	142	7	10	180	2	43	384
2006	138	7	10	180	1	49	385
2007	140	7	10	182	1	47	387

*Includes asphalt and road oil, aviation gasoline, kerosene, and 16 other petroleum products.

Sources: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

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Table G.4 1970-2007 Arkansas Petroleum Consumption by Fuel Type
(Thousand Barrels)

Year	Distillate Fuel Oil	Jet Fuel	LPG	Motor Gasoline Excluding Ethanol	Residual Fuel Oil	Other*	Total
1970	5,462	2,204	10,198	22,457	935	6,579	47,835
1971	5,494	2,292	10,777	23,752	2,957	7,268	52,540
1972	7,957	2,181	12,029	25,732	5,643	6,801	60,343
1973	9,892	2,012	10,790	26,924	9,593	7,689	66,900
1974	10,310	2,031	9,905	27,005	10,532	7,072	66,855
1975	9,566	1,995	9,467	27,611	9,086	6,852	64,577
1976	10,147	1,906	9,716	29,095	13,262	7,171	71,297
1977	11,793	2,029	9,035	29,778	17,843	8,200	78,678
1978	12,289	1,920	6,759	30,615	17,218	8,802	77,603
1979	14,558	1,921	5,040	24,833	11,552	8,670	66,574
1980	10,686	2,035	4,847	26,490	4,981	8,292	57,331
1981	13,103	1,747	3,763	26,306	2,611	7,538	55,068
1982	13,111	2,011	4,082	25,946	1,749	6,607	53,506
1983	13,134	1,604	4,106	25,993	763	8,330	53,930
1984	12,257	2,016	3,172	27,334	480	5,127	50,386
1985	12,804	2,030	3,673	26,607	735	4,576	50,425
1986	11,696	1,919	3,803	27,900	926	3,341	49,585
1987	11,642	2,063	3,503	28,575	265	3,525	49,573
1988	12,284	2,221	3,552	29,540	355	3,961	51,913
1989	12,969	1,938	3,786	29,409	370	3,368	51,840
1990	12,585	1,693	3,463	28,997	228	3,218	50,184
1991	12,352	1,792	3,309	28,995	145	2,963	49,556
1992	13,635	1,134	3,012	29,401	31	3,851	51,064
1993	14,394	1,031	3,478	30,472	222	4,081	53,678
1994	15,943	1,634	3,378	30,874	319	3,828	55,976
1995	17,007	1,179	3,229	32,121	219	3,910	57,665
1996	16,848	1,534	3,116	32,081	197	8,969	62,745
1997	17,950	1,539	3,068	33,184	48	9,561	65,350
1998	18,699	1,528	2,322	33,261	103	9,295	65,208
1999	17,781	4,575	5,973	33,698	109	9,466	71,602
2000	18,815	4,868	6,522	33,297	302	9,256	73,060
2001	20,897	1,036	6,152	33,246	1,543	7,493	70,367
2002	21,682	794	4,047	34,103	226	9,218	70,070
2003	22,044	822	3,211	34,343	570	8,643	69,633
2004	23,356	722	3,470	34,628	1,188	8,368	71,732
2005	24,418	1,251	2,705	34,498	264	7,592	70,728
2006	23,624	1,183	2,767	34,560	223	8,402	70,759
2007	24,072	1,226	2,749	34,962	139	8,062	71,210

*Includes asphalt and road oil, aviation gasoline, kerosene, and 16 other petroleum products.

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Table G.5 1970-2007 Arkansas Petroleum Consumption End-Use and Electric Power Sectors
(Trillion Btu)

Year	Transportation	Commercial	Industrial	Residential	Electric Power	Total
1970	153.02	6.32	56.57	26.00	4.43	246.34
1971	161.56	6.22	60.27	27.28	17.25	272.57
1972	179.86	7.80	69.11	29.79	28.82	315.38
1973	194.39	9.51	80.85	27.68	44.86	357.28
1974	196.52	11.16	84.22	24.44	42.57	358.92
1975	197.29	11.89	87.60	20.84	27.80	345.43
1976	206.54	12.49	89.90	22.05	54.24	385.23
1977	213.25	11.72	96.75	21.77	87.59	431.09
1978	218.20	10.49	97.73	16.19	86.42	429.03
1979	187.53	10.32	109.50	13.14	48.96	369.46
1980	192.86	6.39	82.77	8.75	20.57	311.34
1981	199.23	4.30	84.31	6.69	4.72	299.25
1982	199.55	4.05	78.22	6.35	0.91	289.08
1983	187.56	21.24	69.32	12.12	0.59	290.82
1984	196.62	10.22	56.54	6.98	0.11	270.47
1985	195.01	7.25	60.49	7.68	0.12	270.55
1986	201.64	2.95	51.55	8.52	0.38	265.04
1987	211.04	3.26	43.42	7.15	0.06	264.93
1988	219.11	2.85	47.62	7.01	1.61	278.19
1989	223.98	3.72	39.96	7.69	1.68	277.02
1990	218.88	3.68	37.59	6.82	0.91	267.88
1991	220.62	3.00	34.05	6.13	0.75	264.55
1992	219.29	3.04	46.06	5.53	0.55	274.48
1993	229.47	3.34	48.61	6.22	0.76	288.41
1994	243.56	3.47	46.60	6.11	1.05	300.79
1995	248.37	2.89	52.64	5.51	0.64	310.06
1996	252.88	2.83	74.94	5.46	1.08	337.19
1997	261.68	2.76	80.68	5.81	0.75	351.69
1998	265.54	3.02	77.81	4.31	1.67	352.35
1999	284.08	3.62	80.24	11.15	1.56	380.65
2000	285.17	4.07	86.81	9.83	2.23	388.11
2001	268.87	5.47	81.82	10.35	8.90	375.40
2002	277.53	4.54	87.20	7.79	1.53	378.60
2003	274.01	5.86	88.15	6.44	2.82	377.27
2004	280.86	4.87	90.47	7.09	5.03	388.33
2005	280.47	5.96	89.99	5.46	1.86	383.74
2006	278.69	2.30	96.73	5.34	1.65	384.70
2007	284.91	2.09	94.13	5.00	0.80	386.94

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

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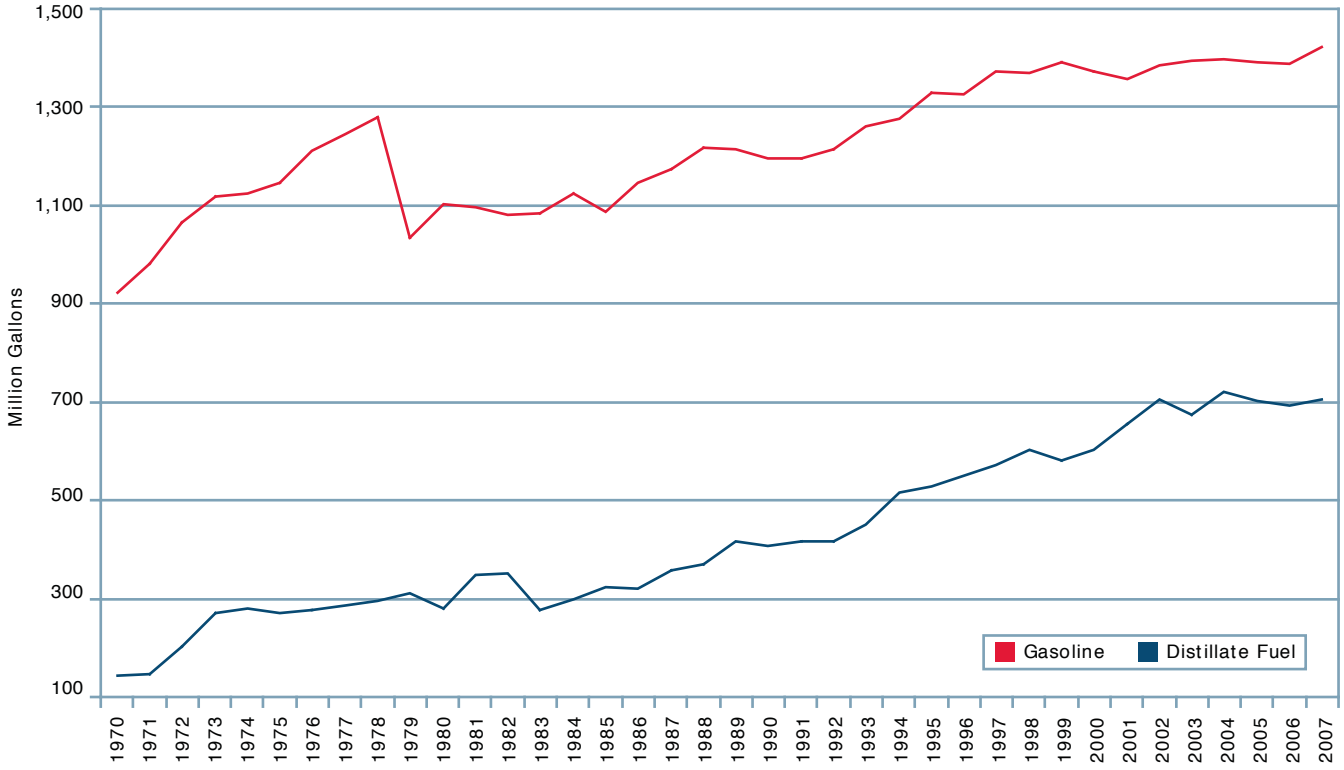
Table G.6 1970-2007 Arkansas Transportation Fuel Consumption
(Millions of Gallons)

Year	Gasoline	% of Total	Distillate Fuel	% of Total	Total
1970	923.38	86.66%	142.10	13.34%	1,065.48
1971	981.00	87.06%	145.86	12.94%	1,126.86
1972	1,064.80	84.04%	202.16	15.96%	1,266.96
1973	1,117.16	80.55%	269.78	19.45%	1,386.94
1974	1,123.63	79.97%	281.51	20.03%	1,405.14
1975	1,146.56	80.98%	269.24	19.02%	1,415.80
1976	1,211.13	81.36%	277.56	18.64%	1,488.69
1977	1,244.18	81.25%	287.17	18.75%	1,531.35
1978	1,278.36	81.24%	295.10	18.76%	1,573.46
1979	1,035.13	76.86%	311.67	23.14%	1,346.80
1980	1,103.59	79.68%	281.35	20.32%	1,384.94
1981	1,096.01	75.95%	347.02	24.05%	1,443.03
1982	1,081.67	75.43%	352.40	24.57%	1,434.06
1983	1,085.51	79.71%	276.26	20.29%	1,361.78
1984	1,123.79	79.05%	297.80	20.95%	1,421.59
1985	1,086.01	77.08%	322.96	22.92%	1,408.97
1986	1,146.67	78.12%	321.25	21.88%	1,467.92
1987	1,174.95	76.72%	356.48	23.28%	1,531.43
1988	1,216.52	76.62%	371.15	23.38%	1,587.68
1989	1,215.62	74.41%	417.99	25.59%	1,633.60
1990	1,194.41	74.52%	408.31	25.48%	1,602.72
1991	1,195.38	74.10%	417.92	25.90%	1,613.30
1992	1,213.41	74.41%	417.37	25.59%	1,630.79
1993	1,262.12	73.67%	451.00	26.33%	1,713.12
1994	1,277.68	71.24%	515.86	28.76%	1,793.54
1995	1,329.04	71.57%	527.88	28.43%	1,856.92
1996	1,327.14	70.75%	548.78	29.25%	1,875.93
1997	1,372.72	70.64%	570.43	29.36%	1,943.16
1998	1,368.56	69.43%	602.51	30.57%	1,971.07
1999	1,391.05	70.55%	580.62	29.45%	1,971.67
2000	1,374.19	69.52%	602.53	30.48%	1,976.71
2001	1,355.76	67.37%	656.58	32.63%	2,012.34
2002	1,385.79	66.25%	706.06	33.75%	2,091.85
2003	1,393.26	67.36%	675.14	32.64%	2,068.40
2004	1,397.22	65.93%	721.95	34.07%	2,119.16
2005	1,391.83	66.44%	703.05	33.56%	2,094.88
2006	1,389.31	66.68%	694.20	33.32%	2,083.51
2007	1,423.33	66.82%	706.66	33.18%	2,129.98

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Figure G.2 1970-2007 Arkansas Transportation Sector Fuel Consumption
(Millions of Gallons)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

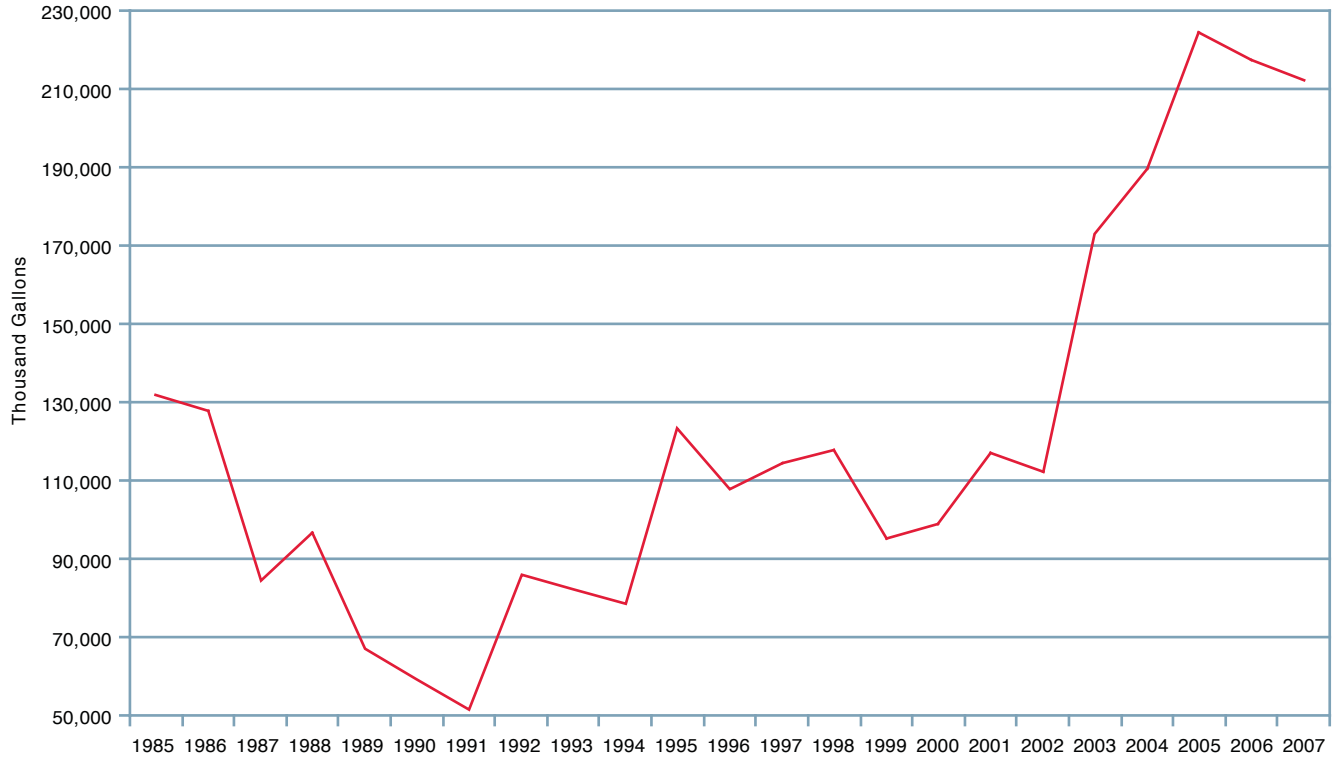
APPENDIX G

Table G.7 1985-2007 Farm Diesel Consumption
(Thousands of Gallons)

Year	Diesel Consumption
1985	131,873
1986	127,941
1987	84,291
1988	96,765
1989	67,178
1990	59,120
1991	51,514
1992	85,982
1993	82,167
1994	78,622
1995	123,346
1996	107,623
1997	114,334
1998	117,881
1999	95,230
2000	98,797
2001	116,946
2002	112,038
2003	172,817
2004	189,671
2005	224,477
2006	217,466
2007	212,255

Source: U.S. Energy Information Administration, Petroleum Navigator http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

Figure G.3 1985-2007 Arkansas Farm Diesel Consumption
(Thousands of Gallons)



Source: U.S. Energy Information Administration, Petroleum Navigator
http://www.eia.doe.gov/emeu/states/_seds.html, June 2010.

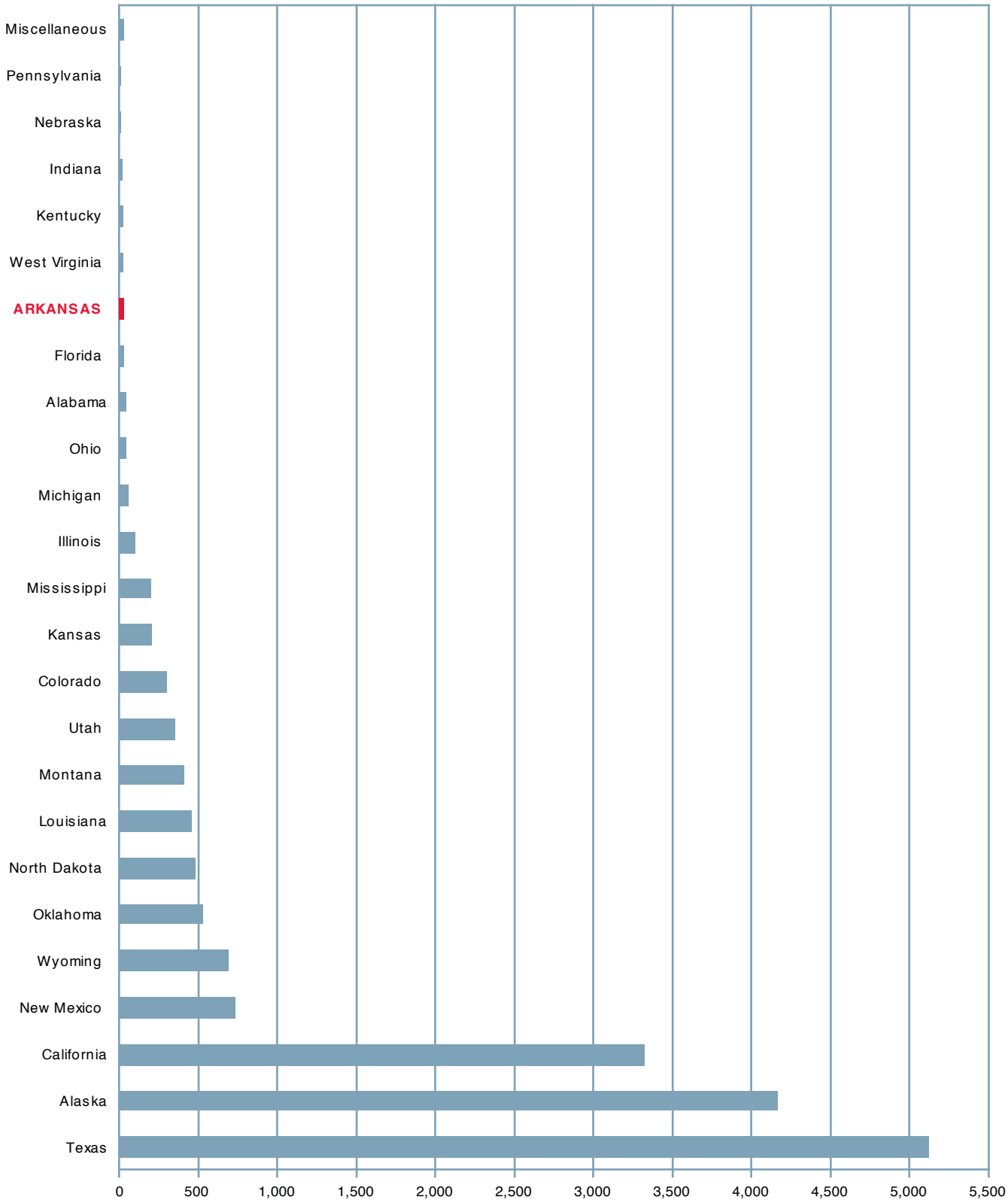
Table G.8 2000-2007 Annual Production of Crude Oil

Rank	State	2000 Million Barrels of 42 U.S. Gallons	2000 % of U.S. Total	2001 Million Barrels of 42 U.S. Gallons	2001 % of U.S. Total	2002 Million Barrels of 42 U.S. Gallons	2002 % of U.S. Total	2003 Million Barrels of 42 U.S. Gallons	2003 % of U.S. Total	2004 Million Barrels of 42 U.S. Gallons	2004 % of U.S. Total	2005 Million Barrels of 42 U.S. Gallons	2005 % of U.S. Total	2006 Million Barrels of 42 U.S. Gallons	2006 % of U.S. Total	2007 Million Barrels of 42 U.S. Gallons	2007 % of U.S. Total
1	Texas	5,273	23.92%	4,944	22.03%	5,015	22.11%	4,583	20.94%	4,613	21.59%	4,919	22.61%	4,826	23.06%	5,122	24.03%
2	Alaska	4,861	22.05%	4,851	21.61%	4,678	20.63%	4,446	20.31%	4,327	20.25%	4,171	19.17%	3,879	18.54%	4,163	19.53%
3	California	3,813	17.30%	3,627	16.16%	3,633	16.02%	3,452	15.77%	3,376	15.80%	3,435	15.79%	3,389	16.19%	3,322	15.58%
4	New Mexico	719	3.26%	715	3.19%	710	3.13%	677	3.09%	669	3.13%	690	3.17%	705	3.37%	735	3.45%
5	Wyoming	561	2.54%	489	2.18%	524	2.31%	517	2.36%	628	2.94%	704	3.24%	706	3.37%	690	3.24%
6	Oklahoma	610	2.77%	556	2.48%	598	2.64%	588	2.69%	570	2.67%	630	2.90%	569	2.72%	530	2.49%
7	North Dakota	270	1.22%	328	1.46%	342	1.51%	353	1.61%	389	1.82%	418	1.92%	412	1.97%	482	2.26%
8	Louisiana	529	2.40%	564	2.51%	501	2.21%	452	2.06%	427	2.00%	432	1.99%	428	2.05%	458	2.15%
9	Montana	235	1.07%	260	1.16%	288	1.27%	315	1.44%	364	1.70%	427	1.96%	419	2.00%	410	1.92%
10	Utah	283	1.28%	271	1.21%	241	1.06%	221	1.01%	215	1.01%	256	1.18%	334	1.60%	355	1.67%
11	Colorado	217	0.98%	196	0.87%	214	0.94%	217	0.99%	225	1.05%	250	1.15%	274	1.31%	304	1.43%
12	Kansas	237	1.08%	216	0.96%	237	1.05%	243	1.11%	245	1.15%	281	1.29%	263	1.26%	206	0.97%
13	Mississippi	182	0.83%	167	0.74%	179	0.79%	169	0.77%	178	0.83%	189	0.87%	186	0.89%	200	0.94%
14	Illinois	111	0.50%	92	0.41%	107	0.47%	125	0.57%	92	0.43%	95	0.44%	89	0.43%	101	0.47%
15	Michigan	56	0.25%	46	0.20%	61	0.27%	75	0.34%	53	0.25%	62	0.28%	63	0.30%	55	0.26%
16	Ohio	59	0.27%	46	0.20%	67	0.30%	66	0.30%	49	0.23%	46	0.21%	49	0.23%	48	0.23%
17	Alabama	34	0.15%	42	0.19%	51	0.22%	52	0.24%	53	0.25%	55	0.25%	45	0.22%	42	0.20%
18	Florida	76	0.34%	75	0.33%	73	0.32%	68	0.31%	65	0.30%	59	0.27%	38	0.18%	32	0.15%
19	**ARKANSAS**	**48**	**0.22%**	**43**	**0.19%**	**49**	**0.22%**	**50**	**0.23%**	**51**	**0.24%**	**40**	**0.18%**	**37**	**0.18%**	**31**	**0.15%**
20	West Virginia	12	0.05%	8	0.04%	13	0.06%	13	0.06%	11	0.05%	21	0.10%	23	0.11%	28	0.13%
21	Kentucky	24	0.11%	17	0.08%	27	0.12%	25	0.11%	27	0.13%	23	0.11%	25	0.12%	24	0.11%
22	Indiana	15	0.07%	12	0.05%	15	0.07%	19	0.09%	11	0.05%	16	0.07%	12	0.06%	17	0.08%
23	Nebraska	18	0.08%	15	0.07%	18	0.08%	16	0.07%	15	0.07%	16	0.07%	14	0.07%	12	0.06%
24	Pennsylvania	15	0.07%	10	0.04%	12	0.05%	13	0.06%	12	0.06%	14	0.06%	20	0.10%	12	0.06%
	Miscellaneous	17	0.08%	21	0.09%	15	0.07%	16	0.07%	15	0.07%	25	0.11%	26	0.12%	33	0.15%
	Federal Offshore	3,770	17.10%	4,835	21.54%	5,009	22.09%	5,120	23.39%	4,691	21.95%	4,483	20.60%	4,096	19.57%	3,905	18.32%
	U.S. Total	**22,045**	**100.00%**	**22,446**	**100.00%**	**22,677**	**100.00%**	**21,891**	**100.00%**	**21,371**	**100.00%**	**21,757**	**100.00%**	**20,927**	**100.00%**	**21,317**	**100.00%**

Note: Miscellaneous includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, New York, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, and Virginia.

Source: U.S. Energy Information Administration, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves Report, April 2010.

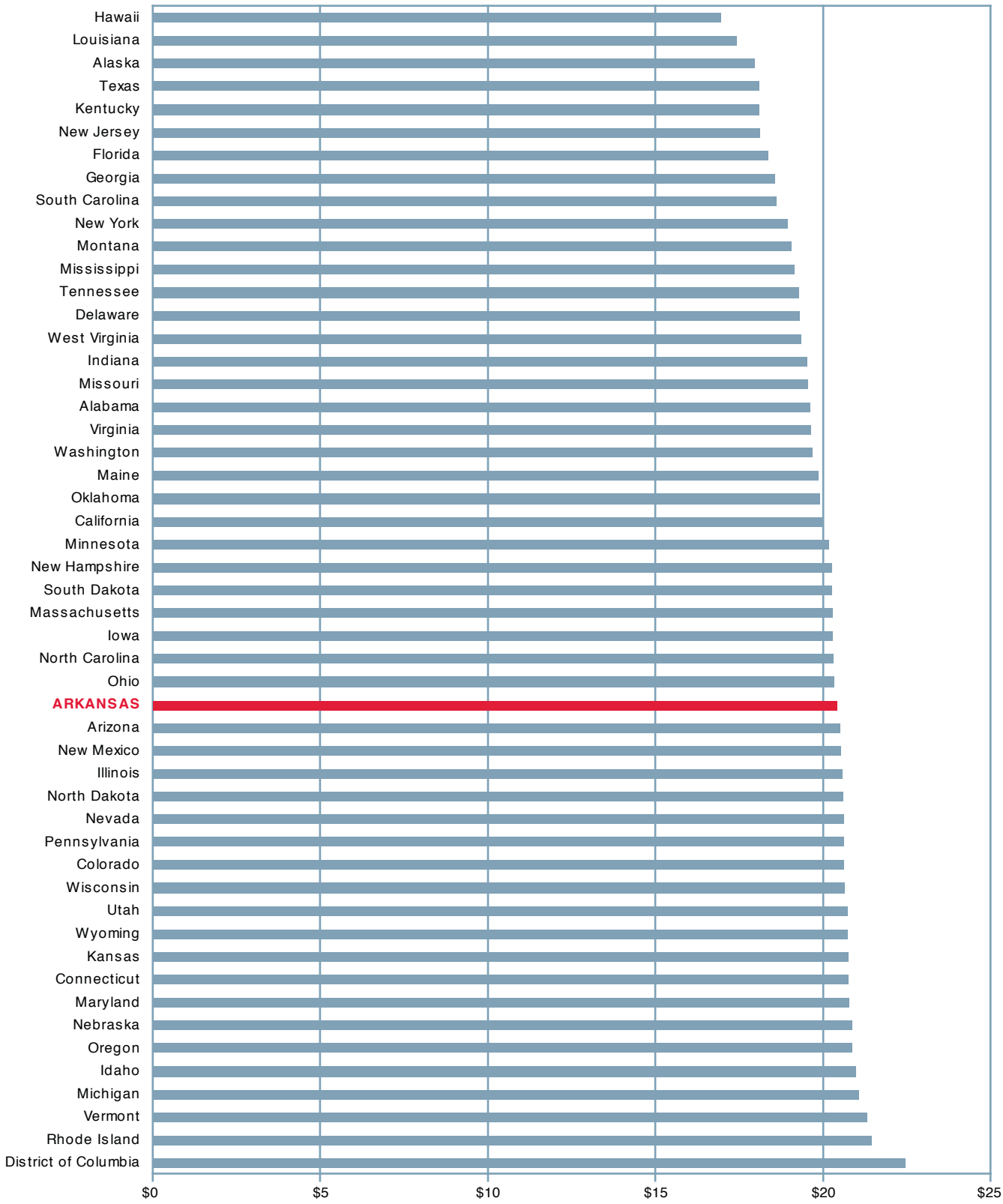
Figure G.4 2007 Proved Reserves of Crude Oil, Selected States
(Millions of Barrels of 42 U.S. Gallons)



Note: Miscellaneous includes Arizona, Illinois, Indiana, Maryland, Missouri, Nebraska, Nevada, New York, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, and Virginia.

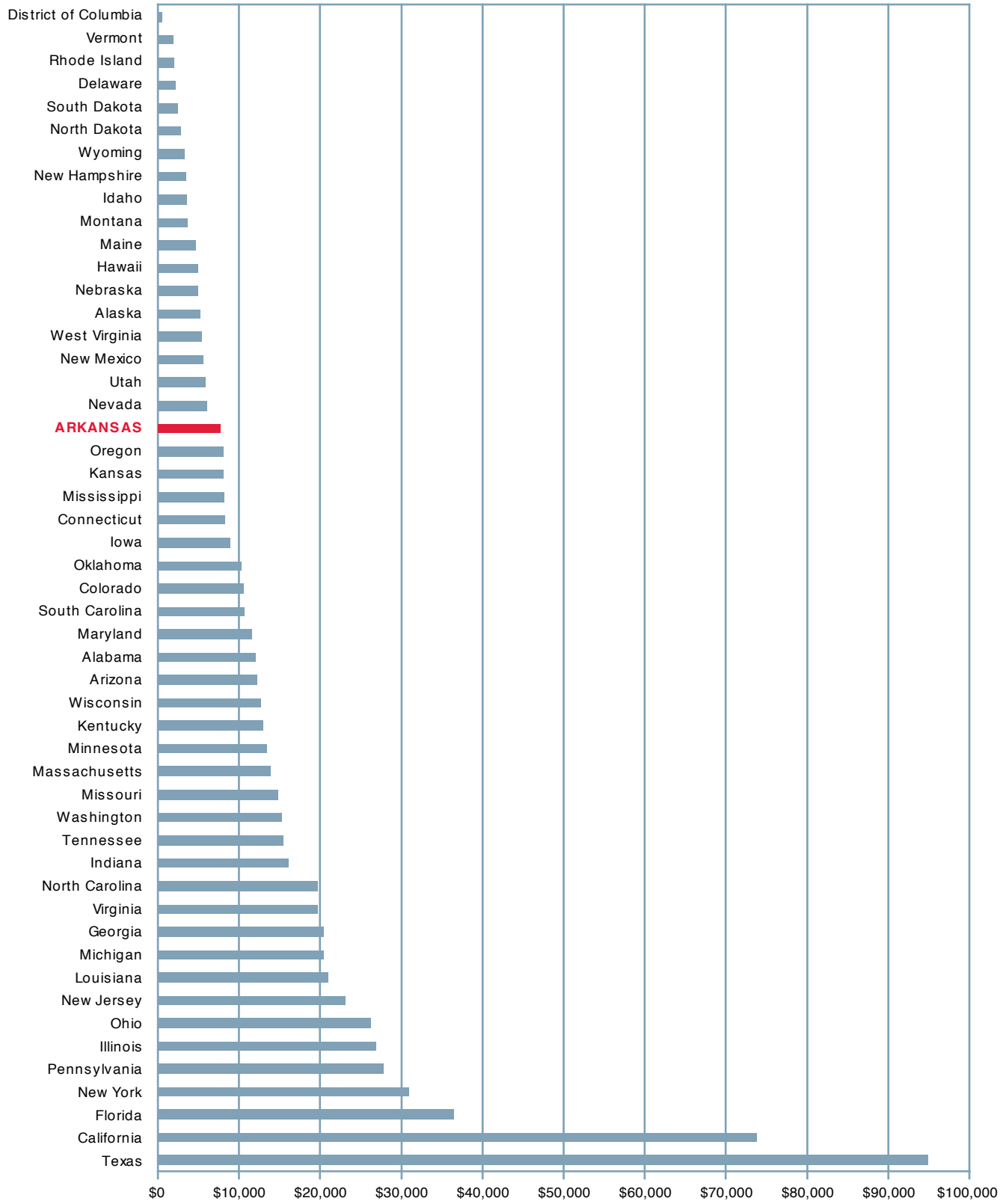
Source: U.S. Energy Information Administration, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves Report, April 2010.

Figure G.5 2007 Petroleum Prices, Ranked by State
(Nominal Dollars Per Million Btu)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

Figure G.6 2007 Petroleum Expenditures, Ranked by State
(Million Nominal Dollars)



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), April 2010.

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Electricity Power

Contents

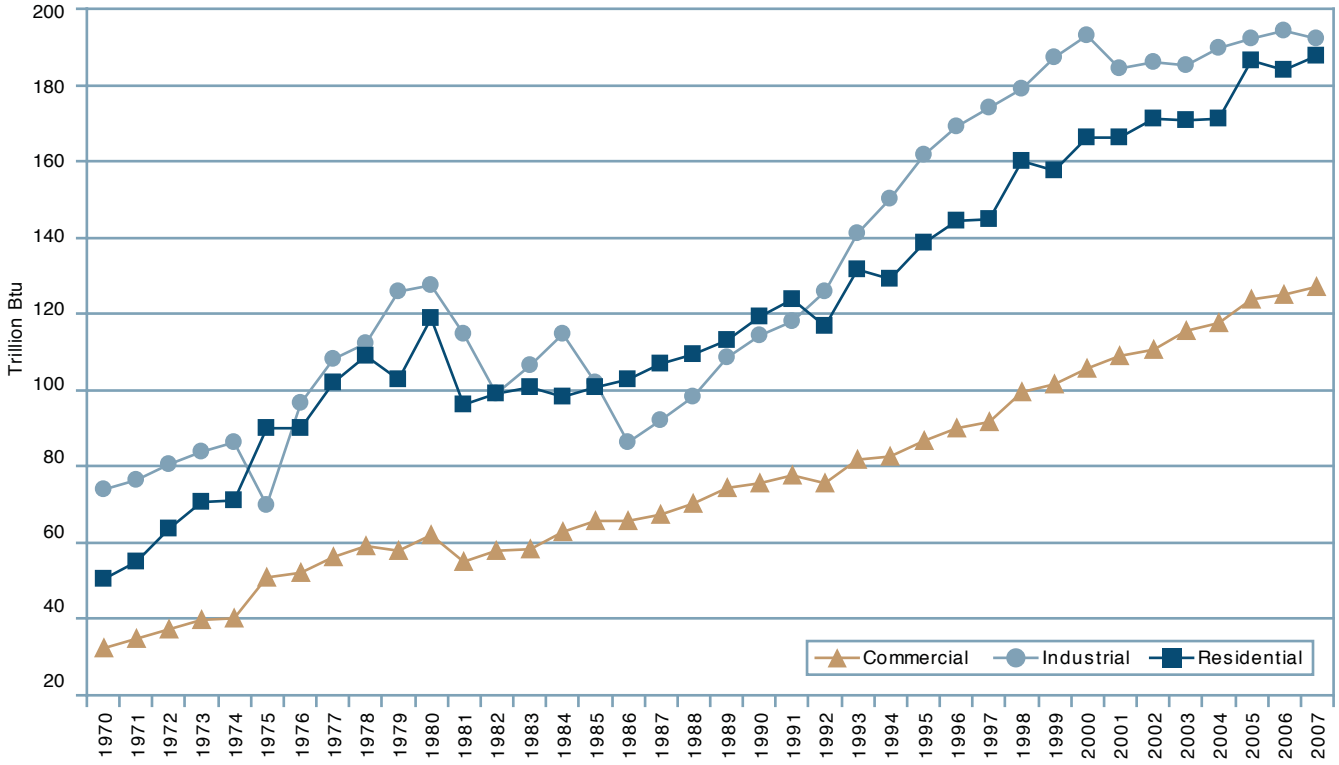
APPENDIX H

Table H.1 1970-2007 Arkansas Electric Power Consumption by Sector
(Million Btu)

	Commercial Sector			Industrial Sector			Residential Sector			Grand Total		
	Consumption	Electrical System Energy Losses	Total	Consumption	Electrical System Energy Losses	Total	Consumption	Electrical System Energy Losses	Total	Consumption	Electrical System Energy Losses	Total
1970	10	23	33	22	52	74	15	36	50	47	111	158
1971	10	25	35	22	54	76	16	39	55	48	118	166
1972	11	26	37	24	57	81	19	45	64	54	128	182
1973	12	28	40	25	59	84	21	50	71	58	137	195
1974	12	28	40	25	61	86	21	50	71	58	139	197
1975	15	36	51	20	49	70	26	64	90	61	149	210
1976	15	37	52	28	68	97	26	63	90	69	168	237
1977	17	40	56	32	76	108	30	72	102	79	188	267
1978	17	42	59	33	80	112	32	77	109	82	199	281
1979	17	41	58	37	89	126	30	72	103	84	202	286
1980	18	44	62	37	90	127	35	84	119	90	218	308
1981	16	39	55	34	81	115	29	68	96	79	188	267
1982	17	41	58	29	70	99	29	70	99	75	181	256
1983	17	41	58	32	75	107	30	71	101	79	187	266
1984	19	44	63	35	80	115	30	69	98	84	193	277
1985	20	46	66	31	71	102	30	70	101	81	187	268
1986	20	46	66	26	60	86	32	71	103	78	177	255
1987	21	47	68	29	64	92	33	74	107	83	185	268
1988	22	49	70	30	68	98	34	76	109	86	193	279
1989	22	52	75	33	76	109	34	79	113	89	207	296
1990	23	53	76	35	80	114	36	83	119	94	216	310
1991	24	54	78	36	82	118	38	86	124	98	222	320
1992	23	53	76	38	87	126	36	81	117	97	221	318
1993	25	57	82	43	98	141	40	92	132	108	247	355
1994	25	57	83	46	104	150	40	89	129	111	250	361
1995	27	60	87	49	112	162	42	96	139	118	268	386
1996	28	63	90	52	117	169	44	100	144	124	280	404
1997	28	64	92	53	121	174	44	100	145	125	285	410
1998	30	69	99	55	124	179	49	111	160	134	304	438
1999	31	71	102	57	130	187	48	110	158	136	311	447
2000	32	74	106	59	134	193	51	115	166	142	323	465
2001	34	75	109	57	127	184	52	115	166	143	317	460
2002	34	76	111	58	128	186	53	118	171	145	322	467
2003	36	80	116	58	128	185	53	117	171	147	325	472
2004	37	81	118	59	131	190	53	118	171	149	330	479
2005	39	85	124	60	132	192	58	128	186	157	345	502
2006	40	85	125	61	133	194	58	126	184	159	344	503
2007	40	87	127	61	131	192	59	128	188	160	346	506

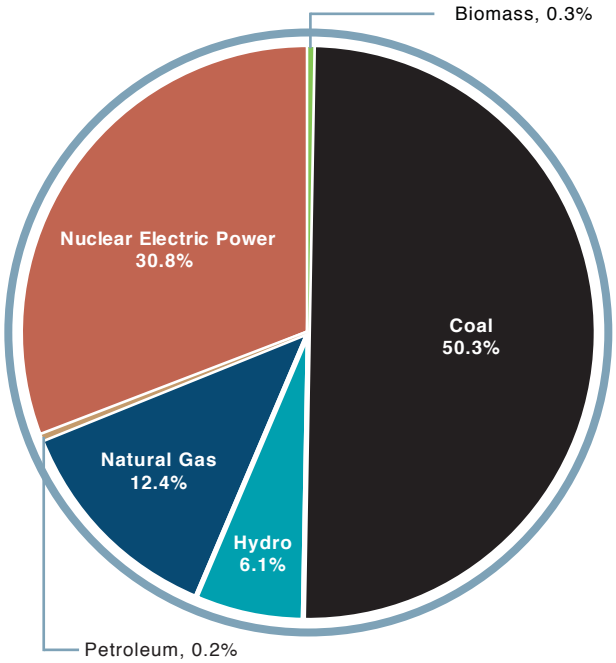
Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure H.1 1970-2007 Arkansas Electric Power Consumption by Sector



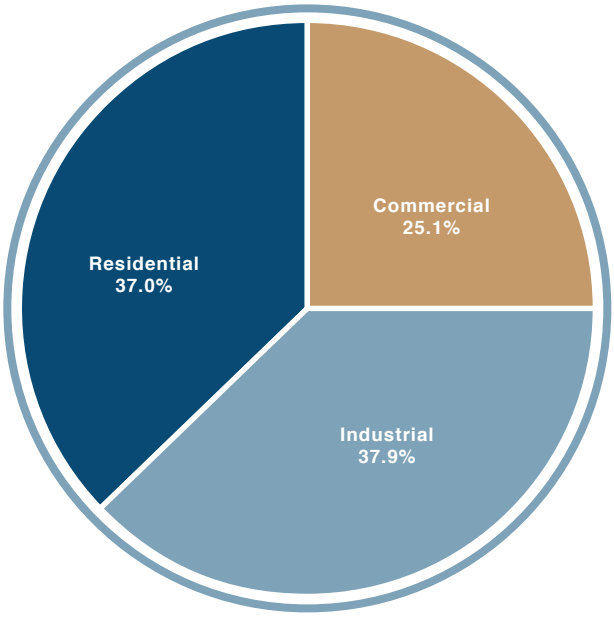
Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure H.2 2007 Arkansas Electric Power Sector Consumption by Fuel Type



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure H.3 2007 Arkansas Electric Power Consumption by Sector



Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

APPENDIX H

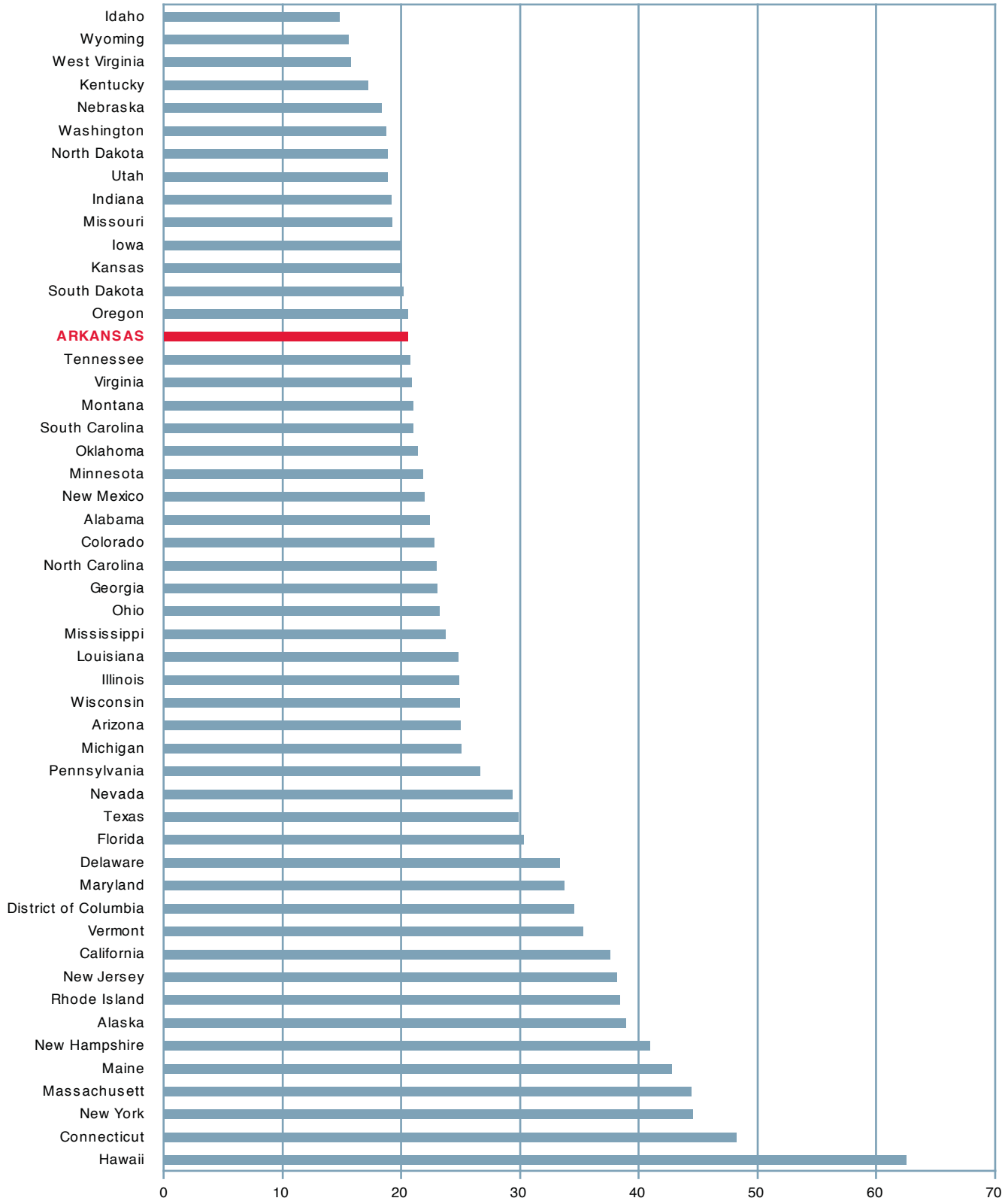
Table H.2 2007 Retail Electricity Prices and Expenditures, Ranked by State

PRICES		
Rank	State	Nominal Dollars Per Million Btu
1	Hawaii	62.57
2	Connecticut	48.20
3	New York	44.61
4	Massachusetts	44.44
5	Maine	42.77
6	New Hampshire	40.98
7	Alaska	38.96
8	Rhode Island	38.44
9	New Jersey	38.18
10	California	37.62
11	Vermont	35.28
12	District of Columbia	34.56
13	Maryland	33.72
14	Delaware	33.35
15	Florida	30.28
16	Texas	29.85
17	Nevada	29.38
18	Pennsylvania	26.69
19	Michigan	25.04
20	Arizona	25.02
21	Wisconsin	24.92
22	Illinois	24.86
23	Louisiana	24.77
24	Mississippi	23.74
25	Ohio	23.26
26	Georgia	23.03
27	North Carolina	22.96
28	Colorado	22.80
29	Alabama	22.46
30	New Mexico	21.96
31	Minnesota	21.85
32	Oklahoma	21.41
33	South Carolina	21.03
34	Montana	21.01
35	Virginia	20.91
36	Tennessee	20.78
37	**ARKANSAS**	**20.57**
38	Oregon	20.56
39	South Dakota	20.19
40	Kansas	20.08
41	Iowa	20.02
42	Missouri	19.24
43	Indiana	19.12
44	Utah	18.88
45	North Dakota	18.85
46	Washington	18.73
47	Nebraska	18.42
48	Kentucky	17.17
49	West Virginia	15.72
50	Wyoming	15.61
51	Idaho	14.85
	United States	**26.84**

EXPENDITURES		
Rank	State	Million Nominal Dollars
1	Texas	33,964
2	California	33,546
3	Florida	23,878
4	New York	22,553
5	Pennsylvania	13,619
6	Ohio	12,692
7	Illinois	12,269
8	Georgia	10,800
9	New Jersey	10,614
10	North Carolina	10,332
11	Michigan	9,251
12	Massachusetts	8,664
13	Virginia	7,904
14	Maryland	7,523
15	Tennessee	7,493
16	Indiana	7,040
17	Alabama	6,771
18	Arizona	6,590
19	Louisiana	6,498
20	Wisconsin	5,997
21	South Carolina	5,880
22	Missouri	5,614
23	Connecticut	5,613
24	Washington	5,404
25	Kentucky	5,333
26	Minnesota	5,035
27	Oklahoma	3,998
28	Colorado	3,943
29	Mississippi	3,775
30	Nevada	3,494
31	Oregon	3,419
32	**ARKANSAS**	**3,183**
33	Iowa	3,093
34	Kansas	2,729
35	Hawaii	2,213
36	West Virginia	1,801
37	Nebraska	1,775
38	Utah	1,763
39	Maine	1,731
40	New Mexico	1,619
41	New Hampshire	1,571
42	District of Columbia	1,428
43	Delaware	1,336
44	Idaho	1,204
45	Montana	1,092
46	Rhode Island	1,051
47	Alaska	831
48	Wyoming	806
49	North Dakota	759
50	South Dakota	730
51	Vermont	706
	United States	**340,928**

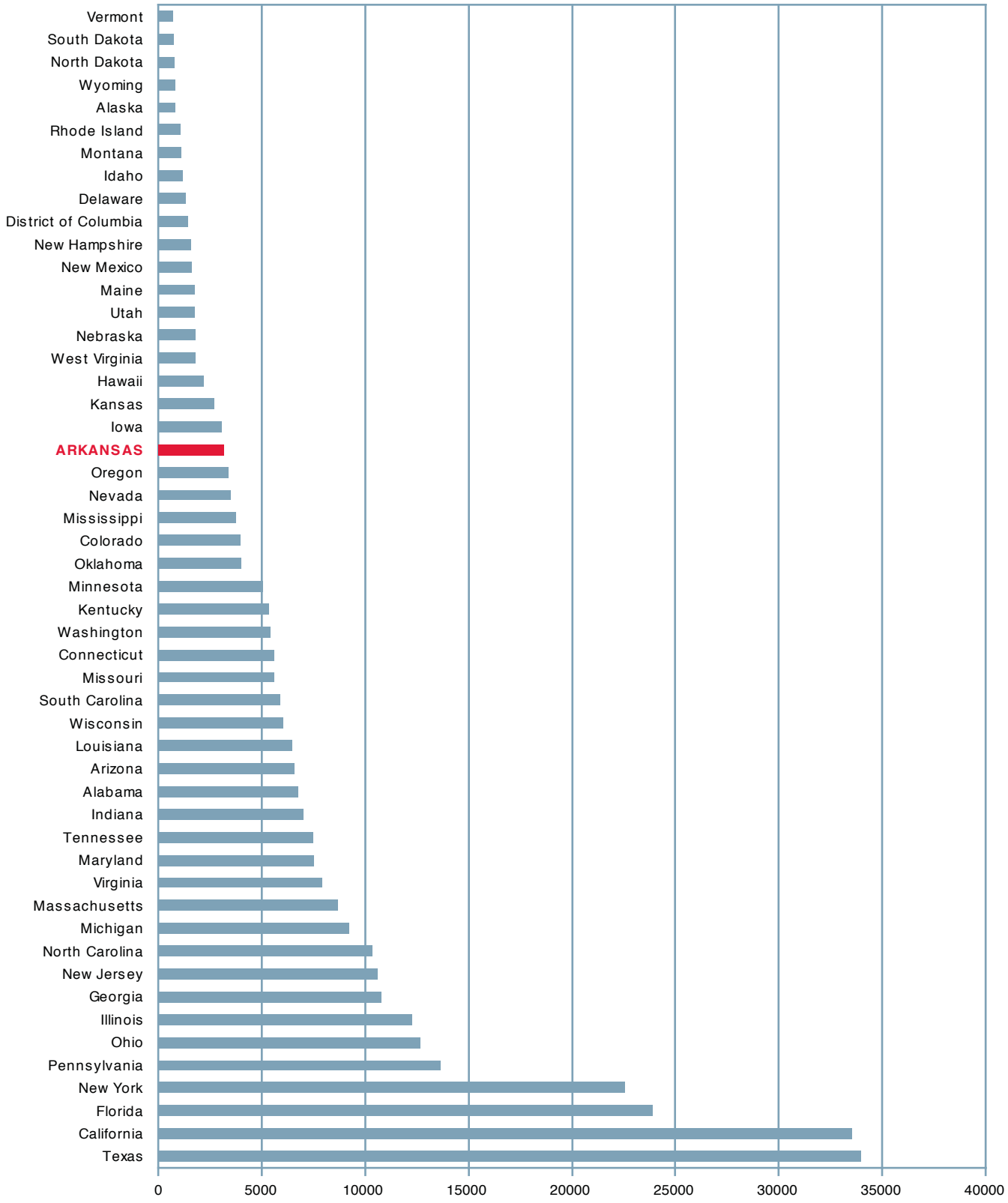
Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Figure H.4 2007 Retail Electricity Prices, Ranked by State
(Nominal Dollars Per Million Btu)



Source: U.S. Energy Information Administration, Petroleum Navigator, April 2010.

Figure H.5 2007 Retail Electricity Expenditures, Ranked by State (Million Nominal Dollars)



Source: U.S. Energy Information Administration, Petroleum Navigator, April 2010.

Table H.3 2007 Arkansas Utility Electric Power Generation Capacity

Company Name	Number of Generating Plants	Generator Nameplate Capacity (Megawatts)
Entergy Arkansas, Inc.	11	7,614.8
Arkansas Electric Cooperative Corporation	8	1,362.7
Southwestern Electric Power Company	2	907.0
USCE - Little Rock District	6	889.2
Associated Electric Cooperative, Inc.	1	679.0
City of Jonesboro	1	224.3
USCE - Vickburg District	3	168.5
City of North Little Rock	1	45.4
Paragould City Light & Water Commission	2	33.1
City of Osceola	1	9.6
City of Piggott	1	7.2
Total	**37**	**11,940.8**

Note: Some of the plants attributed to certain utilities are jointly owned.

Source: U.S. Energy Information Administration, Electricity Generating Capacity. http://www.eia.doe.gov/cneaf/electricity/page/capacity/capacity.html.

Table H.4 2007 Arkansas Nonutility Electric Power Generation Capacity

Company Name	Number of Generating Plants	Generator Nameplate Capacity (Megawatts)
Union Power Partners, LP	1	2,428.0
Hot Spring Power Company, LLC	1	746.0
Cinergy Solutions O&M, LLC	1	714.8
Pine Bluff Energy, LLC	1	236.0
Domtar Industries Inc.	1	156.5
Crossett Paper Operations	1	92.0
Evergreen Packaging, Inc.	1	85.0
Potlatch Forest Products Corporation	2	35.0
Riceland Foods, Inc.	1	18.0
WM Renewable Energy, LLC	1	4.8
Century Flooring Company, LLC	1	2.0
Little Rock Wastewater Utility	1	1.5
City of Fort Smith	1	1.3
Total	**14**	**4,520.9**

Note: Some of the plants attributed to certain utilities are jointly owned.

Source: U.S. Energy Information Administration, Electricity Generating Capacity. http://www.eia.doe.gov/cneaf/electricity/page/capacity/capacity.html.

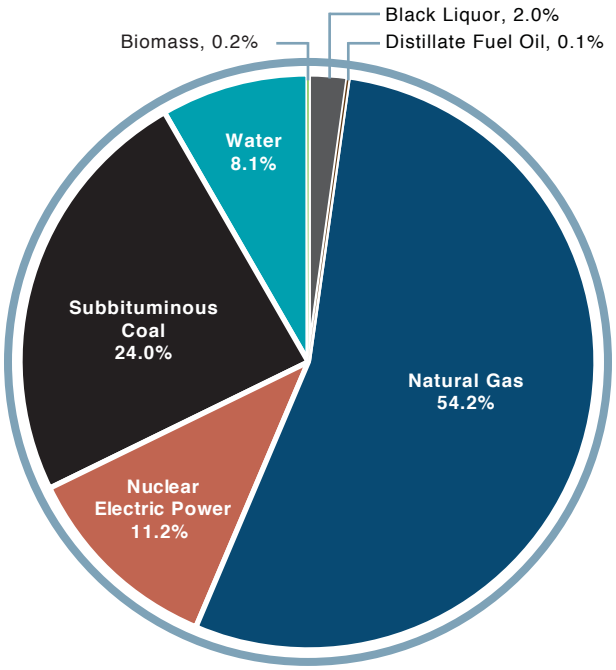
APPENDIX H

Table H.5 2007 Arkansas Hydroelectric Generating Units

Company/Plant	Unit	Generator Nameplate Capacity (Megawatts)
Arkansas Electric Cooperative Corporation		
Dam 2	1	34.2
	2	34.2
	3	34.2
Ellis	1	10.8
	2	10.8
	3	10.8
Whillock	1	10.8
	2	10.8
	3	10.8
City of North Little Rock		
Murray	1	22.7
	2	22.7
Entergy Arkansas Inc		
Carpenter	1	28.0
	2	28.0
Remmel	1	3.0
	2	3.0
	3	3.0
City of Fort Smith		
Lee Creek	0209	1.3
USCE - Vickburg District		
Blakely Mountain	1	37.5
	2	37.5
Degray	1	40.0
	2	28.0
Narrows	1	8.5
	2	8.5
	3	8.5
USCE - Little Rock District		
Beaver	1	56.0
	2	56.0
Bull Shoals	1	40.0
	2	40.0
	3	40.0
	4	40.0
	5	45.0
	6	45.0
	7	45.0
	8	45.0
Dardanelle	1	40.2
	2	40.2
	3	40.2
	4	40.2
Greers Ferry Lake	1	48.0
	2	48.0
Norfork	1	40.2
	2	40.2
Ozark	1	20.0
	2	20.0
	3	20.0
	4	20.0
	5	20.0
Total 6 Companies, 16 Plants	**47 Units**	**1,336.8**

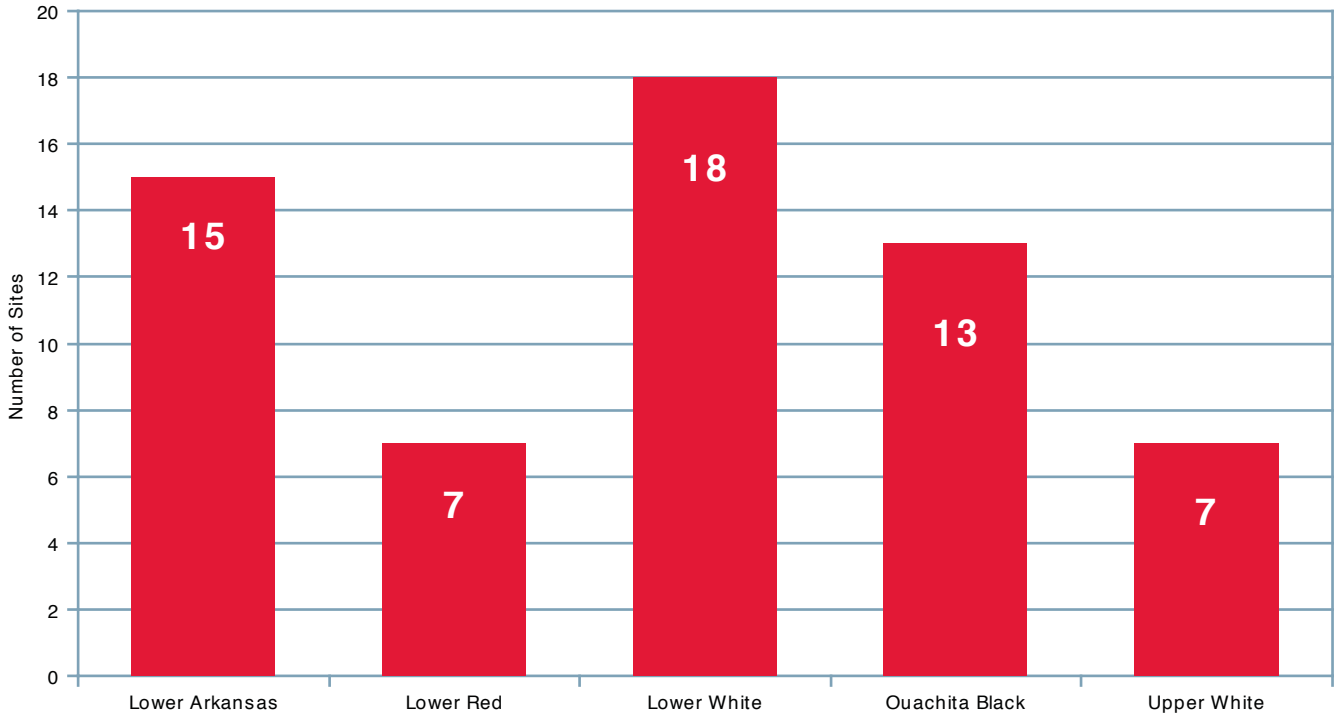
Source: U.S. Energy Information Administration, Electricity Generating Capacity Existing Electric Generating Units in the United States, 2007.

Figure H.6 2007 Arkansas Generator Nameplate Capacity by Primary Energy Source, (Percentage)



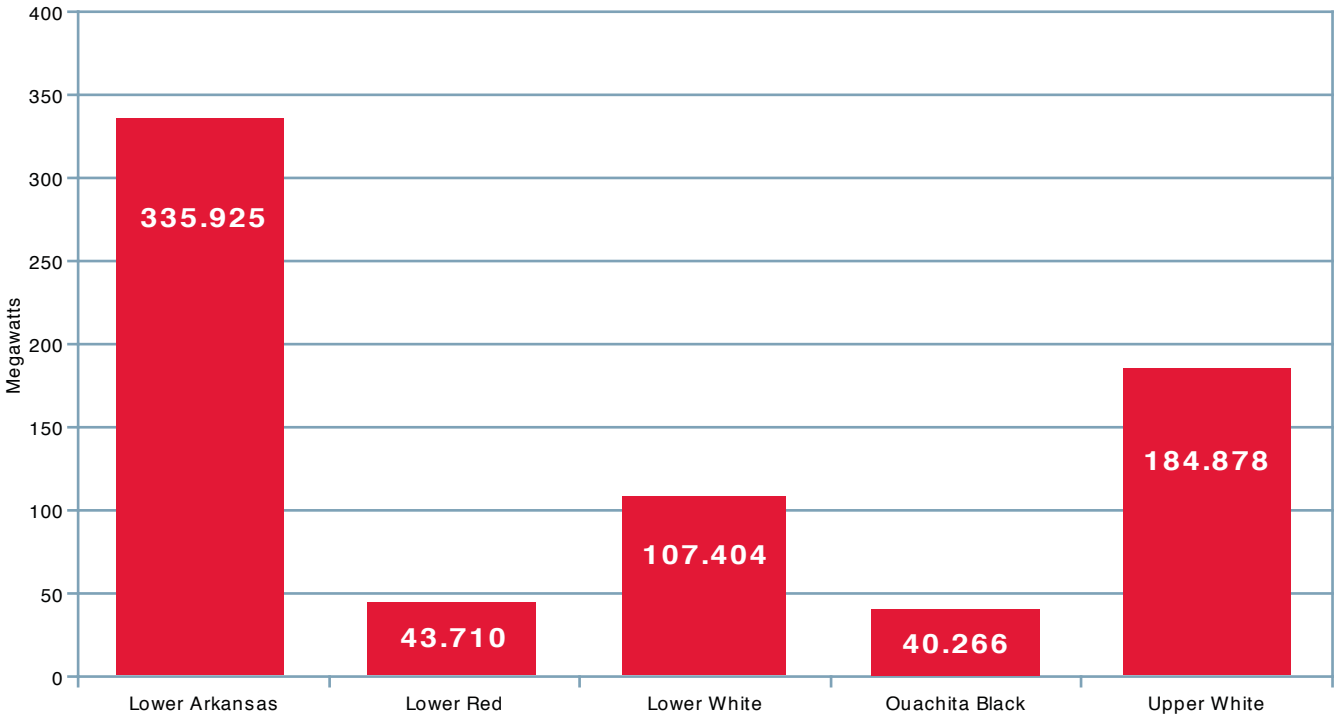
Source: U.S. Energy Information Administration, Electricity Generating Capacity, Existing Electric Generating Units in the United States, 2007. http://www.eia.doe.gov/cneaf/electricity/page/capacity/capacity.html.

Figure H.7 Potential Hydroelectric Sites in the Arkansas River Basin



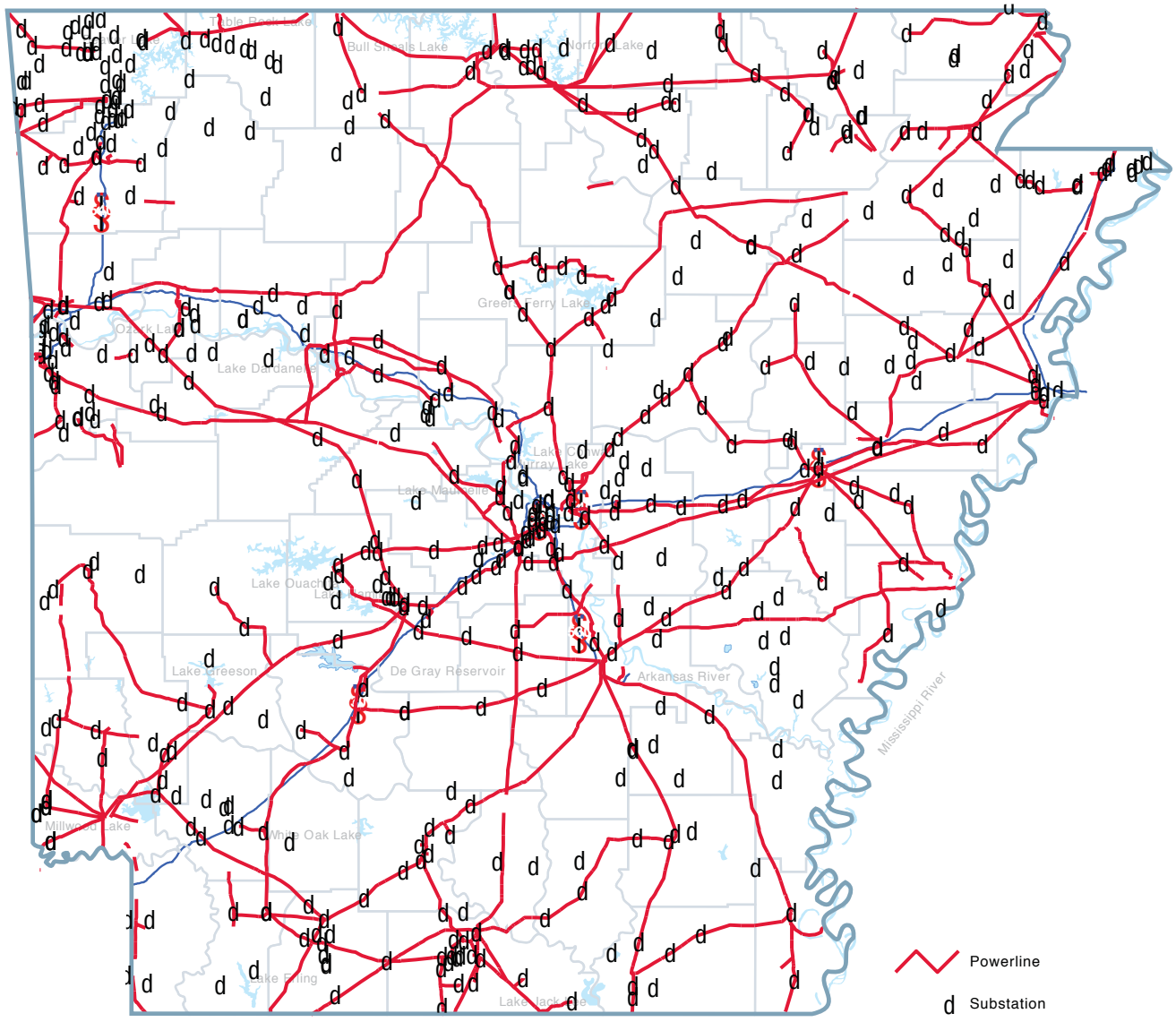
Source: Idaho National Laboratory, Arkansas Hydropower Resource Assessment by River Basin
http://hydropower.inl.gov/resourceassessment/app_b/index_states.shtml?ar.

Figure H.8 Potential Hydroelectric Capacity in the Arkansas River Basin



Source: Idaho National Laboratory, Arkansas Hydropower Resource Assessment by River Basin
http://hydropower.inl.gov/resourceassessment/app_b/index_states.shtml?ar.

Figure H.9 Transmission Facilities



Source: The University of Arkansas at Little Rock GIS Applications Laboratory compiled the data contained herein from various sources*. Where the data were translated from one format to another, the UALR GIS Lab made all reasonable efforts to preserve the data quality. Acceptance or use of this data is done without any expressed or implied warranty.

* Arkansas Geographic Information Office, Arkansas Highway and Transportation Department and the U.S. Geological Survey

Renewable Energy

Contents

APPENDIX I

Table I.1 1970-2007 Arkansas Renewable Energy Production Estimates by Source (Trillion Btu)

Year	Renewable Energy		Total
	Biofuels[a]	Other[b]	
1970	NA	56.9	56.9
1971	NA	53.6	53.6
1972	NA	53.9	53.9
1973	NA	81.7	81.7
1974	NA	81.3	81.3
1975	NA	71.6	71.6
1976	NA	62.3	62.3
1977	NA	69.7	69.7
1978	NA	77.1	77.1
1979	NA	80.8	80.8
1980	NA	70.0	70.0
1981	0.0	68.2	68.2
1982	0.0	77.6	77.6
1983	0.0	95.3	95.3
1984	0.0	91.4	91.4
1985	0.0	109.2	109.2
1986	0.0	91.2	91.2
1987	0.0	86.7	86.7
1988	0.0	92.5	92.5
1989	0.0	119.8	119.8
1990	0.0	110.0	110.0
1991	0.0	109.9	109.9
1992	0.0	112.6	112.6
1993	0.0	133.7	133.7
1994	0.0	119.6	119.6
1995	0.0	117.5	117.5
1996	0.0	118.1	118.1
1997	0.0	124.1	124.1
1998	0.0	115.0	115.0
1999	0.0	110.9	110.9
2000	0.0	108.7	108.7
2001	0.0	94.1	94.1
2002	0.0	108.7	108.7
2003	0.0	108.3	108.3
2004	0.0	113.0	113.0
2005	0.0	109.1	109.1
2006	0.0	96.3	96.3
2007	0.0	116.7	116.7

Note: a = Biomass inputs (feedstock) for fuel ethanol production
b = Other renewable energy consumption used as proxy

Sources: U.S. Energy Information Administration, Independent Statistics and Analysis, August, 2010.
http://www.eia.doe.gov/emeu/states/state.html?q_state_a=ar&q_state=ARKANSAS.

Table I.2 1970-2007 Arkansas Renewable Energy Consumption Estimates by Source
(Trillion Btu)

Year	Hydroelectric Power[a]	Wood & Waste[b]	Fuel Ethanol[c]	Losses & Coproducts[d]	Total	Geothermal	Solar/PV[e]	Wind	Total
1970	22.7	34.3	NA	NA	34.3	0.0	NA	NA	56.9
1971	18.9	34.7	NA	NA	34.7	0.0	NA	NA	53.6
1972	17.1	36.9	NA	NA	36.9	0.0	NA	NA	53.9
1973	44.2	37.6	NA	NA	37.6	0.0	NA	NA	81.7
1974	44.6	36.7	NA	NA	36.7	0.0	NA	NA	81.3
1975	35.7	35.9	NA	NA	35.9	0.0	NA	NA	71.6
1976	21.0	41.3	NA	NA	41.3	0.0	NA	NA	62.3
1977	18.7	51.1	NA	NA	51.1	0.0	NA	NA	69.7
1978	25.1	52.0	NA	NA	52.0	0.0	NA	NA	77.1
1979	34.9	45.8	NA	NA	45.8	0.0	NA	NA	80.8
1980	17.6	52.4	NA	NA	52.4	0.0	NA	NA	70.0
1981	12.9	55.3	0.1	0	55.3	0.0	NA	NA	68.3
1982	22.0	55.6	0.1	0	55.6	0.0	NA	NA	77.7
1983	34.9	60.4	0.1	0	60.5	0.0	NA	0	95.4
1984	28.4	63.0	0.2	0	63.2	0.0	0	0	91.7
1985	46.3	62.9	0.1	0	62.9	0.0	0	0	109.3
1986	29.4	61.8	0	0	61.8	0.0	0	0	91.2
1987	25.1	61.6	0	0	61.6	0.0	0	0	86.7
1988	28.8	63.8	0	0	63.8	0.0	0	0	92.5
1989	32.2	86.2	0	0	86.2	0.1	1.3	0	119.8
1990	38.0	70.6	0.5	0	71.1	0.1	1.3	0	110.5
1991	37.0	71.4	0.3	0	71.7	0.1	1.3	0	110.2
1992	34.9	76.3	0.2	0	76.5	0.1	1.3	0	112.9
1993	46.5	85.8	0.2	0	85.9	0.1	1.3	0	133.8
1994	35.7	82.5	0	0	82.5	0.1	1.3	0	119.6
1995	33.2	82.9	0	0	83.0	0.1	1.3	0	117.6
1996	28.9	87.8	0	0	87.8	0.1	1.2	0	118.1
1997	35.9	86.9	0	0	86.9	0.1	1.2	0	124.1
1998	31.8	82.0	0	0	82.0	0.2	1.1	0	115.0
1999	27.6	82.2	0	0	82.2	0.2	1.0	0	110.9
2000	24.2	83.5	0	0	83.5	0.2	0.9	0	108.7
2001	26.3	66.8	0	0	66.8	0.2	0.7	0	94.1
2002	35.0	72.9	0	0	72.9	0.2	0.6	0	108.7
2003	27.2	80.4	0	0	80.4	0.3	0.4	0	108.3
2004	36.5	75.9	0	0	75.9	0.3	0.3	0	113.0
2005	30.8	77.8	0.1	0	77.9	0.3	0.1	0	109.2
2006	15.4	80.4	0.1	0	80.5	0.4	0.1	0	96.4
2007	32.0	84.2	0.3	0	84.5	0.5	0.1	0	117.0

Note: a = Conventional hydroelectric power. Does not include pumped-storage hydroelectricity.
b = Wood, wood-derived fuels, and biomass waste. Prior to 2001, includes non-biomass waste.
c = Includes denaturant.
d = Losses and co-products from the production of fuel ethanol.
e = Solar thermal and photovoltaic energy.
NA = Not available.*Includes asphalt and road oil, aviation gasoline, kerosene, and 16 other petroleum products.

Sources: U.S. Energy Information Administration, Independent Statistics and Analysis, August, 2010.
http://www.eia.doe.gov/emeu/states/state.html?q_state_a=ar&q_state=ARKANSAS.

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Table I.3 2003-2007 United States Renewable Energy Consumption by End-Use Sector and Energy Source (Quadrillion Btu)

End-Use Sector and Energy Source	2003	2004	2005	2006	2007
Total	**6.150**	**6.261**	**6.424**	**6.909**	**6.813**
Biomass	2.817	3.024	3.134	3.361	3.596
Biofuels	0.414	0.513	0.595	0.795	1.024
Biodiesel	0.002	0.004	0.012	0.032	0.062
Ethanol	0.238	0.299	0.342	0.462	0.580
Losses and Coproducts	0.174	0.210	0.241	0.301	0.381
Biodiesel Feedstock	*	*	*	*	0.001
Ethanol Feedstock	0.174	0.210	0.241	0.301	0.380
Waste	0.401	0.389	0.403	0.414	0.430
Landfill Gas	0.141	0.144	0.148	0.157	0.173
MSW Biogenic	0.165	0.164	0.168	0.171	0.165
Other Biomass	0.096	0.081	0.088	0.086	0.092
Wood and Derived Fuels	2.002	2.121	2.136	2.152	2.142
Geothermal	0.331	0.341	0.343	0.343	0.349
Hydroelectric Conventional	2.825	2.690	2.703	2.869	2.446
Solar/PV	0.064	0.064	0.066	0.072	0.081
Wind	0.115	0.142	0.178	0.264	0.341
Residential	**0.471**	**0.483**	**0.507**	**0.475**	**0.527**
Biomass	0.400	0.410	0.430	0.390	0.430
Wood and Derived Fuels	0.400	0.410	0.430	0.390	0.430
Geothermal	0.013	0.014	0.016	0.018	0.022
Solar/PV	0.058	0.059	0.061	0.067	0.075
Commercial	**0.113**	**0.118**	**0.119**	**0.117**	**0.117**
Biomass	0.101	0.105	0.105	0.102	0.102
Biofuels	0.001	0.001	0.001	0.001	0.002
Ethanol	0.001	0.001	0.001	0.001	0.002
Waste	0.029	0.034	0.034	0.036	0.031
Landfill Gas	0.002	0.002	0.003	0.004	0.003
MSW Biogenic	0.022	0.025	0.025	0.026	0.021
Other Biomass	0.005	0.007	0.007	0.007	0.007
Wood and Derived Fuels	0.071	0.070	0.070	0.065	0.069
Geothermal	0.011	0.012	0.014	0.014	0.014
Hydroelectric Conventional	0.001	0.001	0.001	0.001	0.001
Industrial	**1.731**	**1.861**	**1.884**	**2.007**	**2.032**
Biomass	1.684	1.825	1.848	1.973	2.012
Biofuels	0.178	0.217	0.248	0.311	0.393
Ethanol	0.005	0.006	0.007	0.010	0.012
Losses and Coproducts	0.174	0.210	0.241	0.301	0.381
Biodiesel Feedstock	*	*	*	*	0.001
Ethanol Feedstock	0.174	0.210	0.241	0.301	0.380
Waste	0.142	0.132	0.148	0.147	0.162
Landfill Gas	0.076	0.076	0.081	0.081	0.093
MSW Biogenic	0.005	0.006	0.007	0.006	0.006
Other Biomass	0.062	0.050	0.061	0.061	0.063
Wood and Derived Fuels	1.363	1.476	1.452	1.515	1.457
Geothermal	0.003	0.004	0.004	0.004	0.005
Hydroelectric Conventional	0.043	0.033	0.032	0.029	0.016
Solar/PV	-	-	-	-	-
Wind	-	-	-	-	-
Transportation	**0.235**	**0.296**	**0.346**	**0.483**	**0.629**
Biomass	0.235	0.296	0.346	0.483	0.629
Biofuels	0.235	0.296	0.346	0.483	0.629
Biodiesel	0.002	0.004	0.012	0.032	0.062
Ethanol	0.233	0.292	0.334	0.451	0.566
Electric Power	**3.601**	**3.503**	**3.568**	**3.827**	**3.508**
Biomass	0.397	0.388	0.406	0.412	0.423
Waste	0.230	0.223	0.221	0.231	0.237
Landfill Gas	0.063	0.066	0.065	0.073	0.077
MSW Biogenic	0.138	0.133	0.136	0.139	0.138
Other Biomass	0.029	0.023	0.020	0.019	0.022
Wood and Derived Fuels	0.167	0.165	0.185	0.182	0.186
Geothermal	0.303	0.311	0.309	0.306	0.308
Hydroelectric Conventional	2.781	2.656	2.670	2.839	2.430
Solar/PV	0.005	0.006	0.006	0.005	0.006
Wind	0.115	0.142	0.178	0.264	0.341

Sources: U.S. Energy Information Administration, Statistics and Analysis, Renewable Energy Annual 2007 Addition, Table 1.3, http://www.eia.doe.gov/cneaf/solar.renewables/page/rea_data/rea_sum.html, August 2010.

Table I.4 2003-2007 Arkansas Renewable Electric Power Industry Net Generation by Energy Source (Thousand Megawatt Hours)

Energy Source	2003	2004	2005	2006	2007
Geothermal	-	-	-	-	-
Hydro Conventional	2,655	3,643	3,083	1,551	3,237
Solar	-	-	-	-	-
Wind	-	-	-	-	-
Wood/Wood Waste	1,749	1,778	1,708	1,689	1,581
MSW Biogenic/Landfill Gas	-	-	-	7	33
Other Biomass	95	33	28	26	10
Total	**4,499**	**5,454**	**4,818**	**3,273**	**4,860**

- = No data reported.

Notes: Hydro Conventional does not include pumped storage.
Other Biomass includes agricultural byproducts/crops, sludge waste and other biomass solids, liquids and gases.
Solar includes solar thermal and photovoltaic.
MSW = Municipal Solid Waste

Sources: U.S. Energy Information Administration, Form EIA-906, "Power Plant Report" and EIA-920, "Combined Heat and Power Plant Report."

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Table I.5 2007 Renewable Electric Power Sector Net Generation by Energy Source, Ranked by State
(Thousand Kilowatt -Hours)

State	Biomass			Geothermal	Hydroelectric Conventional	Solar/PV	Wind	Total	State Ranking
	Waste		Wood & Derived Fuels						
	Landfill Gas/MSW Biogenic	Other Biomass							
Washington	162,890	<500 Kwh	567,160	-	78,781,231	-	2,437,823	81,949,105	1
California	1,538,096	346,943	2,536,524	12,990,711	27,314,363	556,969	5,584,933	50,868,540	2
Oregon	88,363	-	242,017	-	33,587,439	-	1,246,994	35,164,813	3
New York	1,312,795	7,416	270,749	-	25,190,534	-	833,476	27,614,970	4
Texas	302,739	8,770	-	-	1,644,437	-	9,006,383	10,962,329	5
Montana	-	-	-	-	9,364,336	-	495,776	9,860,112	6
Idaho	-	-	75,285a	-	9,021,690	-	172,267	9,269,242	7
Arizona	28,507	-	-	-	6,597,671	8,649	-	6,634,827	8
Maine	113,562	13,026	1,910,641	-	3,043,827	-	99,071	5,180,127	9
Tennessee	19,228	-	-	-	4,939,601	-	49,937	5,008,766	10
Oklahoma	-	-	-	-	3,065,862	-	1,849,144	4,915,006	11
Alabama	-	-	209,227	-	4,136,114	-	-	4,345,341	12
Pennsylvania	1,324,739	13,314	191,340	-	2,235,982	-	470,018	4,235,393	13
Minnesota	413,529	135,303	248,844	-	558,269	-	2,638,812	3,994,757	14
Iowa	122,715	-	-	-	962,346	-	2,756,676	3,841,737	15
North Carolina	85,745	-	432,033	-	2,974,677	-	-	3,492,455	16
Nevada	-	-	-	1,252,691	2,003,191	43,967	-	3,299,849	17
ARKANSAS	**33,438**	**5,091**	**-**	**-**	**3,236,753**	**-**	**-**	**3,275,282**	**18**
South Dakota	-	-	-	-	2,917,283	-	150,018	3,067,301	19
Colorado	-	31,105	-	-	1,729,533	2,208	1,291,516	3,054,362	20
Michigan	555,824	s	1,014,377	-	1,243,903	-	2,723	2,816,882	21
Florida	1,793,086	281,067	409,908	-	154,446	-	-	2,638,507	22
New Hampshire	152,816	-	970,038	-	1,260,733	-	-	2,383,587	23
Georgia	12,808	-	-	-	2,217,013	-	-	2,229,821	24
Virginia	498,237	-	459,154	-	1,241,501	-	-	2,198,892	25
Wisconsin	403,251	3,132	193,035	-	1,335,840	-	109,283	2,044,541	26
Maryland	383,974	-	-	-	1,652,216	-	-	2,036,191	27
South Carolina	63,842	-	375,755	-	1,555,213	-	-	1,994,809	28
Massachusetts	1,094,431	-	119,157	-	778,232	-	-	1,991,820	29
North Dakota	-	-	-	-	1,305,393	-	620,772	1,926,165	30
Kentucky	93,440	-	-	-	1,668,587	-	-	1,762,027	31
New Mexico	-	15,994	-	-	267,978	-	1,393,239	1,677,211	32
Wyoming	-	-	-	-	729,424	-	754,881	1,484,305	33
Illinois	603,225	16,348	-	-	153,727	-	664,427	1,437,727	34
Alaska	-	-	-	-	1,291,223	-	1,012	1,292,235	35
Missouri	21,944	-	s	-	1,204,326	-	-	1,226,390	36
Kansas	-	-	-	-	10,501	-	1,152,538	1,163,039	37
Vermont	-	-	453,038	-	645,081	-	10,511	1,108,629	38
Connecticut	728,164	-	1,676	-	363,261	-	-	1,093,100	39
West Virginia	-	-	-	-	805,854	-	167,588	973,442	40
Louisiana	-	74,988	-	-	826,642	-	-	901,630	41
New Jersey	822,453	-	-	-	20,909	-	20,412	863,774	42
Utah	5,954	-	-	163,925	538,782	-	-	708,662	43
Indiana	189,853	-	-	-	449,936	-	-	639,789	44
Hawaii	-	109,237	-	229,886	54,611	-	238,184	631,918	45
Nebraska	46,184	2,837	-	-	347,444	-	216,765	613,230	46
Ohio	10,972	-	31,210	-	410,436	-	14,748	467,366	47
Rhode Island	154,757	-	-	-	4,364	-	-	159,121	48
Delaware	48,116	-	-	-	-	-	-	48,116	49
District of Columbia	-	-	-	-	-	-	-	-	-
Mississippi	-	-	-	-	-	-	-	-	-
U.S. Total	**13,229,677**	**1,064,627**	**10,711,288**	**14,637,213**	**245,842,714**	**611,793**	**34,449,927**	**320,547,239**	**-**

Revisions to biomass removed MSW non-biogenic and tires from renewable waste energy.

The electric power sector comprises electricity-only and combined-heat-power (CHP) plants within North American Classification System (NAICS) 22 category whose primary business is to sell electricity, or electricity and heat, to the public.

Notes: Totals may not equal sum of components due to independent rounding.

Source: U.S. Energy Information Administration, Form EIA-923, "Power Plant Operations Report," and predecessor forms: Form EIA-906, "Power Plant Report," and Form EIA-920, "Combined Heat and Power Plant Report."

Table I.6 2003-2007 Arkansas Renewable Electric Power Industry Net Summer Capacity by Energy Source (Megawatts)

Energy Source	2003	2004	2005	2006	2007
Geothermal	-	-	-	-	-
Hydro Conventional	1,388	1,388	1,388	1,389	1,321
Solar	-	-	-	-	-
Wind	-	-	-	-	-
Wood/Wood Waste	298	292	292	292	292
MSW/Landfill Gas	-	-	-	5	5
Other Biomass	6	6	6	6	6
Total	**1,692**	**1,686**	**1,686**	**1,691**	**1,623**

- = No data reported.

Notes: Hydro Conventional does not include pumped storage.
Other Biomass includes agricultural byproducts/crops, sludge waste and other biomass solids, liquids and gases.
Solar includes solar thermal and photovoltaic.
MSW = Municipal Solid Waste

Sources: U.S. Energy Information Administration, Form EIA-860, "Annual Electric Generator Report."

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Table I.7 2007 Arkansas Renewable Electric Power Industry Statistics

Capacity (megawatts)	Value	Percent of State Total
Total Net Summer Electricity Capacity	**15,296**	**100.0**
Total Net Summer Renewable Capacity	**1,623**	**10.6**
Geothermal	-	-
Hydro Conventional	1,321	8.6
Solar	-	-
Wind	-	-
Wood/Wood Waste	292	1.9
MSW/Landfill Gas	5	*
Other Biomass	6	*

Generation (thousand megawatt hours)	Value	Percent of State Total
Total Electricity Net Generation	**54,596**	**100.0**
Total Renewable Net Generation	**4,860**	**8.9**
Geothermal	-	-
Hydro Conventional	3,237	5.9
Solar	-	-
Wind	-	-
Wood/Wood Waste	1,581	2.9
MSW Biogenic/Landfill Gas	33	0.1
Other Biomass	10	*

* = Absolute percentage less than 0.05.

- = No data reported.

Notes: Hydro Conventional does not include pumped storage.
Solar includes solar thermal and photovoltaic.
MSW = Municipal Solid Waste
Other Biomass includes agricultural byproducts/crops, sludge waste and other biomass solids, liquids and gases.

Source: Capacity: U.S. Energy Information Administration, Form EIA-860, "Annual Electric Generator Report." Generation: Energy Information Administration, Form EIA-906, "Power Plant Report" and EIA-920, "Combined Heat and Power Plant Report."

Emissions

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APPENDIX J

Table J.1 1980-2007 Arkansas Emissions of Carbon Dioxide (CO_2) by End-Use and Electric Power Generation (Metric Tons)

Year	Residential	% of Total	Commercial	% of Total	Industrial	% of Total	Transportation	% of Total	Electric Power	% of Total	Total
1980	3.03	8.00%	2.09	5.53%	10.79	28.49%	14.31	37.79%	7.65	20.20%	37.87
1981	2.68	6.25%	1.80	4.20%	11.52	26.86%	14.69	34.25%	12.19	28.43%	42.88
1982	2.77	6.50%	1.85	4.34%	10.37	24.35%	14.66	34.41%	12.95	30.40%	42.61
1983	3.12	6.65%	3.04	6.47%	9.41	20.03%	13.73	29.23%	17.67	37.63%	46.97
1984	2.92	6.49%	2.31	5.13%	9.33	20.71%	14.51	32.21%	15.97	35.46%	45.04
1985	2.65	5.37%	1.96	3.97%	9.85	19.98%	14.30	29.00%	20.55	41.68%	49.31
1986	2.60	5.25%	1.54	3.10%	8.85	17.83%	14.66	29.53%	22.00	44.30%	49.65
1987	2.60	5.57%	1.55	3.31%	6.23	13.35%	15.32	32.83%	20.96	44.93%	46.66
1988	2.73	5.39%	1.66	3.28%	8.88	17.54%	16.00	31.58%	21.38	42.21%	50.65
1989	2.74	5.36%	1.72	3.36%	9.90	19.36%	16.48	32.24%	20.29	39.69%	51.12
1990	2.52	4.99%	1.60	3.16%	9.10	18.01%	16.02	31.71%	21.28	42.12%	50.52
1991	2.57	5.21%	1.61	3.26%	7.84	15.85%	16.16	32.68%	21.26	43.01%	49.44
1992	2.45	4.81%	1.57	3.07%	9.32	18.26%	16.06	31.47%	21.63	42.39%	51.02
1993	2.83	5.63%	1.79	3.56%	9.47	18.81%	16.89	33.53%	19.37	38.47%	50.36
1994	2.63	4.85%	1.73	3.19%	10.27	18.94%	18.04	33.26%	21.57	39.77%	54.25
1995	2.71	4.71%	1.78	3.09%	11.24	19.52%	18.37	31.90%	23.49	40.79%	57.58
1996	2.86	4.62%	1.88	3.04%	12.79	20.66%	18.71	30.21%	25.69	41.47%	61.94
1997	2.65	4.33%	1.77	2.91%	13.32	21.81%	19.28	31.56%	24.05	39.39%	61.07
1998	2.35	3.76%	1.74	2.79%	13.08	20.98%	19.47	31.24%	25.71	41.23%	62.35
1999	2.65	4.11%	1.75	2.71%	12.64	19.60%	20.70	32.09%	26.77	41.49%	64.51
2000	2.90	4.46%	2.07	3.18%	12.89	19.80%	20.79	31.95%	26.42	40.60%	65.08
2001	2.65	4.15%	2.10	3.30%	12.29	19.28%	19.65	30.84%	27.03	42.43%	63.72
2002	2.67	4.28%	2.16	3.45%	11.87	18.98%	20.27	32.40%	25.57	40.89%	62.54
2003	2.52	4.01%	2.19	3.47%	11.87	18.85%	20.03	31.81%	26.36	41.86%	62.96
2004	2.37	3.71%	2.00	3.12%	11.79	18.46%	20.49	32.09%	27.22	42.62%	63.87
2005	2.13	3.49%	2.11	3.44%	11.07	18.10%	20.49	33.51%	25.35	41.45%	61.15
2006	2.06	3.27%	1.87	2.97%	11.18	17.73%	20.47	32.46%	27.47	43.57%	63.06
2007	2.05	3.19%	1.85	2.88%	10.90	16.95%	20.86	32.44%	28.64	44.55%	64.29

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Table J.2 Emission of the Electric Power Industry, Metric Tons of Carbon Dioxide, Sulfur Dioxide, and Nitrogen Oxides Ranked by State, by Magnitude, Highest Level to Lowest Level

	Rank	CO_2 (Metric Tons)	% of U.S. Total
US		**2,516,580,038**	**100.0**
TX	1	255,092,183	10.1
OH	2	130,407,085	5.2
PA	3	127,888,320	5.1
FL	4	127,662,330	5.1
IN	5	121,724,872	4.8
IL	6	104,619,546	4.2
GA	7	95,248,726	3.8
KY	8	92,320,191	3.7
AL	9	87,344,975	3.5
WV	10	86,273,654	3.4
MI	11	79,090,202	3.1
NC	12	78,533,282	3.1
MO	13	77,131,256	3.1
CA	14	62,780,179	2.5
TN	15	60,837,496	2.4
AZ	16	55,778,500	2.2
LA	17	54,289,959	2.2
NY	18	53,262,343	2.1
OK	19	51,388,701	2.0
WI	20	48,842,014	1.9
VA	21	46,721,552	1.9
WY	22	45,705,725	1.8
IA	23	43,858,798	1.7
CO	24	42,989,936	1.7
SC	25	42,107,344	1.7
KS	26	38,926,886	1.5
UT	27	38,486,267	1.5
MN	28	37,706,385	1.5
ND	29	31,985,187	1.3
NM	30	31,452,437	1.2
MD	31	31,165,417	1.2
AR	**32**	**29,852,236**	**1.2**
MS	33	27,764,176	1.1
MA	34	25,538,756	1.0
NE	35	20,645,874	0.8
NJ	36	20,585,235	0.8
MT	37	20,012,990	0.8
NV	38	16,778,142	0.7
WA	39	12,651,998	0.5
OR	40	10,558,882	0.4
CT	41	10,361,669	0.4
HI	42	8,933,935	0.4
DE	43	7,223,767	0.3
NH	44	6,848,507	0.3
ME	45	5,565,587	0.2
AK	46	4,301,706	0.2
SD	47	3,019,701	0.1
RI	48	2,946,005	0.1
ID	49	1,273,975	0.1
DC	50	85,166	0.0
VT	51	9,980	0.0

	Rank	SO_2 (Metric Tons)	% of U.S. Total
US		**9,041,840**	**100.0**
OH	1	957,947	10.6
PA	2	888,600	9.8
GA	3	681,926	7.5
IN	4	661,897	7.3
TX	5	468,207	5.2
AL	6	448,869	5.0
NC	7	365,244	4.0
MI	8	353,360	3.9
WV	9	353,351	3.9
KY	10	348,035	3.8
FL	11	322,491	3.6
IL	12	302,147	3.3
MD	13	266,696	2.9
MO	14	257,770	2.9
TN	15	246,777	2.7
VA	16	197,290	2.2
WI	17	177,256	2.0
SC	18	173,185	1.9
IA	19	135,656	1.5
ND	20	125,277	1.4
NY	21	123,475	1.4
LA	22	105,086	1.2
KS	23	105,049	1.2
OK	24	104,338	1.2
MN	25	88,957	1.0
WY	26	83,281	0.9
AR	**27**	**81,908**	**0.9**
MS	28	74,721	0.8
NE	29	62,887	0.7
CO	30	58,843	0.7
AZ	31	51,393	0.6
MA	32	51,126	0.6
NJ	33	46,389	0.5
NH	34	39,093	0.4
DE	35	33,667	0.4
UT	36	25,110	0.3
MT	37	24,334	0.3
NM	38	24,194	0.3
CA	39	22,842	0.3
HI	40	21,984	0.2
ME	41	21,242	0.2
OR	42	16,143	0.2
WA	43	9,921	0.1
SD	44	8,922	0.1
NV	45	7,776	0.1
ID	46	6,722	0.1
CT	47	5,261	0.1
AK	48	4,291	0.0
RI	49	697	0.0
DC	50	173	0.0
VT	51	33	0.0

	Rank	NOx (Metric Tons)	% of U.S. Total
US		**3,650,028**	**100.0**
TX	1	247,396	6.8
OH	2	227,032	6.2
FL	3	202,854	5.6
IN	4	194,871	5.3
PA	5	183,406	5.0
KY	6	160,820	4.4
WV	7	138,990	3.8
GA	8	125,030	3.4
AL	9	120,887	3.3
IL	10	119,904	3.3
MI	11	117,458	3.2
MO	12	99,659	2.7
TN	13	98,330	2.7
CA	14	88,569	2.4
LA	15	87,519	2.4
MN	16	84,353	2.3
AZ	17	78,722	2.2
OK	18	77,858	2.1
WY	19	77,122	2.1
WI	20	70,393	1.9
UT	21	70,109	1.9
CO	22	66,627	1.8
ND	23	66,163	1.8
NM	24	65,846	1.8
KS	25	64,352	1.8
VA	26	63,854	1.7
NC	27	60,636	1.7
NY	28	60,419	1.7
IA	29	58,239	1.6
MD	30	54,516	1.5
MS	31	48,848	1.3
SC	32	46,493	1.3
AR	**33**	**41,001**	**1.1**
MT	34	40,024	1.1
NE	35	39,181	1.1
NV	36	29,038	0.8
HI	37	23,063	0.6
NJ	38	21,271	0.6
MA	39	19,951	0.5
WA	40	19,320	0.5
OR	41	17,447	0.5
AK	42	17,205	0.5
DE	43	12,854	0.4
ME	44	10,186	0.3
SD	45	9,809	0.3
CT	46	8,475	0.2
NH	47	6,635	0.2
ID	48	3,697	0.1
RI	49	2,957	0.1
VT	50	456	0.0
DC	51	183	0.0

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

APPENDIX J

Table J.3 1990-2007 Arkansas Airborne Emissions in Metric Tons, Electricity Sector

Year	Carbon Dioxide CO_2		Sulfur Dioxide SO_2		Nitrogen Oxides NOx		Total
	Metric Tons	% of Total	Metric Tons	% of Total	Metric Tons	% of Total	
1990	22,955,524	99.19%	77,465	0.33%	109,397	0.47%	23,142,386
1991	23,655,573	99.21%	76,029	0.32%	111,278	0.47%	23,842,880
1992	24,089,481	99.23%	75,456	0.31%	111,567	0.46%	24,276,504
1993	21,646,655	99.23%	73,488	0.34%	93,784	0.43%	21,813,927
1994	24,009,034	99.25%	78,437	0.32%	102,599	0.42%	24,190,070
1995	25,690,735	99.25%	82,406	0.32%	111,124	0.43%	25,884,265
1996	27,885,131	99.43%	103,190	0.37%	55,304	0.20%	28,043,625
1997	26,352,979	99.49%	86,837	0.33%	48,181	0.18%	26,487,997
1998	27,977,927	99.56%	72,731	0.26%	50,611	0.18%	28,101,269
1999	29,154,298	99.51%	87,656	0.30%	54,598	0.19%	29,296,552
2000	28,735,782	99.52%	84,092	0.29%	54,429	0.19%	28,874,303
2001	28,196,950	99.54%	83,146	0.29%	47,409	0.17%	28,327,505
2002	26,908,598	99.54%	80,279	0.30%	44,164	0.16%	27,033,041
2003	27,219,652	99.54%	78,872	0.29%	45,650	0.17%	27,344,174
2004	27,061,120	99.52%	86,940	0.32%	42,424	0.16%	27,190,484
2005	28,494,446	99.58%	81,970	0.29%	38,230	0.13%	28,614,646
2006	26,360,144	99.47%	96,855	0.37%	44,169	0.17%	26,501,168
2007	29,852,236	99.59%	81,908	0.27%	41,001	0.14%	29,975,145

Source: : U.S. Energy Information Administration, Nuclear, Arkansas Nuclear Industry, May 2010.

Table J.4 1989-2007 Coalbed Methane Production in Billion Cubic Feet (Bcf)

Date	U.S. Coalbed Methane Production (Billion Cu. Ft.)	Alabama Coalbed Methane Production (Billion Cu. Ft.)	Colorado Coalbed Methane Production (Billion Cu. Ft.)	New Mexico Coalbed Methane Production (Billion Cu. Ft.)	Utah Coalbed Methane Production (Billion Cu. Ft.)	Wyoming Coalbed Methane Production (Billion Cu. Ft.)	Virginia Coalbed Methane Production (Billion Cu. Ft.)	Eastern States[1] Coalbed Methane Production (Billion Cu. Ft.)	Western States[2] Coalbed Methane Production (Billion Cu. Ft.)	Other States Natural Gas Coalbed Methane, Reserves Based Production (Bcf)
1989	91	23	12	56						0
1990	196	36	26	133						1
1991	348	68	48	229						3
1992	539	89	82	358						10
1993	752	103	125	486						18
1994	851	108	179	530						34
1995	956	109	226	574						47
1996	1,003	98	274	575						56
1997	1,090	111	312	597						70
1998	1,194	123	401	571						99
1999	1,252	108	432	582						130
2000	1,379	109	451	550	74	133		58	4	
2001	1,562	111	490	517	83	278		69	14	
2002	1,614	117	520	471	103	302		68	33	
2003	1,600	98	488	451	97	344		71	51	
2004	1,720	121	520	528	82	320		72	77	0
2005	1,732	113	515	514	75	336		90	89	
2006	1,758	114	477	510	66	378	81	24	108	
2007	1,754	114	519	395	73	401	85	31	136	

Notes: Eastern States includes Virginia prior to 2006. Other States includes Oklahoma, Pennsylvania, Utah, Virginia, West Virginia, and Wyoming for data prior to 2000. These states are individually listed or grouped in Eastern States and Western States for 2000 and later.

1 Eastern States: Illinois, Indiana, Ohio, Pennsylvania, West Virginia

2 Western States: Arkansas, Kansas, Louisiana, Montana, Oklahoma

Source: U.S. Energy Information Administration, Natural Gas, Natural Gas Navigator, Exploration & Reserves, May 2010.

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Table J.5 1989-2007 Coalbed Methane Production in Billion Cubic Feet (Bcf)

Date	U.S. Coalbed Methane Proved Reserves (Billion Cu. Ft.)	Alabama Coalbed Methane Proved Reserves (Billion Cu. Ft.)	Colorado Coalbed Methane Proved Reserves (Billion Cu. Ft.)	New Mexico Coalbed Methane Proved Reserves (Billion Cu. Ft.)	Utah Coalbed Methane Proved Reserves (Billion Cu. Ft.)	Wyoming Coalbed Methane Proved Reserves (Billion Cu. Ft.)	Virginia Coalbed Methane Proved Reserves (Billion Cu. Ft.)	Eastern States[1] Coalbed Methane Proved Reserves (Billion Cu. Ft.)	Western States[2] Coalbed Methane Proved Reserves (Billion Cu. Ft.)	Other States Natural Gas Coalbed Methane, Proved Reserves (Billion Cu. Ft.)
1989	3,676	537	1,117	2,022						0
1990	5,087	1,224	1,320	2,510						33
1991	8,163	1,714	2,076	4,206						167
1992	10,034	1,968	2,716	4,724						626
1993	10,184	1,237	3,107	4,775						1,065
1994	9,712	976	2,913	4,137						1,686
1995	10,499	972	3,461	4,299						1,767
1996	10,566	823	3,711	4,180						1,852
1997	11,462	1,077	3,890	4,351						2,144
1998	12,179	1,029	4,211	4,232						2,707
1999	13,229	1,060	4,826	4,080						3,263
2000	15,708	1,241	5,617	4,278	1,592	1,540		1,399	41	
2001	17,531	1,162	6,252	4,324	1,685	2,297		1,453	358	
2002	18,491	1,283	6,691	4,380	1,725	2,371		1,488	553	
2003	18,743	1,665	6,473	4,396	1,224	2,759		1,528	698	
2004	18,390	1,900	5,787	5,166	934	2,085		1,620	898	0
2005	19,892	1,773	6,772	5,249	902	2,446		1,822	928	
2006	19,620	2,068	6,344	4,894	750	2,448	1,813	273	1,030	
2007	21,875	2,127	7,869	4,169	922	2,738	1,948	393	1,709	

Notes: Eastern States includes Virginia prior to 2006. Other States includes Oklahoma, Pennsylvania, Utah, Virginia, West Virginia, and Wyoming for data prior to 2000. These states are individually listed or grouped in Eastern States and Western States for 2000 and later.

1 Eastern States: Illinois, Indiana, Ohio, Pennsylvania, West Virginia

2 Western States: Arkansas, Kansas, Louisiana, Montana, Oklahoma

Source: U.S. Energy Information Administration, Natural Gas, Natural Gas Navigator, Exploration & Reserves, May 2010.

State Rankings

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APPENDIX K

Table K.1 2007 Energy Consumption by Sector, Ranked by State

Rank	Residential Sector State	Trillion Btu	Commercial Sector State	Trillion Btu	Industrial Sector State	Trillion Btu	Transportation Sector State	Trillion Btu	Total Consumption State	Trillion Btu
1	Texas	1,594.1	California	1,613.9	Texas	5,950.9	California	3,386.8	Texas	11,834.5
2	California	1,535.2	Texas	1,381.6	Louisiana	2,403.8	Texas	2,907.9	California	8,491.5
3	Florida	1,339.5	New York	1,257.4	California	1,955.7	Florida	1,614.3	Florida	4,601.9
4	New York	1,201.8	Florida	1,089.2	Ohio	1,347.8	New York	1,100.5	New York	4,064.3
5	Illinois	997.1	Illinois	780.1	Indiana	1,345.8	Illinois	1,063.5	Ohio	4,048.9
6	Pennsylvania	966.6	Pennsylvania	718.9	Pennsylvania	1,288.8	Ohio	1,037.8	Illinois	4,043.2
7	Ohio	955.6	Ohio	707.8	Illinois	1,202.5	New Jersey	1,037.0	Pennsylvania	4,006.2
8	Michigan	786.0	New Jersey	639.1	Alabama	941.6	Pennsylvania	1,031.8	Louisiana	3,766.2
9	Georgia	744.4	Michigan	624.5	Kentucky	891.6	Georgia	935.5	Georgia	3,133.0
10	North Carolina	715.9	Virginia	600.5	Georgia	887.4	Virginia	814.5	Michigan	3,026.9
11	Virginia	628.4	North Carolina	573.5	Michigan	818.6	Michigan	797.9	Indiana	2,904.0
12	New Jersey	615.5	Georgia	565.7	Tennessee	740.1	North Carolina	766.9	New Jersey	2,743.7
13	Indiana	551.5	Maryland	416.4	North Carolina	643.7	Louisiana	713.8	North Carolina	2,700.0
14	Tennessee	546.2	Missouri	406.8	Wisconsin	623.5	Washington	672.2	Virginia	2,610.9
15	Missouri	521.1	Tennessee	386.7	South Carolina	620.9	Tennessee	657.5	Tennessee	2,330.5
16	Washington	490.1	Massachusetts	384.0	Oklahoma	588.3	Indiana	646.6	Alabama	2,132.0
17	Massachusetts	443.1	Washington	383.9	Minnesota	578.4	Missouri	607.3	Washington	2,067.2
18	Arizona	430.1	Arizona	368.5	Virginia	567.4	Arizona	547.4	Kentucky	2,023.0
19	Maryland	425.6	Indiana	360.1	Florida	558.9	Minnesota	530.8	Missouri	1,964.1
20	Wisconsin	419.0	Wisconsin	356.8	Washington	521.0	Alabama	504.4	Minnesota	1,874.6
21	Minnesota	413.5	Minnesota	351.9	New York	504.6	Kentucky	497.9	Wisconsin	1,846.3
22	Alabama	405.5	Louisiana	292.3	Iowa	492.2	Massachusetts	491.7	South Carolina	1,692.3
23	Kentucky	372.6	Colorado	291.1	**ARKANSAS**	**463.7**	Oklahoma	463.8	Oklahoma	1,608.5
24	South Carolina	359.0	Alabama	280.6	Mississippi	454.1	Maryland	462.7	Arizona	1,577.8
25	Louisiana	356.4	South Carolina	263.5	New Jersey	452.1	South Carolina	448.9	Massachusetts	1,514.6
26	Colorado	342.9	Kentucky	260.9	Missouri	428.9	Wisconsin	446.9	Maryland	1,488.7
27	Oklahoma	306.2	Oklahoma	250.3	Kansas	426.0	Colorado	446.3	Colorado	1,479.3
28	Connecticut	276.5	Connecticut	218.5	Colorado	399.0	Mississippi	375.9	Mississippi	1,239.5
29	Oregon	267.6	Oregon	209.4	West Virginia	396.1	Oregon	347.0	Iowa	1,235.2
30	Iowa	234.5	Kansas	202.5	Alaska	356.3	Iowa	316.0	**ARKANSAS**	**1,149.3**
31	Mississippi	234.4	Iowa	192.4	Oregon	284.2	**ARKANSAS**	**295.2**	Kansas	1,136.2
32	**ARKANSAS**	**228.6**	Mississippi	175.0	Wyoming	263.4	Kansas	281.7	Oregon	1,108.2
33	Kansas	226.0	**ARKANSAS**	**161.9**	New Mexico	251.9	Utah	262.4	Connecticut	870.7
34	Nevada	183.3	Utah	151.8	Arizona	231.7	Connecticut	260.5	West Virginia	850.5
35	Utah	166.4	Nebraska	136.0	Utah	224.9	Nevada	258.5	Utah	805.5
36	West Virginia	163.6	Nevada	134.2	Nebraska	224.2	Alaska	250.5	Nevada	777.4
37	Nebraska	154.5	New Mexico	124.9	Nevada	201.4	New Mexico	219.6	Alaska	723.6
38	Idaho	122.3	District of Columbia	124.6	North Dakota	198.8	Hawaii	195.3	New Mexico	710.7
39	New Mexico	114.3	West Virginia	111.5	Massachusetts	195.6	West Virginia	179.2	Nebraska	692.9
40	Maine	106.6	Idaho	83.6	Idaho	186.9	Nebraska	178.3	Idaho	529.6
41	New Hampshire	92.2	Maine	75.7	Montana	186.4	Idaho	136.9	Wyoming	496.4
42	Montana	79.4	New Hampshire	70.4	Maryland	184.0	Montana	128.1	Montana	462.1
43	Rhode Island	71.9	Montana	68.3	Maine	146.7	Wyoming	126.9	Maine	455.6
44	Delaware	66.8	Alaska	62.4	Connecticut	115.2	Maine	126.5	North Dakota	428.1
45	South Dakota	66.0	North Dakota	60.9	Delaware	101.1	New Hampshire	107.1	Hawaii	343.7
46	North Dakota	63.8	Wyoming	60.3	South Dakota	74.8	North Dakota	104.5	New Hampshire	314.2
47	Alaska	54.4	South Dakota	58.7	Hawaii	68.3	South Dakota	92.7	Delaware	302.0
48	Vermont	47.5	Delaware	58.4	New Hampshire	44.6	Delaware	75.7	South Dakota	292.2
49	Wyoming	45.8	Rhode Island	57.6	Vermont	29.4	Rhode Island	64.6	Rhode Island	217.6
50	Hawaii	37.7	Hawaii	42.4	Rhode Island	23.5	Vermont	54.0	District of Columbia	187.2
51	District of Columbia	37.1	Vermont	31.2	District of Columbia	4.0	District of Columbia	21.5	Vermont	162.1
	United States	**21,604.3**	**United States**	**18,278.7**	**United States**	**32,494.1**	**United States**	**29,091.0**	**United States**	**101,468.0**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Table K.2 2007 Energy Consumption by Source and Total Consumption Per Capita, Ranked by State

Rank	Coal		Natural Gas		Petroleum		Retail Electricity Sales		Total Consumption Per Capita	
	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu	State	Trillion Btu	State	Million Btu
1	Texas	1,609.1	Texas	3,641.4	Texas	5,886.9	Texas	1,173.1	Alaska	1,062.3
2	Indiana	1,574.5	California	2,440.4	California	3,946.3	California	901.6	Wyoming	948.6
3	Pennsylvania	1,490.7	Louisiana	1,423.1	Florida	1,983.5	Florida	788.5	Louisiana	861.2
4	Ohio	1,461.7	New York	1,218.9	New York	1,633.4	Ohio	552.0	North Dakota	671.1
5	Illinois	1,090.3	Illinois	979.3	Louisiana	1,599.9	Pennsylvania	517.2	Texas	496.3
6	Kentucky	1,020.4	Florida	950.3	Pennsylvania	1,455.6	New York	505.6	Montana	483.1
7	West Virginia	983.0	Michigan	847.8	Illinois	1,418.1	Illinois	498.3	Kentucky	477.5
8	Georgia	934.7	Ohio	836.3	New Jersey	1,373.3	Georgia	469.0	West Virginia	469.9
9	Alabama	888.4	Pennsylvania	781.7	Ohio	1,357.0	North Carolina	450.0	Alabama	460.8
10	North Carolina	827.8	Oklahoma	690.6	Georgia	1,100.2	Virginia	380.7	Indiana	458.4
11	Missouri	802.4	New Jersey	640.7	Virginia	1,016.6	Indiana	373.3	Oklahoma	445.8
12	Michigan	799.9	Indiana	548.1	Michigan	987.3	Michigan	372.9	Mississippi	424.3
13	Florida	720.8	Colorado	515.9	North Carolina	970.8	Tennessee	364.1	Iowa	414.0
14	Tennessee	672.4	Georgia	453.9	Indiana	877.7	Kentucky	315.3	Kansas	409.1
15	Wyoming	494.8	Alabama	431.4	Washington	846.8	Alabama	313.3	**ARKANSAS**	**406.1**
16	Wisconsin	464.9	Massachusetts	417.3	Tennessee	827.1	Washington	292.6	Nebraska	391.6
17	Iowa	464.4	Wisconsin	403.9	Missouri	758.9	Missouri	291.8	South Carolina	384.2
18	Virginia	457.9	Arizona	402.1	Kentucky	747.4	South Carolina	279.6	Tennessee	379.0
19	South Carolina	444.0	Minnesota	396.5	Minnesota	706.2	New Jersey	279.6	South Dakota	367.2
20	Arizona	438.5	Mississippi	374.9	Massachusetts	684.6	Louisiana	271.5	New Mexico	361.8
21	North Dakota	420.1	Alaska	371.8	Alabama	626.4	Arizona	263.4	Minnesota	361.7
22	Kansas	396.3	Virginia	332.7	Wisconsin	619.5	Wisconsin	243.3	Idaho	354.0
23	Utah	391.3	Kansas	291.6	Arizona	595.4	Minnesota	232.8	Ohio	352.8
24	Colorado	388.5	Washington	279.7	Oklahoma	578.0	Maryland	223.1	Delaware	350.4
25	Oklahoma	373.2	Missouri	277.6	South Carolina	576.5	Massachusetts	195.0	Maine	346.3
26	Minnesota	366.0	Nevada	263.6	Maryland	557.3	Oklahoma	188.3	Virginia	339.1
27	Maryland	327.8	Iowa	261.9	Colorado	525.4	Colorado	175.0	Missouri	334.1
28	New Mexico	296.1	Oregon	258.2	Mississippi	470.9	Oregon	166.3	Wisconsin	329.8
29	**ARKANSAS**	**275.0**	North Carolina	245.2	Iowa	441.6	Mississippi	164.3	Georgia	329.0
30	New York	257.5	New Mexico	240.3	Kansas	424.5	**ARKANSAS**	**160.6**	Pennsylvania	322.6
31	Louisiana	249.8	Kentucky	236.0	Connecticut	396.8	Iowa	154.5	Washington	320.5
32	Nebraska	216.8	Utah	232.2	**ARKANSAS**	**386.9**	Kansas	137.0	District of Columbia	318.5
33	Montana	202.5	Tennessee	229.7	Oregon	384.7	Nevada	121.6	New Jersey	317.1
34	Mississippi	184.9	**ARKANSAS**	**228.0**	Alaska	324.1	West Virginia	116.6	Illinois	315.2
35	Massachusetts	120.1	Maryland	208.5	Hawaii	306.3	Connecticut	116.4	Colorado	305.5
36	New Jersey	111.8	Connecticut	184.1	Utah	305.6	Nebraska	96.4	Nevada	304.3
37	Washington	95.7	South Carolina	180.3	Nevada	292.6	Utah	94.8	Utah	301.8
38	Nevada	82.9	Nebraska	146.4	West Virginia	288.7	Idaho	81.1	Michigan	301.2
39	California	66.4	West Virginia	122.6	New Mexico	284.8	New Mexico	76.0	North Carolina	298.6
40	Delaware	63.8	Wyoming	117.6	Maine	235.6	Wyoming	53.0	Oregon	296.7
41	Oregon	45.3	Rhode Island	90.8	Nebraska	235.1	Montana	53.0	Hawaii	269.1
42	New Hampshire	44.9	Idaho	83.9	Montana	210.6	District of Columbia	41.3	Maryland	265.0
43	Connecticut	39.9	Montana	75.0	Wyoming	176.2	North Dakota	40.6	Vermont	261.2
44	South Dakota	33.2	New Hampshire	64.6	New Hampshire	169.6	Delaware	40.5	Florida	252.9
45	Hawaii	19.1	North Dakota	63.0	Idaho	165.8	Maine	40.5	Connecticut	249.5
46	Alaska	13.0	South Dakota	54.1	North Dakota	142.7	New Hampshire	38.3	Arizona	248.3
47	Idaho	10.2	Delaware	49.8	Delaware	135.8	South Dakota	36.2	New Hampshire	239.5
48	Maine	6.6	Maine	47.9	South Dakota	121.3	Hawaii	36.1	Massachusetts	234.2
49	District of Columbia	0.5	District of Columbia	33.9	Rhode Island	91.5	Rhode Island	27.3	California	233.4
50	Rhode Island	(s)	Vermont	8.9	Vermont	87.5	Alaska	21.6	New York	209.2
51	Vermont	(s)	Hawaii	3.0	District of Columbia	22.5	Vermont	20.0	Rhode Island	206.6
	United States	**22,739.9**	**United States**	**23,677.6**	**United States**	**40,358.1**	**United States**	**12,844.8**	**United States**	**336.8**

Note: (s) = Value less than 0.05.

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

APPENDIX K

Table K.3 2007 Total Energy Consumption, Gross Domestic Product by State, State Energy Consumption Per Real Dollar of GDP, Ranked by State

Rank	Total Energy Consumption State	Trillion Btu	Gross Domestic Product (GDP) by State State	Billion*	Energy Consumption Per Real Dollar of GDP State	Thousand Btu Per Dollar*
1	Texas	11,834.5	California	$1,539	Louisiana	26.1
2	California	8,491.5	New York	$950	Wyoming	23.8
3	Florida	4,601.9	Texas	$907	Alaska	23.7
4	New York	4,064.3	Florida	$613	North Dakota	18.9
5	Ohio	4,048.9	Illinois	$515	West Virginia	18.8
6	Illinois	4,043.2	Pennsylvania	$439	Mississippi	17.6
7	Pennsylvania	4,006.2	Ohio	$388	Montana	17.3
8	Louisiana	3,766.2	New Jersey	$388	Kentucky	15.9
9	Georgia	3,133.0	Georgia	$331	Alabama	15.7
10	Michigan	3,026.9	Michigan	$331	Oklahoma	15.5
11	Indiana	2,904.0	North Carolina	$329	**ARKANSAS**	**14.6**
12	New Jersey	2,743.7	Virginia	$320	Indiana	13.8
13	North Carolina	2,700.0	Massachusetts	$307	South Carolina	13.4
14	Virginia	2,610.9	Washington	$259	Texas	13.0
15	Tennessee	2,330.5	Maryland	$218	Kansas	11.8
16	Alabama	2,132.0	Minnesota	$213	New Mexico	11.8
17	Washington	2,067.2	Arizona	$212	Idaho	11.6
18	Kentucky	2,023.0	Indiana	$211	Maine	11.4
19	Missouri	1,964.1	Tennessee	$209	Iowa	11.4
20	Minnesota	1,874.6	Colorado	$197	Tennessee	11.1
21	Wisconsin	1,846.3	Wisconsin	$197	Nebraska	10.5
22	South Carolina	1,692.3	Missouri	$191	Ohio	10.4
23	Oklahoma	1,608.5	Connecticut	$179	Missouri	10.3
24	Arizona	1,577.8	Oregon	$145	South Dakota	10.0
25	Massachusetts	1,514.6	Louisiana	$144	Georgia	9.5
26	Maryland	1,488.7	Alabama	$136	Wisconsin	9.4
27	Colorado	1,479.3	Kentucky	$127	Utah	9.3
28	Mississippi	1,239.5	South Carolina	$126	Michigan	9.1
29	Iowa	1,235.2	Iowa	$108	Pennsylvania	9.1
30	**ARKANSAS**	**1,149.3**	Oklahoma	$104	Minnesota	8.8
31	Kansas	1,136.2	Nevada	$104	North Carolina	8.2
32	Oregon	1,108.2	Kansas	$96	Virginia	8.2
33	Connecticut	870.7	Utah	$87	Washington	8.0
34	West Virginia	850.5	**ARKANSAS**	**$79**	Illinois	7.9
35	Utah	805.5	District of Columbia	$73	Oregon	7.7
36	Nevada	777.4	Mississippi	$71	Vermont	7.6
37	Alaska	723.6	Nebraska	$66	Florida	7.5
38	New Mexico	710.7	New Mexico	$60	Colorado	7.5
39	Nebraska	692.9	Delaware	$50	Nevada	7.5
40	Idaho	529.6	New Hampshire	$50	Arizona	7.5
41	Wyoming	496.4	Hawaii	$49	New Jersey	7.1
42	Montana	462.1	Idaho	$46	Hawaii	7.0
43	Maine	455.6	West Virginia	$45	Maryland	6.8
44	North Dakota	428.1	Maine	$40	New Hampshire	6.3
45	Hawaii	343.7	Rhode Island	$39	Delaware	6.0
46	New Hampshire	314.2	Alaska	$31	Rhode Island	5.7
47	Delaware	302.0	South Dakota	$29	California	5.5
48	South Dakota	292.2	Montana	$27	Massachusetts	4.9
49	Rhode Island	217.6	North Dakota	$23	Connecticut	4.9
50	District of Columbia	187.2	Vermont	$21	New York	4.3
51	Vermont	162.1	Wyoming	$21	District of Columbia	2.6
	United States	**101,468.0**	**United States**	**$11,439**	**United States**	**8.9**

*Chained (2000) Dollars

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Table K.4 2007 Energy Prices and Expenditures, Ranked by State

Rank	Prices		Expenditures		Energy Expenditures Per Person		Energy Expenditures as Share of Nominal GDP	
	State	Nominal Dollars Per Million Btu	State	Million Nominal Dollars	State	Nominal Dollars	State	Percent GDP
1	Hawaii	25.20	Texas	140,651	Alaska	9,191	Louisiana	16.2
2	Connecticut	24.93	California	121,829	Wyoming	8,687	Montana	15.4
3	District of Columbia	24.68	New York	63,642	Louisiana	7,688	Mississippi	15.3
4	Massachusetts	23.89	Florida	60,747	North Dakota	6,442	West Virginia	14.5
5	New Hampshire	23.25	Pennsylvania	49,301	Texas	5,899	North Dakota	14.4
6	Vermont	22.90	Illinois	48,297	Montana	5,504	Wyoming	14.4
7	Rhode Island	22.72	Ohio	48,190	Maine	5,090	Alaska	13.9
8	New York	21.78	New Jersey	39,609	Hawaii	4,833	Maine	13.9
9	Maryland	21.60	Michigan	36,882	Iowa	4,805	Kentucky	13.4
10	Florida	21.47	Georgia	35,678	Kentucky	4,796	ARKANSAS	13.2
11	Nevada	21.12	Louisiana	33,624	Oklahoma	4,719	Alabama	13.1
12	Delaware	20.82	North Carolina	32,574	Alabama	4,670	Oklahoma	12.5
13	Arizona	20.72	Virginia	30,509	West Virginia	4,624	Texas	12.2
14	California	20.12	Indiana	28,627	Kansas	4,610	South Carolina	12.0
15	New Jersey	19.55	Massachusetts	25,862	Mississippi	4,585	Indiana	11.5
16	Maine	19.17	Tennessee	25,462	New Jersey	4,577	Iowa	11.0
17	North Carolina	19.17	Missouri	23,342	Indiana	4,518	Kansas	10.9
18	New Mexico	19.05	Washington	23,224	South Dakota	4,506	Vermont	10.9
19	Pennsylvania	18.30	Wisconsin	22,455	Delaware	4,465	New Mexico	10.5
20	Oregon	18.23	Minnesota	21,708	Nebraska	4,451	Ohio	10.4
21	Alaska	17.87	Alabama	21,606	ARKANSAS	4,428	Idaho	10.4
22	Wisconsin	17.84	Maryland	21,490	Connecticut	4,340	Tennessee	10.4
23	Missouri	17.73	Kentucky	20,316	Vermont	4,329	Missouri	10.2
24	Ohio	17.71	Arizona	20,198	Ohio	4,199	South Dakota	10.2
25	Washington	17.63	South Carolina	18,130	Minnesota	4,189	Hawaii	10.0
26	Texas	17.60	Colorado	17,033	Tennessee	4,141	Nebraska	9.8
27	Virginia	17.58	Oklahoma	17,027	Nevada	4,138	Michigan	9.7
28	South Dakota	17.45	Connecticut	15,146	South Carolina	4,116	Wisconsin	9.6
29	Michigan	17.37	Iowa	14,334	District of Columbia	4,069	Pennsylvania	9.2
30	Illinois	17.27	Mississippi	13,392	New Hampshire	4,065	New Hampshire	9.2
31	Montana	17.26	Oregon	13,175	Wisconsin	4,011	Georgia	9.1
32	Kansas	17.23	Kansas	12,803	New Mexico	4,010	Minnesota	8.6
33	Tennessee	17.19	ARKANSAS	12,533	Massachusetts	3,998	New Jersey	8.6
34	Mississippi	17.16	Nevada	10,571	Missouri	3,971	North Carolina	8.3
35	Georgia	17.10	Utah	8,739	Pennsylvania	3,969	Oregon	8.3
36	South Carolina	17.04	West Virginia	8,369	Virginia	3,963	Utah	8.3
37	Colorado	17.00	New Mexico	7,877	Maryland	3,825	Arizona	8.2
38	Minnesota	17.00	Nebraska	7,877	Illinois	3,766	Florida	8.2
39	Oklahoma	16.76	Maine	6,696	Georgia	3,746	Nevada	8.2
40	Nebraska	16.72	Alaska	6,260	Michigan	3,670	Maryland	8.1
41	ARKANSAS	16.66	Hawaii	6,174	Idaho	3,621	Virginia	7.9
42	Utah	16.44	Idaho	5,418	North Carolina	3,603	Illinois	7.8
43	Iowa	16.12	New Hampshire	5,335	Washington	3,601	Rhode Island	7.6
44	Alabama	16.01	Montana	5,265	Oregon	3,527	Washington	7.5
45	Kentucky	15.99	Wyoming	4,546	Colorado	3,517	Massachusetts	7.3
46	Idaho	15.92	North Dakota	4,110	Rhode Island	3,387	Colorado	7.2
47	West Virginia	15.28	Delaware	3,849	California	3,349	Connecticut	7.1
48	Wyoming	14.81	South Dakota	3,585	Florida	3,338	California	6.8
49	Indiana	14.41	Rhode Island	3,567	New York	3,276	Delaware	6.3
50	Louisiana	14.19	Vermont	2,687	Utah	3,274	New York	5.8
51	North Dakota	13.22	District of Columbia	2,392	Arizona	3,179	District of Columbia	2.6
	United States	**18.23**	**United States**	**1,233,058**	**United States**	**4,093**	**United States**	**9.0**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

APPENDIX K

Table K.5 2007 Total Energy Consumption, Gross Domestic Product by State, State Energy Consumption Per Real Dollar of GDP, Ranked by State

	Prices		Expenditures		Expenditures Per Person	
Rank	State	Nominal Dollars Per Million Btu	State	Million Nominal Dollars	State	Nominal Dollars
1	Hawaii	$24.18	California	45,819	Wyoming	1,858
2	Washington	$23.97	Texas	32,466	North Dakota	1,572
3	District of Columbia	$23.54	Florida	23,023	New Hampshire	1,543
4	Oregon	$23.49	New York	16,115	Alabama	1,542
5	California	$23.06	Ohio	14,569	Vermont	1,536
6	Nevada	$23.00	Pennsylvania	14,496	Mississippi	1,515
7	West Virginia	$22.95	Illinois	14,490	South Carolina	1,510
8	Wisconsin	$22.85	Michigan	13,263	Iowa	1,505
9	Montana	$22.83	Georgia	12,733	Montana	1,504
10	New Mexico	$22.69	North Carolina	12,289	South Dakota	1,500
11	Idaho	$22.61	New Jersey	11,748	Maine	1,494
12	Ohio	$22.49	Virginia	11,217	Kentucky	1,476
13	Colorado	$22.46	Indiana	8,636	Missouri	1,468
14	Maryland	$22.45	Missouri	8,632	Louisiana	1,465
15	Maine	$22.44	Tennessee	8,490	Virginia	1,457
16	Pennsylvania	$22.40	Washington	8,244	Delaware	1,450
17	Rhode Island	$22.38	Massachusetts	8,097	Minnesota	1,430
18	Illinois	$22.34	Arizona	8,019	Oklahoma	1,408
19	Nebraska	$22.34	Maryland	7,764	**ARKANSAS**	**1,389**
20	Connecticut	$22.27	Wisconsin	7,428	New Mexico	1,383
21	North Dakota	$22.22	Minnesota	7,413	Maryland	1,382
22	Utah	$22.21	Alabama	7,135	Tennessee	1,381
23	New York	$22.19	South Carolina	6,651	Indiana	1,363
24	South Dakota	$22.14	Louisiana	6,406	Texas	1,362
25	Alaska	$22.14	Kentucky	6,251	North Carolina	1,359
26	Kentucky	$22.13	Colorado	6,123	New Jersey	1,358
27	Kansas	$22.08	Oklahoma	5,080	Nebraska	1,340
28	Minnesota	$21.98	Oregon	4,635	West Virginia	1,338
29	Massachusetts	$21.96	Iowa	4,489	Georgia	1,337
30	Arizona	$21.95	Mississippi	4,426	Nevada	1,335
31	New Hampshire	$21.91	Connecticut	4,405	Kansas	1,327
32	Michigan	$21.90	**ARKANSAS**	**3,931**	Wisconsin	1,327
33	Vermont	$21.87	Kansas	3,685	Michigan	1,320
34	Wyoming	$21.86	Nevada	3,411	Washington	1,278
35	North Carolina	$21.83	Utah	3,020	Idaho	1,275
36	Virginia	$21.70	New Mexico	2,716	Ohio	1,269
37	Delaware	$21.70	West Virginia	2,422	Florida	1,265
38	Indiana	$21.60	Nebraska	2,371	Colorado	1,264
39	**ARKANSAS**	**$21.54**	New Hampshire	2,024	Connecticut	1,262
40	Oklahoma	$21.45	Maine	1,965	Arizona	1,262
41	Texas	$21.41	Idaho	1,908	California	1,260
42	Tennessee	$21.38	Montana	1,439	Massachusetts	1,252
43	Iowa	$21.37	Hawaii	1,432	Oregon	1,241
44	Alabama	$21.26	Delaware	1,249	Alaska	1,175
45	Missouri	$21.25	South Dakota	1,194	Pennsylvania	1,167
46	New Jersey	$21.22	Rhode Island	1,136	Utah	1,132
47	Louisiana	$21.21	North Dakota	1,003	Illinois	1,130
48	Florida	$21.13	Wyoming	972	Hawaii	1,121
49	Mississippi	$20.92	Vermont	953	Rhode Island	1,079
50	South Carolina	$20.78	Alaska	800	New York	829
51	Georgia	$20.15	District of Columbia	376	District of Columbia	639
	United States	**21.97**	**United States**	**388,561**	**United States**	**1,290**

Source: U.S. Energy Information Administration, State Energy Data System, Data Files, All States and All Years, Consolidated Data File (1.1 million records), May 2010.

Soybeans

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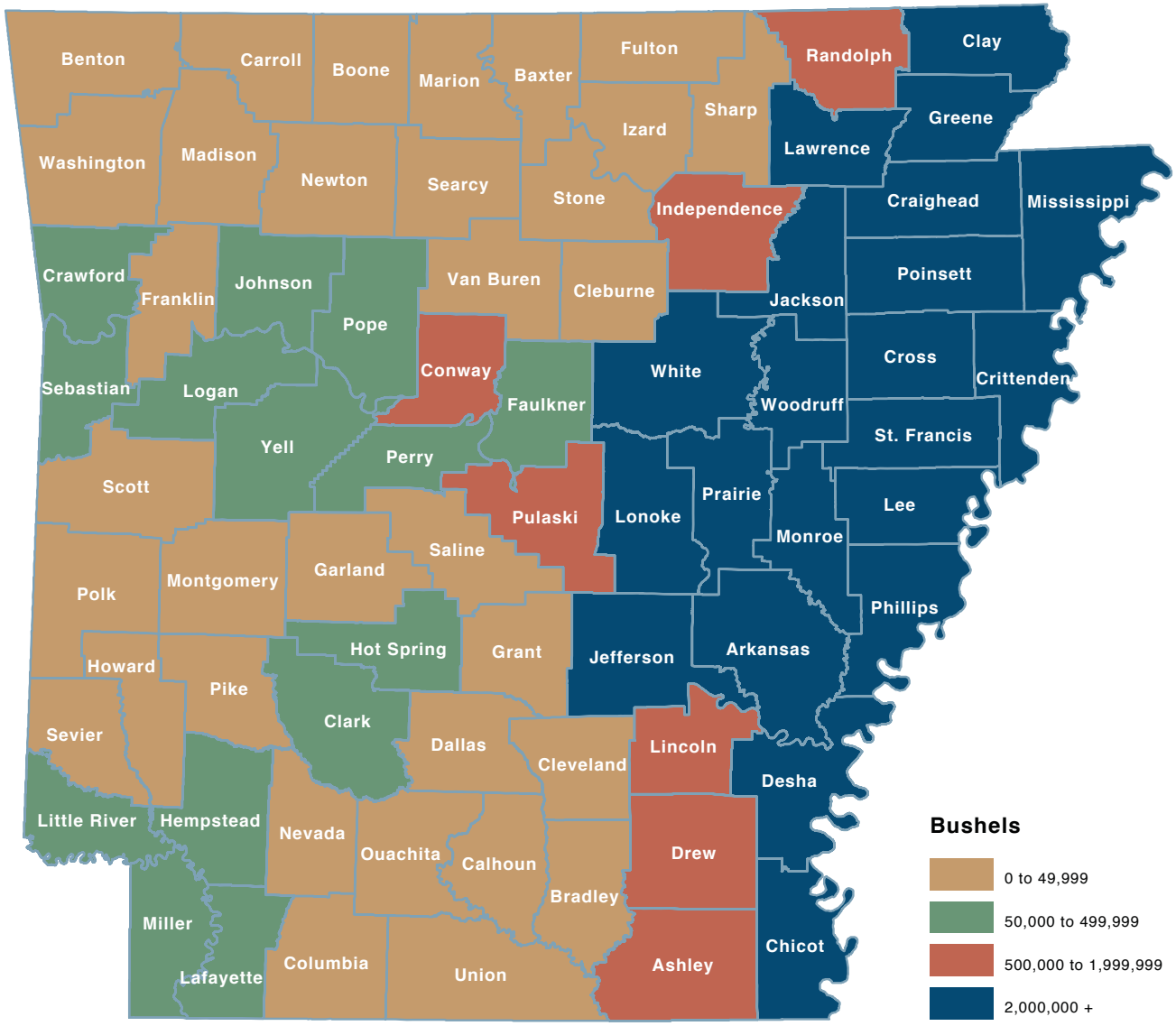
APPENDIX L

2010 Arkansas Soybean Production

Ranking in the top 10 soybean producing states annually, Arkansas appears to have great potential to build and further develop an in-state biodiesel industry. Soybean production has traditionally been one of the largest agricultural enterprises in the state. Soybean acreage in Arkansas declined sharply in the 1980s, but has since stabilized around 3.2 million acres annually. Soybeans are grown in more than 50 of Arkansas' 75 counties, but are concentrated in eastern Arkansas (Figure L.1). Some soybeans are also produced in the Arkansas River Valley in the west as well as the Red River Valley in the southwest.[48]

The following figures illustrate the soybean production data in Arkansas from 1970 through 2007.

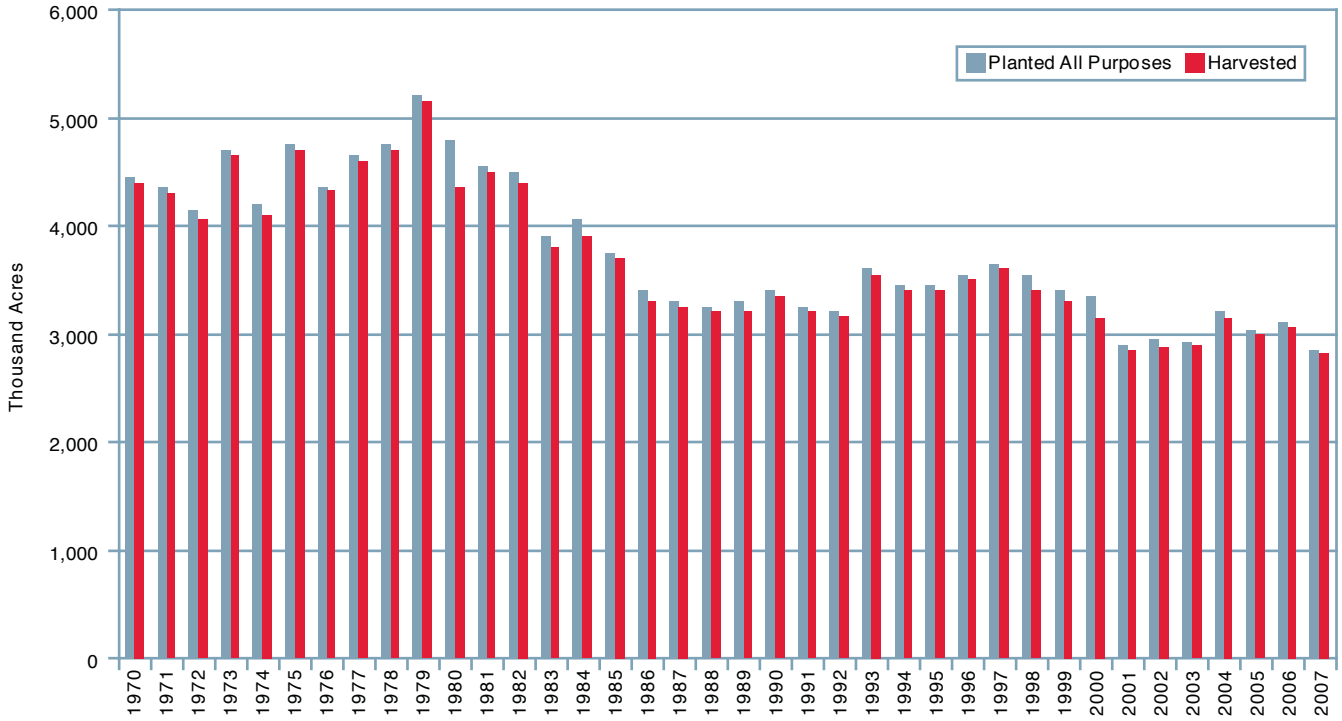
Figure L.1 2010 Arkansas Soybean Production



Source: Arkansas Soybean Promotion Board, Arkansas Ag Statistics, Overview, June 2010. http://www.themiraclebean.com/?page_id=20.

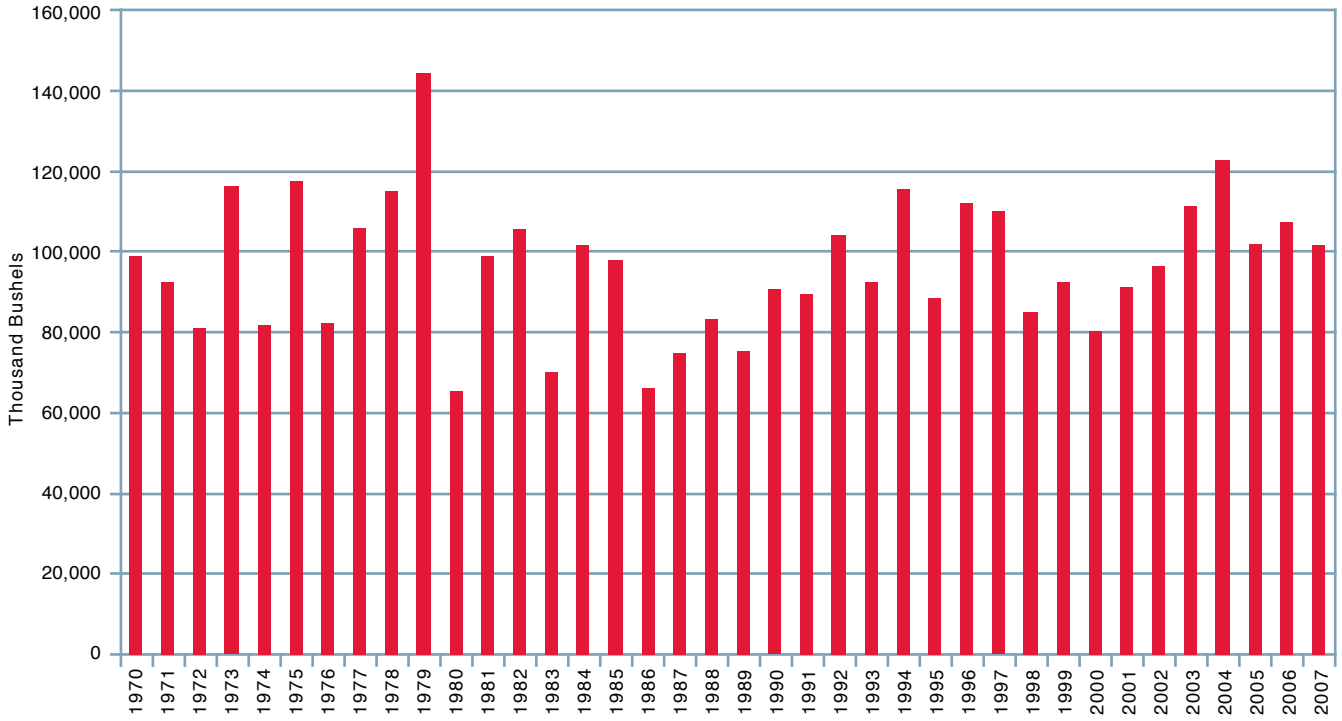
48 Arkansas Soybean Promotion Board, Arkansas Ag Statistics, Profile, June 2010. http://www.arspb.org/statistics/index.asp.

Figure L.2 1970-2007 Arkansas Soybeans Planted and Harvested



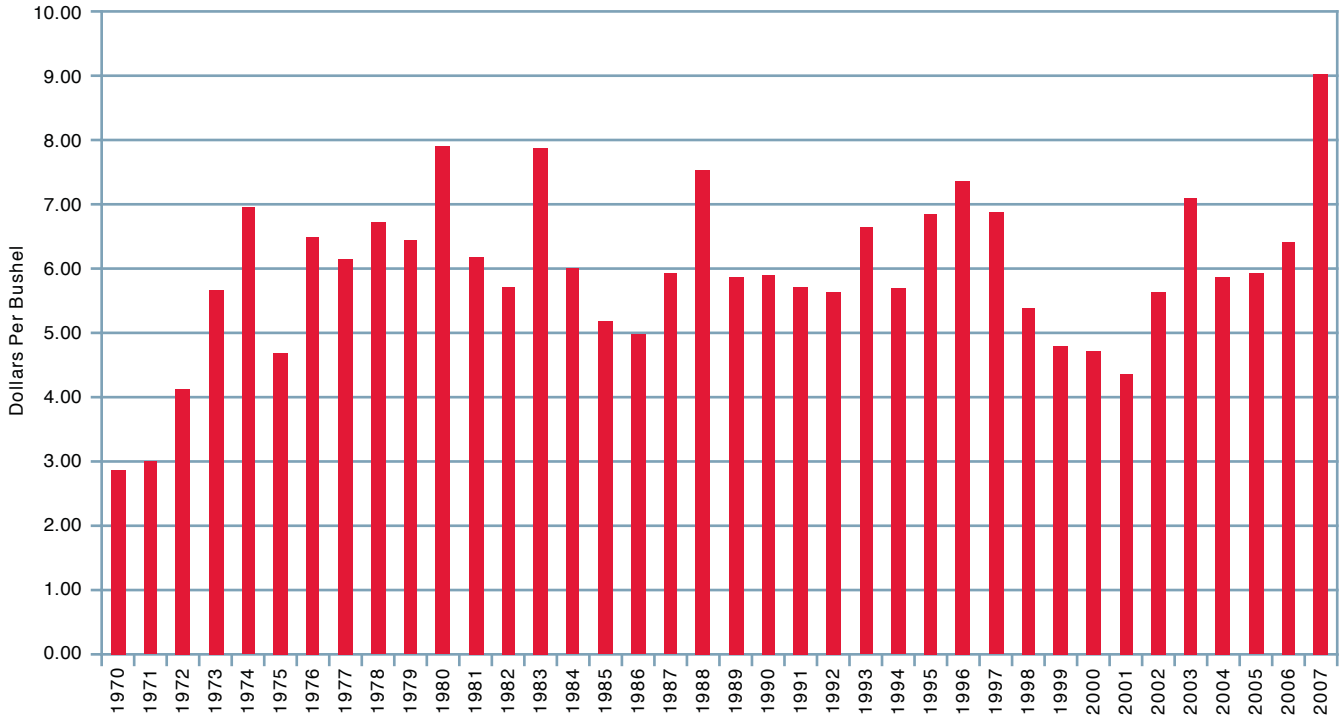
Source: United States Department of Agriculture, National Agricultural Statistics Service, June 2010.
http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats_1.0/index.asp#top.

Figure L.3 1970-2007 Arkansas Soybean Production



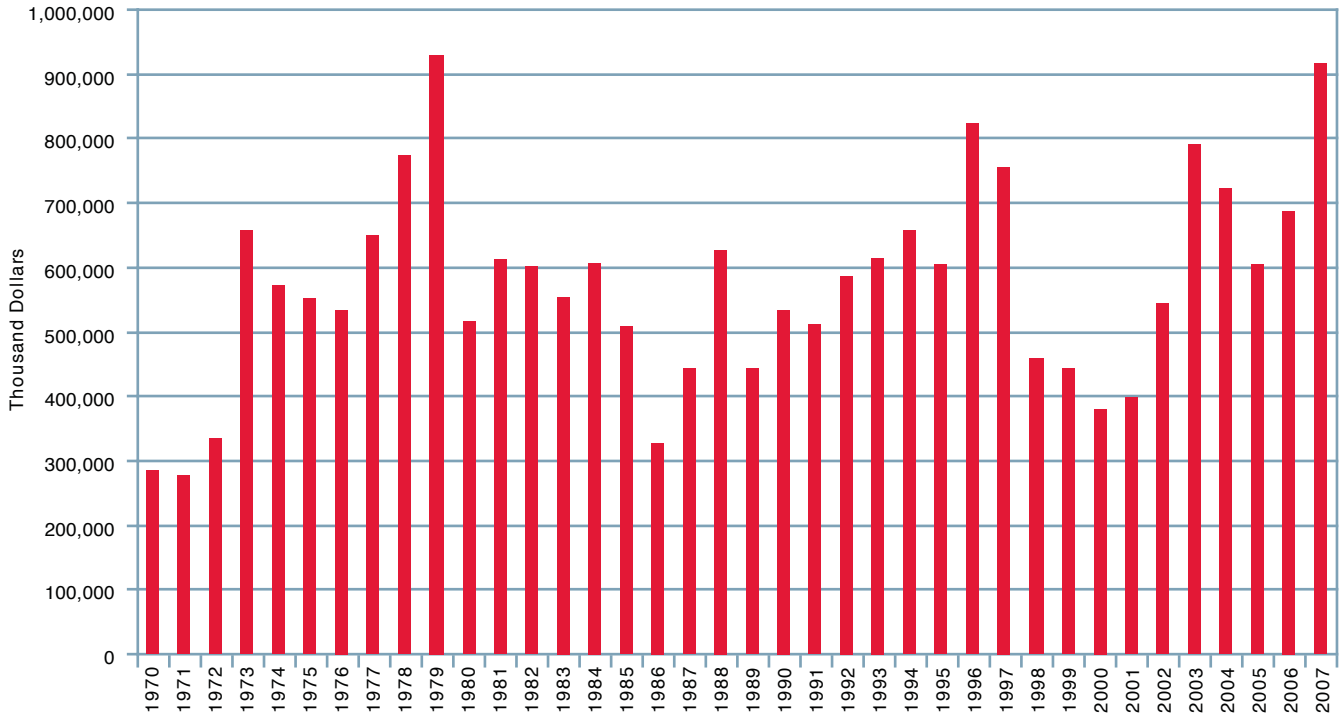
Source: United States Department of Agriculture, National Agricultural Statistics Service, June 2010.
http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats_1.0/index.asp#top.

Figure L.4 1970-2007 Arkansas Soybean Price Per Unit



Source: United States Department of Agriculture, National Agricultural Statistics Service, June 2010.
http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats_1.0/index.asp#top.

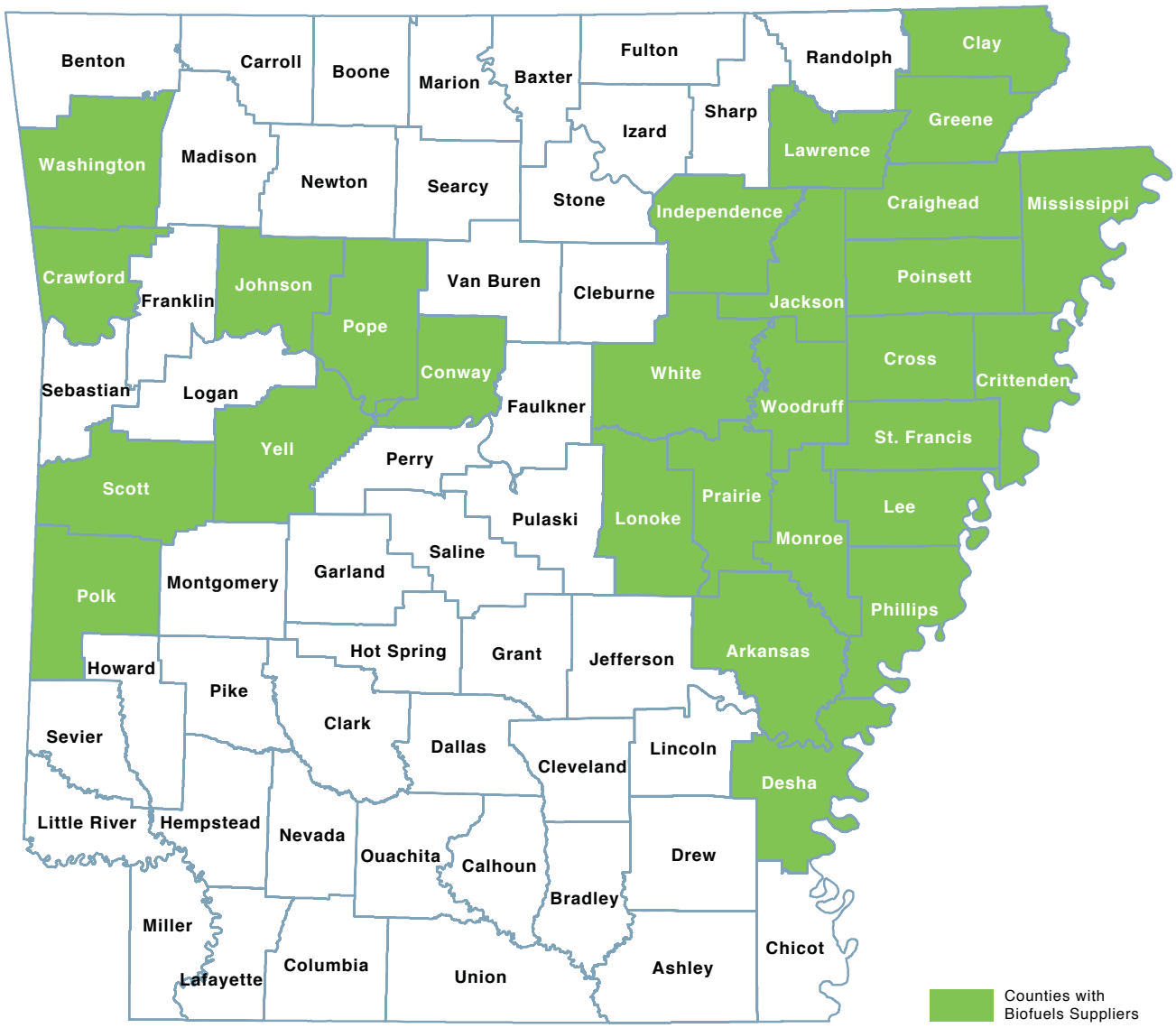
Figure L.5 1970-2007 Arkansas Soybean Value of Production



Source: United States Department of Agriculture, National Agricultural Statistics Service, June 2010.
http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats_1.0/index.asp#top.

Figure L.6 shows the counties in Arkansas that now offer on-road and/or off-road at the pump biodiesel and ethanol.

Figure L.6 2010 Arkansas Biofuels Suppliers



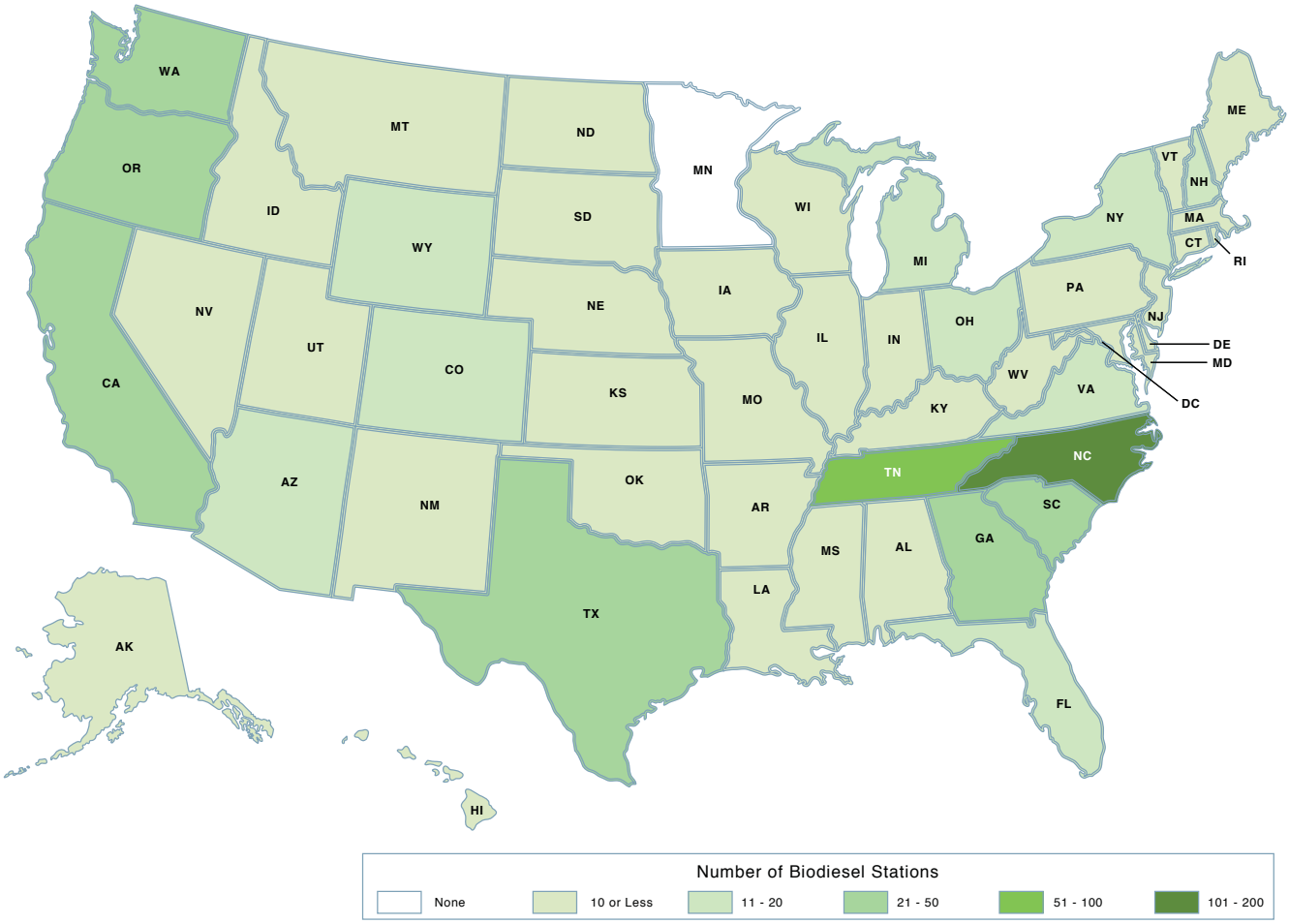
Source: Arkansas Soybean Promotion Board, ASPB Programs, Biodiesel Suppliers, June 2010. http://www.arspb.org/programs/biodiesel.asp.

APPENDIX L

U.S. Fueling Stations

The number of U.S. fueling stations offering biodiesel continues to grow rapidly. Figure L.7 shows the number of biodiesel stations available in each state for 2010.[49]

Figure L.7 Number of Biodiesel Fueling Stations



Source: U.S. Department of Energy, Alternative Fuels & Advanced Vehicles Data Center, Locations, June 2010. http://www.afdc.energy.gov/afdc/fuels/biodiesel_locations.html.

49 U.S. Department of Energy, Alternative Fuels & Advanced Vehicles Data Center, Locations, June 2010. http://www.afdc.energy.gov/afdc/fuels/biodiesel_locations.html.

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