Annual Review and Forecast of UTAH COAL Production and Distribution 2008

Final 2008 numbers and preliminary 2009 data

by Michael D. Vanden Berg

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UTAH GEOLOGICAL SURVEY
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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 data from 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/emp/energydata.

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EXECUTIVE SUMMARY

Utah's coal industry remained steady in 2008 with production totaling 24.3 million short tons for the second straight year. Production losses resulting from the closure of UtahAmerican's deep Aberdeen mine and difficult mining conditions at the company's West Ridge operation were made up for by increased production at Canyon Fuel's Dugout Canyon, Skyline, and SUFCO mines. With the economy running strong for much of the year, employment averages increased 4.5%, mostly on the anticipation of full-scale longwall mining at Hiawatha Company's Bear Canyon mine. The strong economy also helped the average price for a ton of Utah coal reach a 25-year high of $27.78. Distribution of Utah coal remained nearly steady in 2008 at 24.8 million tons, while out-of-state coal imports increased by 68%, with most coal going to the Bonanza power plant in eastern Utah.

Preliminary data indicate that Utah's coal production decreased by a substantial 10.5% in 2009 to a total of 21.7 million tons, the lowest level since 1993. The new longwall production at the Bear Canyon mine was stopped and the mine closed in spring of 2009 as the operator faced financial problems. Also, production at all three Canyon Fuel mines, as well as UtahAmerican's West Ridge mine, were lower than 2008 totals. Coal-related employment in 2009 is projected to decrease by 68 individuals to a total of 1905 employees, with further declines expected in 2010. Despite 2009's economic downturn, the average price of Utah coal increased by 4.4% to $29 per ton, the highest price in nominal dollars since 1984. Utah coal distribution should follow production's downward trend and total 22.3 million tons in 2009, with imports increasing another 37.6% as Utah power plants look to other states to satisfy their demand.

Increasingly, Utah mines are faced with significant reserve depletion, difficult geologic conditions that raise ash contents, and the stresses of mining at greater depths of cover. As a result, operators are looking to new areas to increase their reserve base. UtahAmerican Energy recently began construction and development work on the Lila Canyon mine in the southern part of the Book Cliffs coalfield (with possible production of first coal in 2011). Alton Coal Development received a permit (pending reclamation bond posting) to mine on private land in the Alton coalfield in southern Utah's Kane County; an option to lease surrounding federal land is pending completion of an Environmental Impact Statement. Canyon Fuel was recently awarded the state-owned Cottonwood lease located in the Wasatch Plateau coalfield and has nominated for lease the large Greens Hollow tract near the company's SUFCO mine. These new operations and lease tracts could offset declining production from existing mines and keep Utah's production levels near 23 to 25 million tons.

Another area of concern for coal companies, which could curtail future demand, is the possibility of carbon emission constraints. In fact, all proposed 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 because regulatory uncertainty prevents the identification of economic carbon mitigation strategies. In the meantime, coal demand in Utah will remain steady as established coal plants continue to provide the state with relatively cheap, reliable power.

UTAH COAL PRICES, EMPLOYMENT, AND PRODUCTION

The U.S. Energy Information Administration (EIA) reported that U.S. coal production in 2008 increased 2.2% to 1172 million short tons, a new U.S. record (table 1). This upturn resulted from 16 of the 26 coal producing states having increased production in 2008, including production increases at the top five producing states. Production in the Appalachian and Western Regions increased by 3.3% and 2.0%, respectively, while production in the Interior Region remained roughly the same.

Utah's coal production decreased only 13,000 tons in 2008, from 24,288,000 tons produced in 2007 to 24,275,000 tons, ranking Utah as the 14th highest coal producing state. Preliminary data for 2009 indicate a 10.5% decrease in coal production to 21.7 million tons, resulting from the closure of the Bear Canyon mine and declining production at the Skyline, SUFCO, Dugout Canyon, and West Ridge mines. However, two new mines, Lila Canyon and Coal Hollow, are in various stages of development and could start producing coal in the next year or two.

Table 1. *U.S. coal production by state, 2007–2008.*

Thousand short tons

2008 Rank	State	2007	2008	Percent Change
1	Wyoming	453,568	467,644	3.1%
2	West Virginia	153,480	157,778	2.8%
3	Kentucky	115,280	120,323	4.4%
4	Pennsylvania	65,048	65,414	0.6%
5	Montana	43,390	44,786	3.2%
6	Texas	41,948	39,017	-7.0%
7	Indiana	35,003	35,893	2.5%
8	Illinois	32,445	32,918	1.5%
9	Colorado	36,384	32,028	-12.0%
10	North Dakota	29,606	29,627	0.1%
11	Ohio	22,575	26,251	16.3%
12	New Mexico	24,451	25,645	4.9%
13	Virginia	25,346	24,712	-2.5%
14	Utah	24,288	24,275	-0.1%
15	Alabama	19,327	20,611	6.6%
16	Arizona	7,983	8,025	0.5%
17	Louisiana	3,127	3,843	22.9%
18	Maryland	2,301	2,860	24.3%
19	Mississippi	3,545	2,842	-19.8%
20	Tennessee	2,654	2,333	-12.1%
21	Alaska	1,324	1,477	11.6%
22	Oklahoma	1,648	1,463	-11.2%
23	Missouri	236	247	4.7%
24	Kansas	420	229	-45.5%
25	Arkansas	83	69	-16.9%
	Refuse Recovery	1,156	1,408	21.8%
	Appalachian	377,800	390,218	3.3%
	Interior	146,668	146,586	-0.1%
	Western	621,012	633,597	2.0%
	East of Mississippi R.	477,006	491,935	3.1%
	West of Mississippi R.	668,474	678,467	1.5%
	U.S. Total	1,146,635	1,171,809	2.2%

Source: U.S. Energy Information Administration, Annual Coal Report, 2008; Utah production from UGS coal company questionnaires

Note: Utah production differs from EIA due to different reporting methods, but the overall totals match EIA data.

Prices and Revenue

The average mine-mouth price for Utah coal increased 10.3% in 2008 from $25.18 per short ton in 2007 to $27.78, the highest nominal price since 1984 (table 2). As recently as 2003, the average Utah coal price was at a 30-year low of $16.64 per ton in nominal dollars. Many Utah mines are unable to take advantage of the presently high spot price for coal, currently at about $40.00 per ton, because their production is mostly committed to lower-priced contracts, thus reducing the overall average mine-mouth price. However, the average coal price is expected to increase slightly as demand for coal remains steady, older lower-priced contracts expire, and mining becomes more difficult. Consequently, the average mine-mouth price for 2009 is estimated to increase by 4.4% to $29 per ton. This price is still well below the highest inflation-adjusted price reached in 1976 of $86.44 (table 2).

Revenues from coal produced in Utah increased 10.3% to a record-high $674 million in nominal dollars in 2008, based solely on an increase in price per ton. This is well below the inflation-adjusted high of $1.1 billion reached in 1982. A significant decrease in production in 2009 will offset higher coal prices and push estimated revenues down 6.7% to $629 million.

Employment

During 2008, the number of active mines dropped from 10 to 9, but the total number of employees increased from 1888 to 1973 (table 2). Employment increased at the Bear Canyon mine in anticipation of longwall mining, and there were minor increases at Dugout, Skyline, Horizon, and West Ridge, the last of which has ramped up production to offset the closures at the Aberdeen and Crandall Canyon mines (table 3). Unfortunately, these employment increases will not translate into higher production, and total average employment for 2009 is estimated to drop to 1905, mostly resulting from the sudden closure of the Bear Canyon mine. Employment totals should increase in the next few years as the Lila Canyon and Coal Hollow mines are both in the development stages.

Coal Mining Productivity

Production efficiency at Utah coal mines remained steady in 2008 at 5.87 tons per employee-hour (table 2). The SUFCO mine remains the state's most productive, producing 9.2 tons per employee-hour, albeit lower than 2006's productivity of 11.9 tons per employee-hour. The Dugout and West Ridge mines rank second and third in productivity at 7.6 and 6.4 tons per employee-hour, respectively. The Emery mine had the highest productivity, 3.4 tons per employee-hour, among mines that rely only on continuous miner equipment. Utah's 2008 productivity is less than the average 6.5 tons per employee-hour for underground mines in the western United States (EIA, 2008 Annual Coal Report). Preliminary data indicate that mining productivity in Utah declined during 2009 to 5.4 tons per employee per hour due to large decreases in production, but only a modest reduction in employment.

On average, each employee produced 12,300 tons during 2008, down from 12,900 tons in 2007, but still higher than the 1990s' average of 11,600 tons per employee and much higher than the 1980s' average of 5,300 tons per employee. Utah's most productive year was in 2002 when productivity reached

Table 2. *Utah coal industry production, employment, productivity, prices, and revenue, 1960–2009.*

Year	Production	# of Operators	# of Mines	Employment[1]	Productivity	Average Mine-mouth Price		Revenue	
	Thousand short tons			# of employees	Tons/employee-hour	$/Ton (nominal dollars)	$/Ton (real 2009 dollars)	Million $ (nominal dollars)	Million $ (real 2009 dollars)
1960	4,955	na	45	2,418	na	6.35	46.02	31.5	228.0
1961	5,159	na	50	2,206	na	6.03	43.26	31.1	223.2
1962	4,297	na	38	2,034	na	5.40	38.35	23.2	164.8
1963	4,359	na	36	1,596	na	5.22	36.59	22.8	159.5
1964	4,720	na	35	1,679	na	7.03	48.64	33.2	229.6
1965	4,992	na	31	1,495	na	6.37	43.38	31.8	216.5
1966	4,636	na	25	1,374	na	5.77	38.20	26.7	177.1
1967	4,174	na	24	1,238	na	5.82	37.38	24.3	156.0
1968	4,317	na	23	1,155	na	5.77	35.57	24.9	153.5
1969	4,657	na	21	1,193	na	6.31	36.88	29.4	171.8
1970	4,733	na	20	1,469	na	7.28	40.25	34.5	190.5
1971	4,626	na	22	1,430	na	7.37	39.03	34.1	180.6
1972	4,802	na	22	1,582	na	8.93	45.83	42.9	220.1
1973	5,650	na	16	1,603	na	11.19	54.06	63.2	305.4
1974	6,046	na	15	1,514	na	12.24	53.26	74.0	322.0
1975	6,937	na	20	2,550	na	19.84	79.10	137.6	548.7
1976	7,968	na	24	2,614	na	22.93	86.44	182.7	688.8
1977	8,838	na	26	2,703	na	20.32	71.92	179.6	635.7
1978	9,253	na	28	3,424	na	21.52	70.80	199.1	655.1
1979	12,096	na	25	3,656	na	22.71	67.10	274.7	811.6
1980	13,236	na	29	3,512	na	25.63	66.72	339.2	883.1
1981	13,808	16	28	4,166	1.99	26.87	63.41	371.0	875.5
1982	16,912	16	29	4,296	2.05	29.42	65.39	497.6	1,106.0
1983	11,829	15	25	2,707	2.30	28.32	60.99	335.0	721.5
1984	12,259	15	24	2,525	2.55	29.20	60.28	358.0	739.0
1985	12,831	15	22	2,563	2.38	27.69	55.20	355.3	708.3
1986	14,269	16	21	2,881	2.59	27.64	54.09	394.4	771.9
1987	16,521	16	20	2,650	3.38	25.67	48.47	424.1	800.8
1988	18,164	14	17	2,559	3.74	22.85	41.43	415.0	752.6
1989	20,517	14	20	2,471	4.25	22.01	38.07	451.6	781.2
1990	22,012	13	18	2,791	4.44	21.78	35.74	479.4	786.8
1991	21,875	11	16	2,292	4.55	21.56	33.95	471.6	742.8
1992	21,015	10	16	2,106	5.09	21.83	33.38	458.8	701.4
1993	21,723	9	15	2,161	5.42	21.17	31.43	459.9	682.7
1994	24,422	8	14	2,024	6.20	20.07	29.05	490.1	709.4
1995	25,051	7	14	1,989	6.54	19.11	26.90	478.7	673.8
1996	27,071	7	13	2,077	6.77	18.50	25.29	500.8	684.7
1997	26,428	8	16	2,091	6.01	18.34	24.51	484.7	647.8
1998	26,600	8	17	1,950	6.23	17.83	23.46	474.3	624.1
1999	26,491	8	15	1,843	6.71	17.36	22.35	459.9	592.1
2000	26,920	8	13	1,672	7.54	16.93	21.09	455.8	567.7
2001	27,024	7	13	1,564	6.50	17.76	21.51	479.9	581.3
2002	25,299	8	13	1,525	7.73	18.47	22.02	467.3	557.1
2003	23,069	9	14	1,595	7.30	16.64	19.40	383.9	447.5
2004	21,818	8	13	1,523	6.78	17.70	20.10	386.2	438.5
2005	24,556	8	13	1,803	6.44	19.34	21.24	474.9	521.6
2006	26,131	8	13	1,994	6.18	22.51	23.95	588.2	625.8
2007	24,288	8	10	1,888	5.88	25.18	26.05	611.6	632.8
2008	24,275	7	9	1,973	5.87	27.78	27.68	674.4	671.9
2009*	21,718	6	8	1,905	5.36	29.00	29.00	629.8	629.8

Source: UGS coal company questionnaires

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

*Preliminary

Table 3. *Coal mining employment in Utah by coal mine, 2001–2009.*

Company	Mine	County	2001	2002	2003	2004	2005	2006	2007	2008	2009*
			Number of employees								
UtahAmerican Energy, Inc. — Tower Division	Aberdeen/Pinnacle[1]	Carbon	32	116	136	134	166	219	163	58	5
Canyon Fuel, LLC — Arch Coal, Inc.	Dugout Canyon	Carbon	77	121	171	206	217	231	229	247	289
	Skyline #3	Emery/Carbon	351	234	183	38	120	185	197	210	216
	SUFCO	Sevier	273	275	291	295	303	337	368	365	369
CONSOL Energy	Emery	Emery	3	61	60	116	130	140	140	144	169
Hiawatha Coal Company[2]	Bear Canyon #1, #3, #4	Emery	134	138	156	45	115	121	76	217	100
Energy West Mining Co.	Deer Creek	Emery	335	331	341	354	362	358	356	358	342
	Trail Mountain	Emery	71	--	--	--	--	--	--	--	--
GENWAL Resources, Inc.— UtahAmerican Energy, Inc., Intermountain Power Agency	Crandall Canyon/ South Crandall Canyon[3]	Emery	124	98	73	141	197	154	54	--	--
America West Resources, Inc— Hidden Splendor Resources, Inc.	Horizon[4]	Carbon	16	29	45	45	44	60	76	97	75
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[3]	Carbon	100	101	117	149	149	189	229	277	340
Total			1,564	1,525	1,595	1,523	1,803	1,994	1,888	1,973	1,905

Source: UGS coal company questionnaires

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

[2]Formally C.W. Mining (Co-op)

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

[3]Owned by Lodestar in 2001

*Preliminary

7.7 tons per employee-hour and each employee produced an average 16,600 tons.

Production By Coalfield

Mines in the Wasatch Plateau coalfield produced 62.0% of Utah's coal during 2008, up slightly from 58.6% the year before (table 4). The Skyline mine resumed longwall operations in May of 2006, producing 1.8 million tons in 2006, 2.6 million tons in 2007, and 3.1 million tons in 2008 (table 5). The Bear Canyon #4 mine began longwall production in late 2007, increasing production from 653,000 tons in 2007 to 868,000 tons in 2008. Financial problems forced the mine to close in the spring of 2009 after producing only 633,000 tons. Modest 2008 production increases were also recorded at the SUFCO (3.5%) and Deer Creek (5.2%) mines. Wasatch Plateau production decreased by 6% during 2009 due to the closure of the Bear Canyon mine and production declines at Skyline and SUFCO.

The Book Cliffs coalfield, with only two actively producing mines, accounted for 33.7% of total production in 2008, down from 37.1% the year before (table 4). Overall, production from these mines decreased by 10.2% in 2008 to 8.2 million tons and decreased again in 2009 by 22%. The UtahAmerican Tower Division, which operates the Aberdeen mine, greatly decreased production from 2.1 million tons in 2006 to 1.0 million tons in 2007, before closing the mine in January 2008 after producing 242,000 tons (table 5). Canyon Fuel's Dugout mine increased production from 3.8 million tons in 2007 to 4.1 million tons in 2008, but produced only 3.3 million tons in 2009. West Ridge mine production peaked in 2007 at 4.2 million tons before declining to 3.8 million tons in 2008, and decreased further to 3.1 million tons in 2009. The Book

Table 4. *Coal production in Utah by coalfield, 1870–2009.*

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	15,041	8,184	1,050	0	0	0	24,275
2009*	14,126	6,354	1,238	0	0	0	21,718
Cumulative Production	645,661	356,408	15,625	2,654	4,330	3,095	1,027,773

Source: UGS coal company questionnaires

*Preliminary

Cliffs coalfield will soon become a more prominent producer with the opening of the Lila Canyon mine (first production expected during 2011).

Coal production resumed in the Emery coalfield in 2002 with the reopening of the Emery mine (table 4). This mine produced 243,000 tons in 2003 before closing in August of that year due to contract and ownership issues. The Emery mine reopened in August of 2004 and produced 256,000 tons. Mining has been continuous from 2005 to 2008, with an average annual production of 1.1 million tons. The Emery coalfield produced 4.3% of Utah's coal during 2008.

The remainder of Utah's coalfields 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 (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 for the Alton coalfield in southern Utah's Kane County. This mine has the potential to produce up to two million tons of coal per year.

Production By County

Carbon County led all counties in coal production in 2008, reaching 11.5 million tons, 47.5% of Utah's total, down slightly from 11.8 million tons in 2007 (table 6). Increased production from the Skyline (where mining shifted to Carbon

Table 5. *Coal production and recoverable reserves in Utah by coal mine, 2001–2009.*

Thousand short tons

Company	Mine	County	Coalfield	2001	2002	2003	2004	2005	2006	2007	2008	2009*	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	242	--	--
	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	4,135	3,291	24,700
	Skyline #3[2]	Emery/Carbon	Wasatch Plateau	3,822	3,477	2,771	551	405	1,759	2,558	3,120	2,718	19,900
	SUFCO	Sevier	Wasatch Plateau	7,001	7,600	7,126	7,568	7,567	7,908	6,712	6,946	6,748	44,900
CONSOL Energy	Emery	Emery	Emery	--	26	243	256	1,187	1,054	1,026	1,050	1,238	16,900
Hiawatha Coal Company[3]	Bear Canyon #3	Emery	Wasatch Plateau	--	4	310	227	304	27	--	--	--	9,500[6]
	Bear Canyon #4	Emery	Wasatch Plateau	--	--	--	112	151	462	653	868	633	
	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	3,878	3,833	32,000
	Trail Mountain	Emery	Wasatch Plateau	924	--	--	--	--	--	--	--	--	--
GENWAL Resources, Inc.—UtahAmerican Energy, Inc., Intermountain Power Agency	Crandall Canyon[4]	Emery	Wasatch Plateau	3,996	3,248	1,161	872	1,593	613	400	--	--	--
	South Crandall Canyon[4]	Emery	Wasatch Plateau	--	--	26	103	225	759	--	--	--	--
America West Resources, Inc.—Hidden Splendor Resources, Inc.	Horizon[5]	Carbon	Wasatch Plateau	23	110	108	293	286	257	233	229	194	14,000
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	3,807	3,063	18,000
Total				27,024	25,299	23,069	21,818	24,556	26,131	24,288	24,275	21,718	179,900

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]Formally C.W. Mining (Co-op)

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

[5]Owned by Lodestar in 2001

[6]Combined total for entire operation

*Preliminary

County in 2005) and Dugout Canyon mines have partially offset declining production from the West Ridge mine, and kept Carbon County's total near its 2007 record high. The mines in Emery County maintained production at 5.8 million tons in 2008, 23.9% of Utah's total, but well below the county's peak production of 17.3 million tons in 1995. Emery County coal production should rebound when the Lila Canyon mine begins operation in the next few years. Sevier County's only active mine, SUFCO, increased production to 6.9 million tons in 2008, accounting for 28.6% of Utah's total coal production.

Preliminary production data for 2009 show a significant 20% decrease for Carbon County mines to 9.3 million tons, 42.7% of Utah's total. Declines are also predicted for Emery and Sevier Counties, which will provide 26.3% and 31.1%, respectively, of Utah's total production in 2009.

Production By Landownership

Federal leases continued to dominate Utah's production as mines on U.S. Bureau of Land Management (BLM) and U.S. Forest Service land accounted for 13.8 million tons, or 56.8%, of the state's total coal production in 2008 (table 7). This percentage has decreased since 2004 when production from federal leases made up 92.9% of total coal production. The percentage is expected to decrease in 2009 to 55.5%. This steady decline is the result of companies moving operations to state-owned land during the past five years.

Lands owned by the State of Utah supplied 9.3 million tons of coal in 2008, which is only slightly lower than the record set in 2007 of 9.6 million tons. State lands accounted for 38.3% of total state production in 2008, up significantly from just 3.9% in 2004. 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 decrease in 2009 to about 8.4 million tons, or 38.9% of the state's total, as Dugout, West Ridge, and SUFCO decrease their production.

Production on private (fee) land decreased from 2.0 million tons in 2007 to 1.2 million tons in 2008, 4.9% of Utah's total. Fee coal in 2008 was produced from the Emery, Bear Canyon, and Horizon mines. Coal production on private land is expected to remain steady at 1.2 million tons in 2009.

ACTIVITIES OF UTAH COAL OPERATORS

Utah coal production remained steady in 2008 at 24.3 million short tons. Production declines/losses at West Ridge and the now-closed Aberdeen mine were offset by production increases at Dugout Canyon, Skyline, SUFCO, and Deer Creek. Production in 2009 decreased 10.6% with the closure of the Bear Canyon mine as well as production declines at Dugout, Skyline, SUFCO, and West Ridge.

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 coalfield in Emery County. Development work is underway and the first produced coal is expected in 2011. Also, Alton Coal Development received a permit from the Utah Division of Oil, Gas, and Mining (DOGM) to mine on private land in the Alton coalfield (pending a reclamation bond posting), but work is still being performed on an Environmental Impact Statement, which is needed before the company can lease surrounding federal coal.

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, whereas 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 Lila Canyon mine in the Emery County portion of the Book Cliffs coalfield, which is currently being developed.

Tower Division—Aberdeen and Pinnacle Mines

The Tower Division is located in Deadman Canyon about 7 miles north of Price. The Aberdeen mine closed indefinitely on March 28, 2008, due to depth-related mining difficulties. Peak production at the Aberdeen mine, which was located in the Aberdeen bed, reached 2.1 million tons in 2006; production during 2008 totaled 242,000 tons before the mine closed. Tower's second operation, the Pinnacle mine, was closed in January of 2006 after producing from both the Gilson and Centennial beds.

Dry Canyon Coal Tract

UtahAmerican submitted an application in mid-2009 to lease the federally-owned Dry Canyon Coal tract located on 4325 acres adjacent to the company's Aberdeen mine. This tract has three potentially minable coal beds: the Aberdeen bed, which averages roughly 10 feet thick; the Kennilworth bed, which averages 8 feet thick; and the D bed, which averages about 6 feet thick. Total recoverable coal reserves within the

Table 6. *Coal production in Utah by county, 1870–2009.*

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	11,533	5,796	6,946	0	0	0	0	24,275
2009*	9,265	5,704	6,748	0	0	0	0	21,718
Cumulative Production	487,151	385,719	146,075	4,272	821	70	3,663	1,027,773

Source: UGS coal company questionnaires
*Preliminary

Table 7. *Coal production in Utah by landownership, 1980–2009.*

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	13,788	56.8%	9,295	38.3%	10	0.0%	1,182	4.9%	24,275
2009*	12,043	55.5%	8,440	38.9%	0	0.0%	1,235	5.7%	21,718

Source: UGS coal company questionnaires

*Preliminary

three beds are estimated at 42 million tons.

Lila Canyon Mine

The Lila Canyon mine is located south of Horse Canyon in the Book Cliffs coalfield in Emery County. UtahAmerican has obtained the necessary permits and has started construction on surface facilities. The company also began construction on the rock slopes necessary to access the coal. These slopes will be approximately 1200 feet long with a 12% upwards grade and will require about 1 to 1.5 years to complete. Coal production may begin in 2011. By the time the mine is at full capacity, a couple of years after the first produced coal, it could employ up to 200 people and produce up to 4.5 million tons of coal per year. Coal will be mined from federal leases where the merged upper and lower Sunnyside bed is about 13 feet thick. Between 26 and 40 million tons of recoverable coal are under lease, with ultimate recovery largely 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, which are located in the Wasatch Plateau. The mines were operated by GENWAL Resources, Inc., a wholly owned subsidiary of UtahAmerican Energy.

Production from the Hiawatha bed at the Crandall Canyon mine ceased in August 2007 after a major roof collapse. As recently as 2001, annual production at Crandall Canyon totaled nearly 4.0 million tons, but only 400,000 tons were produced in 2007 before the mine closed. The South Cran-

dall Canyon mine, located within the Blind Canyon bed, was closed by UtahAmerican in August of 2006 after producing only 1.1 million tons of coal in four years.

WEST RIDGE Resources, Inc.—West Ridge Mine

The West Ridge mine began operation in 1999 in the Book Cliffs coalfield with production from the lower Sunnyside bed. 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 3.8 million tons of coal in 2008, down from its record-high of 4.2 million tons in 2007. Production in 2009 declined to 3.1 million tons. UtahAmerican estimates that the West Ridge mine has 18 million tons of recoverable coal under lease.

Canyon Fuel Company—Arch Coal

Dugout Canyon Mine

The Dugout Canyon mine, located in the Book Cliffs coalfield, produced 4.1 million tons of coal from the Gilson bed in 2008, 8.4% more than the 3.8 million tons produced in 2007. Dugout's production decreased by 20% in 2009 to 3.3 million tons. Coal production from the Rock Canyon bed ended in February of 2004, after which longwall equipment was moved to the stratigraphically lower Gilson bed. Canyon Fuel estimates that the Dugout mine has 25 million tons of recoverable coal remaining under lease.

Skyline Mine

Canyon Fuel Company's Skyline mine, located in the Wasatch Plateau coalfield, is currently mining in the Lower O'Connor 'A' bed on their North lease (Winter Quarters lease) in Carbon County. Production from this bed has grown from 405,000 tons produced in 2005 (half year of production) to 3.1 million tons in 2008. Production in 2009 decreased by 13.5% to 2.7 million tons. Canyon Fuel estimates that 20 million tons of coal can be recovered from current leases.

SUFCO Mine

SUFCO is Utah's largest coal producer and the seventh largest underground coal mine in the United States. It is also the only active coal mine in Sevier County. SUFCO produced 6.9 million tons of coal in 2008 from the upper Hiawatha bed, 12.2% less than record high production of 7.9 million tons achieved during 2006. Production at SUFCO decreased in 2009 to 6.7 million tons. Canyon Fuel estimates that roughly 45 million tons of reserves remain under lease in the upper and lower Hiawatha beds.

Canyon Fuel has nominated for leasing the federal Greens Hollow tract, located adjacent to the already acquired Quitchupah lease. A draft Environmental Impact Statement (EIS) was issued in the spring of 2009 and the BLM is currently addressing comments received in preparation for the final EIS. The Greens Hollow tract is thought to contain approximately 73 million tons of reserves within the lower Hiawatha bed.

Cottonwood Tract

On December 31, 2007, The Utah School and Institutional Trust Land Administration (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 for 8204 acres covering lands within the 1998 land exchange Cottonwood Coal Tract and the other for 600 acres within an adjacent SITLA section. Total coal reserves for the combined leases are estimated to equal 49 million tons.

CONSOL Energy

Emery Mine

CONSOL Energy's Emery mine, their only mine in the western United States, has produced just over one million tons each year from the Ferron Sandstone I bed since 2005 (1.1 million tons produced in 2008). Emery coal miners use a combination of three continuous miners to produce the shallow cover coal. Recoverable reserves under lease are estimated by CONSOL to total 17 million tons, but significant unleased reserves are known to be in the area (including near the undeveloped Hidden Valley mine).

Hiawatha Coal Company (Co-op)

Bear Canyon Mines

Hiawatha Coal Company (formally C.W. Mining) commenced longwall mining within the Tank bed in November of 2007. Production totaled 868,000 tons in 2008 as difficult mining conditions hampered longwall operation. The mine produced 633,000 tons of coal in 2009 before it was forced to close due to financial and legal problems. Several million tons of reserves are still available in the Tank, Blind Canyon, and Hiawatha beds in this area.

Energy West Mining Company (PacifiCorp)

Deer Creek Mine

Annual production at Energy West Mining Company's Deer Creek mine has averaged 3.8 million tons over the past 20 years, with 3.9 million tons produced in 2008, and 3.8 million tons in 2009. Energy West estimates that the State-owned Mill Fork tract, where production began in 2005, contains roughly 32 million tons of coal in two beds, the Blind Canyon and the Hiawatha. Five longwall panels were successfully developed within the Hiawatha bed before production shifted in February 2008 to the stratigraphically higher Blind Canyon bed. Production will resume in the Hiawatha bed after Blind Canyon reserves are depleted. Exploration drilling to delin-

eate the northern extent of the Mill Fork reserves is ongoing.

America West Resources, Inc.

Hidden Splendor Resources, Inc.—Horizon Mine

The Horizon mine, located approximately 11 miles west of Helper in the Wasatch Plateau coalfield, is owned and operated by Hidden Splendor Resources, a fully owned subsidiary of America West Resources. Since Hidden Splendor's acquisition of the mine in 2003, full-year production with one continuous miner has averaged 260,000 tons per year, with 2008 production down slightly to 229,000 tons. Estimates indicate that the Horizon mine produced 194,000 tons in 2009, with 14 million tons of coal remaining under lease.

Columbia Property

The Columbia property is located south of the town of Sunnyside in the Book Cliffs coalfield 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. In July of 2008, America West Resources 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 bed, which averages 15 feet thick and is under 1500 to 3500 feet of cover. America West estimates that 35 to 50 million tons of coal are located on company-owned land.

Alton Coal Development, LLC

Coal Hollow Mine

Alton Coal Development, LLC has proposed opening a new coal mine in the Alton coalfield in southern Utah's Kane County. Alton Coal plans to produce 2 million tons of coal annually from a surface mine on 440 acres of private land and 3600 acres of unleased federal land located about 3 miles south of the town of Alton. The coal would be transported by truck on U.S. Highway 89 to State Route 20 and then on Interstate 15 to a coal loadout facility west of Cedar City. A draft EIS is being prepared by the BLM for the proposed federal leasing action.

In June of 2006, the DOGM began processing Alton Coal Development's application to start mining on private land. On October 15, 2009, DOGM declared the company's permit application complete and a permit will be issued as soon as the company provides an adequate reclamation bond. After the permit is granted, production could start on private land, where reserves are estimated at 5 million tons. Reserves within the combined private and federal mining area are estimated between 40 and 45 million tons. The proposed surface mine would produce subbituminous coal from the Smirl bed in the Dakota Formation, which ranges from 9500 to 10,000 Btu per pound, and averages about 1% sulfur and 9% ash.

Carbon Resources, LLC

Kinney #2 Property

In June 2008, Carbon Resources submitted an application to DOGM for a permit to mine a 448-acre area located one half mile north of the town of Scofield, Utah. As of January 2009, Carbon Resources was in the process of responding to deficiencies in the application identified by DOGM. The proposed mine would be located in the Hiawatha coal bed, which averages 8 feet thick and is under about 700 feet of cover. After mining coal on the permitted acreage, the company envisions future production from their surrounding land and unleased federal coal.

DISTRIBUTION OF UTAH COAL

The total amount of Utah coal distributed to market is proportional to the amount of Utah coal produced. With production staying steady in 2008, distribution of Utah coal also remained steady at 24.8 million short tons (table 8). Large increases in electric utility sector demand, 20.3 million tons in 2007 to 21.5 million tons in 2008, were offset by significant declines in industrial sector demand, which fell from 3.9 million tons to 2.9 million tons. International exports increased from 173,000 tons in 2007 to an estimated 312,000 tons in 2008 and included exports to Canada, Mexico, and Korea.

Parallel with the decreased production in 2009, the distribution of Utah coal also declined. Utah coal producers are estimated to deliver a total of 22.3 million tons of coal in 2009, a 9.9% decrease compared to 2008, with 18.7 million tons expected to going to electric utilities, 3.4 million tons to industrial users, and 55,000 tons to residential and commercial customers. The following sections describe some of the major electric utility and industrial customers that use Utah coal. Note, this is not a comprehensive list of Utah coal customers.

Electric Utility Market

During 2008, 86.9% of Utah coal distribution (21.5 million tons) was delivered to the electric utility market in both Utah and other states (table 8). In 2008, coal fueled 81.9% of the electricity generated in Utah, which is substantially more than the U.S. average of 48.5%. This percentage has significantly decreased since 2005 when coal accounted for 94.2% of electric generation in Utah (see appendix table A8). Despite this declining market share, consumption of Utah coal at existing coal-fired power plants remains steady as electricity demand stays strong.

Table 8. *Distribution of Utah coal, 1981–2009.*

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	24,275	6,804	14,724	21,528	0	0	0	2,104	797	2,901	9	33	42	312	24,783
2009*	21,718	4,100	14,248	18,700	0	0	0	2,500	700	3,370	5	50	55	200	22,325

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 2007–2009 exports went to several different countries.

*Preliminary

Out-of-State Electric Utility Market

Electric utility companies outside of Utah received 6.8 million tons of Utah coal in 2008, somewhat less than the peak of 7.7 million tons delivered during 1998 (table 8). Nevada received the majority of that coal, 2.2 million tons, while 1.8 million tons went to electric plants in Alabama, 1.0 million tons went to electric utility markets in California, and 812,000 tons went to electric plants in Tennessee. The remaining tonnage went to Kentucky, Michigan, Missouri, Nebraska, and Wisconsin (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 began service in 1965, with Units 2, 3, and 4 added in 1968, 1976, and 1983, respectively. Each unit has efficient SO_2 scrubbers, and Unit 4 has a baghouse for enhanced air-particulate fly ash capture. The plant purchased 1.3 million tons of Utah coal in 2008 and 301,000 tons of Colorado coal (table 10). Utah coal

purchases in 2009 are estimated to increase to 1.5 million tons, supplemented by 167,000 tons which will be purchased from Colorado. Net power generation in 2008 was 3357 gigawatthours (GWh) running at 73% of capacity; generation is estimated to total 3392 GWh in 2009.

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 582 MW. Unit 1 came online in 1981 and Unit 2 was added in 1985; both units have baghouses for fly ash removal. In 2008, the North Valmy plant received 920,000 tons of Utah coal and about 750,000 tons of coal from Wyoming. Wyoming imports are estimated to reach 850,000 tons in 2009 and have increased steadily since 2003 when only 58,000 tons were purchased. Imports from Utah are estimated to increase slightly to 1.0 million tons in 2009. In 2008, the North Valmy plant generated 4529 net GWh at 86% of available capacity and is estimated to increase generation to 5027 GWh in 2009.

Utah's Electric Utility Market

The amount of coal delivered to electric utilities within Utah totaled 14.7 million tons in 2008, a 1.8% decrease over 2007's record high of 15.0 million tons (table 8). The downturn in Utah coal production from 2008 to 2009 is predicted to result in another decrease, 3.2%, in coal delivered to Utah electric plants in 2009, to 14.2 million tons. Future demand for coal at Utah power plants is expected to remain between 14 and 15 million tons per year, as no new coal plants are expected.

Table 9. *Distribution of Utah coal by state, 2008.*

Thousand short tons

Destination	Residential & Commercial	Coke Plants	Industrial	Electric Utility	Total
Alabama	--	--	--	1,813	1,813
Arizona	--	--	139	--	139
Arkansas	--	--	10	--	10
California	--	--	1,695	1,032	2,727
Idaho	9	--	--	--	9
Illinois	--	--	96	--	96
Indiana	--	--	199	--	199
Kansas	--	--	*	--	*
Kentucky	--	--	--	165	165
Michigan	--	--	*	94	94
Minnesota	--	--	11	--	11
Missouri	--	--	--	394	394
Nebraska	--	--	10	12	22
Nevada	--	--	185	2,224	2,409
Oregon	--	--	63	--	63
Tennessee	--	--	--	812	812
Utah	--	--	811	14,844	15,655
Washington	--	--	1	--	1
Wisconsin	--	--	7	258	265
Unknown	--	--	--	--	--
Total	9	--	3,227	21,648	24,884

Source: U.S. Energy Information Administration, Coal Distribution, 2008

Note: The data in this table is from EIA and is therefore slightly different than the data in table 8, which is from UGS coal company questionnaires.

*Amount less than 500 tons

PacifiCorp—Hunter: Unit 1 of PacifiCorp's Hunter power plant began operating in 1978 with Units 2 and 3 commencing operation 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.

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 5.5 million tons of Utah coal in 2008, up from 4.6 million tons in 2007, relying mostly on coal from Canyon Fuel mines (table 10). Net power generation increased to 10,247 GWh in 2008 from 2007's total of 9584 GWh. Hunter expected to receive 5.4 million tons of Utah coal in 2009 and estimates that net power generation will decrease slightly to about 10,000 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 are both tangentially-fired with dry bottoms and 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-NO_x burners, a separated overfire air system, a SO_2 scrubber, and pulse jet fabric filters for Unit 2. In 2008, Huntington generated a net of 7149 GWh, up slightly from 7122 GWh produced in 2007. Power generation is expected to remain steady in 2009.

Huntington's coal purchases totaled 3.3 million tons in 2008, which was about the same as in 2007 (table 10). The Deer Creek mine continues to supply most of the coal used at the Huntington plant, with smaller amounts coming from Canyon Fuel mines. Coal delivery in 2009 is estimated to decrease slightly to 3.0 million tons.

Table 10. *Utah and non-Utah coal purchases by select companies, 2003–2009.*

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:			Coal purchased in 2009* from:		
		UT	WY	CO	UT	WY	CO	UT	WY	CO	UT	WY	CO
PacifiCorp - Carbon	UT	637	--	--	625	--	--	585	--	--	639	--	--
PacifiCorp - Hunter	UT	5,186	--	--	4,613	--	--	5,455	--	--	5,365	--	--
PacifiCorp - Huntington	UT	2,485	--	--	3,344	--	--	3,257	--	--	3,035	--	--
DG&T - Bonanza	UT	--	--	1,723	86	--	1,428	11	--	2,059	--	--	2,260
IPP	UT	6,074	167	--	6,331	--	--	5,417	405	--	5,210	1,150	--
Ash Grove Cement	UT	127	--	--	102	--	--	113	--	--	96	--	--
Graymont	UT	184	--	--	183	--	--	180	--	--	100	--	--
Holcim	UT	59	31	--	37	56	1	27	40	--	16	40	--
Kennecott Utah Copper	UT	495	--	--	441	--	--	466	--	--	480	--	--
Utelite Corp.	UT	13	8	--	10	11	--	10	9	--	7	7	--
ACE Cogen. Plant [2]	CA	397			291			409			385		
Mt. Poso Cogen.[2]	CA	126			136			192			182		
Rio Bravo Jasmin Cogen.[2]	CA	60			60			74			78		
Rio Bravo Poso Cogen.[2]	CA	59			69			70			78		
Stockton Cogen.	CA	127	--	--	150	--	--	na	na	na	na	na	na
North Valmy Power Plant	NV	1,119	645	--	928	855	--	920	750	--	1,000	850	--
Reid Gardner Power Plant	NV	1,510	--	356	1,458	--	313	1,306	--	301	1,533	--	167

Source: UGS coal company questionnaires

Note: This table includes all Utah companies that use coal, but only a sampling of non-Utah companies that use Utah coal.

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

[2]Reports only Utah coal purchases

*Preliminary

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

Coal delivered to the Carbon power plant decreased from 625,000 tons in 2007 to 585,000 tons in 2008 (table 10). The plant generated a net of 1370 GWh in 2008, slightly more than the 1338 GWh generated in 2007. Net generation for 2009 is estimated to be near 1200 GWh. Coal purchases are estimated to increase to 639,000 tons in 2009, with increasing amounts of coal coming from Canyon Fuel mines.

Intermountain Power Agency—Intermountain Power Project: The IPA and its Intermountain Power Project (IPP), located north of Delta, were established in 1977 to provide power to 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. Possible strategies include burning biomass and/or sequestering carbon dioxide emissions. In addition, IPA has decided not to pursue a third coal-fired generating unit, stating that they will let the air-quality permit for Unit 3 expire.

As of April 2004, IPP increased its net capacity rating on its two coal-fired electric steam generating units to a combined 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 flame stabilization. Both Units 1 and 2 reduce pollution with low-NO_x burners, separated overfire air-port systems, baghouse technology, and SO_2 scrubber systems.

In 2008, IPP generated 14,444 GWh of power, down only slightly from the record setting 14,445 GWh produced in 2006. IPP purchased a total of 5.4 million tons of coal in 2008 from Utah mines and purchased an additional 405,000 tons from mines in Wyoming (table 10). For 2009, IPP is estimating power generation to decrease only slightly to a net of 14,388 GWh, and coal deliveries should total 6.4 million tons, with 5.2 million tons from Utah and 1.2 million tons from Wyoming.

Cogeneration Market

Out-of-State Cogeneration Market

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 be replaced by cleaner technology. At present, circulating fluidized-bed combustion is the most dominant technology for cogen facilities due to its low sulfur and nitrogen oxide emissions and its ability to burn a variety of fuels, including high-ash coal.

ACE Cogeneration: Located in Trona, California, the ACE Cogeneration plant, with a capacity of 102 MW, produced 790 net GWh of electricity during 2008 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 2008 reached 93.4%, but is estimated to decrease to 91.4% in 2009 with power generation equaling 776 GWh. Deliveries of Utah coal in 2008 totaled 409,000 tons, up 40.5% compared to 2007; deliveries are estimated to decrease in 2009 to 385,000 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 from nearby oil wells. As with other cogeneration plants, the remaining generation capacity is supplied to the consumer grid. In 2008, Mt. Poso generated 410 net GWh of electricity, an increase of 5.1% over 2007. Net generated power is estimated to increase slightly in 2009 to 416 GWh. During 2008, Mt. Poso purchased 192,000 tons of Utah coal, 41.2% more than the 136,000 tons purchased in 2007 (table 10). Utah coal deliveries are estimated to decrease in 2009 to 182,000 tons.

Rio Bravo Poso: Rio Bravo Poso is also located in Bakersfield, California, and 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 291 GWh in 2008 and purchased 70,000 tons of Utah coal (table 10). Plant utilization and availability were 94.5% and 97.4%, respectively. Plant availability during 2009 is estimated to decrease slightly to 95%, while power generation is expected to remain steady. Utah coal deliveries in 2009 are estimated to increase to 78,000 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 2008 were 96.6% and 96.2%, respectively, producing a net of 297 GWh of electricity. Rio Bravo Jasmin purchased 74,000 tons of Utah coal in 2008, nearly double the 33,000 tons purchased in 2005 (table 10). Net electricity generation for 2009 is estiamted to decrease slightly to 292 GWh, and Utah coal purchases should increase to 78,000 tons.

Utah's Cogeneration Market

Sunnyside Cogeneration market: The Sunnyside Cogeneration plant is owned and operated by Constellation Energy Company and 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 the power from the Sunnyside cogen plant goes directly to the grid.

The Sunnyside plant is rated at 51 net MW and uses circulating fluidized-bed combustion technology to burn waste coal from the closed Sunnyside coal washing operation, as well as waste coal from the 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 heating value of typical 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, and averages 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 403,000 tons of waste coal during 2008. Net power generation in 2008 totaled 414 GWh, up from the 404 GWh generated in 2007. This figure is estimated to decrease slightly to 412 GWh in 2009 based on the consumption of 433,000 tons of waste coal.

In contrast to conventional pulverized coal combustion, where high-ash content hampers performance, the circulating fluidized-bed 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. The limestone helps to maintain proper bed density and eliminate sulfur emissions. A baghouse is used to remove fly ash and help control particulate emissions.

Industrial Market

Out-of-State Industrial Market

Deliveries of Utah coal to industrial plants in other states reached a record 3.5 million tons in 2002 (table 8). In 2008, deliveries decreased by a significant 34.3% over the previous year to 2.1 million tons as more coal was diverted to electric utilities. Deliveries for 2009 are estimated to increase slightly to 2.5 million tons.

California is the largest industrial consumer of Utah coal, with deliveries of 1.7 million tons in 2008 (table 9). Other states receiving significant amounts of Utah coal for industrial use were Arizona, Arkansas, Illinois, Indiana, Minnesota, Nebraska, Nevada, Oregon, and Wisconsin. 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's Industrial Market

The amount of coal delivered to industrial users within the state of Utah had steadily declined from 792,000 tons in 2001 to only 587,000 tons in 2004 (table 8). Deliveries in 2005 increased dramatically (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 recovered somewhat in 2008 reaching 797,000 tons. With the downturn of the economy in 2009, industrial demand in Utah is estimated to decrease to about 700,000 tons. Similar to the previous few years, only minor amounts of out-of-state coal were purchased by industrial users in Utah in 2008, and should be about the same in 2009 (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 2008, this plant purchased 113,000 tons of Utah coal, slightly more that the 102,000 tons purchased in 2007 (table 10). Utah coal purchases for 2009 are estimated to decrease to 96,000 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 180,000 tons of Utah coal in 2008 and only about 100,000 tons in 2009 (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 2008, this plant purchased 27,000 tons of Utah coal and 40,000 tons of coal from Wyoming (table 10). In 2009, Holcim purchased only about 16,000 tons of Utah coal and 40,000 tons of Wyoming coal. Holcim hopes to reduce its coal consumption and increase 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. Kennecott has four pulverized coal-fired boilers, three wet bottom and one dry bottom; together they are rated at 172 MW. In 2008, Kennecott produced 848 net GWh of electricity, down slightly from the 889 GWh generated in 2007, based on a plant availability of 96%. Generation is estimated to increase in 2009 to 863 GWh. During 2008, Kennecott purchased 466,000 tons of Utah coal (table 10). In 2009, coal purchases increased to about 480,000 tons.

Utelite Corporation: The Utelite Corporation, located near the town of Coalville, produces expanded lightweight shale aggregates that are 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 19,000 tons of coal in 2008, 10,000 tons from Utah and 9,000 tons from Wyoming (table 10). Plans for 2009 called for deliveries of 14,000 tons of coal from Utah and Wyoming.

Utah's 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, and 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 42,000 tons of Utah coal was shipped to businesses and residences during 2008, with 33,000 tons going to Utah customers and 9000 tons going to customers out-of-state (table 8). This is substantially less than the 654,000 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 pipeline 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 tons in 1996, matching peaks in both production and total distribution (table 8). Through 2003, as deliveries dwindled to 222,000 tons, all exported coal went to Asian markets. In 2004, 295,000 tons of Utah coal went to Canadian markets, followed by 212,000 tons in 2005 and only 34,000 tons in 2006. Exports increased again in 2007 and 2008 as companies reported that a total of 173,000 and 312,000 tons of Utah coal went to Canada, Mexico, and Korea.

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 tons of coal per year and employ up to 12 individuals. Processed coal tonnage numbers are unavailable for 2008.

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 uses a heavy media process and has a cleaning capacity of 2 million tons per year. Canyon Fuel plans to operate 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 consistent ash and heating values. Processed coal tonnage numbers are unavailable for 2008.

COAL IMPORTED INTO UTAH

Coal imports into Utah increased 68.0% in 2008 from 1.5 million short tons in 2007 to 2.5 million tons in 2008 (table 11). Nearly all of this imported coal went to the Bonanza power plant in eastern Utah, which primarily uses coal from a company-owned mine in Colorado. However, when coal production dips in Utah, like it did in 2004, industrial and electric power companies purchase coal from Wyoming and Colorado to meet their needs. With a decrease in coal production in 2009, Utah coal imports are estimated to increase by 37.6% to 3.5 million tons, a new record high.

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 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 2008, the Bonanza power plant purchased 2.1 million 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 11,000 tons of Utah coal in 2008. The Bonanza plant burned 2.1 million tons of coal to generate a net of 3731 GWh of electricity in 2008. Power plant availability reached 97% in 2008, with plant utilization at 93%. Both figures are estimated to decrease to near 87% in 2009, with a total net generation of 3520 GWh. Bonanza purchased about 2.3 million tons of coal from Blue Mountain Energy in 2009.

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.

Table 11. *Utah coal imports, 1981–2009.*

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	2,464	0	49	0	2,513
2009*	3,410	0	47	0	3,457

Source: UGS coal company questionnaires

*Preliminary

Intermountain Power Agency—Intermountain Power Project

IPP continues to purchase relatively small amounts of Wyoming coal with 468,000 tons delivered 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 have contrib-

uted to IPP's decision to purchase coal from other states. Although the company purchased no Wyoming coal in 2007, it did purchase 405,000 tons in 2008 and purchased about 1.2 million tons in 2009.

Industrial Plants

Holcim's Devil's Slide cement plant imported 40,000 tons of coal from Wyoming, which is about 60% of their annual consumption (table 10). The company plans to purchase another 40,000 tons of Wyoming coal in 2009. Holcim cites coal quality issues as the main reason for purchasing out-of-state coal. Utelite also purchased 9000 tons of Wyoming coal in 2008, and purchased similar amounts in 2009. Kennecott Utah Copper imported 175,000 tons of Wyoming coal and 2500 tons of Montana coal 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 specialty coal 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

After a relatively productive year in 2006, when coal production totaled 26.1 million short tons, Utah's coal industry suffered a few setbacks due to mine closures and difficult mining conditions, dropping production to 24.3 million tons for both 2007 and 2008. With the 2009 closure of the Bear Canyon mine, and unexpectedly low production from several other mines, Utah's total coal production for 2009 dropped to 21.7 million tons, the lowest level since 1993. On a more positive note, after a 10 year effort to secure the necessary permits, UtahAmerican Energy has finally begun construction on the Lila Canyon mine, with first coal production expected in 2011. Coal produced from Lila Canyon should help reverse production losses from recent mine closures and increasingly difficult mining conditions at other mines.

Utah's long-term (50+ years) coal future is less certain. With the high-quality reserves being rapidly depleted in the Book Cliffs and Wasatch Plateau coalfields, coal companies will have to look to other Utah coalfields 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 coalfields, which is sufficient for roughly 45 to 50 years at current production levels. In addition, the long-term use of coal for electric generation remains uncertain as questions of global warming and carbon mitigation, whether through carbon taxes, caps, offsets, or sequestration, receive increased attention.

In 2009, coal-fired power generation satisfied more than a third of global electricity demand, about half of the United State's electricity needs, and about 82% of Utah's electricity generation. In spite of this present dominance in electric generation, emission standards remain a major undefined regulatory issue for future coal-fired generation. New legislation and research on clean coal technology, including coal gasification and coal-to-liquid plants, are being vigorously debated and pursued both globally and domestically. Also, research continues on carbon sequestration, including several projects in Utah; for additional information about current local 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 2009 predicts that U.S. coal production will increase by an average of 1.5% each year until 2015, when total production will equal 1213 million tons. Coal production growth should slow between 2015 and 2030, averaging only 0.3% per year, reflecting the uncertain future of coal in the electric utility sector. Notably, forecasted coal production growth is anticipated to grow much more slowly than suggested by previous forecasts as future electricity demand is expected to be met by increased renewable, natural gas, and nuclear energy generation. The EIA forecast also assumes that coal-to-liquids plants will begin operating by 2011. Cheap, low-sulfur coal from western mines, especially those in Wyoming's Powder River Basin, is expected to furnish nearly all of the new coal production predicted for the United States. Production from the Powder River Basin is expected to increase from 452 million tons in 2008 to about 502 million tons in 2030. Interior Region coal production is also projected to increase from 138 million tons in 2008 to about 212 million tons in 2030, while Appalachian Region production is expected to decrease from 390 to about 327 million tons over the same period (figure 1). EIA predicts that Rocky Mountain (Utah and Colorado) coal production will remain between 50 and 60 million tons throughout the next two decades.

Preliminary data from Utah coal companies shows a significant decrease in production during 2009 to 21.7 million tons, with production projections indicating a slight increase during 2010 to about 22.2 million tons. With the recent closures of the Crandall Canyon, Aberdeen, and Bear Canyon mines, production will remain at this lower level until at least 2011 when the Lila Canyon mine is expected to begin operations. Declining reserves at many existing mines suggest that the future of Utah coal production will depend on new mines opening in new areas.

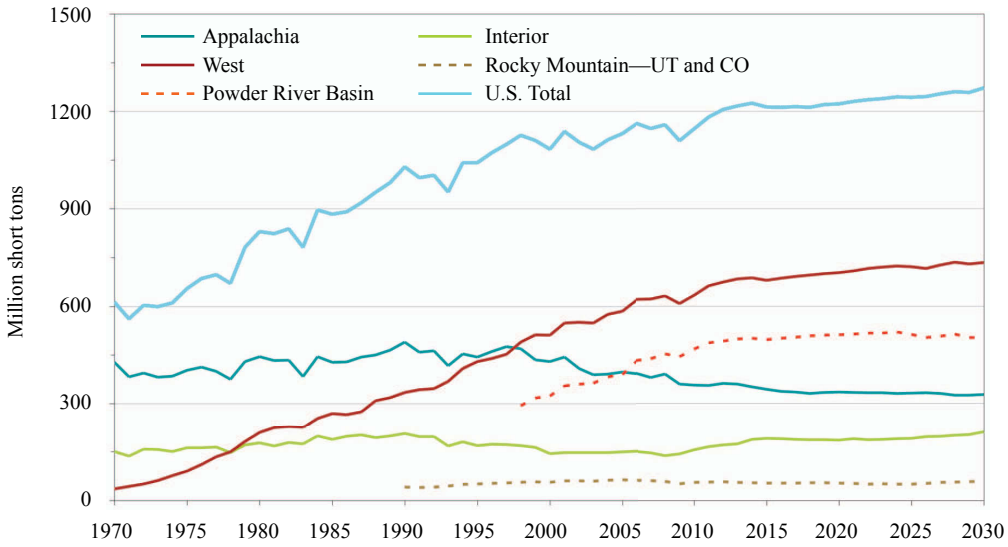

Figure 1. *U.S. coal production by region, 1970–2030*

Source: U.S. Energy Information Administration, Annual Energy Outlook 2009
Note: Data available in appendix table A1

Prices

EIA projects that the average U.S. mine-mouth coal price will increase annually by 1.6% from $29.35 per ton in 2008 to $32.43 per ton in 2015 (figure 2). Between 2015 and 2030, the average U.S. coal price is projected to increase by 2.7% each year to about $48.00 per ton as mining becomes more difficult in many regions of the United States. The average mine-mouth price of Rocky Mountain Region (Utah and Colorado) coal was $28.68 per ton in 2008 and is predicted to steadily increase at an average rate of 2.7% to roughly $52 per ton in 2030 (figure 3). In comparison, Powder River Basin coal is predicted to rise from $12.13 per ton to $25 at an average rate of 3.4% per year, Appalachian coal from $52.18 to $84 at an average rate of 2.2% per year, and Interior coal should rise from $29.44 to $59 at an average rate of 3.2% per year.

Responses to UGS questionnaires indicate that the average mine-mouth price for Utah coal decreased from $18.47 per ton in 2002 to $16.64 in 2003, the lowest price in the past 30 years. Since 2003, prices have increased by 66.9% to an average of $27.78 per ton in 2008 (table 2; figure 4). The average price of Utah coal is strongly influenced by long-term contracts; some Utah mines were selling coal in 2008 for only about $20.00 per ton. Conversely, current spot prices for Utah coal are as high as $40.00 per ton, which indicates upward pressure on the price of Utah coal as old low-priced contracts expire. Estimates indicate that the average Utah coal price will increase by 4.4% to $29 per ton in 2009 and could reach $30 by 2010. Also, as mining moves to thinner beds, the out-of-bed dilution will cause ash contents to rise, which may require operators to wash their coal to meet contract coal-quality specifications. Coal washing is already underway at the Castle Valley Preparation Plant and at the Wellington Cleaning Facility. Washing coal adds roughly $2.00 to $4.00 per ton to its delivered price. However, for the foreseeable future, Utah coal will have to compete with lower-cost Powder River Basin coal, which puts downward pressure on Utah's coal price.

Distribution and Consumption

EIA projects that domestic consumption of coal will total 1077 million tons in 2009, of which 1005 million tons, or 93.3%, will be consumed by electric power plants. Domestic consumption is projected to increase by 0.9% per year and reach 1305 million tons by 2030, with 1174 million tons of this coal 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 59 million tons will be consumed at new coal-to-liquids plants through 2030.

For 2008 and beyond, distribution of Utah coal is expected to parallel predicted rates of production. For example, with production expected to decrease 10.6% in 2009, distribution of Utah coal should decrease commensurately by 9.9% to 22.3 million tons (table 8).

Coal consumption in Utah has remained fairly steady over the past five years, averaging 17.6 million tons each year, with most of this coal (16.7 million tons) burned at electric power plants (figure 6). According to UGS data, coal consumption for power generation totaled a record-high 17.0 million tons in 2008 and accounted for 95.1% of the state's coal consumption. Coal consumption at electric plants is expected to remain the same in 2009, with overall consumption totaling

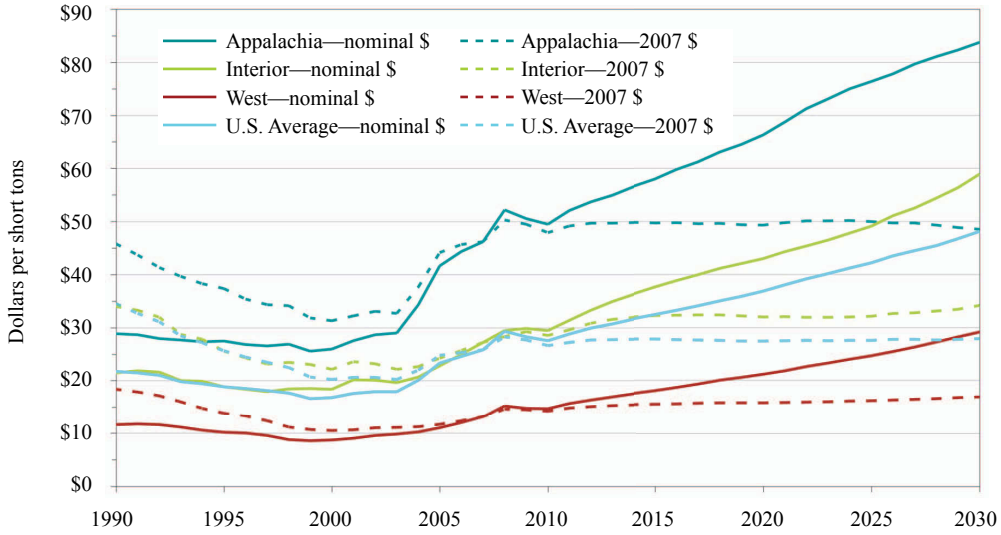

Figure 2. *Average mine-mouth price of U.S. coal by region, 1990–2030.*

Source: U.S. Energy Information Administration, Annual Energy Outlook 2009
Note: Data available in appendix table A2

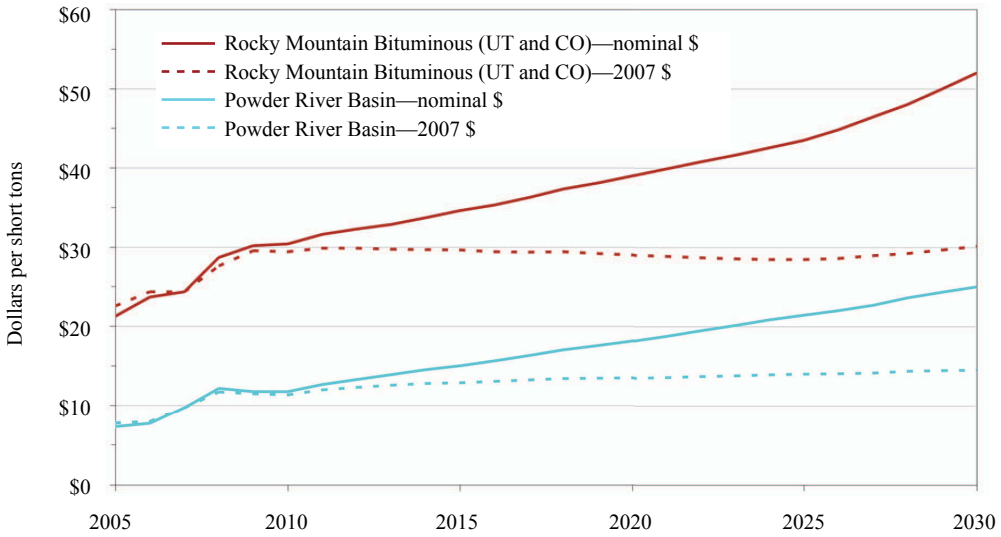

Figure 3. *Average mine-mouth price of Rocky Mountain and Powder River Basin coal, 2005–2030.*

Source: U.S. Energy Information Administration, Annual Energy Outlook 2009
Note: Data available in appendix table A2

17.7 million tons. In the last few years, Utah has added over 1000 megawatts from new natural gas-fired power plants. This new gas-fired capacity has reduced coal's contribution to Utah's electric generation from 94.2% in 2005 to 81.9% in 2008, while the natural gas share increased from 3.1% in 2005 to 15.6% in 2008.

Plans for 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 until carbon mitigation rules are developed and effective strategies identified. Until then, Utah coal consumption will likely remain near current levels.

One possible exception to steady future demand will be if an export market once again develops. Because Utah is a long distance from coal export terminals, this possibility requires favorable exchange rates or higher coal commodity prices to offset transportation cost.

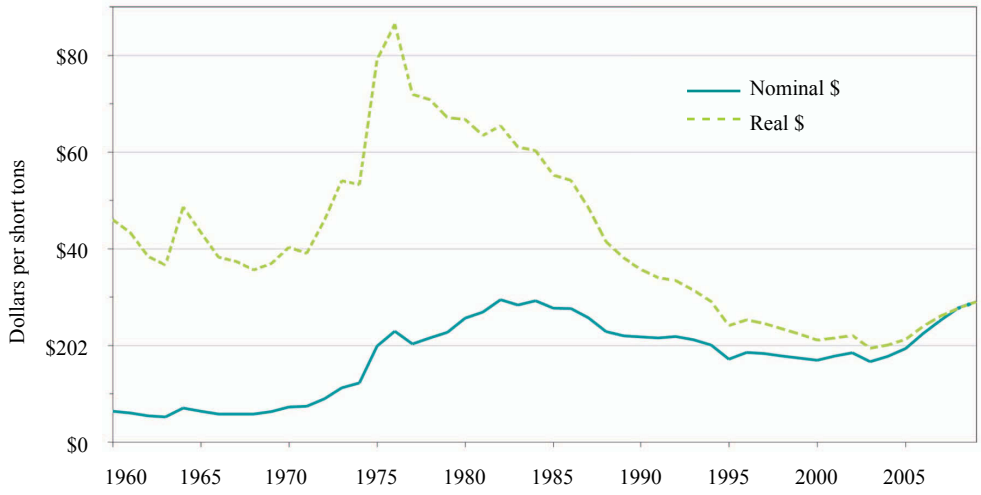

Figure 4. *Average mine-mouth price of Utah coal, 1960–2009.*

Source: UGS coal company questionnaires
Note: 2009 value is preliminary, data available in table 2

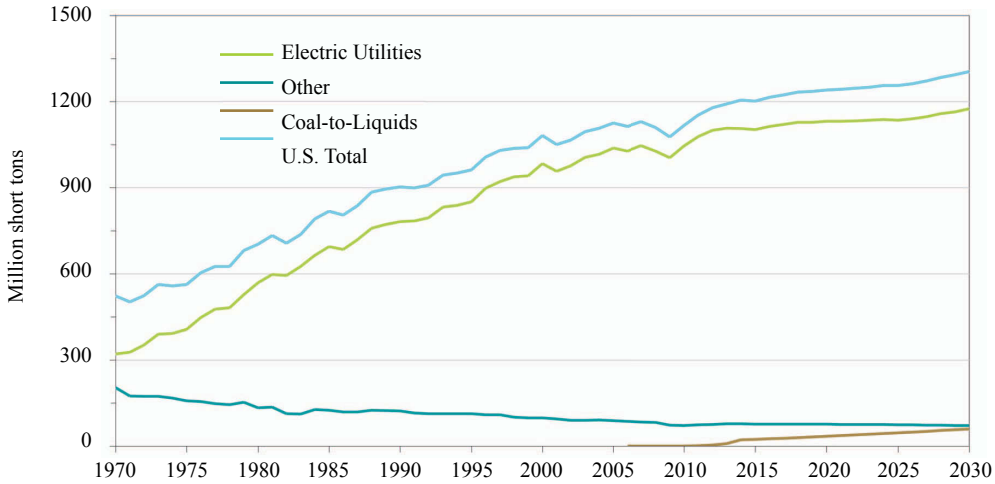

Figure 5. *U.S. coal consumption by sector, 1970–2030.*

Source: U.S. Energy Information Administration, Annual Energy Outlook 2009
Note: Data available in appendix table A3

Reserves

The Kaiparowits Plateau coalfield is estimated to contain about 9.1 billion tons, or 60.5%, of Utah's remaining potentially recoverable coal (figure 7); however, most of this coal cannot be developed because it lies within the Grand Staircase–Escalante National Monument. Other nonproducing Utah coalfields with good quality resources are far from transportation networks and require higher prices to justify the higher transportation costs. As a result, Utah coal production will continue to rely heavily on resources in the Wasatch Plateau coalfield, estimated at 1.3 billion tons; the Emery coalfield, estimated at 0.8 billion tons; and the Book Cliffs coalfield, with resources estimated at 0.7 billion tons. (Note: resource estimates are only constrained by geologic conditions, whereas reserve estimates are also constrained by economic factors).

Most Utah mining companies have leased coal reserves sufficient for 10 to 15 years of production. However, mines are having a harder time adding new leases to extend their reserve

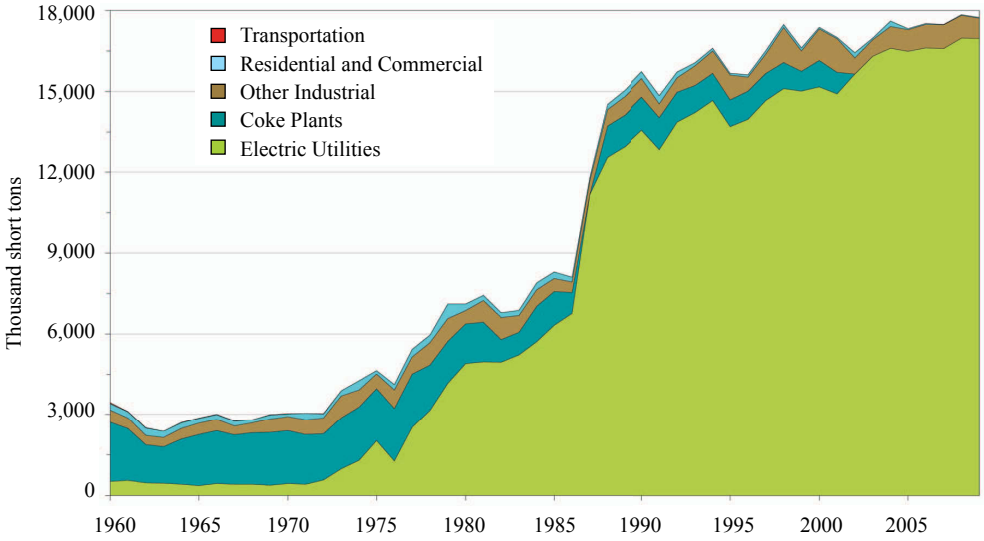

Figure 6. *Consumption of coal in Utah by end use, 1960–2009.*

Source: U.S. Energy Information Administration, Annual Coal Report, 2007; UGS
Note: 2009 values are preliminary, data available in appendix table A4

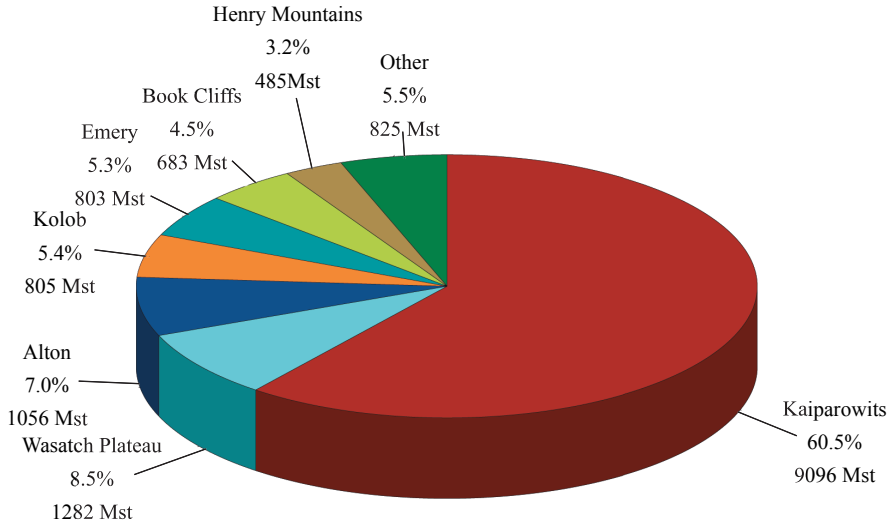

Figure 7. *Remaining estimated recoverable resource in Utah by coalfield, 2008.*

Source: Smith and Jahanbani, 1988; Quick and others, 2004; Bon and others, 2006
Note: Mst - Million short tons, data available in appendix table A5

base. Figure 8 demonstrates this fact; subtracting cumulative production from cumulative tonnage leased from 1975 to 2008 shows a general negative trend indicating that Utah production is outpacing tonnage leased. 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 adjacent to an operating mine. Combined reserves in these two tracts are estimated to exceed 100 million tons and could provide 20 to 30 years of production for two longwall operations. In addition, large reserves exist in the southern Book Cliffs where UtahAmerican has begun development work on the Lila Canyon mine. In total, the UGS estimates that roughly 275 million tons of reserves are available in the Wasatch Plateau coalfield, 686 million tons in the Book Cliffs, and 200 million tons in the Emery coalfield, 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).

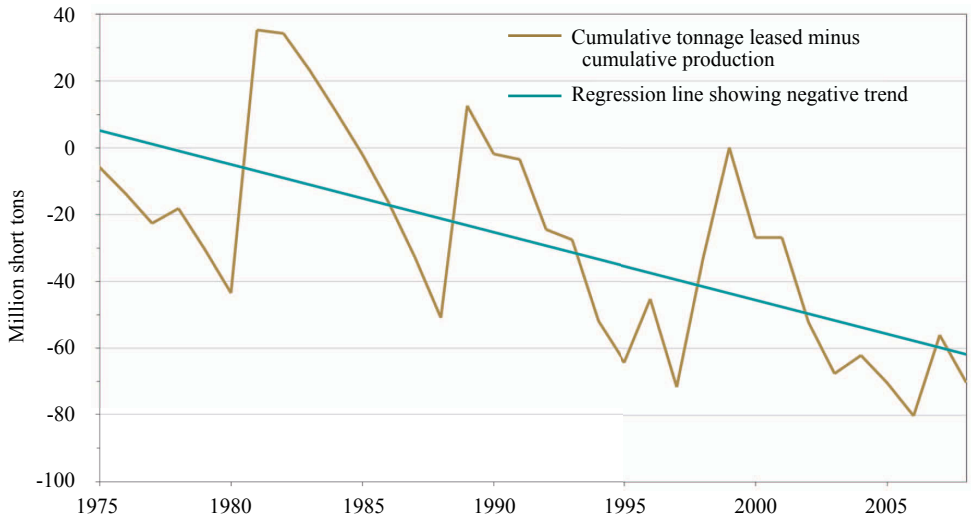

Figure 8. *Net increase/loss of new coal tonnage leased in Utah compared to cumulative production, 1975–2008.*
Source: U.S. Bureau of Land Management, SITLA, UGS
Note: The negative trend indicates coal is being produced faster than new tonnage is being leased.

The rapid depletion of central Utah coal will require future operators to consider difficult, lower-quality, or remote coal resources. For example, the Emery mine in the southern part of the Emery coalfield is located near unleased resources that could total more than 100 million tons, including resources in the Hidden Valley area. Also, the proposed mine in the Alton coalfield could produce up to 2.0 million tons per year of subbituminous coal from a projected reserve base of 40 to 45 million tons. These resources, and others, may become more attractive if prices keep rising and coal washing becomes more economic.

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APPENDIX

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

Million short tons

Year	Appalachia	Interior	West	Rocky Mountain—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	378.5	147.1	621.0	60.7	436.5	1,146.6
2008	390.2	137.8	630.6	59.4	451.8	1,158.6
2009	358.7	143.5	607.2	51.8	443.6	1,109.4
2010	355.9	156.8	632.5	55.4	466.9	1,145.1
2011	354.8	165.7	661.3	56.6	485.8	1,181.7
2012	361.3	171.0	673.4	57.5	491.1	1,205.6
2013	358.3	174.6	683.5	55.6	498.0	1,216.4
2014	350.6	188.6	686.1	54.7	500.2	1,225.3
2015	342.3	191.7	678.6	54.0	495.4	1,212.6
2016	335.9	190.7	685.4	54.0	499.9	1,212.0
2017	334.5	188.2	691.0	53.7	503.6	1,213.8
2018	329.3	187.9	695.1	54.1	507.1	1,212.3
2019	333.5	187.7	699.2	54.3	509.4	1,220.4
2020	334.1	186.7	702.2	53.9	511.2	1,222.9
2021	332.7	190.5	707.3	52.4	513.0	1,230.5
2022	332.3	187.9	714.9	50.6	515.6	1,235.0
2023	331.4	188.1	719.2	51.1	516.3	1,238.6
2024	330.3	191.1	723.1	50.8	519.2	1,244.4
2025	330.4	192.1	720.2	50.4	511.8	1,242.8
2026	331.9	197.3	715.7	52.7	501.9	1,244.9
2027	330.0	198.4	725.8	55.7	506.2	1,254.1
2028	324.5	201.0	734.7	56.2	513.3	1,260.2
2029	324.7	203.9	729.5	58.2	502.5	1,258.1
2030	326.9	211.8	733.6	60.0	501.8	1,272.3

Source: U.S. Energy Information Administration, Annual Energy Outlook, 2009

Note: The 2008 total is forecast, hence it does not match the actual 2008 total recorded in table 1.

Table A2. *Average mine-mouth 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 2007 dollars	Nominal dollars	Real 2007 dollars	Nominal dollars	Real 2007 dollars	Nominal dollars	Real 2007 dollars	Nominal dollars	Real 2007 dollars	Nominal dollars	Real 2007 dollars
1990	28.89	45.82	21.45	34.01	11.60	18.40	na	na	na	na	21.76	34.51
1991	28.69	43.67	21.86	33.27	11.71	17.83	na	na	na	na	21.49	32.71
1992	27.94	41.29	21.61	31.93	11.60	17.14	na	na	na	na	21.03	31.07
1993	27.64	39.66	20.03	28.73	11.14	15.98	na	na	na	na	19.85	28.48
1994	27.36	38.27	19.87	27.80	10.57	14.79	na	na	na	na	19.41	27.15
1995	27.45	37.34	18.81	25.59	10.15	13.81	na	na	na	na	18.83	25.61
1996	26.79	35.39	18.41	24.33	10.03	13.26	na	na	na	na	18.50	24.44
1997	26.55	34.30	17.91	23.14	9.52	12.30	na	na	na	na	18.14	23.43
1998	26.85	34.15	18.45	23.46	8.76	11.15	na	na	na	na	17.67	22.47
1999	25.58	31.83	18.52	23.05	8.59	10.69	na	na	na	na	16.63	20.69
2000	25.99	31.29	18.37	22.11	8.72	10.50	na	na	na	na	16.78	20.20
2001	27.55	32.25	20.14	23.58	9.06	10.60	na	na	na	na	17.59	20.59
2002	28.68	33.05	20.12	23.18	9.55	11.01	na	na	na	na	17.90	20.63
2003	29.02	32.69	19.65	22.13	9.84	11.09	na	na	na	na	17.93	20.20
2004	34.31	37.65	20.66	22.68	10.24	11.23	18.35	20.14	6.85	7.51	20.07	22.02
2005	41.62	44.17	22.82	24.23	11.01	11.69	21.25	22.56	7.25	7.70	23.32	24.75
2006	44.37	45.64	24.96	25.67	11.99	12.33	23.68	24.35	7.65	7.87	24.59	25.29
2007	46.16	46.16	27.18	27.18	13.10	13.10	24.33	24.33	9.65	9.65	25.82	25.82
2008	52.18	50.27	29.44	28.36	15.20	14.65	28.68	27.63	12.13	11.69	29.35	28.28
2009	50.51	49.45	29.87	29.25	14.79	14.48	30.16	29.53	11.72	11.47	28.29	27.70
2010	49.48	47.89	29.45	28.51	14.71	14.24	30.38	29.41	11.72	11.34	27.53	26.65
2011	52.02	49.14	31.33	29.60	15.69	14.82	31.59	29.84	12.63	11.93	28.79	27.20
2012	53.68	49.66	33.30	30.80	16.33	15.11	32.25	29.84	13.23	12.24	29.93	27.69
2013	54.97	49.68	34.91	31.55	16.92	15.29	32.85	29.69	13.85	12.52	30.71	27.76
2014	56.58	49.82	36.27	31.94	17.54	15.44	33.68	29.66	14.49	12.76	31.59	27.82
2015	58.01	49.69	37.63	32.23	18.05	15.46	34.59	29.62	14.99	12.84	32.43	27.77
2016	59.76	49.77	38.79	32.31	18.64	15.53	35.31	29.41	15.61	13.00	33.21	27.66
2017	61.18	49.55	39.96	32.37	19.32	15.65	36.22	29.34	16.30	13.20	34.06	27.59
2018	63.05	49.62	41.09	32.34	20.01	15.75	37.33	29.38	17.00	13.38	34.97	27.52
2019	64.48	49.34	42.02	32.16	20.55	15.72	38.10	29.15	17.52	13.41	35.86	27.44
2020	66.28	49.31	42.96	31.96	21.15	15.74	38.98	29.00	18.12	13.48	36.81	27.38
2021	68.74	49.74	44.29	32.05	21.83	15.79	39.88	28.86	18.76	13.58	37.99	27.49
2022	71.19	50.10	45.33	31.90	22.59	15.90	40.75	28.67	19.47	13.70	39.13	27.53
2023	73.07	50.10	46.46	31.86	23.27	15.95	41.60	28.53	20.12	13.79	40.11	27.50
2024	74.95	50.12	47.75	31.93	24.00	16.05	42.55	28.45	20.84	13.94	41.17	27.53
2025	76.36	49.92	49.07	32.08	24.65	16.11	43.50	28.43	21.41	14.00	42.17	27.57
2026	77.81	49.65	51.08	32.60	25.46	16.25	44.82	28.60	22.00	14.04	43.47	27.74
2027	79.68	49.66	52.50	32.72	26.29	16.39	46.46	28.96	22.66	14.13	44.48	27.73
2028	81.04	49.28	54.38	33.07	27.23	16.56	48.03	29.20	23.61	14.35	45.42	27.62
2029	82.26	48.81	56.34	33.43	28.21	16.74	49.98	29.66	24.34	14.44	46.72	27.72
2030	83.74	48.51	58.90	34.12	29.11	16.87	52.00	30.12	25.01	14.49	48.11	27.87

Source: U.S. Energy Information Administration, Annual Energy Outlook, 2009

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

Million short tons

Year	Electric Utilities	Other	Coal-to-Liquids[1]	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	1,027	86	--	1,112
2007	1,046	83	--	1,129
2008	1,027	82	--	1,109
2009	1,005	72	--	1,077
2010	1,045	72	--	1,117
2011	1,078	74	1	1,152
2012	1,099	76	3	1,178
2013	1,107	77	8	1,192
2014	1,106	77	22	1,205
2015	1,102	77	23	1,202
2016	1,113	76	25	1,214
2017	1,121	76	27	1,223
2018	1,127	76	29	1,232
2019	1,128	76	31	1,235
2020	1,131	76	34	1,240
2021	1,131	75	36	1,243
2022	1,133	75	38	1,246
2023	1,134	75	41	1,250
2024	1,137	75	43	1,255
2025	1,135	74	46	1,255
2026	1,140	74	48	1,262
2027	1,146	73	51	1,271
2028	1,157	72	54	1,283
2029	1,164	72	57	1,293
2030	1,174	71	59	1,305

Source: U.S. Energy Information Administration, Annual Energy Outlook, 2009

[1]Liquids production and liquids used for heat and power

Table A4. *Consumption of coal in Utah by end use, 1960–2009.*

Thousand short tons

Year	Electric Utilities[1]	Coke Plant	Other Industrial	Residential & Commercial	Transportation	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	16,593	0	870	23	0	17,486
2008	16,972	0	852	22	0	17,846
2009*	16,970	0	747	28	0	17,745

Source: U.S. Energy Information Administration, Annual Coal Report, 2007; UGS

Note: Consumption differs from distribution (table 8) because of additional consumption from consumer stockpiles.
[1]Includes waste coal burned at Sunnyside Cogeneration
*Preliminary

Table A5. *Utah coal resources by coalfield, 2008.*

Million short tons

Coalfield	Original Principal Resource[1]	Original Estimated Recoverable Resource[2]	Cumulative Production 1870–2008	Remaining Estimated Recoverable Resource	% of Total Remaining Estimated Recoverable Resource
Kaiparowits	22,740.0	9,096.0	0.1	9,095.9	60.5%
Wasatch Plateau	6,378.9	1,913.7	631.5	1,282.2	8.5%
Alton	2,155.0	1,055.7	0.0	1,055.7	7.0%
Kolob	2,014.3	805.9	0.9	805.0	5.4%
Emery	2,336.0	817.6	14.4	803.2	5.3%
Book Cliffs	3,527.3	1,033.5	350.1	683.4	4.5%
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	0.4%
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	1,006.1	15,035.1	

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 bed 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, 2008.*

Million short tons

County	Original Principal Resource[1]	Original Estimated Recoverable Resource[2]	Cumulative Production 1870–2008	Remaining Estimated Recoverable Resource	% of Total Remaining Estimated Recoverable Resource
Kane	19,579.6	8,025.6	0.1	8,025.5	53.5%
Garfield	7,493.1	3,106.3	0.0	3,106.3	20.7%
Emery	4,457.7	1,392.9	385.7	1,007.1	6.7%
Carbon	4,993.6	1,475.8	487.2	988.6	6.6%
Sevier	3,257.4	1,036.0	146.1	889.9	5.9%
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	1,027.8	15,013.4	

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 bed 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, 1990–2009.*

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	612,539	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	5,689,660	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	1,860,133	3,446,577	1.85	5,898,096	14,420,805	2.44	625,970	1,337,783	2.14	4,563,096	9,583,991	2.10
2008	2,076,286	3,731,300	1.80	6,097,775	14,444,378	2.37	640,349	1,369,915	2.14	4,735,769	10,238,479	2.16
2009*	1,921,427	3,735,106	1.94	6,400,000	14,449,789	2.26	612,050	1,204,984	1.97	4,547,900	10,246,965	2.25

Year	PacifiCorp			Constellation			Total		
	Huntington			Sunnyside Cogeneration Plant					
	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	15,643,508	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	415,939	0.85	16,483,611	35,240,801	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	3,227,226	7,121,757	2.21	417,998	404,184	0.97	16,592,519	36,315,097	2.19
2008	3,018,644	7,133,197	2.36	403,030	414,344	1.03	16,971,853	37,331,613	2.20
2009*	3,055,200	7,148,850	2.34	433,494	411,876	0.95	16,970,071	37,197,570	2.19

Source: UGS coal company questionnaires

*Preliminary

Table A8. *Net generation of electricity in Utah by energy source, 1960–2009.*

Gigawatthours

Year	Coal	Petroleum	Natural Gas	Other Gases[1]	Hydroelectric	Geothermal[2]	Wind	Landfill Gas	MSW[3]	Total
1960	1,130	1,314	290	na	304	0	0	0	0	3,038
1961	1,210	1,236	374	na	231	0	0	0	0	3,051
1962	998	934	433	na	393	0	0	0	0	2,758
1963	923	876	413	na	352	0	0	0	0	2,564
1964	855	824	324	na	765	0	0	0	0	2,768
1965	779	866	392	na	913	0	0	0	0	2,950
1966	1,001	765	700	na	791	0	0	0	0	3,257
1967	909	748	611	na	1,074	0	0	0	0	3,342
1968	931	758	444	na	1,017	0	0	0	0	3,150
1969	806	872	287	na	1,117	0	0	0	0	3,082
1970	948	956	307	na	738	0	0	0	0	2,949
1971	894	905	287	na	981	0	0	0	0	3,067
1972	1,165	657	320	na	1,220	0	0	0	0	3,362
1973	2,007	146	342	na	1,111	0	0	0	0	3,606
1974	2,678	69	312	na	941	0	0	0	0	4,000
1975	4,366	82	283	na	1,074	0	0	0	0	5,805
1976	2,739	32	183	na	1,130	0	0	0	0	4,084
1977	5,533	116	421	na	757	0	0	0	0	6,827
1978	7,238	90	565	na	734	0	0	0	0	8,627
1979	9,408	122	458	na	802	0	0	0	0	10,790
1980	10,870	63	358	na	821	0	0	0	0	12,112
1981	10,869	40	230	na	623	0	0	0	0	11,762
1982	10,635	29	203	na	1,024	0	0	0	0	11,891
1983	10,921	40	69	na	1,394	0	0	0	0	12,424
1984	12,321	30	8	na	1,391	38	0	0	0	13,788
1985	14,229	40	14	na	1,019	109	0	0	0	15,411
1986	15,155	74	6	na	1,413	171	0	0	0	16,819
1987	25,221	92	13	na	893	127	0	0	0	26,346
1988	28,806	59	5	na	593	174	0	0	0	29,637
1989	29,676	48	37	na	562	173	0	0	0	30,496
1990	31,523	52	146	182	508	152	0	0	0	32,564
1991	28,888	51	550	204	627	186	0	0	0	30,506
1992	31,553	34	631	230	602	233	0	0	0	33,284
1993	32,126	37	606	281	860	187	0	0	0	34,097
1994	33,131	33	807	281	750	233	0	0	0	35,235
1995	30,611	36	791	261	969	168	0	0	0	32,836
1996	31,101	47	324	239	1,049	223	0	0	0	32,983
1997	32,544	47	328	281	1,344	203	0	0	0	34,747
1998	33,588	35	528	285	1,315	195	0	0	0	35,945
1999	34,534	31	610	191	1,255	186	0	0	8	36,815
2000	34,491	58	890	258	746	186	0	0	9	36,639
2001	33,679	58	1,446	0	508	186	0	0	10	35,887
2002	34,488	54	1,380	0	458	218	0	0	11	36,608
2003	35,979	33	1,383	0	421	198	0	0	9	38,023
2004	36,618	33	910	0	450	195	0	0	7	38,212
2005	35,970	41	1,178	0	784	185	0	0	7	38,165
2006	36,856	62	3,389	0	747	191	0	9	11	41,264
2007	37,171	39	7,424	0	539	164	0	25	11	45,373
2008	38,020	44	7,366	36	668	254	24	25	142	46,579
2009*	35,368	39	5,959	20	560	220	100	26	150	42,442

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—includes biogenic and non-biogenic
*Preliminary

Table A9. *Average coal quality at Utah mines, 2008.*

Company	Mine	Coalfield	Bed(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'	11,400	0.3%	11.0%	8.6%
Canyon Fuel, LLC	SUFCO	Wasatch	Upper Hiawatha	11,028	0.4%	10.4%	10.3%
Canyon Fuel, LLC	Dugout Canyon	Book Cliffs	Gilson	12,000	0.5%	9.9%	6.3%
CONSOL Energy	Emery	Emery	I	12,260	na	na	na
Hiawatha Coal Co.	Bear Canyon #4	Wasatch	Tank	11,037	0.6%	16.0%	7.1%
Energy West Mining Co.	Deer Creek	Wasatch	Hiawatha/Blind Canyon	11,800	0.5%	11.1%	8.5%
Hidden Splendor Resources, Inc.	Horizon	Wasatch	Hiawatha	11,700	1.0%	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., 1985–2008.*

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	61,474	15,232	76,706	1,758,000
2007	922,000	21,875,000	58,330	15,298	73,628	1,754,000
2008	893,000	20,798,000	53,679	13,940	67,619	1,966,000

Source: [1]U.S. Energy Information Administration, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 2008

[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.

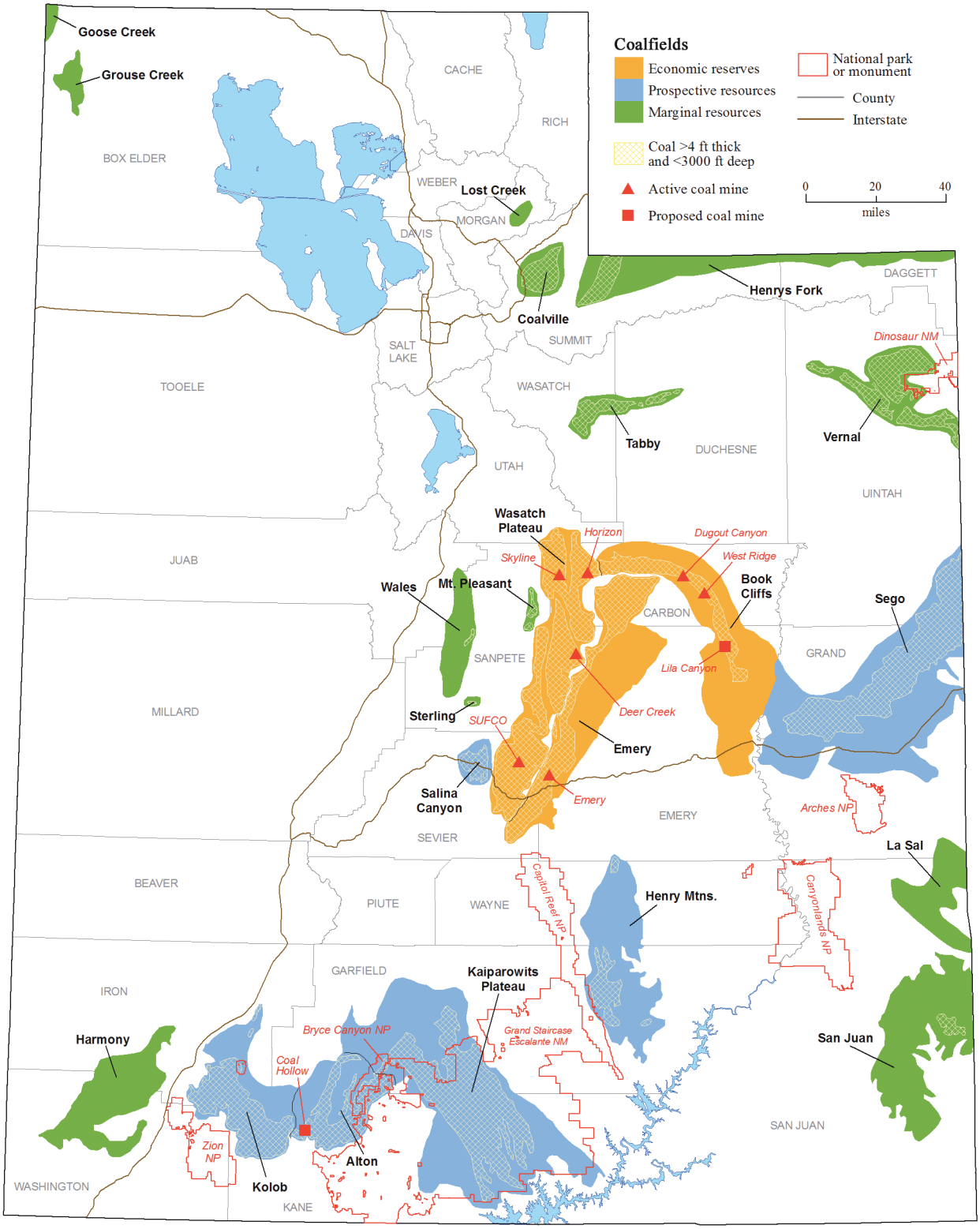

Figure A1. *Location and significance of Utah coalfields.*

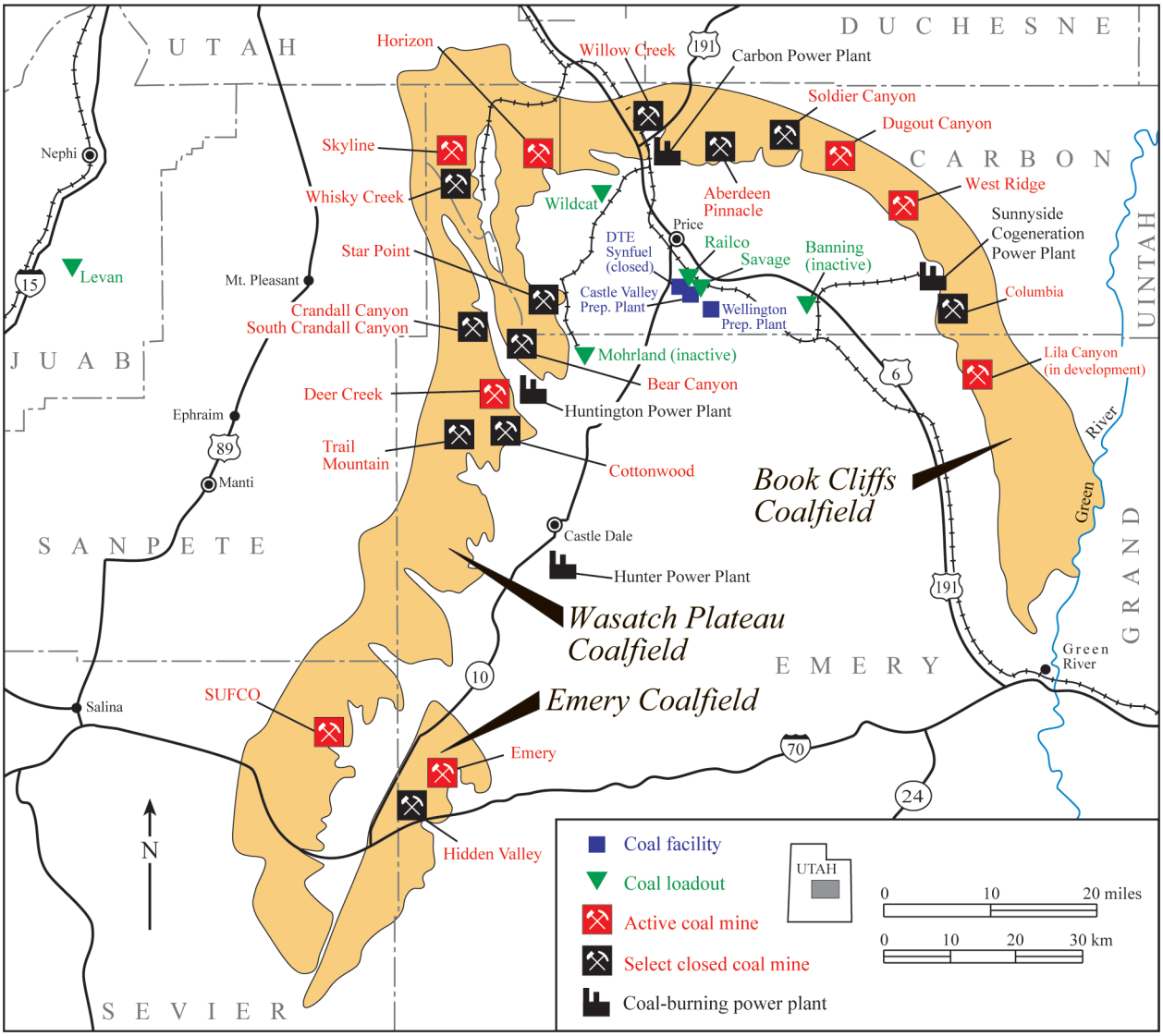

Figure A2. *Location and status (at time of printing) of Utah coal mining operations.*

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° 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 gray, 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.

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

8,000 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.

Mine-mouth price – This is the price paid for coal at the mining operation site. It excludes freight or shipping and insurance costs.

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).

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.