

### Input Values for Economic Impact Modeling

Input Parameter	Value	Data Source
Number of wells drilled to date	Varies by model project	WY and MT production databases
Project timing (number of years between leasing and exploratory drilling, between exploration and delineation and development, and between development and operation)	Leasing to development to operation is assumed to occur in Year 1 No true exploration and delineation phase assumed	CBM operators
Rate of installation of any new wells on existing projects	Additional wells (potential wells) assumed to be installed in Year 1 No drilling costs assumed to have incurred to date	CBM operators
Peak production rate	Varies by model project	WY and MT production databases
Current existing production	Varies by model project	WY and MT production databases
Production decline rates	From maximum gas production (assumed to occur in Year 2 of new and transitional projects) or from current gas production in existing projects, 13% per year From maximum water production (assumed to occur in Year 1 for all projects), 30% per year	WY production database
Initial produced water production	Varies by project	WY and MT production databases
Lease cost	\$400/acre	Coal Bed Operators Information Survey Report
Total lease cost per project	\$256,000	Assumption based on geographic area of 1 project (1 square mile) and lease cost per acre as above
Geophysical and geological costs	Assumed \$0	EPA assumption

Input Parameter	Value	Data Source
Drilling costs	\$60,000 - \$150,000 depending on location \$500,000 Raton Basin	Coal Bed Operators Information Survey Report
Additional infrastructure cost (pod buildings, piping, etc.)	\$22,000	Coal Bed Operators Information Survey Report
Operation & maintenance costs (excluding variable costs of produced water treatment & discharge)	\$0.26/Mcf	Coal Bed Operators Information Survey Report
O&M costs for produced water (per bbl)	Baseline and post-compliance to be calculated by EPA	EPA assumptions
Capitalized costs	Intangible drilling costs are expensed, IDCs represent 60% of the cost of production wells and their infrastructure, integrated producers can expense 70% of IDCs (42% of well drilling costs) and independents can expense 100% (60% of well drilling costs) with the remainder capitalized and treated as depreciable assets	IRS rules

**Table 1. Maximum Water Estimates and Other CBM Modeling Assumptions Derived from WOGCC, COGCC, and Montana DNR Data**

<b>Model</b>	<b>Type</b>	<b>No. of WY/ MT Existing Projects</b>	<b>Number Transitional Projects</b>	<b>Number New Projects</b>	<b>Number Colorado Projects</b>	<b>Total Wells Ever Drilled or Planned</b>	<b>Potential Producing Wells</b>	<b># Wells Producing YR 2000</b>
East1-HH	High prod. High eff.	21	9	51		8	0	6
East1-HL	High prod. Low eff.	22	9	54		10.5	0	8
East1-LH	Low prod. High eff.	21	9	51		3	0	3
East1-LL	Low prod. Low eff.	18	8	44		7	0	4.5
Total East1 (Range 71)		82	35	200				
East2-HH	High prod. High eff.	23	12	37	65	6	0	6
East2-HM	High prod. Med. Eff.	23	12	37	26	8	0	8
East2-HL	High prod. Low eff.	22	11	35		10.5	0	9
East2-MH	Med. Prod. High eff.	23	12	37		5	0	5
East2-MM	Med. Prod. Med. eff.	23	12	37		5	0	5
East2-ML	Med. Prod. Low eff.	20	10	32		11	0	6.5
East2-LH	Low prod. High eff.	11	6	18		3	0	2
East2-LM	Low prod. Med. Eff.	12	6	19	35	3	0	2
East2-LL	Low prod. Low eff.	10	5	16		4	0	4
East2-LV	Low prod. V.low eff.	10	5	16		8	0	3
East2-LX	Low prod. extra low eff.	10	1	16		5.5	0	3
Total East2 (Range 72)		187	96	300				
Central-HH	Hight prod. High eff.	21	21	62		7	0	7
Central-HM	High prod. Med. Eff.	22	22	65		11.5	0	8
Central-HL	High prod. Low eff.	22	22	65		17.5	1.5	10
Central-MH	Med. Prod. High eff.	20	20	59	11	5	0	4
Central-MM	Med. Prod. Med. eff.	20	20	59	16	9.5	0	5
Central-ML	Med. Prod. Low eff.	20	20	59		9.8	0.65	5.95
Central-LH	Low prod. High eff.	13	13	38		8	0	7.5
Central-LM	Low prod. Med. Eff.	10	10	30	24	3	0	2
Central-LL	Low prod. Low eff.	11	11	33		7	0	4
Central-LV	Low prod. V.low eff.	10	10	30		9	3	4
Total Central (Range 73 & 74)		169	172	500				

West1-HH	High prod. High eff.	6	4	250		19	1.5	8.5
West1-HL	High prod. Low eff.	5	3	208		13	0	11
West1-LH	Low prod. High eff.	6	4	250		10	0	3
West1-LL	Low prod. Low eff.	7	5	292		12	0	6
Total West1 (Range 75)		24	16	1000				
West2-HH	High prod. High eff.	7	10	318		16	2	13
West2-HL	High prod. Low eff.	3	4	136		14	3	10
West2-LH	Low prod. High eff.	6	9	273		10.5	1	5
West2-LL	Low prod. Low eff.	6	9	273	18	6.5	0.5	6
Total West2 (Range 76)		22	32	1000				
West3-HH	High prod. High eff.	3	10	300		15	0	15
West3-HL	High prod. Low eff.	3	10	300		23	2	25
West3-LH	Low prod. High eff.	2	7	200		12.5	0	12.5
West3-LL	Low prod. Low eff.	2	7	200		15	3	20
Total West3 (Range 77+)		10	33	1000				

Note: West 3 primarily represents Montana only for existing wells. New wells will include wells drilled on the westernmost extent of the Powder River Basin in Wyoming, as well as Montana wells (including those on Tribal lands).  
Maximum water and gas amounts are assumed to be those reported in the data for 2000.

**Table 1. Maximum Water Estimates and Other CBM Modeling Assumptions Derived from WOGCC, COGCC, and Montana DNR Data**

Model	Type	Historic Data		Gas 2000 (Mcf)	Water 2000 (bbls)	Assumptions for Wells Added	
		Maximum Gas by Project (Mcf/yr)	Maximum Water by Project (bbls/yr)			Average Max. Gas per Well by Project (Mcf)	Average Max. Water per Well by Project (bbls)
East1-HH	High prod. High eff.	396,374	448,090	208,422	165,176	56,164	69,877
East1-HL	High prod. Low eff.	225,919	1,584,351	225,919	1,584,351	29,308	199,118
East1-LH	Low prod. High eff.	104,763	127,714	49,889	4,712	36,277	16,735
East1-LL	Low prod. Low eff.	49,812	514,197	38,155	452,445	7,534	137,089
Total East1 (Range 71)							
East2-HH	High prod. High eff.	533,213	434,023	478,389	240,043	143,297	93,422
East2-HM	High prod. Med. Eff.	654,410	827,657	463,874	451,805	88,520	102,309
East2-HL	High prod. Low eff.	453,869	1,195,792	453,869	1,195,792	52,721	154,735
East2-MH	Med. Prod. High eff.	252,383	350,475	162,359	70,800	71,501	120,379
East2-MM	Med. Prod. Med. eff.	209,075	473,422	132,048	203,158	53,857	121,533
East2-ML	Med. Prod. Low eff.	107,750	670,845	97,501	544,603	23,433	123,732
East2-LH	Low prod. High eff.	50,568	220,489	33,434	12,997	24,088	10,595
East2-LM	Low prod. Med. Eff.	93,107	183,881	32,305	44,733	50,680	123,007
East2-LL	Low prod. Low eff.	154,231	566,797	26,386	142,498	42,353	172,991
East2-LV	Low prod. V. low eff.	82,370	647,871	6,897	282,758	22,946	194,578
East2-LX	Low prod. extra low eff.	13,132	717,055	2,754	572,453	1,651	261,585
Total East2 (Range 72)							
Central-HH	High prod. High eff.	909,725	842,555	706,657	347,785	139,066	122,116
Central-HM	High prod. Med. Eff.	652,849	819,817	607,309	789,371	71,020	98,284
Central-HL	High prod. Low eff.	512,013	1,298,785	458,490	1,139,568	53,110	130,140
Central-MH	Med. Prod. High eff.	171,555	225,675	155,703	193,533	40,008	75,751
Central-MM	Med. Prod. Med. eff.	122,150	520,907	122,150	520,907	24,655	84,316
Central-ML	Med. Prod. Low eff.	133,236	515,379	133,236	512,685	27,118	111,385
Central-LH	Low prod. High eff.	75,687	805,223	75,687	805,223	9,536	103,270
Central-LM	Low prod. Med. Eff.	33,014	104,170	22,666	58,688	8,061	13,191
Central-LL	Low prod. Low eff.	3,130	253,836	3,130	253,836	983	49,746
Central-LV	Low prod. V. low eff.	1,013	206,135	575	146,637	395	80,108
Total Central (Range 73 & 74)							

West1-HH	High prod. High eff.	452,262	724,650	452,262	724,650	28,246	41,376
West1-HL	High prod. Low eff.	160,501	491,710	160,501	491,710	18,680	57,404
West1-LH	Low prod. High eff.	52,797	102,064	52,797	102,064	7,470	17,163
West1-LL	Low prod. Low eff.	6,128	223,144	5,542	223,144	1,532	29,110
Total West1 (Range 75)							
West2-HH	High prod. High eff.	402,798	1,027,325	402,798	1,027,325	35,593	79,025
West2-HL	High prod. Low eff.	136,258	658,345	136,258	658,345	11,355	63,683
West2-LH	Low prod. High eff.	58,682	221,194	58,682	221,194	5,055	35,234
West2-LL	Low prod. Low eff.	11,968	338,397	11,968	338,397	2,501	57,126
Total West2 (Range 76)							
West3-HH	High prod. High eff.	428,064	1,785,793	428,064	1,785,793	28,538	119,053
West3-HL	High prod. Low eff.	652,864	4,004,519	652,864	4,004,519	26,115	160,181
West3-LH	Low prod. High eff.	166,024	927,581	166,024	927,581	13,282	74,206
West3-LL	Low prod. Low eff.	59,053	4,885,501	59,053	4,885,501	2,953	244,275
Total West3 (Range 77+)							

Note: West 3 primarily represents Montana only for existing wells. New wells will include wells drilled on the westernmost extent of the Powder River Basin in Wyoming, as well as Montana wells (including those on Tribal lands).  
Maximum water and gas amounts are assumed to be those reported in the data for 2000.

**Table 1. Maximum Water Estimates and Other CBM Modeling Assumptions Derived from WOGCC, COGCC, and Montana DNR Data**  
**Engineering Design Criteria**

Model	Type	Engineering Design Criteria		
		Total Max. Annual Water Projected Per Existing Project (bbls)	Total Max. Annual Water Projected Per New or Transitional Project (bbls)	Water:gas ratio
East1-HH	High prod. High eff.	165,176	448,090	1
East1-HL	High prod. Low eff.	1,584,351	1,584,351	5
East1-LH	Low prod. High eff.	4,712	127,714	0
East1-LL	Low prod. Low eff.	452,445	514,197	11
Total East1 (Range 71)				
East2-HH	High prod. High eff.	240,043	434,023	0
East2-HM	High prod. Med. Eff.	451,805	827,657	1
East2-HL	High prod. Low eff.	1,195,792	1,195,792	2
East2-MH	Med. Prod. High eff.	70,800	350,475	1
East2-MM	Med. Prod. Med. eff.	203,158	473,422	2
East2-ML	Med. Prod. Low eff.	544,603	670,845	6
East2-LH	Low prod. High eff.	12,997	220,489	1
East2-LM	Low prod. Med. Eff.	44,733	183,881	2
East2-LL	Low prod. Low eff.	26,386	154,231	6
East2-LV	Low prod. V.low eff.	282,758	647,871	30
East2-LX	Low prod. extra low eff.	572,453	717,055	171
Total East2 (Range 72)				
Central-HH	High prod. High eff.	347,785	842,555	1
Central-HM	High prod. Med. Eff.	789,371	819,817	1
Central-HL	High prod. Low eff.	1,310,503	1,334,778	2
Central-MH	Med. Prod. High eff.	155,703	171,555	1
Central-MM	Med. Prod. Med. eff.	520,907	520,907	4
Central-ML	Med. Prod. Low eff.	568,693	585,085	4
Central-LH	Low prod. High eff.	805,223	805,223	10
Central-LM	Low prod. Med. Eff.	58,688	104,170	3
Central-LL	Low prod. Low eff.	253,836	253,836	49
Central-LV	Low prod. V.low eff.	256,615	386,961	255
Total Central (Range 73 & 74)				

West1-HH	High prod. High eff.	852,529	852,529	1
West1-HL	High prod. Low eff.	491,710	491,710	3
West1-LH	Low prod. High eff.	102,064	102,064	2
West1-LL	Low prod. Low eff.	223,144	223,144	36
Total West1 (Range 75)				
West2-HH	High prod. High eff.	1,185,375	1,185,375	2
West2-HL	High prod. Low eff.	855,849	855,849	5
West2-LH	Low prod. High eff.	265,432	265,432	6
West2-LL	Low prod. Low eff.	12,965	13,218	26
Total West2 (Range 76)				
West3-HH	High prod. High eff.	1,785,793	1,785,793	4
West3-HL	High prod. Low eff.	4,004,519	4,004,519	7
West3-LH	Low prod. High eff.	927,581	927,581	5
West3-LL	Low prod. Low eff.	4,885,501	4,885,501	93
Total West3 (Range 77+)				

Note: West 3 primarily represents Montana only for existing wells. New wells will include wells drilled on the westernmost extent of the Powder River Basin in Wyoming, as well as Montana wells (including those on Tribal lands).  
Maximum water and gas amounts are assumed to be those reported in the data for 2000.