Annual Review and Forecast of
UTAH COAL
Production and Distribution—2007

by
Michael D. Vanden Berg

CIRCULAR 107
UTAH GEOLOGICAL SURVEY
a division of
Utah Department of Natural Resources
2008

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(Final 2007 numbers and forecasted 2008 data)

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Cover Photo: Hunter Power Plant, Castle Dale, Utah.
Inserts: Skyline mine (bottom left); Utah coal (bottom center); Dugout mine portal (bottom right).

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PREFACE

This report was prepared by Michael Vanden Berg under the direction of David Tabet, Energy and Minerals Program Manager, and Rick Allis, Director of the Utah Geological Survey, Utah Department of Natural Resources. Additional information about the data in this report can be obtained from Michael Vanden Berg at 801-538-5419, or email at michaelvandenberg@utah.gov.

Data for the annual Utah Coal Report were gathered directly from coal producers and consumers, and comparisons were made to national data, news and company reports, and industry experts.

For more information on Utah coal or other energy-related data, please refer to the "Utah Energy and Mineral Statistics" Web-based data repository located at http://geology.utah.gov/sep/energydata.

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EXECUTIVE SUMMARY

Utah's coal industry experienced a difficult and tragic year in 2007. The terrible circumstances surrounding the unexpected closure of the Crandall Canyon mine, followed by the idling of the Aberdeen mine, resulted in a 7.1% decrease in Utah coal production to a total of 24.3 million short tons. These closures also resulted in a 5.3% loss in mine-related employment. In addition, difficult mining conditions at Canyon Fuel Company's SUFCO and Dugout Canyon mines contributed to production declines. On the brighter side, Canyon Fuel's Skyline mine, with a full-year of longwall operation, increased its production by 45.4% and UtahAmerican's West Ridge mine increased its production by 34.3%. Also noteworthy are record production for both Carbon County and State lands, and a 20-year high in the average price for a short ton of Utah coal: $25.18. Distribution of Utah coal decreased slightly in 2007 to 24.5 million short tons, while out-of-state coal imports hit a 20-year low of only 1.5 million tons.

Utah's coal production will increase slightly in 2008 to a total of 25.4 million short tons. New longwall production at C.W. Mining Company's Bear Canyon mine, as well as production increases at the Dugout mine and Hidden Splendor's Horizon mine, should offset production losses resulting from the closure of the Aberdeen mine. Of particular note, Utah will produce its one billionth ton of coal in the 3rd quarter of 2008, a major milestone for the state's coal industry. Coal-related employment in 2008 is projected to decrease by 134 individuals to a total of 1754 employees. The average price of Utah coal is expected to increase by 6.7% to $26.87 per short ton, the highest price in nominal dollars since 1987. Utah coal distribution should increase slightly to 24.9 million short tons, and imports, mostly Colorado coal going to the Bonanza power plant, are also expected to increase to 2.2 million tons.

One major issue facing Utah operators is increasingly difficult mining conditions, which often results in a higher ash product. To help mitigate this growing problem, two new coal-cleaning facilities have been built, Canyon Fuel's Castle Valley Coal Preparation Plant and Headwater's Wellington Cleaning Facility, both located near Price, Utah.

Utah mines are also faced with significant reserve depletion and the hazards of mining at increasing depths of cover. As a result, operators are looking to other areas to increase their reserve base. UtahAmerican Energy recently received the necessary permits to open the Lila Canyon mine in the southern part of the Book Cliffs coal field, Alton Coal Development is pursuing permits to open the Coal Hollow surface mine in the Alton coal field in southern Utah's Kane County, and Arch Coal was recently awarded the State-owned Cottonwood lease located in the Wasatch Plateau coal field. These proposed operations will replace production losses at current mines and keep Utah's production levels near the 25 million ton mark for the foreseeable future.

Another area of concern for coal companies, which could curtail coal demand, is the possibility of carbon constraints. In fact, all planned coal-fired power plants in Utah are on hold pending permit challenges or financing problems. Furthermore, Rocky Mountain Power has announced that they will not build another coal-fired power plant until regulators develop carbon mitigation strategies. A slowdown in local markets may be offset by a dramatic increase in foreign demand, which could benefit Utah if prices remain high.

UTAH COAL PRICES, EMPLOYMENT, AND PRODUCTION

The U.S. Energy Information Administration (EIA) reports that U.S. coal production in 2007 decreased 1.5% to 1145.5 million short tons, the second highest in U.S. history after 2006's record production of 1162.9 million tons (table 1). This downturn resulted from 20 out of the 26 coal producing states having decreased production in 2007. Increased production in Wyoming and Montana, 1.5% and 3.7% higher than in 2006, respectively, offset significant production decreases in other western states to push the overall Western Region's total coal production up by 0.2% to a new all time high. In contrast, Interior states production decreased by 3.2%, and the Appalachian region's production decreased by 3.6%.

Utah's coal production decreased for the first time since 2004, from 26.1 million short tons in 2006 to 24.3 million tons in 2007, ranking Utah as the 13th highest coal producing state. This decrease was the result of unexpected closures at UtahAmerican's Crandall Canyon and Aberdeen mines, as well as lower than expected production at Canyon Fuel's SUFCO mine. Projections for 2008 indicate a 4.5% increase in coal production to 25.4 million short tons, with increased longwall production at the Bear Canyon #4 mine making up for production losses at the currently idled Aberdeen mine. Operator projections for 2009 remain steady, totaling roughly 25 million short tons.

Prices and Revenue

The average Free on Board (FOB) price for Utah coal increased 11.9% in 2007 from $22.51 per short ton in 2006 to $25.18, the highest nominal price since 1987 (table 2). As recently as 2003, the average Utah coal price was at a 30-year low of $16.64 per short ton in nominal dollars. Many Utah mines are unable to take advantage of the presently high spot price for coal, currently at about $44.00 per short ton, because their production is mostly committed to lower-priced contracts, thus reducing the overall average FOB mine price. However, the average coal price should continue to increase as demand for coal remains steady, prices for other fuels remain high, older lower-priced contracts expire, and mining becomes more difficult. Subsequently, the average FOB price for 2008 is projected to increase by 6.7% to $26.87 per short ton. This price is still well below the highest inflation-adjusted price reached in 1976 of $85.19 (table 2).

Revenues from coal produced in Utah increased 4.0% to $612 million in 2007; the large increase in minemouth price offset a 7% decrease in production. Increases in both production and price are expected in 2008, pushing the estimated revenue up an additional 11.5% to $682 million, the highest amount ever recorded in nominal dollars, but only 63% of the highest inflation-adjusted revenue of $1090 million reached in 1982.

Employment

During 2007, the number of active mines dropped from 13 to 10, and the total number of employees dropped commensurately from 1994 to 1888 (table 2). The largest drop in employment occurred at the Crandall Canyon mine, which had to unexpectedly close (table 3). Employment also dropped at the Aberdeen mine as company officials idled the operation in late August over safety concerns. The Bear Canyon mine also had a drop in employment as work progressed towards longwall development. These decreases in employment were partially offset by increases at the West Ridge mine, which ramped up production after the closure of the Aberdeen and Crandall Canyon mines; increases in employment also occurred at Skyline, SUFCO, and Horizon. Active mine-related employment totals are projected to decrease by an additional 134 individuals in 2008, mostly resulting from the closure of the Aberdeen mine. The largest employment increase, 59 people, is planned at Bear Canyon, where longwall mining began in November of 2007. Employment totals could increase by another 100 people by 2010 if the proposed Lila Canyon mine starts development.

Coal Mining Productivity

Production efficiency at Utah coal mines decreased in 2007, from 6.1 short tons of coal produced per employee per hour in 2006 to 5.8 tons per employee-hour in 2007 (table 2). This decrease was the result of lower overall production and significant worker hours recorded at nonproducing mines such as Crandall Canyon and Aberdeen. The SUFCO mine remains the state's most productive, producing 8.5 tons per employee-hour, albeit much lower than 2006's productivity of 11.9 tons per employee hour, with West Ridge and Dugout in second and third with 8.3 and 7.6 tons per employee-hour, respectively. At mines with only continuous miner equipment, Emery leads the way with a productivity of 2.9 tons per employee-hour. Utah's 2007 productivity is lower than the 6.6 tons per employee-hour recorded by EIA's Annual Coal Report for underground mines in western U.S. states during 2006. Mining productivity projections for Utah in 2008 indicate an increase to 6.6 short tons per employee per hour due to decreased employment but steady production rates.

On average, each employee produced 12,900 tons during 2007, down from 13,100 tons in 2006, but still higher than the 1990s' average of 11,600 tons per employee and much higher than the 1980s' average of 5300 tons per employee. Utah's most productive year was in 2002 when productivity reached 7.7 tons per employee-hour and each employee produced an average of 16,600 tons.

Production by Coal Field

Mines in the Wasatch Plateau coal field accounted for 58.6% of Utah's coal production in 2007, down slightly from 59.4% the year before (table 4). The Skyline mine restarted longwall operations in May of 2006, producing 1.8 million short tons in 2006 and 2.6 million tons in 2007 (table 5). The Bear Canyon #4 mine also started longwall production in late 2007, increasing production from 462,000 short tons in 2006 to 653,000 tons in 2007. Production increases at Skyline and Bear Canyon were offset by significant decreases in production at SUFCO (15.1%), Horizon (9.2%), Deer Creek (1.7%), and the now-closed Crandall Canyon (34.7%). Wasatch Plateau production is expected to increase in 2008 as the Bear Canyon mine nearly quadruples production with full-year longwall operation.

Table 1. *U.S. coal production by state, 2006–2007.*
Thousand short tons

2007 Rank	State	2006	2007	Percent Change
1	Wyoming	446,742	453,568	1.5%
2	West Virginia	152,374	153,223	0.6%
3	Kentucky	120,848	114,970	-4.9%
4	Pennsylvania	66,029	65,048	-1.5%
5	Montana	41,823	43,390	3.7%
6	Texas	45,548	41,948	-7.9%
7	Colorado	36,322	36,384	0.2%
8	Indiana	35,119	35,003	-0.3%
9	Illinois	32,729	32,445	-0.9%
10	North Dakota	30,411	29,606	-2.6%
11	Virginia	29,740	25,268	-15.0%
12	New Mexico	25,913	24,451	-5.6%
13	**Utah**	**26,131**	**24,288**	**-7.1%**
14	Ohio	22,722	22,558	-0.7%
15	Alabama	18,830	19,321	2.6%
16	Arizona	8,216	7,983	-2.8%
17	Mississippi	3,797	3,545	-6.6%
18	Louisiana	4,114	3,062	-25.6%
19	Tennessee	2,804	2,645	-5.7%
20	Maryland	5,054	2,295	-54.6%
21	Oklahoma	1,998	1,648	-17.5%
22	Alaska	1,425	1,324	-7.1%
23	Kansas	426	420	-1.4%
24	Missouri	394	236	-40.1%
25	Arkansas	23	83	260.9%
26	Washington	2,580	0	-100.0%
	Refuse Recovery	752	837	11.3%
	Appalachian	391,159	377,138	-3.6%
	Interior	151,389	146,581	-3.2%
	Western	619,562	620,993	0.2%
	East of Mississippi R.	490,046	476,321	-2.8%
	West of Mississippi R.	672,065	668,390	-0.5%
	U.S. Total	1,162,864	1,145,549	-1.5%

Source: U.S. Energy Information Administration, U.S. Coal Supply and Demand: 2007 Review; Utah production from UGS coal company questionnaires

***Table 2**. Utah coal industry production, employment, productivity, prices, and revenue, 1960–2008.*

Year	Production	# of Operators	# of Mines	Employment[1]	Productivity[2]	Average FOB Price		Revenue	
	Thousand short tons			# of employees	Tons/employee-hour	$/Ton (nominal dollars)	$/Ton (real 2008 dollars)	Million $ (nominal dollars)	Million $ (real 2008 dollars)
1960	4,955	na	45	2,418	na	6.35	45.35	31.5	224.7
1961	5,159	na	50	2,206	na	6.03	42.63	31.1	219.9
1962	4,297	na	38	2,034	na	5.40	37.80	23.2	162.4
1963	4,359	na	36	1,596	na	5.22	36.06	22.8	157.2
1964	4,720	na	35	1,679	na	7.03	47.94	33.2	226.3
1965	4,992	na	31	1,495	na	6.37	42.75	31.8	213.4
1966	4,636	na	25	1,374	na	5.77	37.65	26.7	174.5
1967	4,174	na	24	1,238	na	5.82	36.84	24.3	153.8
1968	4,317	na	23	1,155	na	5.77	35.05	24.9	151.3
1969	4,657	na	21	1,193	na	6.31	36.35	29.4	169.3
1970	4,733	na	20	1,469	na	7.28	39.66	34.5	187.7
1971	4,626	na	22	1,430	na	7.37	38.47	34.1	178.0
1972	4,802	na	22	1,582	na	8.93	45.16	42.9	216.9
1973	5,650	na	16	1,603	na	11.19	53.28	63.2	301.0
1974	6,046	na	15	1,514	na	12.24	52.49	74.0	317.3
1975	6,937	na	20	2,550	na	19.84	77.96	137.6	540.8
1976	7,968	na	24	2,614	na	22.93	85.19	182.7	678.8
1977	8,838	na	26	2,703	na	20.32	70.89	179.6	626.5
1978	9,253	na	28	3,424	na	21.52	69.77	199.1	645.6
1979	12,096	na	25	3,656	na	22.71	66.13	274.7	799.9
1980	13,236	na	29	3,512	na	25.63	65.75	339.2	870.3
1981	13,808	16	28	4,166	1.99	26.87	62.49	371.0	862.9
1982	16,912	16	29	4,296	2.05	29.42	64.45	497.6	1,090.0
1983	11,829	15	25	2,707	2.30	28.32	60.11	335.0	711.0
1984	12,259	15	24	2,525	2.55	29.20	59.41	358.0	728.3
1985	12,831	15	22	2,563	2.38	27.69	54.40	355.3	698.0
1986	14,269	16	21	2,881	2.59	27.64	53.31	394.4	760.7
1987	16,521	16	20	2,650	3.38	25.67	47.77	424.1	789.2
1988	18,164	14	17	2,559	3.74	22.85	40.83	415.0	741.7
1989	20,517	14	20	2,471	4.25	22.01	37.52	451.6	769.9
1990	22,012	13	18	2,791	4.44	21.78	35.23	479.4	775.4
1991	21,875	11	16	2,292	4.55	21.56	33.46	471.6	732.0
1992	21,015	10	16	2,106	5.09	21.83	32.89	458.8	691.2
1993	21,723	9	15	2,161	5.42	21.17	30.97	459.9	672.8
1994	24,422	8	14	2,024	6.20	20.07	28.63	490.1	699.2
1995	25,051	7	14	1,989	6.54	19.11	26.51	478.7	664.1
1996	27,071	7	13	2,077	6.77	18.50	24.93	500.8	674.8
1997	26,428	8	16	2,091	6.01	18.34	24.16	484.7	638.4
1998	26,600	8	17	1,950	6.23	17.83	23.12	474.3	615.1
1999	26,491	8	15	1,843	6.66	17.36	22.03	459.9	583.5
2000	26,920	8	13	1,672	7.51	16.93	20.78	455.8	559.5
2001	27,024	7	13	1,564	6.43	17.76	21.20	479.9	572.9
2002	25,299	8	13	1,525	7.65	18.47	21.70	467.3	549.1
2003	23,069	9	14	1,595	7.25	16.64	19.12	383.9	441.0
2004	21,818	8	13	1,523	6.74	17.70	19.81	386.2	432.2
2005	24,556	8	13	1,803	6.36	19.34	20.93	474.9	514.1
2006	26,131	8	13	1,994	6.09	22.51	23.60	588.2	616.8
2007	24,288	8	10	1,888	5.79	25.18	25.68	611.6	623.7
2008*	25,380	7	9	1,754	6.55	26.87	26.87	682.0	682.0

Source: UGS coal company questionnaires

[1]Includes only active Utah coal mines and their associated operations

[2]Data for 1983-2007 have been revised

*Forecast

FOB = Free on Board

***Table 3**. Coal mining employment in Utah by coal mine, 2001–2008.*

Number of employees

Company	Mine	County	2001	2002	2003	2004	2005	2006	2007	2008*
UtahAmerican Energy, Inc. - Tower Division	Aberdeen/Pinnacle[1]	Carbon	32	116	136	134	166	219	163	27
Canyon Fuel, LLC - Arch Coal, Inc.	Dugout Canyon	Carbon	77	121	171	206	217	231	229	237
	Skyline #3	Emery/Carbon	351	234	183	38	120	185	197	212
	SUFCO	Sevier	273	275	291	295	303	337	368	342
CONSOL Energy	Emery	Emery	3	61	60	116	130	140	140	140
C.W. (Co-op) Mining Co.	Bear Canyon #1, #3, #4	Emery	134	138	156	45	115	121	76	135
Energy West Mining Co.	Deer Creek	Emery	335	331	341	354	362	358	356	356
	Trail Mountain	Emery	71	--	--	--	--	--	--	--
GENWAL Resources, Inc. - UtahAmerican Energy, Inc., Intermountain Power Agency	Crandall Canyon/ South Crandall Canyon[2]	Emery	124	98	73	141	197	154	54	--
America West Resources, Inc. - Hidden Splendor Resources, Inc.	Horizon[3]	Carbon	16	29	45	45	44	60	76	80
Lodestar Energy, Inc.	Whisky Creek #1	Carbon	--	21	22	--	--	--	--	--
	White Oak #2	Carbon	48	--	--	--	--	--	--	--
WEST RIDGE Resources, Inc. - UtahAmerican Energy, Inc., Intermountain Power Agency	West Ridge[2]	Carbon	100	101	117	149	149	189	229	225
Total			1,564	1,525	1,595	1,523	1,803	1,994	1,888	1,754

Source: UGS coal company questionnaires

[1]Owned by Andalex Resources, Inc. until fall 2006

[2]Partially owned by Andalex Resources, Inc. until fall 2006

[3]Owned by Lodestar in 2001

*Forecast

Table 4. *Coal production in Utah by coal field, 1870–2008.*

Thousand short tons

Year	Wasatch Plateau	Book Cliffs	Emery	Sego	Coalville	Others	Total
1870-1981	166,404	234,547	5,723	2,654	4,262	3,095	416,685
1982	12,342	3,718	852	0	0	0	16,912
1983	10,173	1,568	88	0	0	0	11,829
1984	10,266	1,993	0	0	0	0	12,259
1985	9,386	2,805	640	0	0	0	12,831
1986	10,906	2,860	503	0	0	0	14,269
1987	13,871	2,348	269	0	33	0	16,521
1988	15,218	2,363	548	0	35	0	18,164
1989	17,146	2,785	586	0	0	0	20,517
1990	18,591	3,085	336	0	0	0	22,012
1991	18,934	2,941	0	0	0	0	21,875
1992	18,631	2,384	0	0	0	0	21,015
1993	19,399	2,324	0	0	0	0	21,723
1994	22,079	2,343	0	0	0	0	24,422
1995	22,631	2,420	0	0	0	0	25,051
1996	23,616	3,455	0	0	0	0	27,071
1997	22,916	3,512	0	0	0	0	26,428
1998	22,708	3,892	0	0	0	0	26,600
1999	23,572	2,919	0	0	0	0	26,491
2000	22,967	3,953	0	0	0	0	26,920
2001	21,919	5,106	0	0	0	0	27,024
2002	19,654	5,619	26	0	0	0	25,299
2003	15,868	6,958	243	0	0	0	23,069
2004	13,082	8,479	256	0	0	0	21,818
2005	14,442	8,927	1,187	0	0	0	24,556
2006	15,532	9,545	1,054	0	0	0	26,131
2007	14,241	9,021	1,026	0	0	0	24,288
2008*	15,850	8,330	1,200	0	0	0	25,380
Cumulative Production	616,494	341,870	13,337	2,654	4,330	3,095	981,780

Source: UGS coal company questionnaires

*Forecast, 2008 numbers not included in cumulative totals

Table 5. *Coal production and recoverable reserves in Utah by coal mine, 2001–2008.*

Thousand short tons

Company	Mine	County	Coal Field	2001	2002	2003	2004	2005	2006	2007	2008*	Estimated recoverable reserves currently under lease at active mines
UtahAmerican Energy, Inc. - Tower Division	Aberdeen[1]	Carbon	Book Cliffs	531	37	444	1,984	1,519	2,103	1,044	230	--
	Pinnacle[1]	Carbon	Book Cliffs	296	662	584	419	189	8	--	--	--
Canyon Fuel, LLC - Arch Coal, Inc	Dugout Canyon	Carbon	Book Cliffs	1,981	2,080	2,941	3,811	4,592	4,335	3,816	4,100	30,000
	Skyline #3[2]	Emery/Carbon	Wasatch Plateau	3,822	3,477	2,771	551	405	1,759	2,558	2,800	23,000
	SUFCO	Sevier	Wasatch Plateau	7,001	7,600	7,126	7,568	7,567	7,908	6,712	6,800	59,000
CONSOL Energy	Emery	Emery	Emery	--	26	243	256	1,187	1,054	1,026	1,200	18,000
C.W. (Co-op) Mining Co.	Bear Canyon #3	Emery	Wasatch Plateau	--	4	310	227	304	27	--		36,000[5]
	Bear Canyon #4	Emery	Wasatch Plateau	--	--	--	112	151	462	653	2,000	
	Bear Canyon #1	Emery	Wasatch Plateau	1,254	953	403	--	--	--	--		
Energy West Mining Co.	Deer Creek	Emery	Wasatch Plateau	4,338	3,984	3,938	3,356	3,910	3,748	3,685	3,750	45,000
	Trail Mountain	Emery	Wasatch Plateau	924	--	--	--	--	--	--		--
GENWAL Resources, Inc. - UtahAmerican Energy, Inc., Intermountain Power Agency	Crandall Canyon[3]	Emery	Wasatch Plateau	3,996	3,248	1,161	872	1,593	613	400	--	--
	South Crandall Canyon[3]	Emery	Wasatch Plateau	--	--	26	103	225	759	--	--	--
America West Resources, Inc., Hidden Splendor Resources, Inc.	Horizon[4]	Carbon	Wasatch Plateau	23	110	108	293	286	257	233	500	9,000
Lodestar Energy, Inc.	Whisky Creek #1	Carbon	Wasatch Plateau	--	278	25	--	--	--	--	--	--
	White Oak #2	Carbon	Wasatch Plateau	560	--	--	--	--	--	--	--	--
WEST RIDGE Resources, Inc. - UtahAmerican Energy, Inc., Intermountain Power Agency	West Ridge[2]	Carbon	Book Cliffs	2,298	2,840	2,989	2,265	2,627	3,098	4,160	4,000	30,000
Total				27,024	25,299	23,069	21,818	24,556	26,131	24,288	25,380	250,000

Source: UGS coal company questionnaires

[1]Owned by Andalex Resources, Inc. until fall 2006

[2]Mined in Emery County in 2004 and before and in Carbon County in 2005 and beyond

[3]Partially owned by Andalex Resources, Inc. until fall 2006

[4]Owned by Lodestar in 2001

[5]Combined total for entire operation

*Forecast

The Book Cliffs coal field accounted for 37.1% of total production in 2007, the second-highest level behind 2004's share of 38.9% (table 4). Overall production from mines in the Book Cliffs decreased by 5.5% in 2007 to 9.0 million short tons, and production from this field is predicted to decrease an additional 7.7% in 2008. The UtahAmerican Tower Division, which operates the Aberdeen mine, greatly decreased production from 2.1 million short tons in 2006 to only 1.0 million tons in 2007 (table 5). This decrease was the result of company officials having to close the mine for safety reasons from late August 2007 to late January 2008. Canyon Fuel's Dugout mine also decreased production from 4.3 million short tons in 2006 to 3.8 million tons in 2007 as operators encountered difficult mining conditions. In contrast, the West Ridge mine increased production in 2007 by 34.3% to a total of 4.2 million tons. The Book Cliffs coal field will become a more prominent producer in the future with the opening of the Lila Canyon mine, whose production would offset losses from the currently closed Aberdeen mine.

Coal production resumed in the Emery coal field in 2002 with the reopening of the Emery mine (table 4). This mine produced 243,000 short tons in 2003 before closing again in August of that year due to contract and ownership issues. The Emery mine reopened in August of 2004, producing 256,000 short tons before the year was finished. Mining has been continuous from 2005 to 2007, with total production equaling 1.2, 1.1, and 1.0 million short tons, respectively. The Emery coal field produced 4.2% of Utah's total coal production in 2007.

The remainder of Utah's coal fields are inactive, as they have been for many years (table 4). Several fields, such as the Kaiparowits Plateau, which holds an estimated 9.1 billion tons of recoverable coal resources (see appendix table A5), cannot be mined because of land-use restrictions and/or the fields are too remote for economical transport to market. However, a new surface mine has been proposed in the Alton coal field in southern Utah. This mine has the potential to produce up to two million short tons of coal per year.

Production by County

Carbon County led all counties in coal production in 2007, reaching a record-high 11.8 million short tons, 48.6% of Utah's total, up from 11.6 million tons in 2006 (table 6). Production increases at Skyline (where mining shifted to Carbon County in 2005) and West Ridge have added significantly to Carbon County's overall total. The mines in Emery County decreased production to 5.8 million short tons in 2007, 23.7% of Utah's total, compared to producing 6.7 million tons in 2006, well below the peak production of 17.3 million tons in 1995. Emery County will see a significant resurgence in coal production when the proposed Lila Canyon mine begins operation. Sevier County's only active mine, SUFCO, decreased production to 6.7 million short tons in 2007, 27.6% of Utah's total.

Projections for 2008 show a slight decrease for Carbon County production to 46% of total, with a commensurate increase in Emery County to 27%. Production in Sevier County should remain steady at 27% of Utah's total production.

Production by Landownership

Federal leases continued to dominate Utah's production picture as mines on U.S. Bureau of Land Management (BLM) and U.S. Forest Service land accounted for 12.7 million short tons, or 52.4%, of the state's total coal production in 2007 (table 7). This percentage has steadily decreased since 2004 when production on federal leases made up 92.9% of total coal production. The percentage is expected to decrease again in 2008 to 48.5%. This steady decline is the result of many operators moving production to state leases over the last four years.

Lands owned by the State of Utah supplied a record 9.6 million short tons of coal in 2007, which is 37.1% higher than the 2006 production of 7.0 million tons. State lands accounted for 39.5% of total state production in 2007, up from 26.8% in 2006 and just 10.9% in 2005. This increase was the result of steady longwall production from Deer Creek's state-owned Mill Fork tract, as well as significant increases in state production at Dugout Canyon, West Ridge, and SUFCO. Production on State lands is expected to increase again in 2008 to about 11.5 million short tons, or 45.2% of the state's total, as the Dugout mine expects to produce roughly 90% of their coal from State lands, with additional increases in State production at SUFCO and West Ridge.

Production on private "fee" land increased from 1.7 million short tons in 2006 to 2.0 million tons in 2007, 8.1% of Utah's total. Fee coal in 2007 was produced from the Emery, Aberdeen, and Bear Canyon mines. Coal produced on private land is expected to decrease to 1.6 million short tons in 2008 with the idling of the Aberdeen mine.

Production by Mining Method

During 2007, seven longwall mining machines produced 19.1 million short tons of coal, accounting for 78.6% of total Utah production. The SUFCO mine installed a new longwall machine which commenced operation in February of 2007, while the Bear Canyon mine rehabilitated and installed a used longwall machine in November of the same year. The remaining 21.4% of state coal production came from 21 continuous mining machines.

The processing of waste coal piles at the closed Sunnyside and Star Point mines is not generally considered coal mining, but rather reclamation activity. Fluidized-bed combustion technology allows discarded wash-plant waste and other coal refuse to be used as fuel at Utah's Sunnyside Cogeneration power plant. Annual waste coal consumption at the Sunnyside facility averages roughly 450,000 short tons.

ACTIVITIES OF UTAH COAL OPERATORS

Compared to the previous year, Utah coal production decreased 7.1% in 2007 to 24.3 million short tons. This decrease was mainly caused by the unexpected closures of UtahAmerican's Crandall Canyon and Aberdeen mines, along with a 15.1% decline in production at Canyon Fuel's SUFCO mine and a 12.0% decline at their Dugout Canyon mine. During 2008, production at Utah mines is expected to

Table 6. *Coal production in Utah by county, 1870–2008.*
Thousand short tons

Year	Carbon	Emery	Sevier	Summit	Iron	Kane	Others	Total
1870-1959	211,028	49,166	4,046	4,012	521	45	3,608	272,426
1960	3,698	1,137	49	20	50	0	1	4,955
1961	3,916	1,124	47	20	52	0	0	5,159
1962	3,105	1,077	49	20	46	0	0	4,297
1963	3,493	752	47	18	48	1	0	4,359
1964	3,752	848	47	17	54	2	0	4,720
1965	3,779	1,101	61	13	36	2	0	4,992
1966	3,380	1,170	65	15	4	2	0	4,636
1967	2,971	1,113	72	13	3	2	0	4,174
1968	3,062	1,167	70	13	3	2	0	4,317
1969	3,367	1,200	72	12	4	2	0	4,657
1970	3,349	1,292	79	13	0	0	0	4,733
1971	3,347	1,097	158	12	0	12	0	4,626
1972	2,956	1,656	184	6	0	0	0	4,802
1973	2,866	2,445	339	0	0	0	0	5,650
1974	2,754	2,901	391	0	0	0	0	6,046
1975	2,984	3,126	827	0	0	0	0	6,937
1976	3,868	3,057	1,043	0	0	0	0	7,968
1977	4,390	3,107	1,337	0	0	0	4	8,838
1978	4,005	3,640	1,558	0	0	0	50	9,253
1979	5,292	5,147	1,657	0	0	0	0	12,096
1980	5,096	6,319	1,821	0	0	0	0	13,236
1981	6,123	5,609	2,076	0	0	0	0	13,808
1982	8,335	6,329	2,248	0	0	0	0	16,912
1983	4,194	5,404	2,231	0	0	0	0	11,829
1984	5,293	4,825	2,141	0	0	0	0	12,259
1985	6,518	4,516	1,797	0	0	0	0	12,831
1986	6,505	5,404	2,360	0	0	0	0	14,269
1987	7,495	6,765	2,228	33	0	0	0	16,521
1988	7,703	7,801	2,625	35	0	0	0	18,164
1989	8,927	8,531	3,059	0	0	0	0	20,517
1990	8,810	10,315	2,887	0	0	0	0	22,012
1991	5,816	12,980	3,079	0	0	0	0	21,875
1992	3,386	15,049	2,580	0	0	0	0	21,015
1993	2,642	15,528	3,553	0	0	0	0	21,723
1994	4,523	16,330	3,569	0	0	0	0	24,422
1995	3,801	17,344	3,906	0	0	0	0	25,051
1996	5,985	16,872	4,214	0	0	0	0	27,071
1997	6,956	14,533	4,939	0	0	0	0	26,428
1998	7,206	13,675	5,719	0	0	0	0	26,600
1999	4,514	16,214	5,763	0	0	0	0	26,491
2000	4,615	16,399	5,906	0	0	0	0	26,920
2001	5,689	14,334	7,001	0	0	0	0	27,024
2002	6,007	11,692	7,600	0	0	0	0	25,299
2003	7,091	8,852	7,126	0	0	0	0	23,069
2004	8,772	5,477	7,568	0	0	0	0	21,818
2005	9,618	7,372	7,567	0	0	0	0	24,556
2006	11,560	6,662	7,908	0	0	0	0	26,131
2007	11,811	5,765	6,712	0	0	0	0	24,288
2008*	11,630	6,950	6,800	0	0	0	0	25,380
Cumulative Production	466,353	374,219	132,381	4,272	821	70	3,663	981,780

Source: UGS coal company questionnaires

*Forecast, 2008 numbers not included in cumulative totals

Table 7. *Coal production in Utah by landownership, 1980–2008.*
Thousand short tons

Year	Federal Land	% of Total	State Land	% of Total	County Land	% of Total	Fee Land	% of Total	Total
1980	8,663	65.5%	1,105	8.3%	0	0.0%	3,468	26.2%	13,236
1981	8,719	63.1%	929	6.7%	0	0.0%	4,160	30.1%	13,808
1982	10,925	64.6%	998	5.9%	0	0.0%	4,989	29.5%	16,912
1983	6,725	56.9%	419	3.5%	0	0.0%	4,685	39.6%	11,829
1984	8,096	66.0%	285	2.3%	0	0.0%	3,878	31.6%	12,259
1985	9,178	71.5%	510	4.0%	0	0.0%	3,143	24.5%	12,831
1986	11,075	77.6%	502	3.5%	0	0.0%	2,692	18.9%	14,269
1987	13,343	80.8%	488	3.0%	0	0.0%	2,690	16.3%	16,521
1988	15,887	87.5%	263	1.4%	0	0.0%	2,014	11.1%	18,164
1989	16,931	82.5%	375	1.8%	153	0.7%	3,058	14.9%	20,517
1990	17,136	77.8%	794	3.6%	606	2.8%	3,476	15.8%	22,012
1991	18,425	84.2%	942	4.3%	144	0.7%	2,364	10.8%	21,875
1992	17,760	84.5%	1,384	6.6%	136	0.6%	1,735	8.3%	21,015
1993	19,099	87.9%	1,682	7.7%	116	0.5%	826	3.8%	21,723
1994	22,537	92.3%	1,227	5.0%	243	1.0%	415	1.7%	24,422
1995	23,730	94.7%	571	2.3%	289	1.2%	461	1.8%	25,051
1996	25,996	96.0%	446	1.6%	15	0.1%	614	2.3%	27,071
1997	25,161	95.2%	339	1.3%	0	0.0%	928	3.5%	26,428
1998	24,954	93.8%	297	1.1%	37	0.1%	1,312	4.9%	26,600
1999	21,982	83.0%	3,071	11.6%	65	0.2%	1,373	5.2%	26,491
2000	20,812	77.3%	4,021	14.9%	0	0.0%	2,087	7.8%	26,920
2001	18,369	68.0%	5,386	19.9%	331	1.2%	2,939	10.9%	27,024
2002	18,365	72.6%	4,353	17.2%	278	1.1%	2,303	9.1%	25,299
2003	18,815	81.6%	2,192	9.5%	25	0.1%	2,037	8.8%	23,069
2004	20,268	92.9%	849	3.9%	0	0.0%	701	3.2%	21,818
2005	19,602	79.8%	2,665	10.9%	6	0.0%	2,283	9.3%	24,556
2006	17,478	66.9%	6,995	26.8%	0	0.0%	1,657	6.3%	26,131
2007	12,729	52.4%	9,591	39.5%	0	0.0%	1,968	8.1%	24,288
2008*	12,304	48.5%	11,460	45.2%	0	0.0%	1,616	6.4%	25,380

Source: UGS coal company questionnaires
*Forecast

increase slightly to 25.4 million tons with a new longwall operation at Co-op's Bear Canyon #4 mine offsetting production losses from the now-closed UtahAmerican mines. Utah's coal industry should remain steady and strong for the foreseeable future. In fact, sometime in the 3rd quarter of 2008, Utah will produce its one billionth ton of coal.

Utah coal companies report their operations are faced with the soaring costs of fuel, steel, rubber, and general labor. As the cost of mining increases, so does the cost of Utah coal, making it more difficult to compete with cheaper surfaced-mined coal from Wyoming and Colorado. Many Utah operators also report that difficult geologic conditions, such as thinner coalbeds, rock partings, and faults, are resulting in a greater percentage of higher-ash product. In the past, the primary method for dealing with minor high-ash product was to blend it with more abundant low-ash coal; however, the percentage of low-ash coal produced has declined. As an alternative to blending, two new coal-cleaning facilities, the Wellington Cleaning Facility and the Castle Valley Coal Preparation Plant, both located near the Savage Coal Terminal, can help mitigate coal quality problems.

Coal mine safety has also come to the forefront, particularly after the tragedy at the Crandall Canyon mine. Even before this disaster, all coal mines were in the process of implementing new safety regulations required by the MINER Act of 2006, such as having miners carry a second self rescuer, the increased underground storage of oxygen, and the installation of new miner "safe havens."

Following a decade of planning, UtahAmerican has received the necessary permits to open the Lila Canyon mine in the southern portion of the Book Cliffs coal field in Emery County. This new mine would replace production from the now-closed Crandall Canyon and Aberdeen mines. Elsewhere in Utah, Alton Coal Development is in the final permitting stages for a proposed surface mine located in the Alton coal field in Kane County. Furthermore, Arch Coal was the high bidder for the State-owned Cottonwood lease. This new reserve will likely be mined after the company's Skyline and/or Dugout Canyon mines are depleted.

UtahAmerican Energy, Inc. – Murray Energy Corporation

In August of 2006, Murray Energy Corporation, the largest independent, family-owned coal producer in the United States, acquired ANDALEX Resources and its four subsidiary companies: the Tower Division, consisting of the Aberdeen and Pinnacle mines; GENWAL Resources, Inc., which manages the Crandall Canyon and South Crandall Canyon mines; WEST RIDGE Resources, Inc., which manages the West Ridge mine; and the Carbon County-based Wildcat Loadout. UtahAmerican Energy, a Murray Energy subsidiary, wholly owns and operates the Tower Division and the Wildcat Loadout, while GENWAL and WEST RIDGE are half-owned by the Intermountain Power Agency (IPA). IPA owns and operates the Intermountain Power Project near Delta, which is the largest single coal consumer in the state. UtahAmerican Energy also owns the reserves at the proposed Lila Canyon mine in the Emery County portion of the Book Cliffs coal field.

Tower Division – Aberdeen and Pinnacle Mines

The Tower Division is located in Deadman Canyon about 7 miles north of Price. Production from the Aberdeen mine, which mines the Aberdeen seam, totaled 1.0 million short tons in 2007, a significant decrease from the 2.1 million tons produced in 2006. The Aberdeen seam is typically 9 to 10 feet thick, with coal quality averaging 12,200 British thermal units (Btu) per pound with a sulfur content of 0.5% and ash of 8.5%. As is typical in gassy Book Cliffs coal mines, production can be limited by the ability to adequately ventilate the mine. Several gob-vent gas wells have been drilled to aid ventilation; recently BlueTip Energy was contracted to collect and market the gas from the Aberdeen mine. UtahAmerican estimates that about two million cubic feet of natural gas a day can be collected. The Pinnacle mine was indefinitely idled in January of 2006 after producing only 8000 tons from the Centennial seam.

The Aberdeen mine was closed on August 27, 2007 because of safety concerns related to mining at depths ranging to 3000 feet, the deepest longwall operation in the United States. After extensive engineering and ground control studies were conducted and with significant modifications made to the longwall equipment, the mine reopened in January of 2008. On March 28, 2008, the Aberdeen mine shut down again, after producing only 230,000 short tons, due to depth-related safety issues. It is uncertain as to whether the mine has closed permanently.

Lila Canyon Mine

UtahAmerican Energy's proposed Lila Canyon mine is located south of Horse Canyon in the Book Cliffs coal field in Emery County. UtahAmerican has obtained the necessary permits and has started construction on surface facilities. Also, the county has begun construction on a new road linking the mine with State Route 6. The company hopes to begin construction on the rock slopes necessary to access the coal seam in late 2008. These slopes will be approximately 1250 feet long and grade upwards at 12%, taking roughly 1 to 1.5 years to complete. After construction of the slopes, a year and a half of development work will take place before any longwall production can start. Initial construction activities will employ about 30 people, but by the time the mine is at full working capacity, possibly in 2011, it could employ up to 200 people and produce up to 4.5 million short tons of coal per year. Coal would be mined from federal leases where the merged upper and lower Sunnyside seams averages 13.0 to 13.5 feet thick. Recoverable reserves currently under lease are estimated between 26 and 40 million short tons, depending on the cutting height of the equipment that will be used. Approximately 50 million tons of additional federal coal is available to the south of current leases.

GENWAL Resources, Inc. – Crandall Canyon and South Crandall Canyon Mines

UtahAmerican Energy and IPA share equally in ownership of the Crandall Canyon and South Crandall Canyon mines, both of which are located in the Wasatch Plateau. The mines are operated by GENWAL Resources, Inc., a wholly owned subsidiary of UtahAmerican Energy.

The South Crandall Canyon mine, located within the

Blind Canyon seam, was idled by UtahAmerican Energy in August of 2006 after producing 759,000 short tons of coal. Operations were then shifted back to the Hiawatha seam of the Crandall Canyon mine where production totaled 613,000 tons in 2006. Production continued in Crandall until August of 2007 when a major roof collapse closured the mine. Total production in 2007, before the mine closed, was 400,000 tons. GENWAL has stated that the South Crandall Canyon mine was undamaged by the events of August 2007.

WEST RIDGE Resources, Inc. – West Ridge Mine

The West Ridge mine began operation in 1999 in the Book Cliffs coal field with production from the lower Sunnyside seam. The mine is operated by WEST RIDGE Resources while mine assets are co-owned equally by IPA and UtahAmerican Energy.

The West Ridge mine produced a record-high 4.2 million short tons of coal in 2007, up from 3.1 million tons produced in 2006. Production in 2008 is expected to remain high, but decrease to 4.0 million short tons. Operations moved to a new sequence of panels in 2006, located northwest of older workings. The company installed the low-profile longwall from the Crandall Canyon mine in October of that year, while West Ridge's old longwall was dismantled. Current mining depths are about 1500 feet with plans to mine to a maximum depth of 2800 feet. Out-of-seam dilution problems at West Ridge have caused ash content of the coal produced to average around 13%, while sulfur content is also high for Utah, averaging 1%. The West Ridge mine currently has approximately 30 million tons of reserves under lease.

Canyon Fuel Company – Arch Coal

Dugout Canyon Mine

Dugout Canyon produced 3.8 million short tons of coal from the Gilson seam in 2007, 12.0% less than the 4.3 million tons produced in 2006, and 16.9% less than peak production achieved in 2005. Dugout expects to produce 4.1 million short tons in 2008. Production in the Rock Canyon seam ended in February of 2004, after which the longwall was moved to the stratigraphically lower Gilson seam. Parts of three longwall panels containing nearly 2.0 million tons of reserves were abandoned in the Rock Canyon seam because of "bounce" problems and inseam rock partings. These reserves will be retrieved at a later date.

As with all of the deep Utah mines, great care is being taken to address "bounce" problems and provide safe working conditions, such as the use of barrier pillars between longwall panels. Dugout has also shortened some of its longwalls panels due to depths in excess of 3000 feet, bypassing over 4 million tons of coal. Plans for the mine include longwall production continuing until 2015, followed by a couple years of retreat mining. Dugout's recoverable reserves are estimated at 30 million short tons; there are other limited reserves at the idled Soldier Canyon mine.

The opening of Arch Coal's Castle Valley Preparation Plant has given Dugout greater production flexibility and eliminated the need to stockpile or discard its high-ash coal. Company officials report that only 2 to 3% of Dugout's coal needs washing.

Skyline Mine

Canyon Fuel Company's Skyline mine, located in the Wasatch Plateau coal field, was closed in May of 2004 due to substantial water infiltration and the resultant increased cost of operation. Production for 2004 before the mine closed totaled only 551,000 short tons, significantly less than the 3.7 million tons per year average between 1996 and 2003. The closure of the Skyline mine greatly reduced Utah's overall production total for 2004, creating coal shortages that forced some users of Utah coal to look elsewhere to meet their needs.

With the recent rise in coal price, Canyon Fuel decided to reopen the Skyline mine in February 2005. Mining now occurs in the Lower O'Connor 'A' seam on the North lease (Winter Quarters lease) in Carbon County, and no water problems have been encountered like those found with the previously mined Lower O'Connor 'B' seam on leases located farther south in Emery County. Production for 2005 totaled 405,000 short tons from development work in preparation for longwall mining.

Longwall mining began in May of 2006, increasing production for the year to 1.8 million short tons. With a full year of longwall operation in 2007, production increased further to 2.6 million short tons. Canyon Fuel estimates that 10 million short tons of reserves are located in the North lease area south of the Winter Quarters graben, and an additional 13 million tons of coal may be recoverable north of the graben. Several exploratory wells have shown that the area north of the graben has several faults and dikes cutting a coal seam with a thickness of 7 to 10 feet, thinner than the current longwall can effectively cut. Also, 550-foot rock slopes will need to be cut at a 10% slope to access the north part of the lease. A decision on whether to pursue those reserves could be made this year.

Reserves within the Lower O'Conner 'B' seam, some still under lease, but the majority unleased federal coal, are estimated at 20 million short tons. Water infiltration problems associated with these reserves will have to be resolved before mining can occur.

SUFCO Mine

SUFCO is Utah's largest coal producer and the fifth largest underground coal mine in the United States. It is also the only active coal mine located in Sevier County. SUFCO produced 6.7 million short tons in 2007 from the upper Hiawatha seam, 15.1% less than record high production of 7.9 million tons in 2006. SUFCO expects production to increase slightly in 2008 to 6.8 million short tons. Coal must be promptly trucked to distant stockpiles at the Levan loadout or the Hunter power plant due to the limited storage space at the mine site. SUFCO loads roughly 900 trucks per day, five days per week.

Longwall production ended in the Pines federal tract in January 2007. A new longwall mining system was installed in the upper Hiawatha seam in the mostly federal-owned Quitchupah tract in February 2007 (some state coal is also being produced from a School and Institutional Trust Lands Administration [SITLA] tract located north of the Quitchupah lease). The new system is capable of producing 5000 tons of coal per hour from panels up to 1110 feet wide. The company estimates that roughly 59 million tons of reserves

remain in the upper and lower Hiawatha seam in this area.

Canyon Fuel has nominated for leasing the federal Greens Hollow tract, located adjacent to the Quitchupah lease. A third continuous miner was recently brought online to aid in development of mains to access the area. The Green Hollow tract has approximately 73 million short tons of reserves in the lower Hiawatha seam.

SUFCO has received all the necessary permits to build the "Quitchupah Creek" access road. This road would shorten the coal haulage distance to Emery County power plants by more than 25 miles. A Final Environmental Impact Statement was released in January of 2006, and a Record of Decision by both the BLM and the Forest Service was announced in March of 2006. Both agencies chose "Alternative D", the Water Hollow Road Alignment, which generally follows an existing road in Convulsion Canyon for 2.1 miles where it crosses Quitchupah Creek and then continues for approximately half a mile to the Fishlake National Forest boundary and on to State Route 10. The Forest Service decision was appealed but upheld in court. Company officials have yet to make a final decision on whether or not to build the road.

Cottonwood Tract

On December 31, 2007, SITLA held a sale of its Cottonwood Competitive Coal Leasing Unit. The tract was awarded to Ark Land Company, which is a subsidiary of Arch Coal, Inc., also the owner of the Canyon Fuel Company. Two coal leases were issued, one covering lands within the 1998 land exchange Cottonwood Coal Tract, comprising 8204 acres, and the other which covers certain lands within an adjacent SITLA section, totaling 600 acres. Total coal reserves for the entire lease are estimated to equal 48.5 million short tons. Canyon Fuel officials foresee that mining in this tract will commence as reserves at the Skyline and Dugout Canyon mines are depleted.

CONSOL Energy

Emery Mine

CONSOL Energy is one of the nation's largest coal producers. CONSOL's Emery mine, their only mine in the western United States, produced intermittently during 2003 and shut down in August of that year after producing 243,000 short tons. The mine reopened in August of 2004 and produced 256,000 short tons before year-end. With a full year of production in 2005, the Emery mine produced 1.2 million short tons. Production in 2006 decreased slightly to 1.1 million short tons and decreased slightly again to 1.0 million tons in 2007. Production in 2008 is expected to total 1.2 million short tons.

A new portal was opened in 2001, providing access to the "I" seam, which is between 20 and 25 feet thick and under just 60 feet of cover at the portal. In other areas of the mine, the "I" seam splits and only one bench can be mined. Typically, three continuous miners are employed during the development phase, and two miners are used during the retreat portion. Product quality averages 12,000 Btu per pound and roughly 1.0% sulfur. The majority of production is from private land supplemented with a smaller amount of federal coal. Reserves under lease are estimated to be roughly 18 million short tons, while some estimates suggest more than 100 million tons are available in the surrounding unleased area. CONSOL is also investigating mining on their Hidden Valley property to the south of the Emery mine; however, any development there would depend on future market conditions.

CONSOL's 2008 first quarterly report noted that the company recently completed a one-year agreement to sell 750,000 tons of coal from the Emery mine. This coal will be blended with coal from another undisclosed producer, and shipped via the Westshore Terminal in Vancouver, British Columbia, to Pacific Rim steel mills. This would be the first significant amount of Utah coal going overseas since 2003.

Also of note, the Emery mine received the company's prestigious Liv Ireland Award, which recognizes safety performance for an underground mine. One highlight of Emery's achievement was that the operation maintained zero accidents for a 14-month period beginning in 2006 and continuing until October 2007.

C.W. Mining Company (Co-op)

Bear Canyon Mines

Coal production at the privately-owned Bear Canyon mines peaked in 2001 at 1.3 million short tons before declining to just 339,000 tons in 2004, primarily due to labor problems. Production steadily increased from 2005, when production totaled 456,000 short tons, to 653,000 tons in 2007. Mining ceased in the Blind Canyon seam of the Bear Canyon #3 mine in the winter of 2006 after producing just 27,000 short tons. The majority of Co-op's 2006 production, 462,000 short tons, and all of its 2007 production, came from the Tank seam in the Bear Canyon #4 mine.

C.W. Mining recently purchased and rehabilitated a used longwall mining machine, which commenced operation within the Tank seam in November of 2007. A full year of longwall production in 2008 should yield roughly 2.0 million short tons, with peak production reaching 2.5 to 3.0 million tons in 2009. The Tank seam in the Bear Canyon #4 mine averages 7 to 8 feet thick with a maximum depth of 1400 feet. Reserves are estimated at 15 million short tons. After longwall mining is completed in the Tank seam, plans are to move the longwall to the stratigraphically lower Blind Canyon seam where remaining reserves are estimated at 9 million short tons. This seam could also be room and pillar mined if longwall mining is unfeasible. Future plans call for mining within the Hiawatha seam, where reserves range from 13 to 26 million short tons, but further exploration is needed. Access to these reserves could be achieved through old workings of the King #6 mine.

Energy West Mining Company (PacifiCorp)

Deer Creek Mine

Coal produced from the Energy West Mining Company's Deer Creek mine moves via conveyer belt to PacifiCorp's Huntington power plant located near the mouth of the mine in Huntington Canyon. In addition, smaller amounts of Deer Creek coal are trucked to PacifiCorp's Hunter power plant, located south of the town of Castle Dale, and to the Carbon power plant located near Helper. Production has declined

from 3.9 million short tons in 2003 to 3.4 million short tons in 2004, as development work began on the new Mill Fork tract, and as the company recovered coal from smaller, isolated longwall panels on older leases. Production increased to 3.9 million short tons in 2005 as longwall equipment began operating in the State-owned Mill Fork tract, but decreased to 3.7 million short tons in 2006 as miners encountered unexpected geologic problems, including a large rock split that necessitated an early longwall move. Similar geologic problems were encountered in 2007, keeping coal production steady at 3.7 million tons. Production for 2008 is expected to increase slightly to 3.8 million tons. To date, blending at the Huntington and Hunter power plants has mitigated the increased ash content that has resulted from the difficult mining conditions in the Mill Fork tract.

The Mill Fork tract contains roughly 42 million short tons of coal in two seams, the upper Blind Canyon and the lower Hiawatha, and mining in the tract should continue for the next 10 to 15 years. The two seams are each 7 to 12 feet thick, separated by 80 to 100 feet of interburden, and are located under 1200 to 2600 feet of cover. Five longwall panels were mined within the Hiawatha seam while development work took place in the stratigraphically higher Blind Canyon seam. In late February 2008, longwall operations moved to the Blind Canyon; mining will resume in the Hiawatha when the Blind Canyon reserves are depleted. Exploration drilling is still being conducted to help delineate the northern extent of the Mill Fork reserves.

Work is completed on new portals in Rilda Canyon, which allow for efficient and safer access/exit to the ever more distant working face. The recent installation of a new fan will also aid in ventilation of the Mill Fork tract. Coal production will continue to exit through existing portals in Deer Creek Canyon.

America West Resources, Inc.

Hidden Splendor Resources, Inc. – Horizon Mine

The Horizon mine, located approximately 11 miles west of Helper, is owned and operated by Hidden Splendor Resources, Inc., a fully owned subsidiary of America West Resources, Inc. Production at the Horizon mine ceased temporarily in February of 2003, with the sale of assets and lease holdings from Lodestar Resources, Inc. to Hidden Splendor Resources, Inc. Operations resumed in August of that year, resulting in total 2003 production of 108,000 short tons, down only slightly from 2002 production of 110,000 tons. A full year of production in 2004 with one continuous miner yielded 293,000 short tons, with similar production of 286,000 tons in 2005. Production decreased in 2006 and 2007 to 257,000 and 233,000 short tons, respectively. A second continuous miner section was brought online in the spring of 2008, which will nearly double Horizon's production to 500,000 tons.

The discovery of an erroneously mapped fault increased available reserves from 5 to 9 million short tons. In addition, an unleased federal tract with another 13 million short tons of coal lies northwest of the mine, but this tract needs further exploration. Current production is primarily in areas north and west of the portal, where the Hiawatha seam ranges from 5.5 to 7 feet thick and is under 1000 to 1600 feet of cover. Coal quality is typical of the Wasatch Plateau and averages 11,700 Btu per pound, 0.6% sulfur, and 5.0% moisture, making Horizon coal attractive for blending with higher sulfur coal.

In the fall of 2007, Hidden Splendor filed for Chapter 11 bankruptcy. The company is committed to keeping the mine operating and hopes to be out of bankruptcy by the summer of 2008. In fact, several capital improvements have been made to the mine including the paving of the access road and the rehabilitation of a second continuous miner. In addition, operators have recently applied for a 900-acre federal lease expansion that will allow them to mine additional reserves to the north and west.

Columbia Property

The Columbia property (formally called the Razor property) is located just south of the town of Sunnyside in the Book Cliffs coal field in Carbon County. The property was developed by the U.S. Steel Corporation who operated the Columbia mine from 1923 to 1966 to supply metallurgical coal to its steel-making operations.

Arizona-based Bronco Land Co. acquired the property in the spring of 2005. However, plans to open a mine never materialized. A deal brokered in the spring of 2007 between Bronco and the Canadian-based Globex Mining Enterprises, Inc. was terminated later that year by Globex. Afterward, Bronco Land Co. foreclosed on its 2005 deal and ownership was reverted back to C&P Coal Resources, the original owners. In July of 2008, America West Resources announced that the company has entered a Coal Mining Lease and Option to Purchase Agreement with C&P Coal Resources for the Columbia property, which covers approximately 5200 acres.

Reserves on the Columbia property are located east of the old workings of the Columbia mine in the merged upper and lower Sunnyside seam, which averages 15.0 feet thick. Depth of cover could be an issue for future mining because overburden ranges from 1500 to 3500 feet. Potential reserves for the entire area could total as much as 100 million short tons, with 35 to 50 million tons located on company-owned land. A future mine could yield as much as 3.0 million short tons of coal per year with heat content ranging between 11,800 and 13,600 Btu per pound.

Alton Coal Development, LLC

Coal Hollow Mine

Alton Coal Development, LLC has proposed opening a new coal mine in the Alton coal field in southern Utah's Kane County. Alton Coal hopes to surface mine 2 million short tons of coal per year from 440 acres of private land and 3200 acres of unleased federal land located about 3 miles south of the town of Alton. The coal would be trucked on U.S. Highway 89 to State Route 20 and then on Interstate 15 to a coal loadout facility west of Cedar City. Currently, the greatest concern about the proposed mine has been from residents in the towns of Panguitch and Hatch regarding the potential number and frequency of double-trailer, coal-hauling trucks running through their towns. The BLM expects a draft EIS for leasing the federal Alton coal tract to be completed by fall 2008.

In June of 2006, the Utah Division of Oil, Gas and Mining (DOGM) began processing Alton Coal Development's application to start mining on private land. In May 2008, DOGM declared the company's permit application was administratively complete and plans to grant the permit by the fall. After the permit is granted, production on private land, where reserves are estimated at 5 million tons, will commence after construction of the mine facilities.

The proposed surface mine would produce subbituminous coal that ranges from 9500 to 10,000 Btu per pound, and averages about 1% sulfur and 9% ash. Reserves within the combined private and federal mining area are estimated between 40 and 45 million short tons.

DISTRIBUTION OF UTAH COAL

The total amount of Utah coal distributed to market is proportional to the amount of Utah coal production. With a decrease in production in 2007, distribution of Utah coal also decreased to 24.5 million short tons, down 1.2% from 2006 (table 8). All of the decrease occurred in the electric utility sector, where distribution fell from 20.8 million short tons in 2006 to 20.3 million tons in 2007. Coal delivered to the industrial sector remained steady at 4.0 million tons, while coal going to residential and commercial customers increased from 14,000 short tons in 2006 to 70,000 tons in 2007. In addition, international exports dramatically increased in 2007 from just 34,000 ton in 2006 to 173,000 tons, including the first reported exports to Pacific Rim countries since 2003.

Parallel with an increase in production projected for 2008, distribution of Utah coal is also expected to rise. Utah coal producers plan to deliver a total of 24.9 million short tons of coal in 2008, a 1.6% increase over 2007, with a record 21.3 million short tons going to electric utilities, 2.7 million tons to industrial users, and 56,000 tons going to residential and commercial customers. International exports are again expected to dramatically increase to 800,000 tons in 2008 as demand surges in China and other Pacific Rim countries.

The following sections provide descriptions of major electric utility and industrial customers that use Utah coal; however, this is not an exhaustive list.

Electric Utility Market

During 2007, 82.8% of Utah coal distribution, 20.3 million short tons, was delivered to the electric utility market in both Utah and other states (table 8). In 2007, coal fueled 85.3% of all electricity generated in Utah, which is substantially more than the U.S. average of 48.6%. This figure has significantly decreased since 2005 when coal accounted for 94.2% of all electric generation in Utah (see appendix table A8). Despite this decrease in coal's overall share of Utah's electric generation portfolio, demand for Utah coal at power plants remains steady as electricity consumption continues to grow.

Out-of-State Electric Utility Market

Electric utility companies outside of Utah received 5.3 million short tons of Utah coal in 2007, significantly less than peak deliveries of 7.7 million tons in 1998 (table 8). Nevada received the majority of that coal, 2.3 million short tons, while 1.1 million tons went to electric utility markets in Tennessee, 678,000 tons went to electric plants in Wisconsin, 450,000 tons went to electric plants in Missouri, and 17,000 tons went to electric plants in Alabama, Texas, and Virginia. The remaining 734,000 short tons went to California cogeneration plants (table 9).

Nevada Plants – Reid Gardner and North Valmy Power Plants: Nevada Power's Reid Gardner power plant, located in southern Nevada and serving the Las Vegas area, consists of four coal-fired steam electric generating units with a combined net capacity of 587 megawatts (MW). Unit 1 came into service in 1965, Unit 2 was added in 1968, Unit 3 in 1976, and Unit 4 was completed in 1983. Each unit has SO_2 scrubbers that operate at modern day removal rates, and Unit 4 contains a baghouse for fly ash capture. The plant purchased 1.5 million tons of Utah coal in 2007, with smaller amounts, 313,000 tons, purchased from Colorado (table 10). Utah coal purchases in 2008 are expected to increase to 1.6 million short tons, with steady amounts of coal expected to be purchased from Colorado. Net power generation in 2007 was 3716 gigawatthours (GWh) running at 75.7% of capacity. Plant availability will increase from 78.0% in 2007 to 94% in 2008, resulting in an expected net generation of 4600 GWh.

Sierra Pacific's North Valmy power plant, located near Battle Mountain in northern Nevada, consists of two coal-fired steam electric generating units with a combined net capacity of 522 MW. Unit 1 came online in 1981, while Unit 2 was added in 1985, and both units contain a baghouse for fly ash removal. In 2007, the plant received 928,000 short tons of Utah coal and about 855,000 tons of coal from Wyoming. Wyoming imports have risen every year since 2003 when only 58,000 tons were purchased. Imports from Wyoming in 2008 are expected to reach 925,000 short tons. Imports of Utah coal are expected to increase slightly to 950,000 short tons in 2008. In 2007, the North Valmy plant generated a net of 3389 GWh with an availability of 78.8%. Availability is expected to increase in 2008 to 90%, increasing net generation to 4106 GWh.

Utah Electric Utility Market

The amount of coal delivered to electric utilities within Utah hit an all-time high in 2007 of 15.0 million short tons, increasing 0.5% over 2006's total of 14.9 million tons (table 8). The downturn in Utah coal production from 2006 to 2007 is predicted to result in a small decrease, 1.8%, in coal delivered to Utah electric plants in 2008, to 14.7 million tons. Demand for coal at Utah power plants is expected to remain between 14.5 and 15.0 million tons per year, as no new coal plants are expected to be built in the foreseeable future.

PacifiCorp – Hunter: PacifiCorp's Hunter power plant began operating in 1978 with Unit 1; Units 2 and 3 began supplying power in 1980 and 1983, respectively. PacifiCorp and Provo City jointly own Hunter Plant Unit 1 with undivided interest of 93.75% and 6.25%, respectively. PacifiCorp, Deseret Generation and Transmission Cooperative, and Utah Associated Municipal Power Systems, with undivided interests of 60.31%, 25.11%, and 14.58%, respectively, own Hunter Plant Unit 2. PacifiCorp wholly owns Hunter Unit 3.

Table 8. *Distribution of Utah coal, 1981–2008.*

Thousand short tons

Year	Production	Distribution of Utah Coal													
		Electric Utilities[1]			Coke Plants			Industrial[2]			Residential & Commercial			Exports[3]	Total
		Outside UT	In UT	Total	Outside UT	In UT	Total	Outside UT	In UT	Total	Outside UT	In UT	Total		
1981	13,808	2,688	4,829	7,517	779	267	1,046	1,645	493	2,138	180	197	377	3,472	14,550
1982	16,912	3,643	6,135	9,778	859	136	995	1,349	728	2,077	233	177	410	2,177	15,437
1983	11,829	3,404	5,220	8,624	0	32	32	1,091	581	1,672	292	191	483	1,346	12,157
1984	12,259	3,730	4,688	8,418	0	163	163	1,542	466	2,008	311	257	568	849	12,006
1985	12,831	3,746	7,192	10,938	0	39	39	1,866	352	2,218	312	252	564	625	14,384
1986	14,269	2,989	6,955	9,944	0	485	485	1,745	271	2,016	81	191	272	551	13,268
1987	16,521	3,182	10,772	13,954	0	131	131	1,813	249	2,062	83	204	287	555	16,989
1988	18,164	2,797	11,233	14,030	0	171	171	1,996	679	2,675	88	236	324	1,044	18,244
1989	20,517	2,623	11,563	14,186	0	355	355	2,401	765	3,166	84	323	407	2,175	20,289
1990	22,012	3,373	12,604	15,977	0	617	617	2,327	612	2,939	59	380	439	1,708	21,680
1991	21,875	3,608	12,162	15,770	0	615	615	2,158	622	2,780	76	320	396	2,112	21,673
1992	21,015	4,000	11,619	15,619	0	553	553	2,006	488	2,494	81	347	428	2,245	21,339
1993	21,723	3,914	11,842	15,756	0	510	510	2,146	594	2,740	134	228	362	2,567	21,935
1994	24,422	4,841	12,344	17,185	0	109	109	2,322	643	2,965	308	157	465	2,717	23,441
1995	25,051	6,570	11,771	18,341	0	0	0	2,399	642	3,041	68	182	250	3,811	25,443
1996	27,071	7,258	11,923	19,181	0	0	0	2,339	517	2,856	51	260	311	5,468	27,816
1997	26,428	5,638	13,271	18,909	0	0	0	2,164	665	2,829	60	96	156	3,513	25,407
1998	26,600	7,704	12,812	20,516	0	0	0	2,749	680	3,429	82	212	294	2,735	26,974
1999	26,491	6,910	13,162	20,072	0	0	0	2,529	830	3,359	75	107	182	2,567	26,180
2000	26,920	6,639	14,276	20,915	0	5	5	2,892	634	3,526	141	82	223	2,960	27,629
2001	27,024	7,419	12,480	19,899	0	0	0	3,055	792	3,847	254	394	648	2,404	26,798
2002	25,299	5,562	13,009	18,571	0	0	0	3,543	735	4,278	282	372	654	875	24,378
2003	23,069	6,789	13,121	19,910	0	0	0	2,729	760	3,489	28	50	78	222	23,699
2004	21,818	5,798	12,947	18,745	0	0	0	2,905	587	3,492	128	152	280	295	22,812
2005	24,556	5,934	14,428	20,362	0	0	0	3,328	785	4,113	9	44	53	212	24,740
2006	26,131	5,888	14,928	20,816	0	0	0	3,099	878	3,977	2	11	14	34	24,841
2007	24,288	5,318	14,998	20,316	0	0	0	3,200	773	3,973	3	67	70	173	24,532
2008*	25,380	6,598	14,726	21,324	0	0	0	1,929	813	2,742	3	53	56	800	24,922

Source: UGS coal company questionnaires

[1]Includes cogeneration facilities

[2]A large portion of out-of-state industrial deliveries are most likely going to cogeneration plants, which are only required to use 5.0% of their power for industrial use; the remainder typically goes into the consumer power grid.

[3]Exports from 1981 to 2003 went overseas to the Pacific Rim; from 2004 to 2006 exports went to Canada; in 2007 exports went to Mexico and Korea; in 2008 exports are expected to go to the Pacific Rim.

*Forecast

Table 9. *Distribution of Utah coal by state, 2007.*

Thousand short tons

Destination	Residential	Commercial	Industrial	Electric Utility[1]	Total
Alabama	--	--	--	1	1
Arizona	--	--	215	--	215
California	--	--	1,947	734	2,681
Colorado	--	*	*	--	*
Idaho	--	3	112	--	115
Kansas	--	*	--	--	*
Michigan	--	--	10	--	10
Missouri	--	--	--	450	450
Nevada	--	--	280	2,330	2,610
Oregon	--	--	87	--	87
Tennessee	--	--	356	1,109	1,465
Texas	--	--	--	10	10
Utah	**1**	**66**	**773**	**14,998**	**15,838**
Virginia	--	--	--	6	6
Wisconsin	--	--	193	678	871
Exports - Mexico & Korea	--	--	173	--	173
Total - U.S.	1	69	3,973	20,316	24,359
Total - U.S. and Exports	1	69	4,146	20,316	24,532

Source: UGS coal company questionnaires

[1]Includes cogeneration facilities

*Amounts less than 500 tons

Table 10. *Utah and non-Utah coal purchases by select companies, 2003–2008.*

Thousand short tons

Company	Plant Location	Coal purchased in **2003** from:				Coal purchased in **2004** from:				Coal purchased in **2005** from:		
		UT	WY	CO	Other[1]	UT	WY	CO	Other[1]	UT	WY	CO
PacifiCorp - Carbon	UT	657	--	--	--	567	--	--	--	677	--	--
PacifiCorp - Hunter	UT	3,839	--	--	--	4,150	--	--	--	4,967	--	--
PacifiCorp - Huntington	UT	2,891	--	--	--	3,326	--	--	--	3,035	--	--
DG&T - Bonanza	UT	--	--	2,036	--	--	--	2,553	--	--	--	2,142
IPP	UT	5,304	--	--	--	5,270	468	--	--	5,457	634	--
Ash Grove Cement	UT	124	--	--	--	123	--	--	--	123	--	--
Graymont	UT	150	--	--	--	166	--	--	--	156	--	--
Holcim	UT	70	--	--	--	79	7	--	--	84	0.5	--
Kennecott Utah Copper	UT	400	--	--	--	207	175	--	3	398	--	--
Utelite Corp.	UT	16	0.2	--	--	12	3	--	--	25	9	--
ACE Cogen. Plant[2]	CA	222				300				351		
Mt. Poso Cogen.[2]	CA	150				114				156		
Rio Bravo Jasmin Cogen.[2]	CA	66				41				33		
Rio Bravo Poso Cogen.[2]	CA	66				49				49		
Stockton Cogen.	CA	121	--	--	9	135	--	15	6	141	--	22
North Valmy Power Plant	NV	1,220	58	--	--	1,356	487	--	--	1,611	527	10
Reid Gardner Power Plant	NV	1,756	--	48	--	1,721	--	187	--	1,490	--	330

Company	Plant Location	Coal purchased in **2006** from:			Coal purchased in **2007** from:			Coal purchased in **2008*** from:		
		UT	WY	CO	UT	WY	CO	UT	WY	CO
PacifiCorp - Carbon	UT	637	--	--	625	--	--	572	--	--
PacifiCorp - Hunter	UT	5,186	--	--	4,613	--	--	4,854	--	--
PacifiCorp - Huntington	UT	2,485	--	--	3,344	--	--	3,130	--	--
DG&T - Bonanza	UT	--	--	1,723	86	--	1,428	--	--	2,139
IPP	UT	6,074	167	--	6,331	--	--	6,000		
Ash Grove Cement	UT	127	--	--	102	--	--	128	--	--
Graymont	UT	184	--	--	183	--	--	180	--	--
Holcim	UT	59	31	--	37	56	1	23	70	--
Kennecott Utah Copper	UT	495	--	--	441	--	--	475	--	--
Utelite Corp.	UT	13	8	--	10	11	--	11	11	--
ACE Cogen. Plant[2]	CA	397			291			391		
Mt. Poso Cogen.[2]	CA	126			136			182		
Rio Bravo Jasmin Cogen.[2]	CA	60			60			68		
Rio Bravo Poso Cogen.[2]	CA	59			69			68		
Stockton Cogen.	CA	127	--	--	150	--	--	190	--	--
North Valmy Power Plant	NV	1,119	645	--	928	855	--	950	925	--
Reid Gardner Power Plant	NV	1,510	--	356	1,458	--	313	1,630	--	320

Source: UGS coal company questionnaires

Note: This table only includes a sampling of companies that use Utah coal. This is not an exhaustive list.

[1]Includes coal from Canada, Montana, Oklahoma, and Pennsylvania

[2]Reports coal purchased only in Utah

*Forecast

The three coal-fired steam electric generating units at the Hunter power plant have a combined total gross capacity of 1472 MW with a net capacity of 1320 MW. Units 1 and 2 are tangentially fired, dry bottom units, and Unit 3 is a wall-fired, dry bottom unit. Roughly 18,000 barrels of fuel oil per year are used during cold startups, to maintain boiler flame stabilization, and to operate a 200 million Btu per hour auxiliary boiler. Hunter uses electrostatic precipitators and SO_2 scrubbers to reduce pollution from Units 1 and 2, while a baghouse and SO_2 scrubber are used for pollution control on Unit 3.

The Hunter power plant purchased 4.6 million short tons of Utah coal in 2007, down from 5.2 million tons in 2006, relying mostly on coal from Canyon Fuel mines (table 10). Net power generation decreased to 9700 GWh in 2007 over 2006's total of 9886 GWh. Hunter expects to receive only 4.9 million short tons of Utah coal in 2008 and estimates that net power generation will increase to about 9800 GWh.

PacifiCorp – Huntington: Completed in 1977, PacifiCorp's Huntington plant was built in Huntington Canyon, adjacent to the company's Deer Creek mine. Huntington's two coal-fired steam electric generating units, both tangentially fired with dry bottoms, have a combined gross capacity of 960 MW with a net capacity of 895 MW. The plant uses roughly 13,000 barrels of fuel oil per year for cold startups and for boiler flame stabilization. The Huntington plant uses an electrostatic precipitator and SO_2 scrubber to reduce pollution from Unit 1 and low-NOx burners, a separated overfire air system, a SO_2 scrubber, and pulse jet fabric filters for Unit 2. In 2007, Huntington generated a net of 7128 GWh, up significantly from 6131 GWh produced in 2006. Power generation is expected to remain steady in 2008.

Huntington's coal purchases increased to 3.3 million short tons in 2007 from 2.5 million tons the year before (table 10). The Deer Creek mine continues to supply the majority of coal used at the Huntington plant, with smaller amounts coming from Canyon Fuel mines. Coal delivery in 2008 is expected to decrease slightly to 3.1 million short tons.

PacifiCorp – Carbon: The Carbon power plant, PacifiCorp's oldest and smallest coal-fired power plant in Utah, is a steam electric generating facility consisting of two units. Located at the intersection of U.S. Highways 6 and 191, just north of Helper, Carbon's two units, which came online in 1954 and 1957, respectively, and have a combined gross capacity of 189 MW with a net capacity of 182 MW. Units 1 and 2 are both tangentially fired, dry bottom units. Roughly 2000 barrels of fuel oil per year are used for cold startups and for boiler flame stabilization. Carbon uses an electrostatic precipitator and a cyclonic dust collector to reduce pollution from Unit 1 and an electrostatic precipitator only for Unit 2.

Coal delivered to the Carbon power plant decreased from 637,000 short tons in 2006 to 625,000 tons in 2007 (table 10). The plant generated a net of 1339 GWh in 2007, slightly more than the 1311 GWh generated in 2006. Net generation for 2008 is expected to be near 1205 GWh.

During 2007, the Carbon plant utilized coal from the company-owned Deer Creek mine, as well as from Canyon Fuels mines. Coal purchases are expected to again decrease to 572,000 short tons in 2008, with increasing amounts of coal coming from Canyon Fuel.

Intermountain Power Agency – Intermountain Power Project: IPA and its Intermountain Power Project (IPP), located just north of Delta, were created in 1977 to meet the power needs of Utah and southern California. Power purchasers include 23 Utah municipalities (entitlement share of 14%), six Utah cooperatives (7%), Rocky Mountain Power (PacifiCorp) (4%), and six California municipalities (75%). The Power Sales Contracts for these entities will expire in 2027. The plant is operated and managed by the Los Angeles Department of Water and Power.

In the fall of 2006, the six California municipalities, which purchase at least 75% of IPP's power, decided not to extend their contracts to 2044 as originally planned. Instead they plan to explore more environmentally friendly sources of electricity. IPP has given the municipalities until 2027 to revise this decision, and is currently exploring ways to modernize its facility to bring it into compliance with California's greenhouse gas legislation, including possibly burning biomass and/or sequestering carbon dioxide emissions.

Plans for expanding IPP by adding a third unit would increase generation capacity by another 900 MW. Coal consumption would rise almost 50% with such an expansion, with demand expected to be met by Utah, Wyoming, and Colorado coal. However, California, currently the largest IPP power purchaser, has opted not to participate in the proposed third unit without carbon capture technology, as have several Utah municipalities including Logan and Bountiful. With significant power purchasers unwilling to invest in the current design of the IPP expansion, it appears that Utah coal's long-term demand may depend on technology different than the current pulverized coal boilers.

In late 2007, the Utah Associated Municipal Power Systems (UAMPS) filed a lawsuit against the Los Angeles Department of Water & Power and the Intermountain Power Agency due to their refusal to support construction of the third unit. UAMPS believes that the California utility should not be able to block the construction of a power plant in Utah to satisfy California's environmental laws. In contrast, Rocky Mountain Power has announced that they will not pursue the construction of additional coal-fired power plants for at least the next decade, citing their belief that coming federal regulations would limit or tax carbon dioxide emissions. With 4% participation in the current IPP plants, this lack of support for a third unit will also hurt chances for its construction.

As of April 2004, IPP increased its net capacity rating on its two coal-fired electric steam generating units to 1800 MW, making it the largest power generation facility in Utah. Both units consist of dry-bottom, wall-fired boilers. Roughly 12,000 barrels of fuel oil per year are used for cold startups, shutdowns, and boiler flame stabilization. Both Units 1 and 2 reduce pollution with low-NO_x burners, separated overfire air-port systems, baghouse technology, and SO_2 scrubbers systems.

In 2007, IPP generated 14,417 GWh of power, down only 0.2% from the record setting 14,445 GWh produced in 2006. IPP purchased a total of 6.3 million short tons of coal in 2007, all from Utah mines (table 10). For 2008, IPP is expecting power generation to decrease only slightly to a net of 14,388 GWh, and coal deliveries are projected to total 6.0 million short tons.

Cogeneration Market

Out-of-State Cogeneration Plants

Cogeneration ("cogen") plants in California are major customers of Utah coal. Cogen facilities provide process steam and power for industry, but are primarily devoted to generating electricity for consumer markets, generally providing a maximum allowable 95% of total net capacity to the grid. The increasing stringency of California air quality standards means that conventional stoker power plants, particularly for coal, will eventually give way entirely to cleaner technology. At present, circulating fluidized-bed combustion is the most popular technology for cogen facilities due to its low oxide emissions and its ability to burn a variety of fuels, including high-ash coal.

ACE Cogeneration: Located in Trona, California, ACE Cogeneration, with a capacity of 102 MW, produced a net of 784 GWh of electricity during 2007 using a combination of Utah coal, petroleum coke, and natural gas. In addition to generating electricity, the circulating fluidized-bed power plant supplied process steam to an adjacent chemical company as required by its cogeneration status. Plant availability during 2007 reached 97.8% with net generation totaling 784 GWh, but is expected to decrease to 90% in 2008 with power generation equaling 769 GWh. Deliveries of Utah coal in 2007 totaled 291,000 short tons, down 26.7% compared with 2006, however deliveries are expected to increase in 2008 to 391,000 tons (table 10).

Mt. Poso: Located in Bakersfield, California, Mt. Poso is a 58 MW circulating fluidized-bed cogen plant that provides a minimum 5.0% of its energy generation to steam production for enhanced oil recovery at nearby oil wells. As with other cogeneration plants, the remaining generation capacity is supplied to the consumer grid. In 2007, Mt. Poso generated a net of 390 GWh of electricity, a decrease of 1.0% over 2006. Plant utilization and availability were at 89.0% and 84.0%, respectively. Net generated power is expected to increase in 2008 to 417 GWh. During 2007, Mt. Poso purchased 136,000 short tons of Utah coal, 7.9% more than the 126,000 tons purchased in 2006 (table 10). Utah coal deliveries are expected to increase in 2008 to 182,000 short tons.

Rio Bravo Poso: Rio Bravo Poso, also located in Bakersfield, California, uses circulating fluidized-bed combustion to generate power at a rated net capacity of 35 MW. Like Mt. Poso, this plant distributes at least 5.0% of generated energy to steam-based enhanced recovery at nearby oil wells. Remaining power is sold into the California grid.

Rio Bravo Poso generated a net of 293 GWh in 2007 and purchased 69,000 short tons of Utah coal (table 10). Plant utilization and availability were 95.4% and 98.5%, respectively. Plant availability during 2008 is expected to decrease slightly to 97%, while power generation is expected to remain steady. Utah coal deliveries in 2008 are expected to decrease slightly to 68,000 short tons.

Rio Bravo Jasmin: Rio Bravo Jasmin is another circulating fluidized-bed cogen plant located 7 miles from the nearly identical Rio Bravo Poso plant. Both plants provide roughly the same amount of steam for enhanced oil recovery in the surrounding oil fields. Remaining generation is sold to Southern California Edison.

Plant utilization and availability in 2007 were 95.3% and 92.3%, respectively, producing a net of 283 GWh of electricity. Rio Bravo Jasmin purchased 60,000 short tons of Utah coal in 2006 and 2007, nearly double the 33,000 tons purchased in 2005 (table 10). Net electricity generation for 2008 is expected to increase to 293 GWh, and Utah coal purchases are expected to increase to 68,000 short tons.

Stockton Cogeneration Company: The Stockton Cogeneration facility in Stockton, California, was created to supply process heat for agricultural products. Stockton, with a plant capacity of 63 MW, purchased a total of 150,000 short tons of Utah coal in 2007 and expects to increase that amount to 190,000 tons in 2008 (table 10).

Utah Cogeneration Plant

Sunnyside Cogeneration Plant: The Sunnyside Cogeneration plant, owned and operated by Constellation Energy Company, was built in 1993 in the town of Sunnyside, Utah. The plant was originally designed as a true cogen plant, which would have supplied a minimum of 5.0% of its power to a commercial greenhouse. However, since the plant burns waste coal, it is designated as a "qualifying facility," which under the Federal Public Utility Regulatory Policy Act is exempt from the cogeneration requirement, and the proposed commercial greenhouse was never developed. Subsequently, all of Sunnyside's power goes directly to the grid.

The Sunnyside plant, rated at a net of 51 MW, uses circulating fluidized-bed combustion technology to burn waste coal left from the closed Sunnyside coal wash operation as well as waste coal from the also-closed Star Point wash plant. The heating value of the Sunnyside fuel varies from 4000 to 5500 Btu per pound, which is less than half the Btu value for most Utah coal. The sulfur content of the fuel averages about 1.5%. The Star Point waste coal is of higher quality than that from Sunnyside, averaging 5700 to 6000 Btu per pound with 0.7% sulfur. Total reserves from both sources will be enough to last through 2023 when Sunnyside's power purchase agreement with Rocky Mountain Power expires.

The Sunnyside plant consumed about 418,000 short tons of waste coal during 2007. Sunnyside also purchased a combined 45,000 tons of poor-quality coal from the West Ridge mine, the Wellington Cleaning Facility, and the Savage Coal Terminal. Net power generation in 2007 totaled 404 GWh, down from the 419 GWh generated in 2006. This figure is expected to increase to 447 GWh in 2008 based on the consumption of 446,000 short tons of waste coal.

In contrast to conventional coal combustion, where high-ash content hampers performance, the use of circulating fluidized-bed combustion at the Sunnyside plant requires the addition of noncombustible material. The plant consumes about 33,000 tons of pulverized limestone per year, most of which is purchased from the Graymont lime plant in the Cricket Mountains, in order to achieve proper combustion and eliminate sulfur emissions. Bag house technology is used to remove fly ash.

Industrial Market

Out-of-State Industrial Market

Deliveries of Utah coal to industrial plants in other states

reached a record 3.5 million short tons in 2002 (table 8). In 2007, deliveries increased by 3.3% over the previous year to 3.2 million short tons. Deliveries for 2008 are expected to substantially decrease to 1.9 million short tons as more coal is diverted to electric utilities.

California is the largest industrial consumer of Utah coal, with deliveries of 1.9 million short tons in 2007, about the same as in 2006 (table 9). Other states receiving significant amounts of Utah coal for industrial use were Arizona, Idaho, Nevada, Oregon, Tennessee, and Wisconsin. In addition, 173,000 tons were delivered to both Mexican and Korean industrial markets, signaling a possible upswing in foreign exports.

It is important to note that a large portion of out-of-state industrial deliveries could be going to cogeneration plants. These plants are only required to use 5.0% of their power generation for industrial use, with the remainder typically sold to the power grid.

Utah Industrial Market

The amount of coal delivered to industrial users within the state of Utah had steadily decreased in previous years from 792,000 short tons in 2001 to only 590,000 tons in 2004 (table 8). Deliveries in 2005 increased dramatically by 33.7% to 785,000 tons, and increased another 11.8% in 2006 to reach a new record of 878,000 tons. In 2007, demand decreased by 12.0% to 773,000 tons, but is predicted to increase by 5.3% in 2008 to 813,000 tons. Similar to the previous few years, only minor amounts of out-of-state coal was purchased by industrial users in Utah in 2007, and the same is expected in 2008 (table 10).

Ash Grove Cement: Ash Grove Cement uses a 25 MW conventional boiler to produce steam and electricity for Portland cement production at its remote site about 25 miles west of Nephi. During 2007, this plant purchased 102,000 short tons of Utah coal, slightly less that the 127,000 tons purchased in 2006 (table 10). Utah coal purchases for 2008 are expected to total 128,000 short tons.

Graymont: Graymont Western U.S., Inc., is an affiliate of Graymont Dolime of Genoa, Ohio, one of the largest producers of limestone products in the United States. The Utah operation is located about 40 miles south of Delta, where limestone from the nearby Cricket Mountains is used to produce calcium oxide, “quicklime,” and magnesium oxide in rotary kilns. Graymont purchased 183,000 short tons of Utah coal in 2007 and expects to purchase about 180,000 in 2008 (table 10).

Holcim, Inc.: Holcim is one of the world's leading suppliers of cement, sand and gravel, and construction-related services. The company’s Devil’s Slide plant, located in Morgan County, produces Portland cement and washed aggregates. During 2007, this plant purchased 37,000 short tons of Utah coal, 57,000 tons of coal from Wyoming, and a minor amount from Colorado (table 10). In 2008, Holcim plans to purchase only 23,000 short tons of Utah coal and 70,000 short tons of Wyoming coal. Holcim hopes to reduce its future overall coal consumption by increasing the use of alternative fuels.

Kennecott Utah Copper: Kennecott Utah Copper uses coal to produce electricity for copper refining at its Salt Lake County facility. The Kennecott steam boiler is fed by a conventional stoker and is rated at 172 MW. In 2007, Kennecott produced a net of 889 GWh of electricity, up substantially from the 803 GWh generated in 2006, based on a plant availability of 95%. Generation is expected to decrease in 2008 to 865 GWh. During 2007, Kennecott purchased 441,000 short tons of Utah coal (table 10). In 2008, coal purchases will increase to 475,000 short tons.

Utelite Corporation: The Utelite Corporation, located near the town of Coalville, produces expanded lightweight shale aggregates used in applications ranging from structural concrete to geotechnical fill. The raw shale is quarried, crushed, and fed into a rotary kiln where it is heated to 2000 degrees Fahrenheit, using coal as the fuel source. At this temperature the shale is red hot and somewhat plastic. Internal gases escaping the shale expand or "bloat" the particles, creating a myriad of small non-interconnecting internal voids. These voids are retained after the material cools and solidifies. The extreme firing temperature also vitrifies the shale, creating a hard ceramic shell. These attributes account for the material’s light weight, high strength, and acoustic, insulative, and fire resistant qualities. Utelite purchased 21,000 short tons of coal in 2007, 10,000 tons from Utah and 11,000 tons from Wyoming (table 10). Plans for 2008 call for deliveries of 11,000 short tons of coal from both Utah and Wyoming.

Utah Coking Coal Market

The coking coal market was once a major Utah industry in support of steel-making and other industrial processes. During the early 1980s, an annual average of 1.0 million short tons of Utah coking coal were delivered to companies, the majority of which was shipped out-of-state (table 8). By 1983, Utah stopped delivering coking coal to out-of-state customers, while deliveries ceased altogether in 1994, except for a one-time delivery of 5000 tons in 2000. Utah stopped importing coking coal in 2001 when the Geneva Steel plant ceased operation (see appendix table A4).

Residential and Commercial Markets

About 70,000 short tons of Utah coal was shipped to businesses and residences during 2007, with 67,000 tons going to Utah customers and 3000 tons going to customers out-of-state (table 8). This is substantially less than the 654,000 short tons delivered in 2002 and 648,000 tons delivered in 2001. The recent large swings in total residential and commercial coal deliveries are partly due to changing reporting methods and purchases by commercial coal brokers. Commercial brokers buy and sell substantial amounts of coal each year, with most of their volumes going to utilities for power generation. These transactions may be logged as commercial deliveries, but are probably not going to homes or businesses.

There is little market evidence of coal use by businesses and residences in Utah. Approximately 20 wholesale and retail outlets for coal have been identified in the state, but these sources have dwindled in number, and few proprietors report useful customer information, except to say that a few customers, mostly in rural areas, continue to use coal as a backup fuel or for decorative fireplaces. In addition, a few tons of Pennsylvania anthracite coal is distributed in Utah

and nearby states as "boutique" fuel. Due to the expansion of natural gas networks, there are only a few remote locations in Utah where coal still competes favorably with propane, electricity, or renewable sources of energy for residential and commercial applications.

Exports

Demand for Utah coal by foreign countries peaked in the early 1980s and again in the mid-1990s, reaching a record 5.5 million short tons in 1996, matching peaks in both production and total distribution (table 8). Through 2003, as deliveries dwindled to 222,000 short tons, all exported coal went to Asian markets. In 2004, 295,000 short tons of Utah coal went to Canadian markets, followed by 212,000 tons in 2005 and only 34,000 tons in 2006. Exports increased substantially in 2007 as companies reported that a total of 173,000 tons of Utah coal went to Mexico and Korea. In addition, the latest 2008 quarterly report filed by CONSOL Energy indicated that the company recently completed a one-year agreement to sell 750,000 tons of coal from the Emery mine. This coal will be blended with coal from another undisclosed producer, and shipped via the Westshore Terminal in Vancouver, British Columbia, to Pacific Rim steel mills. This would be the first significant amount of Utah coal going overseas since 2003.

EIA's Quarterly Coal Report for the 4th quarter of 2007 (published March 2008) indicates that the global coal markets are tight mainly because Australia, the world's largest exporter, has experienced port infrastructure failures and production problems. At the same time, the demand for steam coal to fuel new power plants and industrial plants has continued to grow in China, India, and other parts of Asia. In addition, China, which has historically provided Asia with a significant amount of coal, became a net importer of coal for the first time in early 2007. These factors, and the relative weakness of the U.S. dollar, have created an increase in demand for U.S. coal. This demand is reflected in surging spot prices for Appalachian and Interior coal, ranging to $100 and $52 per short ton, respectively, nearly double the prices seen as recently as 2005. Meanwhile, with the closure of the Port of Los Angeles coal terminal, the capability for the western United States to export coal has significantly declined. However, with demand surging and prices rising, it may become economic to export western coal through ports in Canada or even the eastern United States.

DTE Utah Synfuels, LLC

DTE Energy Services was owner and operator of a synthetic fuel production facility called DTE Utah Synfuels, located near Price. This was the only synfuel plant west of the Mississippi River. The synthetic fuel process begins by combining crushed coal with a chemical reagent. This mixture then undergoes a shaping process using heat and pressure to form an enhanced coal product. The end product was used by customers in electric generating plants and industrial facilities in Utah and other states. Tax credits associated with synthetic fuel production expired at the end of 2007, and the DTE facility shut down.

DTE Utah processed 2.1 million short tons, the maximum allowed by the tax credit, of synthetic fuel in 2007, up from the 1.1 million tons processed in 2006, with a crew of 24 individuals, including hourly and management personnel. DTE Utah utilized coal from several Utah mines including Bear Canyon, Horizon, West Ridge, and Dugout. In total, DTE has processed about 11 million short tons of coal over the life of the plant.

Headwaters Energy Services – Wellington Cleaning Facility

Headwaters Energy Services started operation of the Wellington Cleaning Facility in 2006. The facility is located just south of the Savage loadout. The new coal cleaning facility uses a custom waterless system for removing ash along with its associated sulfur and mercury. Headwaters contracts with local end users and brokers to clean high-ash coal, but also buys "waste" coal, which it then cleans and resells. At full capacity, the plant is designed to process more than 750,000 short tons of coal per year and employ up to 12 individuals. The plant processed 96,000 short tons of coal in 2007, down from the 119,000 tons processed in 2006.

Canyon Fuel Company – Castle Valley Coal Preparation Plant

During 2006, Canyon Fuel Company, LLC, a subsidiary of Arch Western Bituminous Group, LLC, constructed a new coal preparation plant at the Savage Coal Terminal in Wellington, Utah. The new plant uses the same structure that once housed the old ARCO Coal plant.

The plant utilizes a heavy media process and has a cleaning capacity of 2 million short tons per year. Canyon Fuel will use the plant to optimize coal quality specifications. The plant will enable Canyon Fuel, through its sales agent Arch Coal Sales Company, to offer a premium product with a more consistent ash and heat content than coals that are not washed. In 2006, the plant processed 152,000 tons of coal, mostly from the Dugout Canyon mine, with minor amounts from the Skyline mine. The plant processed 568,000 tons in 2007, again from both Dugout and Skyline.

COAL IMPORTED INTO UTAH

Coal imports into Utah have steadily declined since peaking in 2004 at 3.2 million short tons (table 11). Imports in 2007 totaled only 1.5 million tons, the lowest level since 1987. The vast majority of imported coal goes to the Bonanza power plant in eastern Utah, which primarily uses Colorado coal from a company-owned mine. However, when coal production decreases in Utah, like it did in 2004, industrial companies and other power plants look to Wyoming and Colorado to meet their coal needs. With an increase in coal purchases planned at the Bonanza plant, coal imports in 2008 are expected to total 2.2 million tons.

Electric Utilities

Deseret Generation and Transmission Co.–Bonanza Plant

Deseret Generation and Transmission Co. (DG&T) is a cooperative of Utah and Colorado municipalities that jointly

Table 11. *Utah coal imports, 1981–2008.*

Thousand short tons

Year	Electric Utilities	Coke Plants	Industrial	Res./ Com.	Total
1981	8	1,030	98	0	1,136
1982	18	695	84	0	797
1983	0	854	83	0	937
1984	224	1,229	85	1	1,539
1985	193	1,289	98	0	1,580
1986	659	383	103	0	1,145
1987	905	160	100	0	1,165
1988	1,300	1,088	60	0	2,448
1989	1,400	922	45	0	2,367
1990	1,449	679	7	2	2,137
1991	1,310	695	2	0	2,007
1992	1,517	629	9	0	2,155
1993	1,501	579	20	0	2,100
1994	1,495	1,089	4	0	2,588
1995	779	1,062	0	0	1,841
1996	805	1,120	0	0	1,925
1997	1,509	1,106	0	0	2,615
1998	1,733	982	0	0	2,715
1999	1,431	728	0	0	2,159
2000	1,531	936	0	0	2,467
2001	2,028	648	0	0	2,676
2002	2,074	0	16	0	2,090
2003	2,036	0	0	0	2,036
2004	3,021	0	185	0	3,206
2005	2,776	0	10	0	2,786
2006	1,890	0	38	0	1,928
2007	1,428	0	68	0	1,496
2008*	2,139	0	81	0	2,220

Source: UGS coal company questionnaires

*Forecast

own and operate a 458 MW coal-fired power plant located near Bonanza, Utah, a remote area of Uintah County near the Utah-Colorado border. During 2007, the Bonanza power plant purchased 1.4 million short tons of coal from the Deserado mine in Colorado, operated by Blue Mountain Energy, a wholly owned subsidiary of DG&T (table 10). The plant also purchased 86,000 tons of Utah coal in 2007 to augment production loses at the Deserado mine due to a gob fire. The power plant burned 1.9 million short tons of coal to generate a net of 3451 GWh of electricity in 2007.

Power plant availability reached 89% in 2007, with plant utilization at 86%. Both figures are expected to increase to 90% in 2008, with total net generation of 3703 GWh. Bonanza plans to purchase 2.1 million short tons of coal in 2008, all from Blue Mountain Energy, with no plans to buy Utah coal.

DG&T was granted a permit from the EPA in late 2007 for a new 86 MW circulating fluidized-bed combustion unit at the Bonanza plant (since the plant is on tribal land, it is under federal, not state, jurisdiction). This new unit would burn waste coal from the Deserado mine. The Bonanza permit is the first issued since the U.S. Supreme Court ruled in April 2007 that the EPA has the authority under the federal Clean Air Act to regulate greenhouse gases that might contribute to global warming. In the permit, the EPA denied it had to consider the impact of carbon dioxide and other greenhouse gas emissions in setting the permit's pollution control requirements. As a result, several environmental groups have appealed the decision, arguing the new permit must address greenhouse gas emissions.

Intermountain Power Agency – Intermountain Power Project

IPP has recently imported significant amounts of coal from Wyoming: 468,000 tons in 2004, 634,000 tons in 2005, and 167,000 tons in 2006 (table 10). Volatile prices, quality issues, and short supplies of Utah coal in the last few years have necessitated IPP's need to look to other states to meet demand. The company purchased no Wyoming coal in 2007 and has no plans to purchase out-of-state coal in the future.

Industrial Plants

Holcim's Devil's Slide cement plant imported 56,000 short tons of coal from Wyoming and 1000 tons from Colorado in 2007, 60.6% of their total purchases for the year (table 10). The company plans to purchase even more,

70,000 tons from Wyoming in 2008. Holcim cites coal quality issues as the main reason for purchasing out-of-state coal. Utelite, Inc., also purchased 11,000 short tons of Wyoming coal in 2007, with plans to purchase similar amounts in 2008. Kennecott Utah Copper imported 175,000 short tons of coal from Wyoming and 2500 tons from Montana in 2004, but has not purchased any out-of-state coal since, and has no plans to do so in the future.

Minor Coal Imports

Small amounts of coal for specialized purposes are imported into Utah from other states. Anthracite coal from Pennsylvania is burned in some residential fireplaces, and eastern coke is used by some steel fabricators and foundries. These markets are small and are declining as natural gas replaces coal in nearly all but the most remote areas, and markets for specialized uses in homes and industry are limited and relatively insignificant.

OUTLOOK FOR UTAH'S COAL INDUSTRY

Following a 10-year low in 2004, Utah coal production increased by 12.6% to 24.6 million short tons in 2005 and increased another 6.4% to 26.1 million tons in 2006. However, 2007 brought several unexpected circumstances which hampered mining and caused a drop in production to 24.3 million tons. After the tragedy at Crandall Canyon and the subsequent closure of the mine, coal mine safety concerns also led UtahAmerican Energy to close the deep Aberdeen mine. The lost production from the closed mines is expected to be made up by increased production from new longwall mining in the Bear Canyon mine in 2008. Rising prices, rising demand in foreign countries, and the proposed opening of two new coal mines all suggest a stable future for Utah's coal industry, at least over the next several years.

Utah's long-term (50 years and beyond) coal future is less certain. With the high-quality reserves being depleted in the Book Cliffs and Wasatch Plateau coal fields, coal companies will have to look to other Utah coal fields to meet future demand. The BLM estimates that only 1.2 billion tons of coal reserves are left in the Wasatch Plateau, Book Cliffs, and Emery coal fields, equating to roughly 45 to 50 years of production. In addition, the use of coal as a fuel for electric generation remains uncertain as questions of global warming and carbon mitigation, whether through carbon taxes or caps, receive increased attention.

In 2008, coal-fired power generation is projected to supply more than a third of worldwide electricity generation, roughly 50% of the United State's electricity needs, and about 85% of Utah's electricity generation. Despite this dominance, emission standards remain a major undefined regulatory issue for coal combustion. New legislation and research on clean coal technology, including coal gasification and coal-to-liquid plants, are being vigorously pursued around the world, particularly in the United States. Also, research continues on carbon sequestration, including a DOE-funded test project at Farnham Dome located near the town of Wellington in central Utah. For additional information about current sequestration research, visit the Utah Geological Survey's (UGS) Web site at http://geology.utah.gov/emp/co2sequest/.

Production

EIA's Annual Energy Outlook for 2008 predicts that U.S. coal production will increase by an average of 0.6% each year until 2015, when total production will equal 1215 million short tons. Coal production growth should be even stronger between 2015 and 2030, averaging 1.2% per year, as electricity demand continues to increase. However, the forecasted growth is less than in previous years as more electricity generation is expected to be met by increased renewable and nuclear energy. The forecasted increase in demand also assumes that several coal-to-liquids plants will be built. Cheap, low-sulfur coal from western mines, especially Wyoming's Powder River Basin, is expected to furnish the vast majority of the production increase predicted for the country. Powder River Basin coal production is expected to increase from 436 million short tons in 2007 to roughly 567 million tons in 2030. Interior coal production is also projected to increase from 156 million short tons in 2007 to about 241 million tons in 2030, while Appalachian production is expected to decrease from 384 to about 328 million short tons over the same period (figure 1). EIA predicts that Rocky Mountain coal production, from both Utah and Colorado, will nearly double from a 2007 total of 56 million short tons to roughly 92 million tons in 2030. However, it is the opinion of the UGS that a doubling of Utah coal production is highly unlikely.

Short-term projections from coal companies for Utah production show an increase in 2008 to 25.4 million short tons, and staying roughly the same in 2009 at 25.3 million tons. With the closure of Crandall Canyon and the Aberdeen mines, new longwall production at the Bear Canyon mine, along with smaller increases at Dugout, Skyline, and Horizon, will help keep Utah coal production steady in coming years. Production should remain at the 25 to 27 million short tons per year range for the foreseeable future as proposed mines like Lila Canyon, Coal Hollow, and a mine on the newly-leased Cottonwood tract, replace declining production from current mines.

Prices

EIA projects that the average minemouth coal price in the United States should increase from $26.20 per short ton in 2007 (all prices in nominal dollars) to around $27.63 per short ton by 2015 (figure 2), equating to about an average 0.7% increase each year. This moderate increase is expected for several reasons including improvements in mining productivity and a continuing shift to low-cost coal from Wyoming's Powder River Basin. Between 2015 and 2030, the average U.S. coal price is projected to increase by an average of 2.2% each year to about $38.00 per short ton as the need for baseload generating capacity will keep coal demand at power plants strong. Also, as mining becomes more difficult in many regions of the United States, prices will continue to rise. The average minemouth price of Rocky Mountain (Utah and Colorado) coal was $25.05 per short ton in 2007 and is predicted to steadily increase at an average rate of 2.7% to roughly $48.00 per ton in 2030 (figure 3). In comparison, Powder River Basin coal is predicted to rise from $9.93 per ton to $18.00 at an average rate of 2.5% per year, Appalachian coal from $47.36 to $67.00 at an average

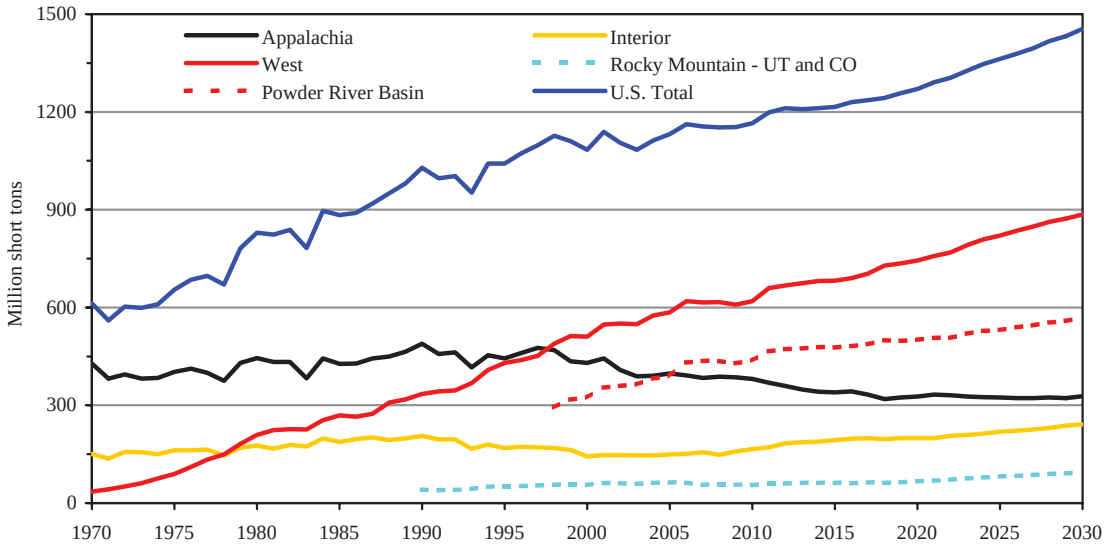

Figure 1. *U.S. coal production by region, 1970–2030.*
Source: U.S. Energy Information Administration, Annual Energy Outlook 2008
Note: Data available in appendix table A1

rate of 1.3% per year, and Interior coal will rise from $26.53 to $49.00 at an average rate of 2.7% per year.

According to responses to UGS questionnaires, the average FOB price for Utah coal decreased from $18.47 per short ton in 2002 to $16.64 in 2003, the lowest price in the past 30 years. Since 2003, prices have increased by 51.3% to an average price of $25.18 per short ton in 2007 (table 2; figure 4). The average price of Utah coal is strongly influenced by long-term contracts; some Utah mines were selling coal in 2007 for only about $21.00 per short ton. Conversely, current spot prices for Utah coal are as high as $44.00 per short ton, which indicates there will be upward pressure on the price for Utah coal in coming years. The average Utah coal price is estimated to increase another 6.7% to $26.87 per short ton in 2008 and could reach $28.00 by 2009. Also, as mining becomes more difficult and ash contents rise, washing some coal might be the only option for operators to meet coal-quality standards set in their contracts. Coal washing has already started at the new Castle Valley Preparation Plant and the Wellington Cleaning Facility. Washing coal adds roughly $2.00 to $4.00 to its delivered price. However, Utah coal will always have to compete with lower-cost Powder River Basin coal, which puts downward pressure on Utah's coal price.

Distribution and Consumption

EIA projects total U.S. domestic consumption of coal will be 1113 million short tons in 2008, of which 1026 million short tons, or 92.2%, will be consumed at electric utility plants. Looking farther ahead, U.S. consumption should increase by an average of 1.9% per year and total 1682 million short tons by 2030, with 1443 million short tons going to electric utilities (figure 5). Similar to production estimates, these forecasted numbers are less than in previous years as modelers predict a slowdown in the building of coal-fired electric plants. EIA also predicts that a total of 157 million short tons will be consumed at new coal-to-liquids plants by 2030.

For 2007 and beyond, distribution of Utah coal is expected to parallel predicted steady rates of production. For example, as production decreased 7.1% in 2007, distribution of Utah coal also decreased by 1.2% to 24.5 million short tons (table 8). As production increases in 2008, Utah's total distribution should also increase slightly to 24.9 million short tons.

Coal demand in Utah has remained fairly steady over the past five years, averaging 17.4 million short tons consumed a year, with an average of 16.5 million tons being burned at electric power plants (figure 6). According to UGS questionnaire responses, coal consumption for power generation totaled a record-high 16.6 million short tons in 2007 and accounted for 94.9% of all coal used in the state. This total is expected to increase slightly to 16.9 million short tons in 2008, with almost all the increase coming from the Bonanza power plant. In the last few years, even with the rising costs of natural gas, Utah has experienced a surge in natural gas-fired power plants with over 1000 megawatts of new capacity coming online. This new capacity has reduced coal's percentage of Utah's total electric generation from 94.2% in 2005 to 85.3% in 2007, with natural gas' portion increasing from 3.1% in 2005 to 12.7% in 2007.

The recent surge in natural gas-fired electric capacity underlines the current negative atmosphere surrounding newly proposed coal-fired power plants. Plans for all proposed coal plants in Utah have been delayed due to lawsuits and permit problems stemming from uncertainties surrounding regulation of greenhouse gases, as well as other air quality issues. In fact, Rocky Mountain Power has announced that they will not build a new coal-fired power plant for at least the next ten years as regulators develop carbon mitigation strategies. Until carbon regulations or mitigation strategies are developed, coal consumption in Utah will remain near current levels.

One possible exception to steady future demand will be if an export market once again develops. The current strong world demand will benefit Utah coal producers in 2008 as exports are expected to total roughly 800,000 tons, the high-

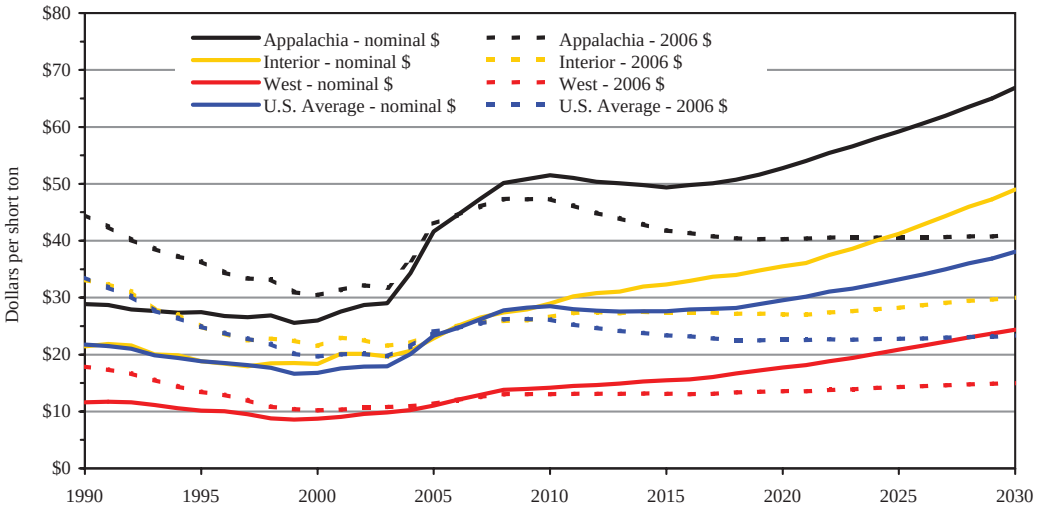

Figure 2. *Average minemouth price of U.S. coal by region, 1990–2030.*
Source: U.S. Energy Information Administration, Annual Energy Outlook 2008
Note: Data available in appendix table A2

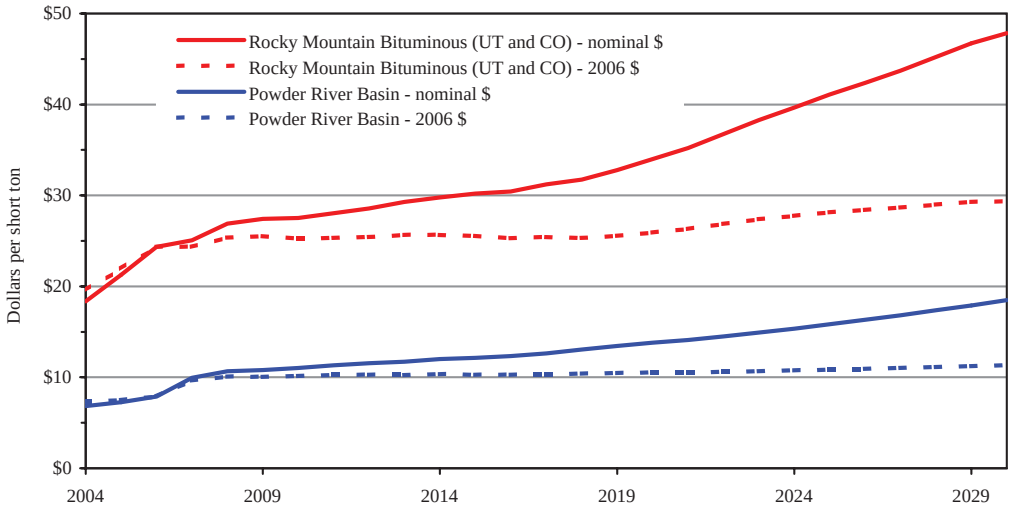

Figure 3. *Average minemouth price of Rocky Mountain and Powder River Basin coal, 2004–2030.*
Source: U.S. Energy Information Administration, Annual Energy Outlook 2008
Note: Data available in appendix table A2

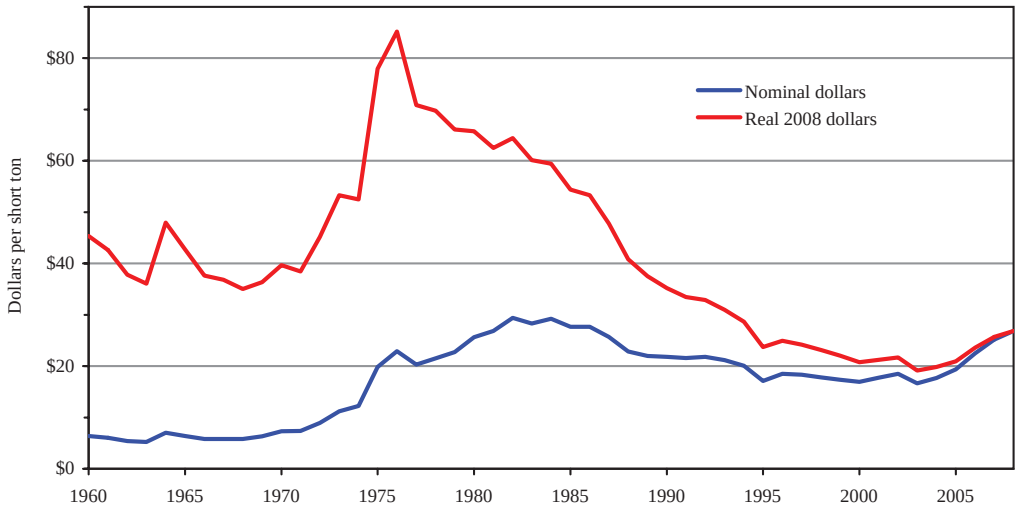

Figure 4. *Average FOB price of Utah coal, 1960–2008.*
Source: UGS coal company questionnaires
Note: 2008 value is estimated, FOB – Free on board, data available in table 2

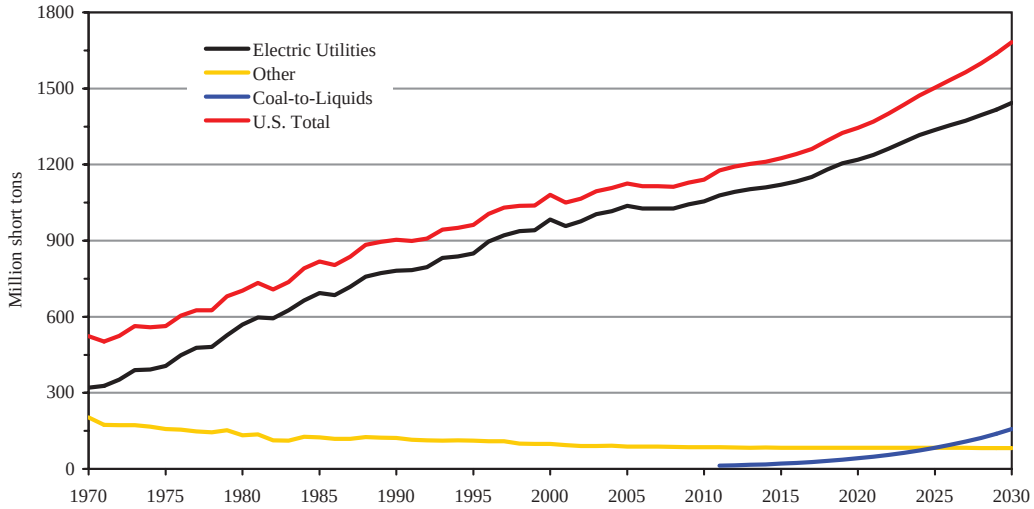

Figure 5. *U.S. coal consumption by sector, 1970–2030.*
Source: U.S. Energy Information Administration, Annual Energy Outlook 2008
Note: Data available in appendix table A3

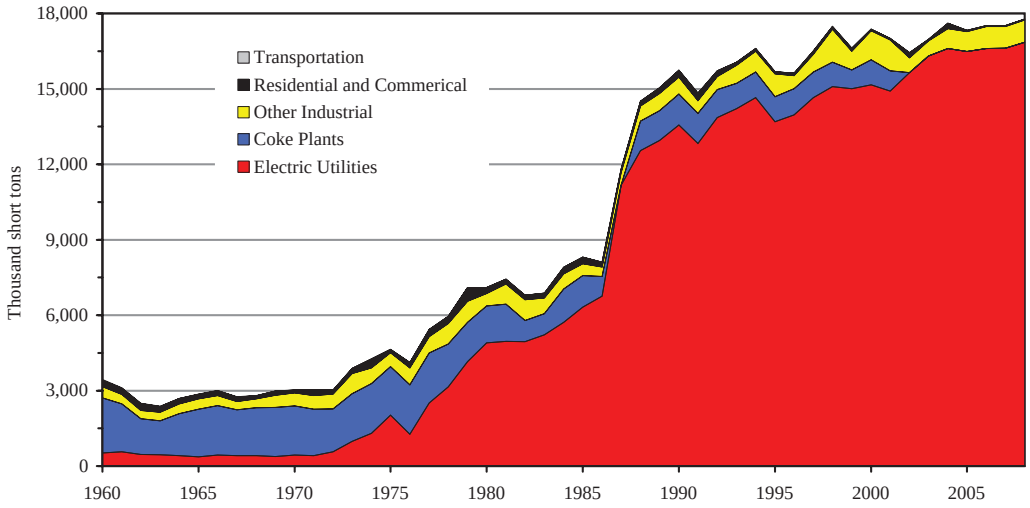

Figure 6. *Consumption of coal in Utah by end use, 1960–2008.*
Source: U.S. Energy Information Administration, 2007 Coal Report, 2006; UGS
Note: 2008 values are estimated, data available in appendix table A4

est level since 2002. However, Utah has a transportation disadvantage to coal export terminals, which will add significantly to the overall cost of Utah exports.

Reserves

The Kaiparowits Plateau coal field is estimated to contain about 9.1 billion short tons, or 60.4%, of Utah's remaining recoverable coal resource, but most of this coal is unavailable for development due to its location within the Grand Staircase–Escalante National Monument (figure 7). Other nonproducing coal fields with good quality resources are far from transportation networks and are therefore less economic to mine. As a result, Utah coal production will continue to rely heavily on resources in the Wasatch Plateau coal field, estimated at 1.3 billion short tons; the Emery coal field, estimated at 0.8 billion short tons; and the Book Cliffs coal field, with resources estimated at 0.7 billion short tons. (Resource numbers are only constrained by geologic conditions, whereas reserve numbers are constrained by both economic and geologic factors).

Most of Utah's mining companies generally have 10 to 15 years worth of coal reserves under lease. However, mines are having a harder time adding new leases to extend their reserve base. Figure 8 demonstrates this fact; subtracting cumulative leases from cumulative production from 1975 to 2007 shows a general negative trend indicating that production is outpacing new leasing. In fact, the Cottonwood (recently leased to Canyon Fuel Company) and North Horn tracts, both located in the central Wasatch Plateau, may represent the last large virgin tracts of good quality, accessible coal that are not already adjacent to an operating mine. Combined reserves in these two tracts could exceed 100 million short tons and provide 20 to 30 years of steady production for two longwall operations. In addition, large reserves exist in

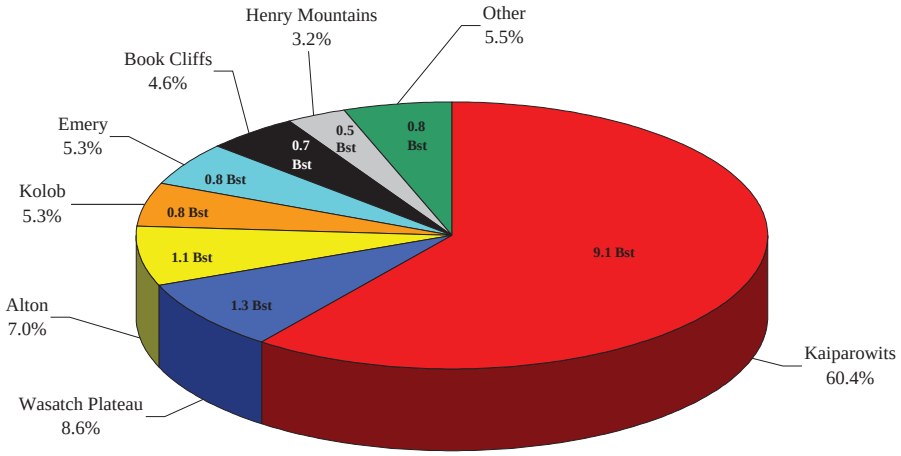

Figure 7. *Remaining estimated recoverable resources in Utah by coal field, 2007.*
Source: Smith and Jahanbani, 1988; Quick and others, 2004; Bon and others, 2006
Note: Bst – Billion short tons, data available in appendix table A5

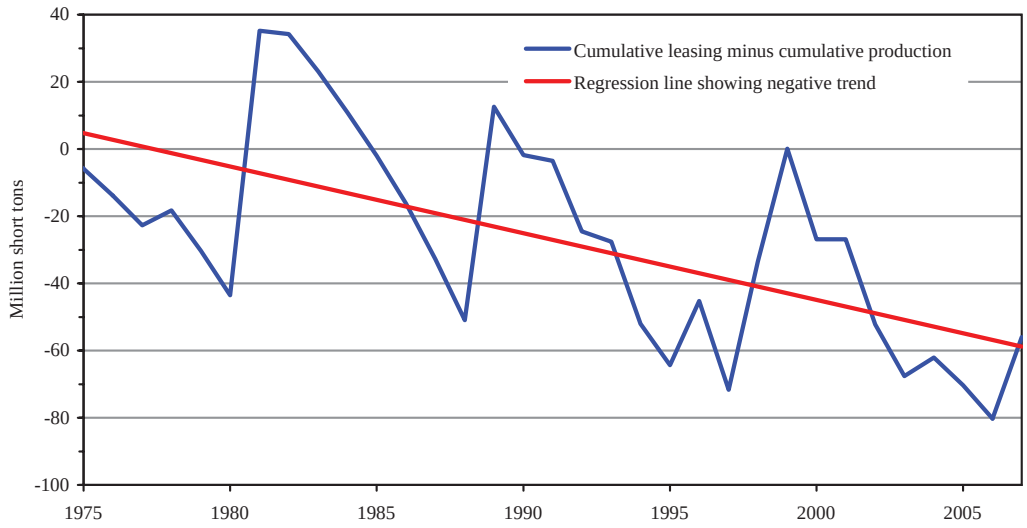

Figure 8. *Net increase/loss of new coal leases in Utah as compared to cumulative production, 1975–2007.*
Source: BLM, SITLA, UGS
Note: The negative trend indicates coal is being produced faster than new tonnage is being leased.

the southern Book Cliffs where UtahAmerican has obtained permits to open the Lila Canyon mine. In total, the UGS estimates that roughly 275 million tons of reserves are available in the Wasatch Plateau coal field, 686 million tons in the Book Cliffs, and 200 million tons in the Emery coal field, for a total of 1.2 billion tons, or roughly 45 to 50 years worth of mining at current production rates (as recorded in Appendix 25 of the BLM Price Field Office Resource Management Plan).

The gradual depletion of central Utah's "easy" coal turns interest toward more difficult and/or lower-quality resources. For example, the Emery mine in the southern portion of the Emery coal field is located near unleased resources that could total more than 100 million short tons, including re-sources in the Hidden Valley area. Also, the newly proposed mine in the Alton coal field could produce up to 2.0 million short tons per year of sub-bituminous coal from a projected reserve base of 40 to 45 million short tons. These resources, and others, may become more attractive if prices keep rising and coal washing becomes more economic.

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GLOSSARY

Anthracite – The highest rank of coal, used primarily for residential and commercial space heating. It is a hard, brittle, and black lustrous coal, containing a high percentage of fixed carbon and a low percentage of volatile matter. The moisture content of fresh-mined anthracite generally is less than 15%. The heat content of anthracite ranges from 11,000 to 14,000 Btu per pound.

Appalachian Region – Consists of Alabama, Eastern Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia.

Ash – Impurities consisting of silica, iron, alumina, and other incombustible matter that are contained in coal. Ash increases the weight of coal, adds to the cost of handling, and can affect the burning characteristics.

Bituminous Coal – A dense coal, usually black, sometimes dark brown, often with well-defined bands of bright and dull material, used primarily as fuel in steam-electric power generation, with substantial quantities also used for heat and power applications in manufacturing and to make coke. Bituminous coal is the most abundant coal in active U.S. mining regions. Its moisture content usually is less than 20%. The heat content of bituminous coal ranges from 10,500 to 15,000 Btu per pound.

Bounce – A sudden outburst of coal and rock that occurs when stresses in a coal pillar, left for support in underground workings, cause the pillar to rupture without warning, sending coal and rock flying with explosive force.

British thermal unit (Btu) – The amount of heat needed to raise the temperature of 1 pound of water by 1 degree Fahrenheit.

Cogeneration power plant – A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam) used for industrial, commercial, heating, and cooling purposes. To receive status as a qualifying facility under the Public Utility Regulatory Policies Act, the facility must produce electric energy and "another form of useful thermal energy through the sequential use of energy," and meet certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission.

Coke (coal) – A solid carbonaceous residue derived from low-ash, low-sulfur bituminous coal from which the volatile constituents are driven off by baking in an oven at temperatures as high as 2,000 degrees Fahrenheit so that the fixed carbon and residual ash are fused together. Coke is used as a fuel and as a reducing agent in smelting iron ore in a blast furnace. Coke from coal is grey, hard, and porous and has a heating value of 12,400 Btu per pound.

Continuous mining – A form of room-and-pillar mining in which a continuous mining machine extracts and removes coal from the working face in one operation; no blasting is required.

Electric Utility Sector – The electric utility sector consists of privately and publicly owned establishments that generate, transmit, distribute, or sell electricity primarily for use by the public, and that meet the definition of an electric utility. Nonutility power producers are not included in the electric utility sector.

Field – An area consisting of a single coal deposit or multiple deposits all grouped on, or related to, the same individual geological structural feature and/or stratigraphic condition. There may be two or more deposits in a field that are separated vertically by intervening strata or laterally by local geologic barriers, or by both.

Fluidized-bed combustion – A method of burning particulate fuel, such as coal, in which the amount of air required for combustion far exceeds that found in conventional burners. The fuel particles are continually fed into a bed of mineral ash in the proportions of 1 part fuel to 200 parts ash, while a flow of air passes up through the bed, causing it to act like a turbulent fluid.

F.O.B. mine price – The free on board mine price. This is the price paid for coal at the mining operation site. It excludes freight or shipping and insurance costs.

Generator capacity – The maximum output, commonly expressed in megawatts (MW), that generating equipment can supply to system load, adjusted for ambient conditions.

Gob – Coal leftover from underground mining in the form of cave-ins or waste piles.

Industrial Sector – The industrial sector comprises manufacturing industries, which make up the largest part of the sector, along with mining, construction, agriculture, fisheries, and forestry. Establishments in the sector range from steel mills, to small farms, to companies assembling electronic components.

Interior Region – Consists of Arkansas, Illinois, Indiana, Kansas, Louisiana, Mississippi, Missouri, Oklahoma, Texas, and Western Kentucky.

Longwall Mining – An automated form of underground coal mining characterized by high recovery and extraction rates, feasible only in relatively flat-lying, thick, and uniform coalbeds. A high-powered cutting machine is passed across the exposed face of coal, shearing away broken coal, which is continuously hauled away by a floor-level conveyor system. Longwall mining extracts all machine-minable coal between the floor and ceiling within a contiguous block of coal, known as a panel, leaving no support pillars within the panel area. Panel dimensions vary over time and with mining conditions but currently average about 900 feet wide (coal face width) and more than 8000 feet long (the minable extent of the panel, measured in direction of mining). Longwall mining is done under movable roof supports that are advanced as the bed is cut. The roof in the mined-out area is allowed to fall as the mining advances.

Metallurgical Coal – Coking coal and pulverized coal consumed in making steel.

Moisture – A measure of the coal's natural inherent or bed moisture, but not including water adhering to the surface.

Net generation – The amount of gross generation less the electrical energy consumed at the generating station(s) for station service or auxiliaries.

Nominal Price – The price paid for a product or service at the time of the transaction. The nominal price, which is expressed in current dollars, is not inflation adjusted.

Powder River Basin – Consists of the Montana counties of Big Horn, Custer, Powder River, Rosebud, and Treasure, and the Wyoming counties of Campbell, Converse, Crook, Johnson, Natrona, Niobrara, Sheridan, and Weston.

Real Price – A price that has been adjusted for inflation.

Reserves – That portion of the demonstrated reserve base that is estimated to be recoverable at the time of determination. The reserve is derived by applying a recovery factor to that component of the identified resources of coal designated as the demonstrated reserve base.

Residential and Commercial Sector – Housing units; wholesale and retail businesses (except coal wholesale dealers); health institutions (hospitals); social and educational institutions (schools and universities); and Federal, State, and local governments (military installations, prisons, office buildings).

Seam – A bed of coal lying between a roof and floor.

Spot price - The price for a one-time open market transaction for immediate delivery of a specific quantity of product at a specific location where the commodity is purchased "on the spot" at current market rates.

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% inherent moisture by weight. The heat content of subbituminous coal ranges from 8500 to 12,000 Btu per pound.

Sulfur – One of the elements present in varying quantities in coal that contributes to environmental degradation when coal is burned.

Synfuel – Coal that has been processed by a coal synfuel plant; and coal-based fuels such as briquettes, pellets, or extrusions, which are formed by binding materials and processes that recycle material.

Waste coal – Usable coal material that is a byproduct of previous processing operations or is recaptured from what would otherwise be refuse.

Western Region – Consists of Alaska, Arizona, Colorado, Montana, New Mexico, North Dakota, Utah, Washington, and Wyoming.

APPENDIX

ADDITIONAL UTAH AND U.S. COAL-RELATED DATA

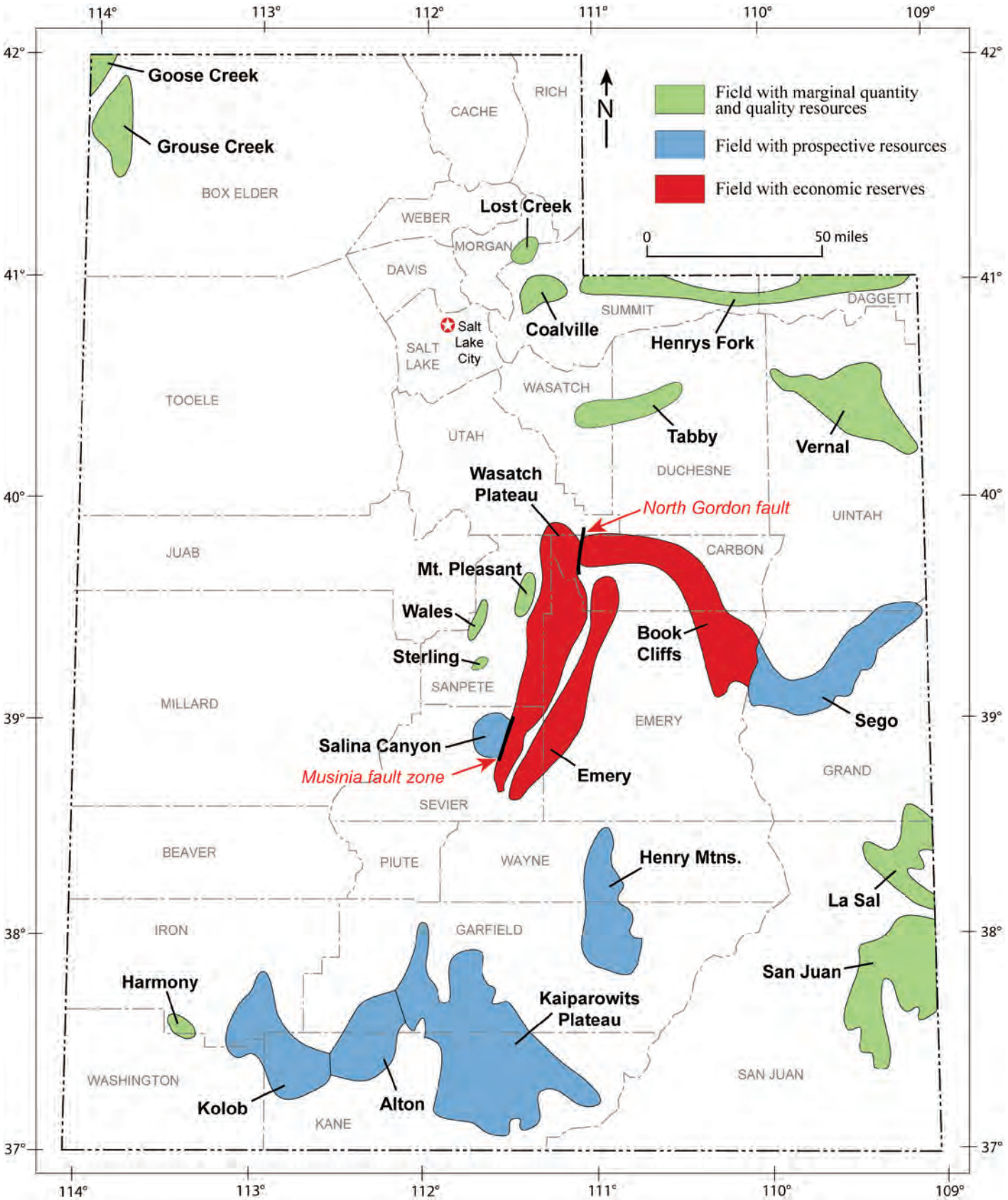

Figure A1. *Location and significance of Utah coal fields.*

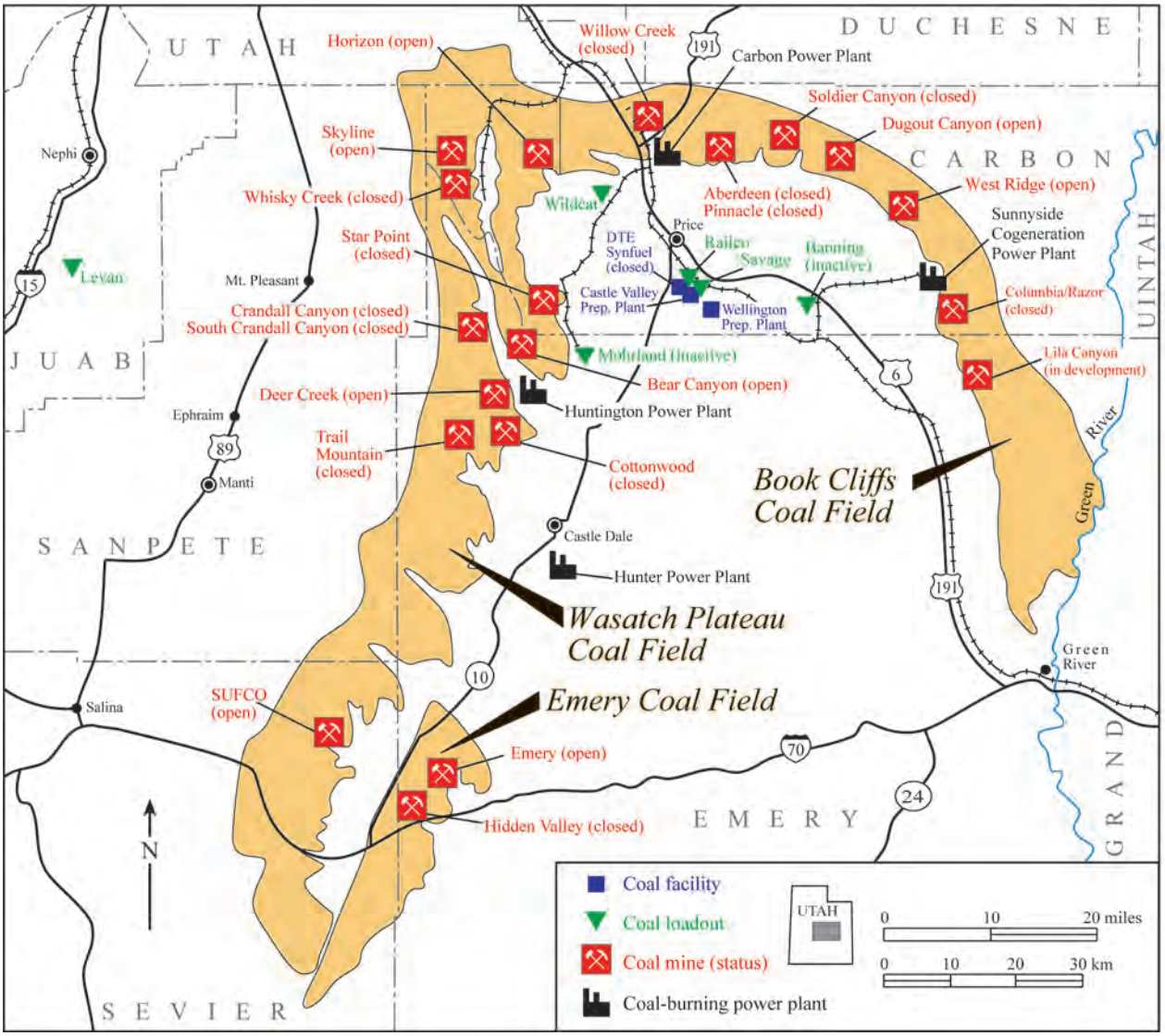

Figure A2. *Location and status (at time of printing) of Utah coal mining operations.*

Table A1. *U.S. coal production by region, 1970–2030.*

Million short tons

Year	Appalachia	Interior	West	Rocky Mt. – UT and CO	Powder River Basin	U.S. Total
1970	427.6	149.9	35.1	na	na	612.6
1971	382.3	136.3	42.3	na	na	560.9
1972	394.4	157.5	50.6	na	na	602.5
1973	381.6	156.4	60.5	na	na	598.5
1974	384.3	150.2	75.5	na	na	610.0
1975	402.7	162.1	89.8	na	na	654.6
1976	412.4	162.0	110.6	na	na	685.0
1977	399.7	163.8	133.8	na	na	697.3
1978	374.9	146.2	149.0	na	na	670.1
1979	429.5	170.2	181.4	na	na	781.1
1980	444.3	176.3	209.1	na	na	829.7
1981	433.0	166.6	224.1	na	na	823.7
1982	433.2	178.2	226.8	na	na	838.2
1983	383.1	173.7	225.3	na	na	782.1
1984	444.0	198.0	253.8	na	na	895.8
1985	427.2	187.8	268.7	na	na	883.7
1986	428.5	196.6	265.2	na	na	890.3
1987	443.3	201.7	273.8	na	na	918.8
1988	449.4	193.0	307.9	na	na	950.3
1989	464.5	197.9	318.4	na	na	980.8
1990	489.0	205.7	334.4	40.9	na	1,029.1
1991	457.8	195.4	342.8	39.7	na	996.0
1992	462.6	195.7	345.3	40.2	na	1,003.5
1993	416.1	167.2	368.5	43.6	na	951.8
1994	453.3	179.9	408.3	49.7	na	1,041.4
1995	443.4	168.5	429.6	50.8	na	1,041.5
1996	460.7	172.8	439.1	52.0	na	1,072.7
1997	475.9	170.9	451.3	53.8	na	1,098.0
1998	469.4	168.4	488.8	56.2	293.4	1,126.5
1999	435.2	162.5	512.3	56.5	316.9	1,110.0
2000	429.5	143.5	510.7	56.0	323.0	1,083.7
2001	443.4	147.0	547.9	60.4	354.0	1,138.3
2002	408.1	146.9	550.4	60.4	359.5	1,105.4
2003	388.4	146.3	548.7	58.9	363.4	1,083.4
2004	390.7	146.3	575.2	61.7	381.7	1,112.1
2005	397.3	149.2	585.0	63.0	390.1	1,131.5
2006	391.9	151.4	619.4	62.3	431.1	1,162.7
2007	383.9	156.1	615.3	56.4	436.3	1,155.3
2008	387.8	148.1	616.5	56.5	435.7	1,152.4
2009	386.1	158.0	609.0	56.2	428.5	1,153.1
2010	380.9	165.6	619.1	55.3	436.6	1,165.7
2011	369.1	170.4	659.3	59.2	465.4	1,198.8
2012	359.5	183.8	667.9	60.0	472.5	1,211.2
2013	348.2	186.3	674.1	61.7	474.2	1,208.7
2014	342.1	188.9	680.9	62.2	478.6	1,211.8
2015	340.0	192.9	681.9	62.1	477.0	1,214.9
2016	342.9	196.9	690.1	60.4	481.5	1,229.9
2017	332.4	198.9	704.1	62.6	486.8	1,235.5
2018	319.3	195.9	727.9	61.4	500.0	1,243.2
2019	323.8	199.0	734.8	64.0	497.6	1,257.6
2020	326.6	198.8	744.6	66.4	500.5	1,270.0
2021	332.8	199.6	758.0	69.0	506.5	1,290.4
2022	330.7	205.7	768.4	72.0	506.9	1,304.7
2023	326.8	208.7	791.0	75.2	518.9	1,326.5
2024	324.6	213.1	809.1	78.4	527.7	1,346.9
2025	323.7	218.7	820.3	81.1	531.5	1,362.7
2026	321.7	221.6	835.5	83.5	539.0	1,378.8
2027	322.0	225.4	847.7	86.0	544.6	1,395.1
2028	323.8	231.2	863.0	88.9	553.3	1,418.0
2029	322.3	237.4	872.4	91.1	558.6	1,432.2
2030	328.2	241.1	885.3	91.9	567.4	1,454.6

Source: U.S. Energy Information Administration, Annual Energy Outlook, 2008

Note: The 2007 total is forecast, hence it does not match the actual 2007 total recorded in table 1

Table A2. *Average minemouth price of U.S. coal by region, 1990–2030.*

Dollars per short ton

Year	Appalachia		Interior		West		Rocky Mountain - Utah and Colorado (bituminous)		Powder River Basin		U.S. Average	
	Nominal dollars	Real 2006 dollars	Nominal dollars	Real 2006 dollars	Nominal dollars	Real 2006 dollars	Nominal dollars	Real 2006 dollars	Nominal dollars	Real 2006 dollars	Nominal dollars	Real 2006 dollars
1990	28.89	44.57	21.45	33.08	11.60	17.90	na	na	na	na	21.76	33.57
1991	28.69	42.47	21.86	32.36	11.71	17.34	na	na	na	na	21.49	31.81
1992	27.94	40.16	21.61	31.05	11.60	16.67	na	na	na	na	21.03	30.22
1993	27.64	38.57	20.03	27.95	11.14	15.54	na	na	na	na	19.85	27.70
1994	27.36	37.22	19.87	27.04	10.57	14.39	na	na	na	na	19.41	26.41
1995	27.45	36.32	18.81	24.89	10.15	13.43	na	na	na	na	18.83	24.91
1996	26.79	34.42	18.41	23.66	10.03	12.89	na	na	na	na	18.50	23.77
1997	26.55	33.36	17.91	22.50	9.52	11.97	na	na	na	na	18.14	22.79
1998	26.85	33.21	18.45	22.82	8.76	10.84	na	na	na	na	17.67	21.86
1999	25.58	30.96	18.52	22.42	8.59	10.40	na	na	na	na	16.63	20.13
2000	25.99	30.43	18.37	21.50	8.72	10.22	na	na	na	na	16.78	19.65
2001	27.55	31.36	20.14	22.93	9.06	10.31	na	na	na	na	17.59	20.03
2002	28.68	32.15	20.12	22.55	9.55	10.71	na	na	na	na	17.90	20.06
2003	29.02	31.80	19.65	21.53	9.84	10.78	na	na	na	na	17.93	19.65
2004	34.31	36.62	20.66	22.06	10.24	10.93	18.35	19.59	6.85	7.31	20.07	21.42
2005	41.62	42.97	22.82	23.56	11.01	11.37	21.25	21.94	7.25	7.49	23.32	24.07
2006	44.44	44.44	25.00	25.00	12.01	12.01	24.35	24.35	7.87	7.87	24.63	24.63
2007	47.36	46.00	26.53	25.77	12.92	12.55	25.05	24.33	9.93	9.65	26.20	25.45
2008	50.15	47.34	27.40	25.87	13.79	13.02	26.88	25.38	10.68	10.08	27.78	26.22
2009	50.81	47.29	27.90	25.97	13.99	13.02	27.43	25.53	10.80	10.05	28.22	26.27
2010	51.52	47.31	28.97	26.60	14.18	13.02	27.52	25.27	11.04	10.14	28.49	26.16
2011	51.03	46.14	30.21	27.31	14.46	13.07	28.03	25.34	11.34	10.25	27.96	25.28
2012	50.38	44.86	30.82	27.45	14.65	13.05	28.56	25.43	11.54	10.28	27.71	24.67
2013	50.12	43.93	31.07	27.23	14.93	13.08	29.28	25.67	11.70	10.26	27.55	24.15
2014	49.77	42.85	31.94	27.50	15.27	13.15	29.79	25.65	12.01	10.34	27.61	23.77
2015	49.37	41.77	32.29	27.32	15.47	13.09	30.22	25.57	12.14	10.27	27.63	23.38
2016	49.76	41.35	32.92	27.36	15.66	13.01	30.44	25.30	12.35	10.26	27.93	23.21
2017	50.08	40.79	33.66	27.41	16.05	13.08	31.23	25.43	12.64	10.29	28.05	22.84
2018	50.71	40.44	34.00	27.11	16.69	13.31	31.75	25.32	13.04	10.40	28.16	22.45
2019	51.62	40.25	34.78	27.12	17.23	13.43	32.79	25.56	13.44	10.48	28.86	22.50
2020	52.78	40.24	35.51	27.08	17.73	13.52	34.00	25.93	13.82	10.53	29.53	22.51
2021	54.03	40.36	36.09	26.96	18.14	13.55	35.21	26.30	14.11	10.54	30.17	22.54
2022	55.44	40.52	37.51	27.41	18.80	13.74	36.75	26.86	14.51	10.61	31.03	22.68
2023	56.60	40.48	38.60	27.61	19.40	13.87	38.28	27.38	14.93	10.68	31.58	22.59
2024	57.91	40.54	39.99	27.99	20.14	14.10	39.65	27.76	15.36	10.75	32.38	22.67
2025	59.21	40.55	41.19	28.21	20.84	14.27	41.10	28.15	15.83	10.84	33.22	22.75
2026	60.53	40.55	42.76	28.65	21.55	14.44	42.38	28.39	16.32	10.93	34.05	22.81
2027	61.97	40.61	44.33	29.05	22.26	14.59	43.72	28.65	16.82	11.02	34.99	22.93
2028	63.53	40.72	45.96	29.46	23.02	14.76	45.23	28.99	17.36	11.13	36.01	23.08
2029	64.99	40.74	47.26	29.63	23.68	14.85	46.73	29.30	17.90	11.22	36.89	23.13
2030	66.87	40.99	48.97	30.02	24.38	14.95	47.83	29.32	18.48	11.33	38.04	23.32

Source: U.S. Energy Information Administration, Annual Energy Outlook, 2008

Table A3. *U.S. coal consumption by sector, 1970–2030.*

Million short tons

Year	Electric Utilities	Other	Coal-to-Liquids	U.S. Total
1970	320	203	--	523
1971	327	174	--	502
1972	352	173	--	524
1973	389	173	--	563
1974	392	167	--	558
1975	406	157	--	563
1976	448	155	--	604
1977	477	148	--	625
1978	481	144	--	625
1979	527	153	--	681
1980	569	133	--	703
1981	597	136	--	733
1982	594	113	--	707
1983	625	111	--	737
1984	664	127	--	791
1985	694	124	--	818
1986	685	119	--	804
1987	718	119	--	837
1988	758	125	--	884
1989	772	123	--	895
1990	781	122	--	903
1991	784	115	--	899
1992	795	113	--	908
1993	832	112	--	944
1994	838	113	--	951
1995	850	112	--	962
1996	897	109	--	1,006
1997	921	109	--	1,030
1998	937	100	--	1,037
1999	941	98	--	1,039
2000	983	98	--	1,081
2001	957	94	--	1,050
2002	976	90	--	1,066
2003	1,005	90	--	1,095
2004	1,016	91	--	1,107
2005	1,037	88	--	1,125
2006	1,026	88	--	1,114
2007	1,027	88	--	1,115
2008	1,026	86	--	1,113
2009	1,043	86	--	1,129
2010	1,055	86	--	1,141
2011	1,079	85	13	1,177
2012	1,092	85	14	1,192
2013	1,103	84	16	1,203
2014	1,109	84	18	1,211
2015	1,120	83	21	1,225
2016	1,134	83	24	1,241
2017	1,151	83	27	1,262
2018	1,180	83	31	1,294
2019	1,205	83	37	1,325
2020	1,219	83	42	1,344
2021	1,238	83	48	1,369
2022	1,262	83	56	1,401
2023	1,289	83	64	1,436
2024	1,316	83	73	1,472
2025	1,336	83	83	1,503
2026	1,356	83	95	1,534
2027	1,373	83	108	1,564
2028	1,395	83	122	1,600
2029	1,417	82	139	1,638
2030	1,443	82	157	1,682

Source: U.S. Energy Information Administration, Annual Energy Outlook, 2008

Table A4. *Consumption of coal in Utah by end use, 1960–2008.*
Thousand short tons

Year	Electric Utilities[1]	Coke Plant	Other Industrial	Residential & Commercial	Trans-portation	Total
1960	515	2,195	445	249	45	3,449
1961	563	1,910	383	243	10	3,110
1962	462	1,414	338	275	7	2,497
1963	447	1,351	342	228	6	2,374
1964	411	1,676	392	204	8	2,690
1965	363	1,892	414	181	8	2,857
1966	440	1,961	409	185	7	3,003
1967	410	1,829	330	180	5	2,753
1968	417	1,903	359	119	5	2,803
1969	375	1,951	496	161	4	2,988
1970	435	1,959	518	109	4	3,025
1971	417	1,841	545	240	3	3,047
1972	571	1,705	586	161	2	3,024
1973	984	1,890	811	199	2	3,886
1974	1,296	1,984	627	355	1	4,263
1975	2,026	1,932	546	131	0	4,636
1976	1,267	1,959	683	208	0	4,117
1977	2,511	1,991	644	282	0	5,429
1978	3,148	1,700	826	281	0	5,954
1979	4,151	1,569	842	542	0	7,104
1980	4,895	1,473	501	237	0	7,106
1981	4,956	1,477	804	196	0	7,432
1982	4,947	845	818	177	0	6,787
1983	5,223	831	627	191	0	6,873
1984	5,712	1,326	608	259	0	7,905
1985	6,325	1,254	472	252	0	8,303
1986	6,756	785	380	191	0	8,112
1987	11,175	0	507	124	0	11,807
1988	12,544	1,176	597	196	0	14,513
1989	12,949	1,178	686	231	0	15,044
1990	13,563	1,231	676	267	0	15,738
1991	12,829	1,192	508	305	0	14,834
1992	13,857	1,114	525	223	0	15,719
1993	14,210	1,005	727	121	0	16,063
1994	14,656	1,007	835	105	0	16,603
1995	13,693	990	915	77	0	15,675
1996	13,963	1,047	512	94	0	15,615
1997	14,654	1,020	709	123	0	16,507
1998	15,094	971	1,304	113	0	17,482
1999	15,011	741	744	114	0	16,611
2000	15,164	984	1,166	59	0	17,373
2001	14,906	806	1,235	60	0	17,007
2002	15,644	0	592	198	0	16,434
2003	16,302	0	611	61	0	16,974
2004	16,606	0	795	213	0	17,614
2005	16,484	0	800	45	0	17,329
2006	16,609	0	871	35	0	17,515
2007	16,613	0	870	32	0	17,515
2008*	16,850	0	895	30	0	17,775

Source: U.S. Energy Information Administration, 2007 Annual Coal Report, 2006; UGS
Note: Consumption differs from distribution (table 8) because of additional consumption from consumer stockpiles.
[1]Includes waste coal burned at Sunnyside Cogeneration
*Forecast

Table A5. *Utah coal resources by coal field, 2007.*
Million short tons

Coal Field	Original Principal Resource[1]	Original Estimated Recoverable Resource[2]	Cumulative Production 1870–2007	Remaining Estimated Recoverable Resource	% of Total Remaining Estimated Recoverable Resource
Kaiparowits	22,740.0	9,096.0	0.1	9,095.9	60.4%
Wasatch Plateau	6,378.9	1,913.7	616.5	1,297.2	8.6%
Alton	2,155.0	1,055.7	0.0	1,055.7	7.0%
Kolob	2,014.3	805.9	0.9	805.0	5.3%
Emery	2,336.0	817.6	13.3	804.3	5.3%
Book Cliffs	3,527.3	1,033.5	341.9	691.6	4.6%
Henry Mountains	925.5	484.7	0.0	484.7	3.2%
Sego	1,144.0	343.2	2.7	340.5	2.3%
Salina Canyon	692.7	207.8	0.5	207.3	1.4%
Mt. Pleasant	249.1	99.6	0.0	99.6	0.7%
Tabby Mountain	231.7	69.4	0.0	69.4	0.5%
Vernal	177.1	53.2	0.5	52.7	0.3%
Coalville	186.0	55.8	4.3	51.5	0.3%
Wales	12.2	3.7	0.8	2.9	*
Harmony	1.3	0.4	0.0	0.4	*
Lost Creek	1.1	0.4	0.0	0.4	*
Sterling	2.0	0.6	0.3	0.3	*
Total	42,774.2	16,041.2	981.8	15,059.4	

Source: Smith and Jahanbani, 1988; Quick and others, 2004; Bon and others, 2006; production data from UGS coal company questionnaires

Note: Estimated recoverable resources do not take into account economic or land use constraints

[1]Total coal resource with no economic, land use, or geologic constraints.

[2]For Wasatch Plateau, Alton, Emery, Book Cliffs, and Henry Mountains; resources were constrained by a seam height minimum of four feet, with no more than 3000 feet of cover. For the remaining fields, resources were constrained by an estimated resource factor ranging from 30% to 40% of principal resources.

* Value less than 0.1%

Table A6. *Utah coal resources by county, 2007.*
Million short tons

County	Original Principal Resource[1]	Original Estimated Recoverable Resource[2]	Cumulative Production 1870–2007	Remaining Estimated Recoverable Resource	% of Total Remaining Estimated Recoverable Resource
Kane	19,579.6	8,025.6	0.1	8,025.5	53.3%
Garfield	7,493.1	3,106.3	0.0	3,106.3	20.6%
Emery	4,457.7	1,392.9	374.2	1,018.6	6.8%
Carbon	4,993.6	1,475.8	466.4	1,009.4	6.7%
Sevier	3,257.4	1,036.0	132.4	903.6	6.0%
Grand	1,144.0	343.2	2.7	340.5	2.3%
Iron	650.8	260.2	0.8	259.4	1.7%
Sanpete	489.5	171.8	0.7	171.1	1.1%
Wasatch	177.3	53.2	0.0	53.2	0.4%
Uintah	177.1	53.2	0.3	52.9	0.4%
Summit	186.0	55.8	4.3	51.5	0.3%
Washington	86.1	34.4	0.0	34.4	0.2%
Duchesne	53.9	16.2	0.0	16.2	0.1%
Wayne	27.0	16.2	0.0	16.2	0.1%
Morgan	1.1	0.4	0.0	0.4	*
Total	42,774.2	16,041.2	981.8	15,059.4	

Source: Smith and Jahanbani, 1988; Quick and others, 2004; Bon and others, 2006; production data from UGS coal company questionnaires

Note: Estimated recoverable resources do not take into account economic or land use constraints.

[1]Total coal resource with no economic, land use, or geologic constraints.

[2]For Emery, Sevier, Kane, Carbon, and Garfield Counties; resources were constrained by a seam height minimum of four feet, with no more than 3000 feet of cover. For the remaining counties, resources were constrained by an estimated resource factor ranging from 30% to 40% of principal resources.

* Value less than 0.1%

Table A7. *Electricity generation and coal consumption at coal burning power plants in Utah, 1990–2008.*

Year	Deseret Generation & Transmission Co.			Intermountain Power Agency			PacifiCorp			PacifiCorp		
	Bonanza			Intermountain (IPP)			Carbon			Hunter		
	Coal Consumption	Net Generation	MWh per Short Ton	Coal Consumption	Net Generation	MWh per Short Ton	Coal Consumption	Net Generation	MWh per Short Ton	Coal Consumption	Net Generation	MWh per Short Ton
	Short tons	MWh		Short tons	MWh		Short tons	MWh		Short tons	MWh	
1990	1,237,312	2,577,271	2.08	4,967,883	12,410,005	2.50	582,320	1,260,497	2.16	4,022,009	9,019,470	2.24
1991	1,309,770	2,764,208	2.11	4,145,585	10,106,144	2.44	547,905	1,192,091	2.18	4,124,260	8,915,149	2.16
1992	1,511,878	3,201,401	2.12	4,959,568	12,264,308	2.47	623,178	1,307,598	2.10	4,107,391	8,605,835	2.10
1993	1,414,980	3,132,999	2.21	4,856,527	11,936,833	2.46	631,909	1,358,949	2.15	4,253,731	9,151,459	2.15
1994	1,533,363	3,242,413	2.11	4,916,555	12,171,664	2.48	622,621	1,366,103	2.19	4,277,130	9,323,744	2.18
1995	1,125,003	2,344,439	2.08	4,248,623	10,306,059	2.43	605,712	1,351,984	2.23	4,376,632	9,453,500	2.16
1996	1,341,076	2,831,105	2.11	4,350,752	10,711,308	2.46	622,126	1,410,369	2.27	4,343,571	9,337,663	2.15
1997	1,532,158	2,947,675	1.92	5,158,831	12,762,721	2.47	653,833	1,403,936	2.15	4,220,568	8,893,113	2.11
1998	1,734,613	3,456,787	1.99	5,278,344	12,973,101	2.46	600,317	1,286,805	2.14	4,140,205	9,044,084	2.18
1999	1,598,296	3,227,344	2.02	5,266,047	13,069,535	2.48	552,590	1,217,838	2.20	4,220,721	9,483,957	2.25
2000	1,510,407	2,931,869	1.94	5,301,096	13,176,578	2.49	628,623	1,371,586	2.18	4,226,218	9,518,367	2.25
2001	2,013,770	3,932,642	1.95	5,365,021	13,383,601	2.49	632,124	1,371,822	2.17	3,722,062	8,289,465	2.23
2002	2,092,485	3,921,576	1.87	5,429,620	13,479,234	2.48	612,536	1,322,047	2.16	4,327,402	9,393,626	2.17
2003	1,893,338	3,512,734	1.86	5,518,129	13,554,882	2.46	657,111	1,369,884	2.08	4,563,686	9,934,622	2.18
2004	1,996,868	3,734,811	1.87	5,996,797	14,429,288	2.41	556,458	1,133,139	2.04	4,668,586	9,957,531	2.13
2005	1,978,718	3,712,862	1.88	5,689,688	13,657,657	2.40	673,436	1,348,569	2.00	4,692,991	9,732,018	2.07
2006	2,127,658	3,893,733	1.83	5,910,423	14,445,440	2.44	632,468	1,310,932	2.07	4,677,662	9,885,959	2.11
2007	1,860,128	3,450,695	1.86	5,883,562	14,417,354	2.45	636,000	1,339,000	2.11	4,568,100	9,700,000	2.12
2008*	2,026,226	3,702,983	1.83	6,000,000	14,388,000	2.40	580,100	1,205,000	2.08	4,630,900	9,800,000	2.12

Year	PacifiCorp			Sunnyside Cogeneration Plant			Total		
	Huntington								
	Coal Consumption	Net Generation	MWh per Short Ton	Waste Coal Consumption	Net Generation	MWh per Short Ton	Coal Consumption	Net Generation	MWh per Short Ton
	Short tons	MWh		Short tons	MWh		Short tons	MWh	
1990	2,753,717	6,253,702	2.27	--	--	--	13,563,241	31,520,945	2.32
1991	2,701,376	5,907,238	2.19	--	--	--	12,828,896	28,884,830	2.25
1992	2,655,409	6,164,281	2.32	--	--	--	13,857,424	31,543,423	2.28
1993	2,837,819	6,339,069	2.23	214,580	184,187	0.86	14,209,546	32,103,496	2.26
1994	2,919,715	6,660,541	2.28	386,800	348,287	0.90	14,656,184	33,112,752	2.26
1995	2,968,886	6,803,932	2.29	368,550	332,194	0.90	13,693,406	30,592,108	2.23
1996	2,927,155	6,402,742	2.19	378,230	392,483	1.04	13,962,910	31,085,670	2.23
1997	2,686,976	6,136,491	2.28	402,040	385,829	0.96	14,654,406	32,529,765	2.22
1998	2,910,474	6,445,954	2.21	430,000	376,057	0.87	15,093,953	33,582,788	2.22
1999	2,952,484	7,126,340	2.41	421,230	398,945	0.95	15,011,368	34,523,959	2.30
2000	3,021,448	7,047,404	2.33	476,170	430,408	0.90	15,163,962	34,476,212	2.27
2001	2,670,253	6,226,810	2.33	502,490	387,382	0.77	14,905,720	33,591,722	2.25
2002	2,686,747	5,964,496	2.22	494,715	390,985	0.79	15,643,505	34,471,964	2.20
2003	3,155,334	7,207,036	2.28	514,564	399,490	0.78	16,302,162	35,978,648	2.21
2004	2,878,761	6,379,605	2.22	508,950	395,307	0.78	16,606,420	36,029,681	2.17
2005	2,960,952	6,373,756	2.15	487,854	471,735	0.97	16,483,639	35,296,597	2.14
2006	2,793,793	6,131,487	2.19	467,364	386,149	0.83	16,609,368	36,053,700	2.17
2007	3,247,500	7,128,000	2.19	418,000	404,191	0.97	16,613,290	36,439,240	2.19
2008*	3,166,500	7,117,000	2.25	445,821	446,760	1.00	16,849,547	36,659,743	2.18

Source: UGS coal company questionnaires

*Forecast

Table A8. *Net generation of electricity in Utah by energy source, 1960–2007.*
Gigawatthours

Year	Coal	Petroleum	Natural Gas	Other Gases[1]	Hydro-electric	Geothermal[2]	Landfill Gas	MSW[3]	Total
1960	1,130	1,314	290	na	304	0	0	0	3,038
1961	1,210	1,236	374	na	231	0	0	0	3,051
1962	998	934	433	na	393	0	0	0	2,758
1963	923	876	413	na	352	0	0	0	2,564
1964	855	824	324	na	765	0	0	0	2,768
1965	779	866	392	na	913	0	0	0	2,950
1966	1,001	765	700	na	791	0	0	0	3,257
1967	909	748	611	na	1,074	0	0	0	3,342
1968	931	758	444	na	1,017	0	0	0	3,150
1969	806	872	287	na	1,117	0	0	0	3,082
1970	948	956	307	na	738	0	0	0	2,949
1971	894	905	287	na	981	0	0	0	3,067
1972	1,165	657	320	na	1,220	0	0	0	3,362
1973	2,007	146	342	na	1,111	0	0	0	3,606
1974	2,678	69	312	na	941	0	0	0	4,000
1975	4,366	82	283	na	1,074	0	0	0	5,805
1976	2,739	32	183	na	1,130	0	0	0	4,084
1977	5,533	116	421	na	757	0	0	0	6,827
1978	7,238	90	565	na	734	0	0	0	8,627
1979	9,408	122	458	na	802	0	0	0	10,790
1980	10,870	63	358	na	821	0	0	0	12,112
1981	10,869	40	230	na	623	0	0	0	11,762
1982	10,635	29	203	na	1,024	0	0	0	11,891
1983	10,921	40	69	na	1,394	0	0	0	12,424
1984	12,321	30	8	na	1,391	38	0	0	13,788
1985	14,229	40	14	na	1,019	109	0	0	15,411
1986	15,155	74	6	na	1,413	171	0	0	16,819
1987	25,221	92	13	na	893	127	0	0	26,346
1988	28,806	59	5	na	593	174	0	0	29,637
1989	29,676	48	37	na	562	173	0	0	30,496
1990	31,523	52	146	182	508	152	0	0	32,564
1991	28,888	51	550	204	627	186	0	0	30,506
1992	31,553	34	631	230	602	233	0	0	33,284
1993	32,126	37	606	281	860	187	0	0	34,097
1994	33,131	33	807	281	750	233	0	0	35,235
1995	30,611	36	791	261	969	168	0	0	32,836
1996	31,101	47	324	239	1,049	223	0	0	32,983
1997	32,544	47	328	281	1,344	204	0	0	34,748
1998	33,588	35	528	285	1,315	195	0	0	35,945
1999	34,534	31	610	191	1,255	186	0	8	36,815
2000	34,491	58	890	258	746	187	0	9	36,640
2001	33,679	58	1,446	0	508	185	0	10	35,886
2002	34,488	54	1,380	0	458	218	0	11	36,608
2003	35,979	33	1,383	0	421	198	0	9	38,024
2004	36,618	33	910	0	450	195	0	7	38,212
2005	35,970	41	1,178	0	784	185	0	7	38,165
2006	36,856	62	3,389	0	747	191	9	11	41,263
2007*	37,251	69	5,551	0	638	164	8	10	43,691

Source: EIA, Electric Power Annual, Electric Power Monthly
Note: Includes Electric Utilities; Independent Power Producers; and Combined Heat and Power for Commercial, Industrial and Electric Sectors.

[1]Blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels

[2]EIA only records data from the Blundell Geothermal Plant and not the Cove Fort Plant. Cove Fort's generation data have been added to the overall geothermal total for 1992 to 2002 (data obtained from company interviews).

[3]Municipal solid waste

*Preliminary

Table A9. *Average Coal Quality at Utah Mines, 2007.*

Company	Mine	Coal Field	Seam(s)	Heat Content	% Sulfur	% Ash	% Moisture
				Btu/lb			
UtahAmerican Energy, Inc.	Aberdeen	Book Cliffs	Aberdeen	12,200	0.5%	8.5%	6.5%
Canyon Fuel, LLC	Skyline #3	Wasatch	Lower O'Connor 'A'	11,600	0.5%	10.3%	8.5%
Canyon Fuel, LLC	SUFCO	Wasatch	Upper Hiawatha	10,944	0.4%	11.3%	10.0%
Canyon Fuel, LLC	Dugout Canyon	Book Cliffs	Gilson	12,028	0.6%	11.1%	6.5%
CONSOL Energy	Emery	Emery	I	12,000	1.0%	10.0%	8.0%
C.W. (Co-op) Mining Co.	Bear Canyon #4	Wasatch	Tank	11,700	0.7%	12.0%	8.5%
Energy West Mining Co.	Deer Creek	Wasatch	Hiawatha/Blind Canyon	10,900	0.7%	16.6%	8.0%
GENWAL Resources, Inc.	Crandall Canyon	Wasatch	Hiawatha	12,014	0.4%	9.0%	9.0%
Hidden Splendor Resources, Inc.	Horizon	Wasatch	Hiawatha	11,700	0.6%	10.0%	5.0%
WEST RIDGE Resources, Inc.	West Ridge	Book Cliffs	Lower Sunnyside	11,889	1.0%	13.0%	6.0%

Source: UGS coal company questionnaires

Table A10. *Coalbed methane proved reserves and production in Utah and the U.S., 1985–2007.*

Million cubic feet

Year	Reserves in Utah[1]	Reserves in U.S.[1]	Production in Utah[2]			Production in U.S.[1]
			Carbon County	Emery County	Total	
1985	na	na	0	0	0	na
1986	na	na	0	0	0	na
1987	na	na	9	0	9	na
1988	na	na	37	0	37	na
1989	na	3,676,000	0	0	0	91,000
1990	na	5,087,000	0	0	0	196,000
1991	na	8,163,000	76	0	76	348,000
1992	na	10,034,000	156	0	156	539,000
1993	na	10,184,000	905	0	905	752,000
1994	na	9,712,000	4,681	0	4,681	851,000
1995	na	10,499,000	12,206	1	12,207	956,000
1996	na	10,566,000	16,718	221	16,939	1,003,000
1997	na	11,462,000	22,528	356	22,883	1,090,000
1998	na	12,179,000	31,750	799	32,549	1,194,000
1999	na	13,229,000	49,819	1,840	51,659	1,252,000
2000	1,592,000	15,708,000	71,990	3,602	75,591	1,379,000
2001	1,685,000	17,531,000	85,683	7,316	92,999	1,562,000
2002	1,725,000	18,491,000	88,753	13,302	102,054	1,614,000
2003	1,224,000	18,743,000	81,060	16,586	97,646	1,600,000
2004	934,000	18,390,000	72,628	16,660	89,288	1,720,000
2005	902,000	19,892,000	66,051	15,875	81,926	1,732,000
2006	750,000	19,620,000	61,473	15,232	76,705	1,758,000
2007	na	na	58,317	15,298	73,615	na

Source: [1]U.S. Energy Information Administration, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 2006

[2]Utah Division of Oil, Gas and Mining, Annual Coalbed Methane Gas Production

Note: Coalbed methane wells are classified as gas wells in the state of Utah. The production shown above is included in the state's published gas production volumes.