

3.0 CUMULATIVE SOCIAL AND ECONOMIC EFFECTS

The cumulative development scenarios developed in the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably Foreseeable Development Activities (ENSR 2005b) and summarized in Chapter 2.0 of this report define an extended period of sustained energy development in the PRB study area. Employment in the economic sectors that drive the regional economy is expected to increase in response to the anticipated levels of future development activity and production. In the short-term, expanding labor demand would result in tight labor markets, characterized by competition for available labor, shortages of available and qualified labor, and higher wages, some of which already is occurring in the PRB study area (Bigelow 2004). Secondary employment gains in the trades, services, and other local industries associated with increased business and consumer spending may exacerbate the situation. Over time, such conditions may prompt migration, population growth, and a wide range of associated socioeconomic changes and effects, or constrain the pace of economic development activity.

This report describes the anticipated future effects of the cumulative development scenarios on the following key dimensions of the socioeconomic environment:

- Employment
- Population
- Housing
- Public Education
- Facilities and Services
- Selected Fiscal Revenue Effects

The assessment of cumulative impacts presented below maintains a macro-level perspective on anticipated changes, focusing on indicators of change over time at the county level and reporting projected levels of key indicators that can be monitored as a means of assessing the adequacy of the cumulative development scenario as a basis for NEPA compliance in future coal leasing actions. For purposes of this study, conditions as of year-end 2003 are the base or benchmark for the analysis, and 2010, 2015, and 2020 are the milestone years for projected cumulative effects.

The discussion and presentation of results for each key dimension of the socioeconomic environment begins with a general overview and conclusion of the projected effects under the lower production scenario, with an emphasis on changes in Campbell County and Gillette. That emphasis reflects both the fact that much of the development activity is and would be located in Campbell County, and that Gillette serves as the employment, trade, and service center for a large share of that activity. The assessment initially addresses anticipated effects at a regional scale over the entire time horizon of this study (2003 through 2020). The assessment then narrows to examine the effects at a more localized level, as well as highlighting timing issues in terms of how the changes would occur over time with respect to the three milestone years and the intervening periods they define (2003 to 2010, 2011 to 2015, and 2016 to 2020). Effects associated with the upper production scenario are presented in a parallel fashion.

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3.1 Employment and Personal Income

3.1.1 Lower Production Scenario

Total employment of 63,903 was reported in the six-county study area in 2003. Another 48,300 jobs were based in Natrona and Niobrara counties. In the same year, total employment in Campbell County, where most of the coal mining and oil and gas related jobs were located, was 25,906 (U.S. Bureau of Economic Analysis 2005).

Total employment in the study area under the lower production scenario is projected to increase by 12,500 jobs, to 76,403 in 2020. Approximately 61 percent of the total increase, nearly 7,700 additional jobs, would be based in Campbell County. Sheridan, Johnson, and Converse counties also are expected to experience substantial gains in employment, while Crook and Weston counties would see modest long-term increases in employment. Across the region, the growth would be characterized by more rapid gains through 2010, followed by a much reduced pace of growth as gains in coal mining employment would be tempered by productivity gains, and construction of three power plants would be completed.

The projected employment gains over the entire analysis period (through 2020) translate to overall growth of 1.1 percent compounded annual growth rate (CAGR) across the six-county study area. Among the individual counties, the growth rate in employment is projected to range from 0.1 percent CAGR in Crook County, to 0.9 percent CAGR in Sheridan County and 1.5 percent in Campbell County (Table 3-1).

Table 3-1
Total Employment by County to 2020 Under the Lower Production Scenario

County	2000	2003	2010	2015	2020	Change 2003 to 2020	CAGR (percent)
Campbell	23,418	25,096	30,737	31,992	32,374	7,278	1.5
Converse	7,043	7,001	7,415	7,567	7,575	574	0.5
Crook	3,692	3,808	3,973	3,984	3,904	96	0.1
Johnson	4,839	5,261	5,830	6,146	6,315	1,054	1.1
Sheridan	16,610	17,928	19,651	20,385	20,743	2,815	0.9
Weston	4,853	4,809	5,039	5,115	5,112	303	0.4
Six-county Study Area	60,455	63,903	72,645	75,189	76,023	12,500	1.0

Source: U.S. Census Bureau 2005b (2000 and 2003 data).

Anticipated increases in coal mine employment, coupled with the associated secondary impacts on other industries, would account for approximately 9 percent of the total cumulative employment change through 2020. Increases in oil- and gas-related employment, including both conventional and CBNG, would account for an estimated 34 percent of the total increase. Another driving force behind projected growth, particularly in the surrounding counties, is underlying growth projected in

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other sectors, including health and education, accommodations and food service, and professional services, that reflect local manifestations of larger-scale national trends.

The strong growth in employment, particularly in Campbell County through 2010, would outpace the capacity of the resident labor force to satisfy the projected demand. The imbalance is expected to set in motion forces that would result in labor force and population migration into the region. The net level of commuting into Campbell County by workers who reside in the surrounding counties and elsewhere also is projected to increase over time (**Table 3-2**). By 2020, an estimated 3,780 jobs in Campbell County would be filled by such commuters. At the same time, 430 Campbell County residents are expected to commute to jobs based elsewhere, many of those being associated with mining and other energy-related jobs in Converse County.

Table 3-2
Work Force Commuting in the PRB Under the Lower Production Scenario

County	2003	2010	2015	2020	Change 2003 to 2020
Campbell County					
Non-residents Commuting In	2,990	3,600	3,740	3,780	790
Residents Commuting Out	360	390	410	430	70
Net In	2,630	3,210	3,330	3,350	720
Neighboring Counties					
Non-residents Commuting In	1,550	1,680	1,730	1,750	200
Residents Commuting Out	6,100	6,990	7,160	7,200	1,100
Net Out	4,550	5,310	5,430	5,450	900

Historical data show that most of the work force commuting affecting Campbell County is to or from adjacent counties in Wyoming (see the Task 1C Report for the PRB Coal Review, Current Social and Economic Conditions [ENSR 2005a]). Thus, the increase of commuters into Campbell County would have a corollary effect on the levels of outbound commuting projected from the surrounding counties and from Natrona County. However, comparing the numbers of commuters into Campbell County to the numbers of residents in the neighboring counties who travel outside their place of residence to work suggests that substantial cross-commuting also occurs between counties in the surrounding region, for example, between Converse and Natrona counties and between counties in the study area and locations outside the study area. An example of the latter are residents of Sheridan employed at mines in southern Montana.

Another implication of the projected increases in the level of commuting would be increases in the net outflow of wage and salary earnings from Campbell County to the surrounding counties. Such flows of earnings and the consumer expenditures they produce support additional employment in the surrounding counties. Under the lower production scenario, the net annual outflow from Campbell County is projected to increase by approximately \$75 million (in 2003 dollars) relative to the 2003 base of \$115 million. The increases in net outflows are the combined results of increase in the level of commuting and increases in average real wages and salaries, particularly in energy-related industries.

The economic expansion associated with the lower production scenario would stimulate growth in personal income across the PRB, both in aggregate and on a per capita basis. In 2003, total

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personal income in Campbell County was \$1.12 billion and \$1.88 billion in the surrounding counties. Under the lower production scenario, total personal income in Campbell County is projected to increase by approximately 180 percent to \$3.14 billion (nominal) in 2020. After accounting for inflationary effects, total personal income is projected to increase by 58 percent between 2005 and 2020, to \$2.02 billion (2003 dollars). Total personal income in the surrounding counties is projected to increase by 111 percent to \$4.43 billion (nominal). In real terms, that increase amounts to approximately \$833 million (2003 dollars), although only a portion of the total change would be attributable to RFD activities.

The gains in total personal income would be reflected in rising real per capita personal incomes across the region. In Campbell County, real per capita income is projected to climb from \$32,870 (2003 dollars) in 2005, to \$36,737 in 2007 when construction of the three power plants is occurring. Per capita income then would decline to approximately \$34,300 in 2010, before resuming a steady upward climb to \$38,463 (2003 dollars) in 2020; a net increase of 17 percent through 2020. Real per capita income in the surrounding region also is anticipated to increase through 2020, from \$35,145 in 2005 to \$44,368 (both in 2003 dollars), or 27 percent⁴.

Year 2010

Employment increases through the year 2010 is projected to total 8,742 jobs across the study area, raising total employment to 72,645. Gains of 5,641 jobs would be based in Campbell County, with an additional 3,101 jobs created elsewhere in the study area. The added economic stimulus associated with RFD activities in the PRB also may result in job gains in nearby areas beyond the surrounding counties, primarily in response to the indirect and induced effects of energy industry demands and higher consumer income. Those effects are not addressed in this study.

Employment in Campbell County is expected to jump to nearly 34,000 total jobs in 2007-2008 when three power plant construction projects are projected to be active concurrently at a time that also coincides with a projected surge in conventional oil and gas drilling and continued CBNG development. That construction is expected to be completed by 2010, such that projected employment in the milestone year actually reflects a decline compared to the temporary peak.

Employment gains across much of the remainder of the region, particularly Natrona County, are predicated as much on energy development in other parts of the state or on national trends (e.g., gains in health care services in response to general aging trends) as they are to future development assumptions outlined in the lower production RFD scenario. Consequently, employment growth in the surrounding counties is expected to occur more steadily over time.

Year 2015

The pace of employment growth is projected to moderate between 2011 and 2015, with 2,544 net new jobs being added, only about 30 percent of the total job growth between 2003 and 2010. The gains would be less heavily concentrated in Gillette and other counties in the primary study area

⁴ The apparent anomaly of per capita income being higher in the surrounding counties than in Campbell County reflects the combined effects of: larger average household sizes in Campbell County (i.e., more children), the net inflows of labor income from Campbell County to the surrounding counties, and the continued influence of higher-than-average non-labor income in Sheridan and Natrona counties on the overall average. The latter is a residual impact of the structure of the REMI model which included Natrona and Niobrara counties in the second region even though they are not included in the six-county study area.

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than during the preceding period (49 percent compared to 65 percent, respectively) as more oil and gas development and new mining activity moves into Johnson and Sheridan counties. The DM&E railroad also is projected to become operational during this period, resulting in both temporary construction and long-term operations job gains. Total employment in the six-county study area in 2015 is projected at 75,179.

Year 2020

Total employment of 76,023 is projected for the six-county study area. During the period from 2016 to 2020, the key forces shaping the economic outlook would be a slow down in the rate of conventional oil and gas development and gains in coal mining employment, although such gains would be tempered by anticipated long-term productivity increases in mining allowing for annual production to increase with relatively fewer employees.

3.1.2 Upper Production Scenario

Total employment in the six-county study area is projected to increase by 15,230 jobs, to 79,133 in 2020 under the upper production scenario. The difference in employment, relative to the lower production scenario, would be 2,730 jobs in 2020. That difference would amount to an approximate 3.6 percent increase in total employment, or approximately 23 percent higher than the increase projected under the lower production scenario. Factors contributing to the additional growth include higher annual coal production, higher levels of coal shipment by rail, and the completion of a fourth new power plant in the PRB. This analysis estimates future coal mining employment for the upper production scenario based on productivity improvements comparable to those assumed for the lower production scenario. This assumption represents a departure from the more aggressive productivity assumptions developed in Task 2, whereby the higher production was achieved with little additional employment. Although such productivity increases may be realized, this analysis adopted the more conservative approach as a means of assessing the potential implications of higher employment growth on social and economic conditions.

As in the lower production scenario, the job gains would be concentrated in Campbell County, as more than 10,100 new jobs would be added. Gains of nearly 3,000 jobs in Sheridan and 1,100 jobs in Johnson counties also are projected under the upper production scenario. A substantial portion of the gains in Sheridan would be tied to underlying migration and national economic trends fueling growth in trade and services employment that would be unrelated to specific activities identified in the RFD.

The projected employment gains over the entire analysis period translate to a 1.3 percent CAGR across the region, with a 2.0 percent CAGR in Campbell County (**Table 3-3**).

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Table 3-3
Total Employment by County to 2020 Under the Upper Production Scenario

County	2000	2003	2010	2015	2020	Change 2003-2020	CAGR (percent)
Campbell	23,418	25,096	33,316	34,386	35,206	10,110	2.0
Converse	7,043	7,001	7,459	7,614	7,625	624	0.5
Crook	3,692	3,808	3,994	4,006	3,927	119	0.2
Johnson	4,839	5,261	5,862	6,182	6,355	1,094	1.1
Sheridan	16,610	17,928	19,768	20,507	20,877	2,949	0.9
Weston	4,853	4,809	5,067	5,144	5,143	334	0.4
Six-county Study Area	60,455	63,903	75,466	77,839	79,133	15,230	1.3

Source: U.S. Census Bureau 2005b (2000 and 2003 data).

Local labor market conditions associated with the upper production scenario would foster higher levels of work force commuting into Campbell County. By 2020, an estimated 4,110 workers would commute from surrounding communities and more distant locations to jobs in Campbell County, 1,120 more than the estimated number of such commuters in 2003. Some of the commuting may be on a daily basis, while others may travel to and from their permanent residence on a less frequent basis. The projected numbers of workers living in neighboring communities who commute to Campbell County or elsewhere also would increase, with more than 7,600 such workers in 2020 (Table 3-4).

Table 3-4
Work Force Commuting In the PRB Under the Upper Production Scenario

County	2003	2010	2015	2020	Change 2003 to 2020
Campbell County					
Non-residents Commuting In	2,990	3,900	4,010	4,110	1,120
Residents Commuting Out	360	390	410	420	60
Net In	2,630	3,510	3,600	3,690	1,060
Surrounding Counties					
Non-residents Commuting In	1,550	1,690	1,740	1,760	210
Residents Commuting Out	6,100	7,380	7,510	7,610	1,510
Net Out	4,550	5,690	5,770	5,850	1,300

The increase in work force commuting under the upper production scenario would increase the net annual outflow from Campbell County by an additional \$21 million (2003 dollars). This would be over and above the \$75 million in additional outflow projected under the lower production scenario, thereby raising the net annual outflow to \$212 million (2003 dollars)

The incremental economic expansion associated with the upper production scenario would stimulate additional personal income growth across the PRB, both in aggregate and on a per capita basis. Total personal income in Campbell County is projected to increase to \$3.4 billion (nominal) in 2020, \$262 million higher than under the lower production scenario. After accounting for inflationary effects, total personal income is projected to increase by 60 percent between 2005 and 2020, to

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\$2.18 billion (2003 dollars). Total personal income in the surrounding counties is projected to increase by 112 percent to \$4.46 billion (nominal). In real terms, that increase would amount to approximately \$850 million (2003 dollars) although only a portion of the total change would be attributable to PRB energy mineral resource development activity.

The gains in total personal income would be reflected in rising real per capita personal incomes across the region. In Campbell County, real per capita income is projected to climb from \$32,870 (2003 dollars) in 2005, to \$37,704 in 2007 when the combined effects of additional coal mining employment and construction of the three power plants are projected to occur. Per capita income then would decline to approximately \$35,512 in 2010, before resuming a steady upward climb to \$38,649 (2003 dollars) in 2020; a net increase of 18 percent through 2020. Real per capita income in the surrounding region also is anticipated to increase through 2020, from \$35,214 to \$44,361 (both in 2003 dollars), or 27 percent⁵.

Year 2010

Employment increases through the year 2010 are projected to total 11,563 jobs across the study area, raising total employment to 75,466. Construction of three power plants is assumed to be completed by 2010, such that projected employment in the milestone year actually reflects a decline compared to the temporary peak. Relative to the lower production scenario, the projected employment in 2010 is 2,821 jobs higher, the differences being attributable to projected higher levels of coal production. Most of the gains (8,220 jobs) would be based in Campbell County, with 3,343 additional jobs projected elsewhere in the study area.

Some gains in the region are predicated on national trends (e.g., gains in health care services in response to general aging trends) as much as they are on future development assumptions outlined in the cumulative development scenario. Consequently, employment growth in the surrounding counties region is expected to occur more steadily over time.

Year 2015

The pace of employment growth is projected to moderate between 2011 and 2015, with 2,373 net new jobs being added, only about one-fifth the total added between 2003 and 2010. The gains would be relatively more concentrated outside of Campbell County, due to increases in mine employment in Sheridan County and the stimulus associated with the construction and initial operations of the DM&E railroad. Total employment in the six-county primary study area in 2015 is projected at 77,839.

Year 2020

Another short-term spike in employment is projected to occur over a 3-to-4 year period in Campbell County due to the assumed construction of another power plant. That project temporarily would support as many as 1,400 jobs. Completion of the project would result in a subsequent reduction in

⁵ The apparent anomaly of per capita income being higher in the surrounding counties than in Campbell County reflects the combined effects of: larger average household sizes in Campbell County (i.e., more children), the net inflows of labor income from Campbell County to the surrounding counties, and the continued influence of higher-than-average non-labor income in Sheridan and Natrona counties on the overall average. The latter is a residual impact of the structure of the REMI model which included Natrona and Niobrara counties in the second region even though they are not included in the six-county study area.

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employment, such that the net gain between 2016 and 2020 under the lower production scenario would be 1,294 net new jobs across the six-county study area, of which 820 would be located in Campbell County.

Total employment of 79,133 jobs is projected for the six-county study area. Assumed long-term productivity gains in mining factor into the forecasts as those gains would allow annual production to increase with relatively few additional mine employees. Campbell and Weston counties would gain jobs associated with operations of the DM&E railroad.

3.2 Effects on Population

3.2.1 Lower Production Scenario

The economic expansion associated with cumulative development under the lower production scenario would stimulate substantial population growth in the study area, arresting or stabilizing recent trends of declining population. Total population growth of more than 24,100 residents between 2003 and 2020 is projected across the entire six-county study area, a CAGR of 1.3 percent (**Table 3-5**).

Table 3-5
Projected County Population to 2020 Under the Lower Production Scenario

County	2000	2003	2010	2015	2020	Change 2003-2020	CAGR (percent)
Campbell	33,698	36,438	45,925	48,905	50,995	14,557	2.0
Converse	12,104	12,314	13,103	13,671	14,193	1,879	0.8
Crook	5,895	5,986	6,542	6,759	6,989	1,003	0.9
Johnson	7,108	7,554	8,389	8,867	9,326	1,772	1.2
Sheridan	26,606	27,115	28,459	30,016	31,467	4,352	0.9
Weston	6,642	6,671	7,108	7,174	7,208	537	0.5
Six-county Study Area	92,053	96,078	109,526	115,392	120,178	24,100	1.3

Source: U.S. Census Bureau 2005b (2000 and 2003 data).

Approximately 60 percent of the net population growth in the study area through 2020 is projected to occur in Campbell County, with the addition of 14,557 net new residents raising the county's total population to 50,995 (**Figure 3-1**). Such growth equates to a CAGR of 2.0 percent, compared to a 1.3 percent CAGR for the overall study area. Sheridan, Johnson, Converse, and Crook counties also would experience substantial population growth over the time horizon of this analysis (2003 to 2020). Population gains in Weston County would be smaller, despite the growth stimulus associated with future energy resource development, due to anticipated declines in agriculture and other economic sectors in the local economy. Although not part of the six-county study area, Natrona County also would realize long-term population growth, both as an indirect consequence of the activity in the PRB and its role as a trade and services center for much of the state.

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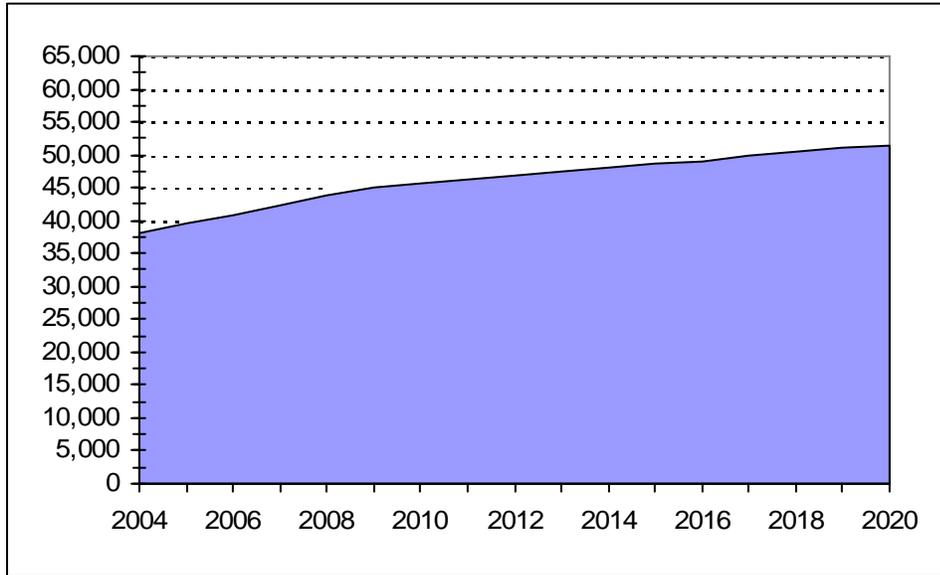


Figure 3-1. Campbell County Population Under the Lower Production Scenario

Resident labor is expected to satisfy much, but not all, of the expanded labor demand associated with the lower production scenario. Consequently, labor force shortages would trigger net labor force immigration to meet the strong demand for workers. Approximately 61 percent of the total population growth between 2003 and 2020 would be the result of net migration (**Table 3-6**).

**Table 3-6
Projected Net Migration by County to 2020 Under the Lower Production Scenario**

County	2003-2010	2011-2015	2016-2020	Total
Campbell County	6,150	469	33	6,652
Surrounding Counties	3,119	2,356	2,567	8,042
Total	9,269	2,825	2,600	14,694

As is presently the case, the majority of the population growth would be concentrated in Gillette, Sheridan, Douglas, and Buffalo. Smaller towns such as Newcastle, Wright, and Sundance that serve as local employment, trade, and service centers also would see gains. Collectively, these communities are projected to gain 15,581 residents between 2003 and 2020, a 27 percent increase compared to 2003. An aggregate population gain of 8,519 residents is projected in the unincorporated rural areas and remaining smaller communities in the study area by 2020, a 22 percent gain (**Table 3-7**).

Of the communities in the region, Gillette would experience the largest population gains, approximately 9,500 additional residents between 2003 and 2020. When compared to the estimated 2003 population of 22,113, the growth would represent a 43 percent increase and a continuation of the strong growth that has characterized the past three decades. Although smaller in magnitude, the projected population growth of approximately 5,600 residents in the unincorporated

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areas near Gillette, Wright, and other parts of the county also would represent strong growth with attendant pressures on public services.

Table 3-7
Projected Population to 2020 for Counties and Selected Communities Under the Lower Production Scenario

County/Community	2000	2003	2010	2015	2020	Change 2003 - 2020
Campbell County						
Gillette	20,494	22,113	29,392	30,810	31,617	9,504
Wright	1,357	1,418	1,952	1,956	1,989	571
Rest of county	12,129	12,907	14,581	16,139	17,389	4,482
Total	33,980	36,438	45,925	48,905	50,995	14,557
Converse County						
Douglas	5,302	5,396	5,962	6,220	6,103	707
Glenrock	2,241	2,284	2,366	2,428	2,478	194
Rest of county	4,511	4,634	4,775	5,023	5,612	978
Total	12,054	12,314	13,103	13,671	14,193	1,879
Crook County						
Moorcroft	804	826	896	940	985	159
Sundance	1,155	1,176	1,341	1,386	1,398	222
Rest of county	3,908	3,984	4,305	4,433	4,606	622
Total	5,867	5,986	6,542	6,759	6,989	1,003
Johnson County						
Buffalo	3,899	4,221	4,698	5,010	5,316	1,095
Rest of county	3,172	3,333	3,691	3,857	4,010	677
Total	7,071	7,554	8,389	8,867	9,326	1,772
Sheridan County						
Sheridan	15,803	16,000	16,933	18,010	18,880	2,880
Rest of county	10,788	11,115	11,526	12,006	12,587	1,472
Total	26,591	27,115	28,459	30,016	31,467	4,352
Weston County						
Newcastle	3,241	3,247	3,447	3,465	3,467	220
Upton	869	872	889	897	901	29
Rest of county	2,515	2,552	2,772	2,812	2,840	288
Total	6,625	6,671	7,108	7,174	7,208	537
Six-county Study Area						
Selected Places	55,165	57,553	67,876	71,122	73,134	15,581
Rest of area	37,023	38,525	41,650	44,270	47,044	8,519
Total	92,188	96,078	109,526	115,392	120,178	24,100

Source: U.S. Census Bureau 2005c (2000 and 2003 data).

The growth implications of the lower production scenario for Gillette may be even more pronounced than suggested by the projections outlined above. Long-term monitoring of the local housing stock and vacancy rates by the city suggest many dwelling units in the community are occupied on an extended-term basis by individuals or groups of unrelated individuals who consider their primary place of residence to be elsewhere. By U.S. Census Bureau definitions, those individuals, although they spend considerable time in the community and impose demands on public services while simultaneously supporting local retail and service establishments and generating tax revenues, are not classified as residents and the dwelling units they inhabit are considered vacant. The

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projections presented in **Table 3-7** are consistent with the U.S. Census Bureau definition. From the city's perspective, these individuals are more like residents than, for example, motorists traveling along the Interstate-90 corridor who overnight in Gillette. The city has developed the concept of a Gillette Service Population to characterize the situation. In recent years, the city estimates its effective population is 2,300 to 2,800 higher than estimates reported by the U.S. Census Bureau. Thus, assuming that current trends continue in the future, the city's effective service population would increase to approximately 34,000 by 2020.

Year 2010

The continuing level of CBNG development, combined with a surge in conventional oil and gas drilling and new power plant construction, is expected to trigger strong growth through 2010. A total population change of 13,448 is projected across the region between 2003 and 2010; 56 percent of the total projected growth through 2020. Interim periods of accelerated growth would occur in 2007 and 2008 due to the simultaneous development of several power plants. Of the total change, 71 percent is expected to occur in Campbell County. Sheridan County would gain 1,344 residents during the same period, reaching a total population of 28,459. Johnson and the other counties in the study area also would see population gains, but of lesser magnitudes.

The strong demand for labor associated with energy development would result in a considerable influx of new residents. Migration is expected to account for 69 percent of the net population change during the period. In addition, the level of net commuting into Campbell County from neighboring counties is expected to increase.

Year 2015

Population growth across the region is projected to moderate between 2011 and 2015, with the total regional population climbing to 115,392 by 2015. The moderation would occur as activity at the proposed power plants transitions from construction to less labor-intensive operations, the pace of conventional oil and gas abates, and the construction of ancillary CBNG gas field development slows. At the same time, the level of oil and gas production and well service employment would climb as the number of wells in production and the number of wells being plugged and abandoned increases. Direct employment associated with coal mines would increase by an estimated 150 workers, accounting for less than one-half of the total change in mining and about one-third of the total population change. Sheridan County's population would top 30,000 for the first time during this period

Year 2020

The population growth trends established in the preceding 5-year period are anticipated to continue between 2016 and 2020 as the mining sector continues to expand in response to increases in coal production and the cumulative oil and gas field services and production employment. Consequently, the net result of the lower production scenario is a projected population of 120,178 across the six-county study area. Campbell County's population would exceed 50,000 for the first time at some point between 2015 and 2020.

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3.2.2 Upper Production Scenario

The added economic stimulus could translate into an incremental population growth of 4,525 residents by 2020 relative to the projected population under the lower production scenario. Of that total, Campbell County would gain nearly 3,950 additional residents, Converse County approximately 120 residents, and Sheridan County almost 270 residents. The remaining counties in the PRB also would register modest additional population gains relative to the lower production scenario.

With the additional growth, the total population in the six-county study area is projected to reach 124,703 by 2020 (**Table 3-8**). The net gain across the six-county study area would be 28,625 residents, a compounded annual growth rate of 1.5 percent compared to 1.3 percent under the lower production scenario. The impetus for the additional growth primarily would occur over time in relation to coal mining employment increases, construction of another new power plant, and increases in rail shipment of coal. As a result, the differences in projected population under the lower and upper production scenarios would climb from 2,006 in 2010 to 4,525 in 2020 (**Table 3-9**).

Table 3-8
Projected County Population to 2020 Under the Upper Production Scenario

County	2000	2003	2010	2015	2020	Change 2003 – 2020	CAGR (percent)
Campbell	33,698	36,438	47,662	51,558	54,943	18,505	2.4
Converse	12,104	12,314	13,160	13,763	14,313	1,999	0.9
Crook	5,895	5,986	6,570	6,802	7,045	1,059	1.0
Johnson	7,108	7,554	8,424	8,924	9,403	1,849	1.3
Sheridan	26,606	27,115	28,579	30,214	31,733	4,618	0.9
Weston	6,642	6,671	7,137	7,219	7,266	595	0.5
Six-county Study Area	92,053	96,078	111,532	118,480	124,703	28,625	1.5

Source: U.S. Census Bureau 2005b (2000 and 2003 data).

Table 3-9
Differences in Projected County Population Lower Versus Upper Production Scenarios

County	2010	2015	2020
Campbell	1,737	2,653	3,948
Converse	57	92	120
Crook	28	43	56
Johnson	35	57	77
Sheridan	120	198	266
Weston	29	45	58
Six-county Study Area	2,006	3,088	4,525

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Higher levels of immigration would account for virtually all of the additional population growth, with most of that occurring by 2010. By 2010, nearly 7,800 individuals, 68 percent of the newly in-migrating persons, would be expected to settle in Campbell County, compared to 3,665 new residents locating elsewhere in the region, which in this case includes Natrona County. Beyond 2010, the pace of labor demand growth would slow, with an attendant slowdown in migration. Net migration into Campbell County would decline to approximately 1,200 and 1,000, respectively, in each of the subsequent 5 year periods. Net migration into the surrounding counties would be approximately 2,600 to 2,700 per 5 years in the subsequent periods, only marginally higher than under the lower production scenario (Table 3-10).

Table 3-10
Projected Net Population Migration by County to 2020 Under the Upper Production Scenario

County	2003-2010	2011-2015	2016-2020	Total
Campbell County	7,773	1,187	1,003	9,963
Surrounding Counties	3,665	2,632	2,777	9,074
Total	11,438	3,819	3,780	19,037

At the local level, population changes affecting communities under the upper production scenario would mirror those outlined under the lower production scenario, with the majority of the gains occurring in Gillette, Sheridan, Buffalo, and Douglas. Gillette would be anticipated to gain nearly 12,000 residents by 2020 under the upper production scenario, climbing to 34,065, approximately 2,450 higher than under the lower production scenario (Tables 3-7 and 3-11). Including allowances for persons who work and live in the community on a long-term basis, but who consider the primary residence to be elsewhere, the estimated Gillette Service Area population would exceed 36,400. The Gillette area also would see additional population growth in the nearby unincorporated portions of the county. Wright and the communities and unincorporated areas of Converse and Sheridan counties would experience population gains upwards of 200 residents above the corresponding forecasts for the lower production scenario.

Year 2010

Realization of the upper production scenario would imply a 30 percent increase, more than 120 mmtpy, in total annual coal production in the PRB by 2010. Projected gains in average employee productivity would temper the increases in employment needed to achieve the projected production levels. Although one set of forecasts developed in the Task 2 report (ENSR 2005b) assumed productivity gains that would minimize the need for additional employees to achieve the increased production, the socioeconomic analysis maintains the more conservative productivity assumptions embodied in the lower production scenario. The consequences of doing so include higher population growth projections. The need for more coal mine employees, coupled with the other cumulative activities, would result in a total population change of 15,454 across the six-county study area between 2003 and 2010. That change would account for approximately 54 percent of the total change projected through 2020. Periods of accelerated growth would occur in 2007 and 2008 due to the projected simultaneous development of several power plants. Of the total population change, approximately 73 percent is expected to occur in Campbell County. Sheridan County would gain over 1,400 residents during the period, reaching a total population of nearly

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28,600. Other counties in the study area would experience population gains, but of lesser magnitudes.

Table 3-11
Projected Population for Counties and Selected Communities in the PRB to 2020 Under the
Upper Production Scenario

County/Community	2000	2003	2010	2015	2020	Change 2003 - 2020
Campbell County						
Gillette	20,494	22,113	30,504	32,500	34,065	11,952
Wright	1,357	1,418	2,026	2,064	2,143	725
Rest of county	12,129	12,907	15,133	17,024	18,736	5,829
Total	33,980	36,438	47,662	51,588	54,943	18,505
Converse County						
Douglas	5,302	5,396	5,988	6,262	6,155	759
Glenrock	2,241	2,284	2,376	2,444	2,499	215
Rest of county	4,511	4,634	4,796	5,057	5,659	1,025
Total	12,054	12,314	13,160	13,763	14,313	1,999
Crook County						
Moorcroft	804	826	900	945	993	167
Sundance	1,155	1,176	1,347	1,394	1,409	233
Rest of county	3,908	3,984	4,323	4,463	4,643	659
Total	5,867	5,986	6,570	6,802	7,045	1,059
Johnson County						
Buffalo	3,899	4,221	4,717	5,042	5,360	1,139
Rest of county	3,172	3,333	3,707	3,882	4,043	710
Total	7,071	7,554	8,424	8,924	9,403	1,849
Sheridan County						
Sheridan	15,803	16,000	17,005	18,128	19,040	3,040
Rest of county	10,788	11,115	11,574	12,086	12,693	1,578
Total	26,591	27,115	28,579	30,214	31,733	4,618
Weston County						
Newcastle	3,241	3,247	3,461	3,487	3,495	248
Upton	869	872	892	902	908	36
Rest of county	2,515	2,552	2,783	2,830	2,863	311
Total	6,625	6,671	7,137	7,219	7,266	595
Six-County Study Area						
Selected Places	55,165	57,553	69,216	73,168	76,067	18,514
Rest of area	37,023	38,525	42,316	45,342	48,636	10,111
Total	92,188	96,078	111,532	118,510	124,703	28,625

Source: U.S. Census Bureau 2005c (2000 and 2003 data).

The strong demand for labor associated with energy development would result in a considerable influx of new residents. Migration is expected to account for 74 percent of the net population change during the period. In addition, the level of net commuting into Campbell County from neighboring counties is expected to increase.

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Year 2015

Population growth across the region is projected to moderate between 2011 and 2015, with the total regional population climbing to 118,510 by 2015, a net change of 6,978 residents (or 6 percent) during the 5-year period. The moderation would occur as the new power plants transition from construction to less labor intensive operations, the pace of conventional oil and gas abates, and the construction of ancillary CBNG gas field infrastructure slows.

Campbell County's population would exceed 50,000 for the first time in approximately 2013 or 2014, approximately 5 years earlier than would be anticipated under the lower production scenario.

Year 2020

The population growth trends established in the preceding 5-year period is projected to continue between 2016 and 2020 as the mining sector expands in response to increases in coal production and cumulative oil and gas field services and production employment. Consequently, the net result of the upper production RFD scenario is a projected population of 124,703 across the six-county study area. Because most of the incremental economic activity associated with the upper production scenario would be centered around Gillette, other communities in the study area would not experience major additional growth under the upper production scenario.

3.3 Housing

Effects of the RFD scenarios on regional housing demand would link population change to social conditions in the PRB communities that potentially would be affected by the cumulative development. The private sector generally produces housing when presented with new market opportunities. However, when housing demand is created by short-term projects or by sustained rapid growth, supply may not expand sufficiently in quantity or in the appropriate time frame to match a community's housing needs.

Both RFD scenarios substantially would increase the need for new housing in the six-county study area. In terms of new housing requirements (a measure that assumes that the housing supply would grow in response to a rising number of households but would not shrink when households decrease) the lower production scenario would require approximately 11,268 housing units through 2020, an approximate 27 percent growth over 2003 levels. New housing requirements under the upper production scenario would be 13,601 units more, an approximately 31 percent growth over current inventories and 1,800 units more than under the lower production scenario. Approximately 60 percent of the projected demand for new housing under either RFD scenario would occur in Campbell County.

The relative size of the housing impacts from the two RFD scenarios may be evaluated by a comparison to past growth in the study area. One comparative benchmark is the dramatic growth that occurred in the PRB in the 1970s. During that decade alone, the number of housing units in the six-county study area grew by approximately 78 percent (14,900 units) (see the Task 1C Report for the PRB Coal Review, Current Social and Economic Conditions [ENSR 2005a], p. 3-40). This was 1,500 units per year on average for the "boom" decade, compared to an average of 1,100 to 1,200 units under these scenarios. That pace of development, while acknowledged as coinciding

3.0 Cumulative Social and Economic Effects

with a period of economic expansion and prosperity, also strained the region's construction trade and building supplier industries. Although the underlying economies are larger now, the projected needs would tax the ability of communities to respond. Signs of strain already are apparent in Gillette and could surface elsewhere. The forecasted rate of growth under the upper production scenario, and to only a slightly lesser extent under the lower production scenario, would be large enough to exert substantial pressure on housing markets and the housing development and construction industries, all at a time when demands for labor and other resources already would be high.

3.3.1 Lower Production Scenario

More than two-thirds of the new housing potentially required in Campbell County under the lower production scenario would be needed by 2010. This forecast, along with requirements for other counties in the study area, is presented in **Tables 3-12** and **3-13**. Other counties of the six-county study area, as well as Natrona County, would see demand for new housing emerge more gradually.

Table 3-12
Total Housing Requirements to 2020 Under the Lower Production Scenario

County	2003	2010	2015	2020
Campbell	13,707	18,015	19,260	20,177
Converse	5,741	6,004	6,314	6,621
Crook	3,036	3,277	3,438	3,615
Johnson	3,622	4,119	4,340	4,560
Sheridan	12,861	13,563	14,290	14,917
Weston	3,273	3,420	3,523	3,618
Six-county Study Area	42,240	48,398	51,165	53,508

Source: U.S. Census Bureau 2005d (2003 data).

Table 3-13
Net New Housing Required to 2020 Under the Lower Production Scenario

County	2003-2010	2011-2015	2016-2020	Total
Campbell	4,308	1,245	917	6,470
Converse	263	310	307	880
Crook	241	161	177	579
Johnson	497	221	220	938
Sheridan	702	727	627	2,056
Weston	147	103	95	345
Six-county Study Area	6,158	2,767	2,343	11,268

Year 2010

From the present to 2010, the potential need for new housing under the lower production scenario would be most heavily concentrated in Campbell County. The requirement to house an expanding

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population would create a demand for approximately 4,300 new units in Campbell County, approximately 70 percent of the total needs within the six-county study area and 67 percent of the total housing requirement in Campbell County through 2020 under the lower scenario.

Projected housing needs in Sheridan and Johnson counties between 2003 and 2010 are approximately 700 and 500 units, respectively, or approximately 34 and 53 percent of the respective housing requirement for these counties through 2020.

In Converse and Crook counties, the estimated housing requirement through 2010 would be approximately 260 units (30 percent of the total need through 2020) and approximately 240 units (42 percent of total need), respectively. The estimated new housing requirement in Weston County is for 147 units through 2010 under the lower production scenario. Although smaller in magnitude than the estimated needs in Campbell and Sheridan counties, the needs in the other counties also would tax the capabilities of the construction sector to respond in a timely manner.

Year 2015

Relatively greater housing needs would emerge among the smaller counties of the six-county study area during the second 5-year period of the lower production scenario. In Converse County, the potential housing requirement would be approximately 310 units (approximately 35 percent of the total need through 2020), while in Crook County, it would be lower than during the previous period through 2010 at approximately 160 units (approximately 28 percent of the total need). Weston County potentially would require approximately 100 units to accommodate new households during the period, or about a third of the county's projected total need through 2020 under the lower scenario.

Campbell County's demand for new housing from 2011 to 2015 is estimated at approximately 1,245 new units, or approximately 19 percent of the total demand through 2020 under the lower scenario. Sheridan and Johnson counties potentially would require approximately 730 and 220 units, respectively, during the period, or approximately 35 percent and 24 percent of the total need in each county, respectively, through 2020.

Year 2020

In the final 5-year period of the forecast (2016 through 2020), Campbell County would require nearly 920 additional new housing units, 14 percent of the total requirement through 2020.

Given the projected population growth, Sheridan and Johnson counties would require approximately 630 and 220 additional units, respectively, or approximately 30 and 23 percent of the total needs through 2020 in the westernmost counties of the six-county study area.

In Converse and Crook counties, potential housing requirements from 2016 to 2020 respectively would be approximately 310 units (approximately 35 percent of the total need through 2020) and approximately 180 units (approximately 24 percent of the total need). Weston County potentially would require another 100 units to accommodate net household growth from 2016 through 2020, or approximately the remaining half of the county's projected total housing need for the entire forecasted period (2003 through 2020).

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3.3.2 Upper Production Scenario

Housing requirements under the upper production scenario would reflect increased mining in Campbell and Converse counties, construction of an additional power plant, and increased rail shipments affecting the southeast portion of the six-county study area. Based on the timing of the development activities and the related production level, a somewhat higher proportion of all new housing potentially demanded in Campbell and Converse counties through 2020 would be needed from 2003 through 2010. **Tables 3-14** and **3-15** present the total and incremental new housing requirements in the study area under the upper production scenario.

Table 3-14
Total Housing Requirements to 2020 Under the Upper Production Scenario

County	2003	2010	2015	2020
Campbell	13,707	18,674	20,273	21,694
Converse	5,741	6,026	6,358	6,677
Crook	3,036	3,289	3,459	3,642
Johnson	3,622	4,133	4,368	4,596
Sheridan	12,861	13,613	14,388	15,045
Weston	3,273	3,433	3,545	3,647
Six-county Study Area	42,240	49,168	52,391	55,301

Source: U.S. Census Bureau 2005d (2003 data).

Table 3-15
Net New Housing Required to 2020 Under the Upper Production Scenario

County	2003-2010	2011-2015	2016-2020	Total
Campbell	5,010	1,599	1,421	7,987
Converse	286	332	319	936
Crook	253	170	183	606
Johnson	511	235	228	974
Sheridan	755	775	657	2,184
Weston	-	112	102	374
Six-county Study Area	6,815	3,223	2,910	13,061

Year 2010

RFD activities under the upper production scenario would add to the housing requirements projected for Campbell County through 2010. The upper scenario implies demand for approximately 4,970 new units in Campbell County for the period. This is approximately 15 percent above housing needs under the lower scenario and approximately 62 percent of the total housing requirement forecasted for Campbell County through 2020 under the upper scenario.

During the same time frame, Sheridan and Johnson counties potentially would require approximately 750 and 510 units, respectively, or 35 and 52 percent of their total housing requirements through 2020. Housing impacts through 2010 under the upper scenario would be

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7 percent higher than under the lower scenario in Sheridan County and 3 percent higher in Johnson County.

In Converse and Crook counties, projected new housing requirements through 2010 would be approximately 285 units (about 30 percent of total need through 2020) and approximately 253 units (approximately 42 percent of the total need), respectively. Through 2010, housing impacts under the upper scenario would be 8 percent higher than under the lower scenario in Converse County and 5 percent higher in Crook County.

New housing demand through 2010 in Weston County is projected at 160 units under the upper production scenario.

Year 2015

As the upper production scenario includes more development in the southeastern part of the PRB, Weston County would need 112 units of additional housing from 2011 to 2015. This would be approximately 9 percent higher than under the lower production scenario and approximately 30 percent of the cumulative new housing requirements in Weston County through 2020.

Under the upper production scenario, Campbell County potentially would need nearly 1,600 units of additional housing from 2011 to 2015, approximately 20 percent of the total needs through 2020. This level of housing need would be approximately 350 units and 28 percent higher than under the lower scenario in Campbell County through 2010.

New housing requirements in other counties under the upper production scenario from 2011 to 2015 would include:

- Converse County – 332 units, 35 percent of the total upper scenario requirements through 2020
- Crook County – 170 units, 9 units more than under the lower scenario and 28 percent of total requirements through 2020
- Sheridan County – 775 units, 48 units more than under the lower scenario and 35 percent of total requirements under the upper production scenario
- Johnson County – 235 units, 24 percent of total requirements under the upper production scenario

Year 2020

From 2016 to 2020, new housing needs under the upper production scenario would include:

- Campbell County – 1,421 units
- Converse County – 319 units
- Crook County – 183 units
- Sheridan County – 657 units
- Johnson County – 228 units

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- Weston County – 102 units

3.4 Public Education

Communities across the PRB study area likely would see higher total population as a result of economic migration; however, the effects on the sizes of the school-age populations would vary by location. In some counties, the size of that group (aged 5 to 17 years) may even trend in the opposite direction of the total population trend.

As the age structure of the population changes, school districts in the PRB would be among the public service providers most affected. The demographic forecasts developed from the RFD scenarios project an end to recent declines in school enrollments across much of the PRB, with growth resuming and then continuing beyond 2010 for all PRB school districts except those serving Weston County. However, some districts still may have enrollments in 2020 that are lower than current levels as growth from 2010 to 2020 would not offset the recent declines they have experienced.

From 2010 to 2020, annual growth in projected school enrollments would range from 0.7 percent to 2.2 percent CAGR, depending on the district, with one exception. The exception, Weston County, potentially would lose school-age children from 2010 to 2020.

Impacts to school enrollment of the magnitude described above likely would be accommodated within the normal operation of the state's system for funding operations and construction of school facilities. The Wyoming School Foundation Program (WSFP) provides a guaranteed level of funding to every school district. When enrollment growth occurs, the WSFP's provisions generally ensure adequate funding for operations, although the WSFP practice of funding on a 3-year moving average can cause a gaps when unanticipated rapid growth occurs in a short period (e.g., 1 or 2 years). School districts are eligible for additional funding when they experience rapid growth of more than 10 percent above the previous year.

In the past, appropriations for extraordinary facility needs in the public schools have been funded from the state's budget reserve account, which in turn receives revenue from the mineral severance tax, mineral royalties, and coal lease bonus distributions. Additionally, under Wyoming School Facilities Commission (WSFC) planning guidelines, minor capacity shortages generally are accommodated through temporary facilities, such as portable classrooms.

Finally, capital construction programs are under way at every school district in the study area as part of the 5-year planning process, and all districts have included energy and natural resource development in their planning considerations, although not necessarily at levels implied by the RFD scenarios analyzed in this report. Presently, the Commission has approved \$88.1 million for 31 school replacement and major improvement projects within the six-county study area. **Table 3-16** summarizes current capital construction plans for the study area's school districts and the potential for upcoming projects to position the districts for the growth potential implied by the RFD scenarios.

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Table 3-16
Approved Capital Construction for Public Education in the PRB Study Area

County School District	Schools in Operation	Approved Capital Construction Under 2004 5-year Plans (millions)	Number of New Schools and Remodeling and Improvement Projects
Campbell #1 – Gillette	20	\$23.7	7
Converse #1 – Douglas	8	\$3.27	1
Converse #2 – Glenrock	5	\$9.6	9
Crook #1 – Sundance	10	\$11.5	6
Johnson #1 – Buffalo	8	\$19.3	4
Sheridan #1 – Ranchester	7	\$2.5	1
Sheridan #2 – Sheridan	12	\$11.6	2
Sheridan #3 – Clearmont	4	\$4.4	1
Weston #1 – Newcastle	5	\$0.1	--
Weston #7 – Upton	3	\$2.1	--
Six-county Study Area	82	\$88.1	31

Source: WSFC 2005.

3.4.1 Lower Production Scenario

Under the lower production scenario, Campbell County would experience a substantial increase in school-age children through 2020 (an added 1,587 children or 22 percent). The impacts in Campbell County would be composed of two elements: a substantial increase in grades K-8 and a modest increase in grades 9-12. Beyond 2020, secondary enrollments would increase as the school-age population matures and moves through the system. Johnson County's school enrollments, which had been declining, would bottom out and then begin climbing, eventually registering a net increase of 100 children, or 8 percent, under the lower production scenario.

Other counties in the six-county study area are expected to experience net declines in school enrollments between 2000 and 2010, followed by enrollment growth from 2010 to 2015 and from 2016 to 2020. During the latter two periods of the study, the school enrollments in Johnson County would grow substantially by a total of 279 students.

In those school districts where enrollment growth would occur under the lower production scenario, the response under WSFC planning guidelines generally would be to accommodate minor capacity shortages through temporary facilities, such as portable classrooms. For larger, more long-term increases, the Commission's policy is to fund capital expansion where warranted by projections developed during annual updates of school districts' 5-year plans. The projections of school-age population under the lower production scenario are presented in and illustrated in **Tables 3-17** and **3-18** and **Figures 3-2** and **3-3**.

Year 2010

From 2000 to 2010, the school-age population is projected to decline in all counties in the PRB study area except for Campbell County. Projected changes in school enrollment include:

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- Campbell County – approximately 440 additional (up 6 percent for the period)
- Converse County – approximately 570 fewer (down 22 percent)
- Crook County – 195 fewer (down 16 percent)
- Johnson County – approximately 180 fewer (down 14 percent)
- Sheridan County – approximately 960 fewer (down 20 percent)
- Weston County – approximately 340 fewer (down 27 percent)

Table 3-17
School-age Population (Ages 5 through 17) Under the Lower Production Scenario

County	2000	2010	2015	2020	Change 2000/2020
Campbell	7,182	7,620	8,225	8,769	1,587
Converse	2,607	2,038	2,115	2,293	(314)
Crook	1,252	1,057	1,069	1,128	(124)
Johnson	1,323	1,144	1,248	1,423	100
Sheridan	4,947	3,983	4,240	4,715	(232)
Weston	1,265	928	893	892	(373)
Six-county Study Area	18,576	16,770	17,790	19,220	644

Source: Wyoming Department of Education 1975-2003 (2000 data).

Table 3-18
Campbell County School-age Population By Grade Group Under the Lower Production Scenario

School Grades	2000	2010	2015	2020	Change 2000/2020
Primary/Middle (K-8)	4,936	5,447	6,022	6,428	1,492
Secondary (9-12)	2,246	2,173	2,203	2,341	95

Source: Wyoming Department of Education 1975-2003 (2000 data).

In Campbell County, public school enrollment would rise by approximately 511 children (up 10 percent) in grades K–8 but fall by approximately 73 students (down 3 percent) for the age group in grades 9–12.

Year 2015

From 2010 to 2015, total school enrollment is projected to rise in all counties in the PRB study area except Weston County. Projected changes in enrollments based on the population aged 5 to 17 years include:

- Campbell County – approximately 605 additional (up 8 percent)
- Converse County – approximately 80 additional (up 4 percent)
- Crook County – approximately 10 additional (up 1 percent)
- Johnson County – approximately 100 additional (up 9 percent)

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- Sheridan County – 257 additional (up 6 percent)
- Weston County – approximately 35 fewer (down 6 percent)

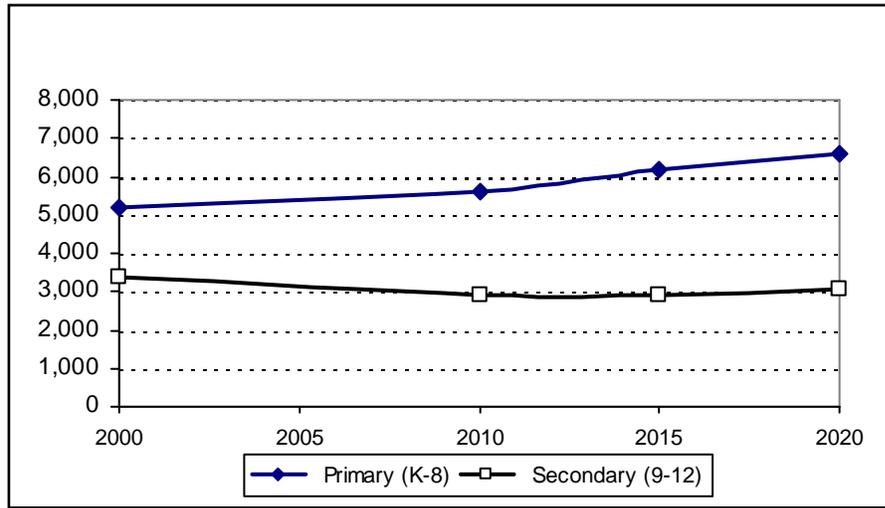


Figure 3-2. School Enrollment in Campbell County School District #1 from 2000 to 2020 Under the Lower Production Scenario

Source: Wyoming Department of Education 1975-2003 (2000 data).

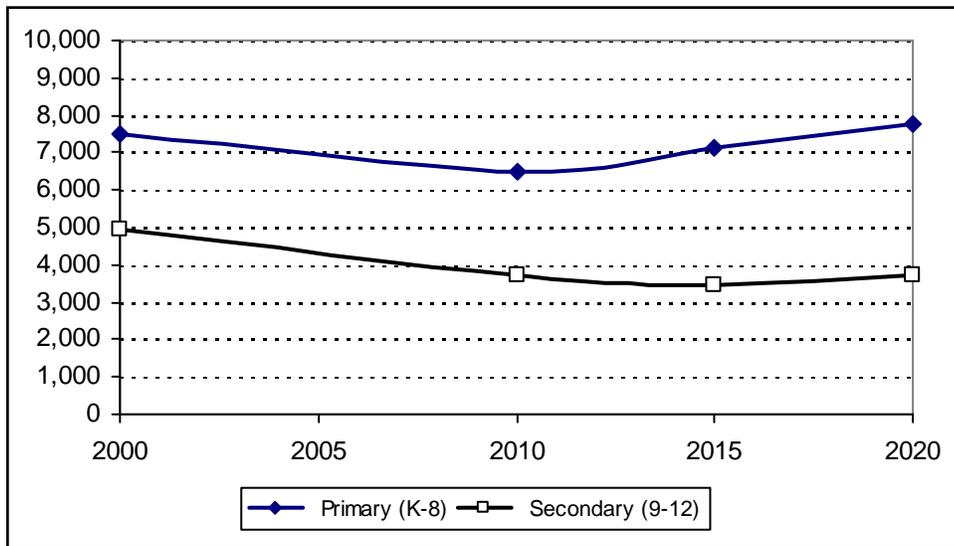


Figure 3-3. School Enrollment in the Surrounding Counties from 2000 to 2020 Under the Lower Production Scenario

Source: Wyoming Department of Education 1975-2003 (2000 data).

In Campbell County, school enrollment would rise by 575 students (up 11 percent) for grades K-8 from 2010 to 2015 and by 30 students (up 1 percent) in grades 9-12.

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Year 2020

From 2016 to 2020, total school enrollments is projected to rise across virtually the entire PRB study area. Projected changes in enrollment include:

- Campbell County – approximately 44 additional (up 7 percent)
- Converse County – approximately 180 additional (up 8 percent)
- Crook County – approximately 60 additional (up 6 percent)
- Johnson County – approximately 175 additional (up 14 percent)
- Sheridan County – 475 additional (up 11 percent)
- Weston County – no substantial change.

In Campbell County, the school enrollment grades K-8 would rise by approximately 410 children (up 7 percent) from 2016 to 2020 and by approximately 140 children (up 6 percent) in grades 9-12.

3.4.2 Upper Production Scenario

The upper production scenario substantially would increase total school-age population growth in Campbell County through 2020. The projected increase of 2,408 students would be 34 percent growth over the entire forecast time frame and 52 percent higher than potentially would occur under the lower production scenario.

RFD activities under the upper scenario also would raise the level of growth in Johnson County's school-age population. The age group would increase by approximately 140 children or 9.5 percent over the entire forecast time frame (2003 to 2020). This would exceed total growth under the lower scenario by approximately 16 percent.

Among the other counties of the six-county study area, losses of school-age children still would occur under the upper production scenario through 2020.

For the school districts in Campbell and Johnson counties, where net enrollment growth would occur, the response under WSFC planning guidelines generally would be to accommodate minor capacity shortages through temporary facilities, such as portable classrooms, and to fund capital expansion where warranted by projections developed during the annual updates of school districts' 5-year plans. The projections of school-age population under the upper production scenario are presented in **Tables 3-19** and **3-20**.

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Table 3-19
School-age Population (Ages 5 through 17) Under the Upper Production Scenario

County	2000	2010	2015	2020	Change 2000/2020
Campbell	7,182	7,940	8,770	9,590	2,408
Converse	2,607	2,049	2,133	2,319	(288)
Crook	1,252	1,063	1,079	1,141	(111)
Johnson	1,323	1,150	1,259	1,439	116
Sheridan	4,947	4,005	4,277	4,770	(177)
Weston	1,265	933	901	902	(363)
Six-county Study Area	18,576	17,140	18,419	20,161	1,585

Source: Wyoming Department of Education 1975-2003 (2000 data).

Table 3-20
Campbell County School-age Population by Grade Group Under the Upper Production Scenario

School Grade	2000	2010	2015	2020	Change 2000/2020
Primary/Middle (K-8)	4,936	5,695	6,447	7,058	2,122
Secondary (9-12)	2,246	2,245	2,323	2,532	286

Source: Wyoming Department of Education 1975-2003 (2000 data).

Under the WSFC and WSFP programs, school districts in Converse, Sheridan, and Weston counties, which are facing protracted declining enrollments, may encounter pressures to reduce staff and facility capacity.

Year 2010

From 2000 to 2010, all counties in the PRB study area except for Campbell County would see a net decline in enrollments under the upper production scenario. However, the projected 2010 enrollments reflect an increase in the latter years following an expected bottoming out of enrollments in 2005 or 2006. Projected enrollment changes in the PRB based on the 5 to 17 year old population include:

- Campbell County – approximately 760 additional (up 11 percent) and 320 above the lower scenario
- Converse County – approximately 560 fewer (down 21 percent) and 10 above the lower scenario
- Crook County – approximately 190 fewer (down 15 percent), just slightly higher than the lower scenario

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- Johnson County – approximately 170 fewer (down 13 percent), approximately the same as the lower scenario
- Sheridan County – approximately 940 fewer (down 19 percent), 20 above the lower scenario
- Weston County – approximately 30 fewer (down 3 percent) and approximately the same as the lower scenario

Under the lower production scenario Campbell #1 would experience a net increase of approximately 760 elementary and middle school students (grades K-8) between 2000 and 2010, with no effective change in secondary enrollment (grades 9-12).

Year 2015

Between 2010 and 2015, total school enrollments would climb in all counties in the PRB study area, except Weston County. Projected changes in the public school enrolments based on the 5 to 17 year old population include:

- Campbell County – 830 higher (up 11 percent) and 545 students above the lower scenario
- Converse County – approximately 80 higher (up 4 percent) and 20 additional students than under the lower scenario
- Crook County – 16 higher (up 2 percent)
- Johnson County – approximately 110 additional (up 10 percent)
- Sheridan County – approximately 270 additional (up 7 percent) and nearly 40 students above projected enrollment under the lower scenario
- Weston County – 32 fewer (down 3 percent)

In Campbell County, elementary and middle school enrollments would increase by about 480 students (up 13 percent) K-8 from 2010 to 2015 and nearly 80 additional students (up 1 percent) in grades 9-12.

Year 2020

From 2016 to 2020, public school enrollments would increase in all counties in the PRB study area. Projected changes during this 5-year period (by county) based on the school-age population aged 5 to 17 years include:

- Campbell County – 820 additional (up 9 percent)
- Converse County – approximately 190 additional (up 9 percent)
- Crook County – approximately 60 additional (up 6 percent)
- Johnson County – 180 additional (up 14 percent)
- Sheridan County – 493 additional (up 12 percent)

- Weston County – no substantial change

In Campbell County, the number of students grades K-8 would rise by approximately 610 children (up 9 percent) from 2016 to 2020 and by approximately 210 students (up 9 percent) for grades 9-12.

3.5 Facilities and Services

This section discusses potential local government facility and service demand associated with cumulative energy-related employment and population growth as presented in Sections 3.1 and 3.2, respectively, of this report. Also discussed is the potential service demand associated with other aspects of energy development in the PRB.

As noted in Section 3.8 of the Task 1C Report of the PRB Coal Review, Current Social and Economic Conditions (ENSR 2005a), local government facilities and services not only reflect demand but revenue availability and community values regarding appropriate services and service levels. Although energy development typically affects all services provided by local governments, this report focuses on water supply and wastewater systems, two of the facilities, along with schools (discussed in the previous section) that require substantial cost and long lead times to develop, and law enforcement and emergency response, two of the services most immediately affected by energy development. This report also identifies areas where potential demands on county administrative capacities and road maintenance departments may result from energy development.

Counties and some special districts that would receive increased service demand from energy development also would receive substantial revenues, in the form of ad valorem property taxes on facilities and production and, for counties, sales and use taxes on materials and supplies purchases. Municipalities, on the other hand, typically receive no property taxes from energy development, relying instead on sales and use tax revenues from energy development, which typically are substantially lower than property taxes, and on other revenues and bonded indebtedness to fund expansion of facilities and services to meet energy-related demand.

Additionally, counties and municipalities often face the need to expand facilities and services in advance of energy development. Such expansion often precedes the receipt of substantial revenues from the development.

There are several mechanisms at the state level available to municipalities to help address these problems.

The Wyoming Joint Powers Act (described in section 3.10.3 of the Task 1C Report for the PRB Coal Review, Current Social and Economic Conditions [ENSR 2005a]) allows counties to cooperate with municipalities to fund development and operation of public facilities and services, which allows municipalities to benefit directly from the larger source of energy revenues.

Energy developers intending to construct coal mines and power plants with a construction cost over a threshold amount (\$255.2 million in 2005) would be required to satisfy the provisions of the Wyoming Industrial Information and Siting Act (described in section 3.10.4 of the Task 1C Report for the PRB Coal Review, Current Social and Economic Conditions [ENSR 2005a]). Communities

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identified as affected by the project would be eligible for impact assistance payments (IAPs), which could help fund needed expansions of facilities and services.

In addition to the above sources of funding, the Wyoming State Land and Investment Board administers a variety of loan and grant programs that may help local governments expand facilities to address energy development-related demand (see section 3.10.5 of the Task 1C Report for the PRB Coal Review, Current Social and Economic Conditions [ENSR 2005a]).

3.5.1 Lower Production Scenario

2010

Campbell County. The addition of a re-opened coal mine and three new electric power generating facilities, coupled with the anticipated increase level of drilling and field development for conventional oil and gas and CBNG, would generate relatively high levels of both population and project-driven demand for local government facilities and services in Campbell County during the next 5 years.

In addition to the population-driven demand resulting from nearly 9,500 new residents and 4,300 new homes in the county between 2003 and 2010, increases in services would be required to respond to specific localized demand associated with mine and power plant construction and more dispersed demand resulting from conventional oil and gas and CBNG development. As noted in Section 3.1.1, construction of multiple power plants would result in 3,000 construction jobs in Campbell County between 2006 and 2009, with a peak expected in 2007 – 2008 under either coal production scenario. Anticipating demand from these projects, the recruiting, hiring, training, and retention of staff, given the attractiveness of often higher-paying jobs in the energy industries, are likely to challenge county law enforcement, fire protection, emergency response, and road maintenance agencies during this period. Campbell County and its municipalities may continue to use the mechanism of the Wyoming Joint Powers Act to fund fire and emergency response needs throughout the county.

Campbell County also may need to expand its administrative and human service functions during this period, particularly if the conventional oil and gas and CBNG ramp-up coincides with construction or reopening of coal mines and construction of power plants. Some human services in the county are provided by non-profit agencies that receive funding from the county.

Campbell County would receive substantial property tax revenues from energy development and production during this period, and, for the re-opening of a coal mine and construction/operation of three new power plants, the county would receive sales tax revenues and IAPs, which could be substantial. These funds could be used by the county to offset higher facility and service costs, particularly if they are available in a timely fashion. In that regard, the county budget has been benefiting from higher revenues as a result of rising CBNG production and energy prices in recent years, which translates into added fiscal capacity to respond to the impending demands.

City of Gillette. Under the lower production scenario, the City of Gillette could grow by approximately 7,300 by 2010 to 29,392 (or 33 percent) over its estimated 2003 population. In addition, the Gillette Department of Community Development estimates that the city routinely hosts 2,300 to 2,800 temporary or non-permanent residents and provides water and wastewater service

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to some homes outside the city in the Gillette Urban Service Area (GUSA). The number of temporary residences served in Gillette likely would increase in 2007–2008 when it would host many single-status construction workers associated with construction of three additional power plants. The temporary and longer-term growth during this period correspondingly would increase demand on municipal facilities and services. Improvements to the city's wastewater treatment facility, scheduled to be completed by 2006, would provide service capacity for a design population of 41,000 residents, plus associated commercial and municipal demands; therefore, the city would have ample capacity to accommodate the anticipated population for 2010 under the lower production scenario. The city water system currently has limited capacity. A number of planned water supply, storage, and transmission improvements would provide capacity to serve the city's 20 year population projection. However, full capacity would not be reached until 2009 under the current Capital Improvements Plan funding schedule; consequently, timing could be an issue, particularly if multiple construction projects occur early in the 2003–2010 period.

Given that Gillette could experience a 33 percent population increase during this period, the resultant demand would require expansion in all city services and may require expansion of some facilities to meet demand. Funding service demand may challenge the city financially, as the addition of new staff and equipment may occur before the receipt of additional revenues. The city's capital improvements program includes replacement and expansion of some facilities to keep pace with its 20-year population projections, but the rate and type of growth may require unplanned expansion of certain facilities.

Town of Wright. Under the lower production scenario, population growth in Campbell County would provide the impetus for the Town of Wright to add 534 persons (38 percent) between 2003 and 2010. This growth rate and the resultant new demand for public facilities and services likely would result in strains for some services; however, key public facilities such as water and wastewater have existing capacity to accommodate this level of population growth. As with Gillette, Wright may incur service and facility expansion costs in advance of energy-development revenues.

Wright's ability to accommodate additional growth may be limited in the short term until the town is able to recover from the August 12, 2005, tornado which destroyed or damaged a total of 92 homes. Wright was declared a federal disaster area, making the town eligible for low interest loans and federal disaster assistance.

One possibility not included in the projections is that Wright may, after recovering from the tornado, host a construction camp for an electric power generating facility. The temporary population increase would place additional demands on local facilities and services, but, depending on the size of the camp, these demands probably could be accommodated by existing utilities. As with Campbell County and the City of Gillette, the Town of Wright would benefit from any IAPs that accompany future mine or power plant construction.

Converse County. Under the lower production scenario, Converse County would grow by an estimated 789 persons by 2010 or approximately 6 percent above the county's 2003 population level. The county's population in 2010 still would be almost 1,000 persons below the peak population level attained in 1980s. The moderate rate of projected population increase likely would allow the county to plan for and accommodate growth. However, because energy revenues within the county are anticipated to decline, the county may need to seek other sources to fund any needed expansion in facility and service systems.

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The anticipated development of three additional power plants during this period may result in some spillover of temporary construction workers seeking accommodations in Douglas, particularly if one or more power plants are located in the southern portion of Campbell County. The county also could host railroad construction, maintenance, and operating crews as the UP and BNSF lines make anticipated improvements to their lines serving the PRB. This circumstance would place particular demands on some county services such as law enforcement, emergency response, and health care. The county would not receive substantial tax revenues to help fund the required services, but could be eligible for IAPs.

City of Douglas. Under the lower production scenario, the City of Douglas would be anticipated to grow by 566 persons over 2003 levels, approaching a population of 6,000 in 2010. This level would be substantially below the water system design capacity of 10,000 and the wastewater system design capacity of approximately 15,000.

Douglas also could host temporary power plant and railroad construction workers and have associated law enforcement, emergency response, and health care demands. As with Converse County, the city could be eligible for IAPs.

Town of Glenrock. The Town of Glenrock is anticipated to gain 82 persons between 2003 and 2010 under the lower production scenario, reaching a level of 2,366 persons, which is below its 1980 peak of 2,736. The town's water system currently is designed to accommodate a population of 5,000 with plans to expand capacity to 7,500 to 8,000 residents, and the wastewater system is designed to accommodate a population of 3,000. Consequently, the town would be able to accommodate anticipated growth under this scenario.

Crook County. Crook County would grow by 556 persons (about 9 percent) between 2003 and 2010 under the low production scenario. Given that power plant construction may occur in the part of Campbell County near Crook County, there may be some temporary construction worker impacts during this period. The construction worker impact, coupled with the recreation impact at Keyhole Reservoir where many Campbell County residents recreate, would place additional demands on law enforcement and emergency response services during this period. Crook County would receive no energy-related property tax revenues and little sales tax to offset these additional costs, but could be eligible for IAPs for power plant construction projects.

Town of Moorcroft. The Town of Moorcroft would add 70 people between 2003 and 2010 under the low production scenario. Moorcroft's water system currently is at capacity, and the town purchases raw water from Gillette. The town has drilled a new water well and has applied for funding to construct a water transmission line to the town. The wastewater treatment system could accommodate this relatively small population increment.

Moorcroft may host power plant construction workers during this period which would add to the town's service demand. As with the county, the town might be eligible for IAPs, which could offset some of these costs.

Johnson County. Johnson County would add an estimated 835 residents between 2003 and 2010 under this scenario. Most of this population growth would be attributed to CBNG development and general population growth. CBNG development can be anticipated to continue to generate demand

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for law enforcement, emergency response, road maintenance, and county administrative services. This demand would be dispersed in nature, at times creating higher levels of demand in relatively remote parts of the county. The increased demand would exacerbate overcrowding at the county jail, unless a new jail is constructed during this period. Increasing energy-related revenues in Johnson County would provide additional fiscal resources for the county to expand facility and service systems.

City of Buffalo. Buffalo is anticipated to grow by 477 persons by 2010, or approximately 11 percent under the lower production scenario. With the planned improvements to the water system, the city would have adequate capacity to handle this level of growth. The wastewater treatment system also would be able to handle the projected growth.

Sheridan County. Sheridan County would grow by 1,344 persons, or approximately 5 percent between 2003 and 2010 under the lower production scenario. In the latter part of the period, part of the growth is assumed to be associated with construction of the P&M Ash Creek coal mine in the northern part of the county. The construction work force, coupled with ongoing CBNG development and general population growth would result in increasing demands for law enforcement, emergency response, road maintenance, and county administrative services. Sheridan County is anticipated to experience strong growth in energy revenues, and may be eligible for IAPs during construction of P&M's Ash Creek Mine, which would offset the county's service costs.

City of Sheridan. The City of Sheridan would grow by 933 persons or approximately 6 percent between 2003 and 2010 under the lower production scenario. This population easily could be served by the city's water and wastewater systems.

Weston County. Weston County would add 437 people by 2010 under the lower production scenario. The addition of a new coal mine in central Campbell County and possibly the construction of new power plants could result in Weston County hosting some construction workers. The county might experience demand for law enforcement and emergency response services in that case, and also could be eligible for IAPs. Weston County is not anticipated to receive substantial other energy-related tax revenues.

City of Newcastle. Newcastle would add 200 residences by 2010 under the lower production scenario. The city possibly could host some construction workers under this scenario; however, it has adequate water and wastewater system capacity to accommodate substantial growth.

Town of Upton. Upton would add 17 people by 2010 under the lower production scenario. Like Newcastle, the town potentially could host some construction workers under this scenario; however, it has adequate water and wastewater system capacity to accommodate substantial growth.

2015

Campbell County. Campbell County would grow by an additional 2,980 persons or approximately 6 percent between 2011 and 2015 under the lower production scenario. As there are no major construction projects projected during this period, law enforcement and emergency response demands would be associated with ongoing operations and continued CBNG development and production. Some increased demand would result from construction of the proposed DM&E railroad. Although the rate of growth during this period would be relatively substantial and constant,

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the county would receive increased energy-related revenue, which could be used to fund expansion of county facilities and services to accommodate the anticipated growth.

City of Gillette. Under the lower production scenario, Gillette's resident population would grow by approximately 1,418 to 30,810 between 2011 and 2015. Including the city's service area population, which could be several thousand people higher, the city should be able to accommodate the anticipated population gains with water and wastewater services, assuming anticipated improvements are completed. This slower rate of growth (the city would grow by an estimated 7 percent over the 5-year period), as compared to the preceding period, and the absence of large scale construction projects would reduce the need for major service demand and facility expansion. However, if anticipated improvements are not completed, the city would face residual needs from the rapid growth expected prior to 2010.

Town of Wright. Wright would see little new growth between 2011 and 2015 under the lower production scenario. The town's projected population of 1,956 in 2015 would be within the capacity of the town's water and wastewater systems.

Other Counties and Municipalities in the Study Area. As shown in **Table 3-7**, the other counties and municipalities in the study area would experience moderate population increases during this period, ranging from a low of 3 percent in Upton (a net gain of 21 new residents) to 9 percent in Moorcroft (a net gain of 79 new residents). Although other counties and municipalities would add more population during the 5-year period, (e.g. Converse County 709; Sheridan County 1,169), the rate of growth in these areas would be moderate (e.g., 6 percent and 4 percent, respectively, for these two counties), owing to their larger size. The relatively steady nature of this growth (no large scale construction projects are anticipated) would be unlikely to generate population-related strains on local facilities and services. Johnson and Sheridan counties could experience service demands in new areas as CBNG development expands westward.

Water and wastewater systems in all municipalities would have capacity to accommodate the anticipated lower production scenario growth, assuming completion of planned improvements.

2020

Campbell County. Campbell County would grow by an estimated 2,343 persons or approximately 5 percent between 2016 and 2020 under the lower production scenario, reaching an estimated 48,545. As there would be no major construction projects during this period, law enforcement and emergency response demands would be associated with ongoing operations. Although the rate of growth during this period would be relatively substantial and constant, the county also would receive energy-related revenue increases, which could be used to fund expansion of county facilities and services to accommodate the anticipated growth.

City of Gillette. Under the lower production scenario, the City of Gillette would grow by approximately 1,392 to a total of 30,743 between 2016 and 2020. Including the city's service area population, which could be several thousand people higher, the city should be able to accommodate the anticipated population gains with its water and wastewater systems, assuming anticipated improvements are completed. It should be noted that the Gillette population estimate for the lower production scenario is somewhat lower than the preliminary 2020 population estimate (34,449) developed for the city's comprehensive planning process.

Town of Wright. Wright would grow by an estimated 63 persons to 1,917 between 2016 and 2020 under the lower production scenario, which still would be within the capacity of the town's water and wastewater systems.

Other Counties and Municipalities in the Study Area. As shown in **Table 3-7**, the other counties and municipalities in the study area would experience moderate population growth during this period, at levels similar to the preceding 5-year period. Again, the relatively moderate and steady nature of the growth associated with RFD activities under the lower production scenario during this period would be unlikely to generate population-related strains on local facilities and services.

Water and wastewater systems in all municipalities would have capacity to accommodate the anticipated lower development scenario growth during this period, assuming completion of planned improvements.

3.5.2 Upper Production Scenario

2010

Campbell County. Under the upper production scenario, Campbell County population growth would be 1,737 residents higher than the lower production scenario (during the 2003–2010 period) reaching 47,662 by 2010. This level of growth (31 percent over 7 years) would further increase demand for local government services over the lower development scenario, and spread demand as the county would have to provide services to one re-opened coal mine. The substantial increment in energy-related tax revenues could help offset service costs, but the timing of revenues versus the increases in demand and the staff hiring and retention issues would be exacerbated under this scenario. Similarly, county administrative and human service functions would require greater expansion than under the lower production scenario.

City of Gillette. Gillette would grow by an additional 8,391 people under the upper production scenario (1,112 more residences than under the lower production scenario) reaching a population of 30,504 by 2010. Assuming completion of planned improvements, the city water and wastewater systems should be able to accommodate this level of growth, as well as the 2,300 to 2,800 temporary workers that the City routinely hosts and the population in the GUSA.

Given that Gillette would experience a 31 percent population increase under the upper production scenario during this period, the resultant demand would require additional expansion in city services and some facilities beyond that associated with the lower production scenario.

Unlike Campbell County, Gillette receives little property tax revenue directly from energy development and production, although revenues would be derived indirectly on new residential and commercial construction located within the city. The city could receive substantial sales and use tax revenues and IAPs from coal mine and power plant construction, but the city might need to expand services in advance of its receipt of sales tax revenues and IAPs.

Town of Wright. The Town of Wright would be expected to grow by 608 (43 percent) between 2003 and 2010 under the upper production scenario, 74 persons more than under the lower

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production scenario. Consequently, there would be little difference in service demand for Wright between the two scenarios, and the town's water and wastewater systems would be adequate.

Other Counties and Municipalities in the Study Area. Other counties and municipalities in the study area would experience negligible differences in population gains (less than 100 persons, except for Sheridan County where the difference would be 120 persons) during the 2003–2010 period, as contrasted to the lower production scenario, and correspondingly experience negligible differences in facility and service demand between the two scenarios.

2015

Campbell County. Campbell County's population would grow by 3,896 to 51,558 residences between 2011 and 2015 under the upper production scenario, 2,653 persons higher than under the lower production scenario. The incremental growth under this scenario substantially would increase service demand over the lower production scenario. A portion of this increase would result from construction of the proposed DM&E railroad, increasing county law enforcement and emergency response costs during this period.

City of Gillette. The population of Gillette would increase to an estimated 32,500 by 2015 under the upper production scenario, 1,690 higher than the 2015 population under the lower production scenario. This population coupled with the typical temporary and GUSA population still would be within the capacity of the water and wastewater systems, assuming the planned improvements are completed. However, other city facilities and services could require expansion during this period.

Town of Wright. Wright would add an estimated 38 residents between 2011 and 2015 under the upper production scenario, 108 persons more than anticipated under the lower production scenario. Consequently, there would be negligible differences in service demand between the two scenarios.

Other Counties and Municipalities in the Study Area. During the 2011–2015 period, other counties and municipalities in the study area would experience negligible differences in population growth under the upper production scenario as compared to the lower production scenario, and correspondingly would experience little difference in facility and service demand between the two scenarios.

2020

Campbell County. Under the upper production scenario, Campbell County population would reach an estimated 54,943 by 2020, approximately 3,950 higher than the 2020 estimate for the lower production scenario. This population gain would be fueled by the construction of another power plant, and the county could receive IAPs in addition to the substantial ad valorem property tax increases associated with higher coal production and the ongoing level of conventional oil and gas and CBNG production. These revenues could offset the cost of meeting the increased service demand resulting from the temporary and longer term population gains.

City of Gillette. Population in the City of Gillette is projected to reach an estimated 34,065 by 2020, approximately 2,450 higher than the 2020 population estimate for the city under the lower production scenario. It should be noted that this estimate is close to the city's recent comprehensive planning 2020 population estimate of 34,449. Including the traditional temporary population hosted

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by the city and homes served in the Gillette Urban Service area, the water and wastewater systems would have adequate capacity to accommodate the anticipated growth, assuming planned improvements are completed. The city would need to expand some other municipal services and facilities during this period. IAPs from the construction of an additional power generating facility could help offset these costs.

Town of Wright. The Town of Wright would have a projected population of 2,143 by 2020 under the upper production scenario, approximately 154 higher than the 2020 population under the lower production scenario. This population level is within the capacity of the Wright water and wastewater systems. It is possible that Wright could host a portion of the construction work force during the construction of the fourth power generating facility assumed under this scenario. In that case, expansion of town services could be offset by IAPs.

Other Counties and Municipalities in the Study Area. Population gains between 2016 and 2020 in other counties and municipalities within the study area would be negligibly higher than those estimated for the lower production scenario, resulting in similarly negligible differences in facility and service demand between the two scenarios. Water and wastewater systems in all municipalities should be able to accommodate the anticipated 2020 population levels associated with the RFD activities under the upper production scenario, assuming the completion of planned improvements.

3.6 Mineral-related Public Sector Revenue Effects

Federal mineral royalties and state and local taxes levied on coal and other mineral production are important sources of public revenue in Wyoming. Taxes, fees, and charges levied on real estate improvements, retail trade, and other economic activity supported by energy development provide additional sources of revenue to support public facilities and services. These revenues benefit not only those jurisdictions within which the production or activity occurs, but also the federal treasury, state coffers, school districts, and local governments across the state through various revenue-sharing and intergovernmental transfer mechanisms. This section examines the changes in some of the key revenue sources associated with the cumulative development activity under the two RFD scenarios. The projected changes primarily reflect changes in future production levels, as the prices for oil and gas, assessment basis, and tax rates are held constant at current level over the entire analysis period (2003 through 2020). Nominal coal prices are assumed to increase 1.0 percent per year over time. Public expenditures by affected units of local government, school districts, and other special districts would increase over time in response to growing demand for services, changing regulations, and other factors. The current study does not project future expenditures due to the large number of affected entities and complexities associated with estimating expenditures over time.

At the foundation of the mineral development revenue projections are projected levels of future energy and mineral resource production (i.e., tons of coal mined and barrels of oil produced). In fiscal year 2003/2004, the total value of such production is estimated at \$5.05 billion. Slightly over half (\$2.57 billion) was the value of coal production (CREG 2005; Wyoming Taxpayers Association [WTA] 2004)⁶. Projections of future coal production, summarized in Section 2.1 of this report, were developed for the Task 2 Report for the PRB Coal Review, Past and Present and Reasonably

⁶ Note: all monetary values are reported in nominal dollar terms.

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Foreseeable Development Activities (ENSR 2005b). Projected conventional oil and gas and CBNG production was based on the number of new wells drilled and typical per well production profiles. Production of other minerals also contribute mineral development revenues; however, the values on other resources are relatively minor in comparison to coal, oil, and natural gas and are, consequently, not included in this analysis.

Under the lower production scenario, the aggregate value of annual mineral production would climb by \$3.69 billion to \$8.75 billion (nominal dollars) by 2020, a 73 percent increase over the current value. As shown in **Figure 3-4**, the annual production values would increase over time, topping \$7.0 billion in 2010 and \$8.0 billion in 2015. The combined value of coal, oil, and natural gas production under the upper production scenario, all of which represents the incremental value of higher coal production, would increase by 86 percent to \$9.41 billion in 2020. The incremental difference, as compared to the value under the lower production scenario, would be \$670 million.

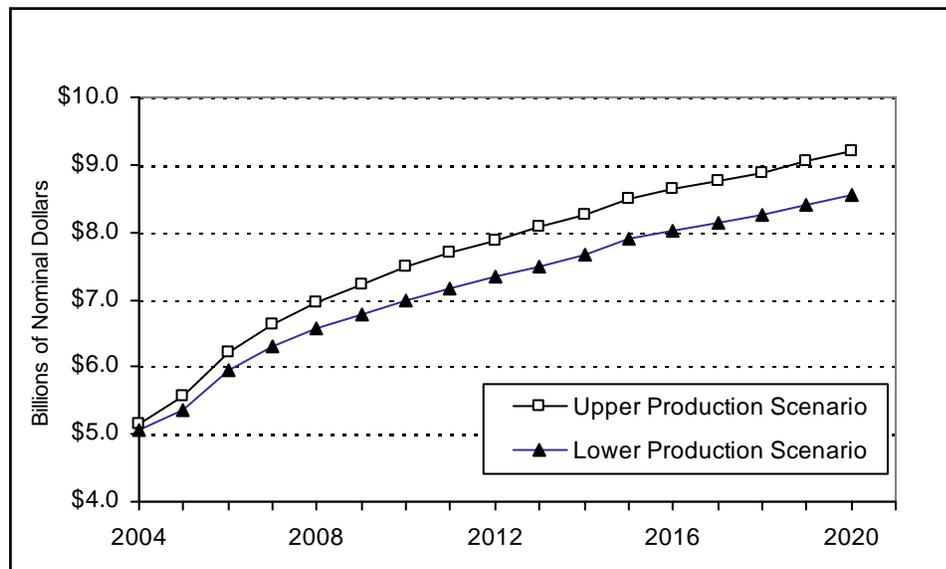


Figure 3-4. Projected Value of Coal, Oil, and Natural Gas Production in the Wyoming PRB

As occurs presently, the overwhelming majority of the mineral production value is anticipated to be in Campbell County, with more than \$2.1 billion in additional production. Approximately 40 percent of the incremental production value (\$1.5 billion by 2020) would be located in Sheridan and Johnson counties, as the value of annual production in Converse County would decline over time. By comparison, approximately 20 percent of the 2003/04 total mineral development value was located in those and other surrounding counties. Total annual mineral production value by 2020 is projected to reach \$6.6 billion in Campbell County and \$2.1 billion in the surrounding counties (**Figure 3-5** and **Table 3-21**).

3.0 Cumulative Social and Economic Effects

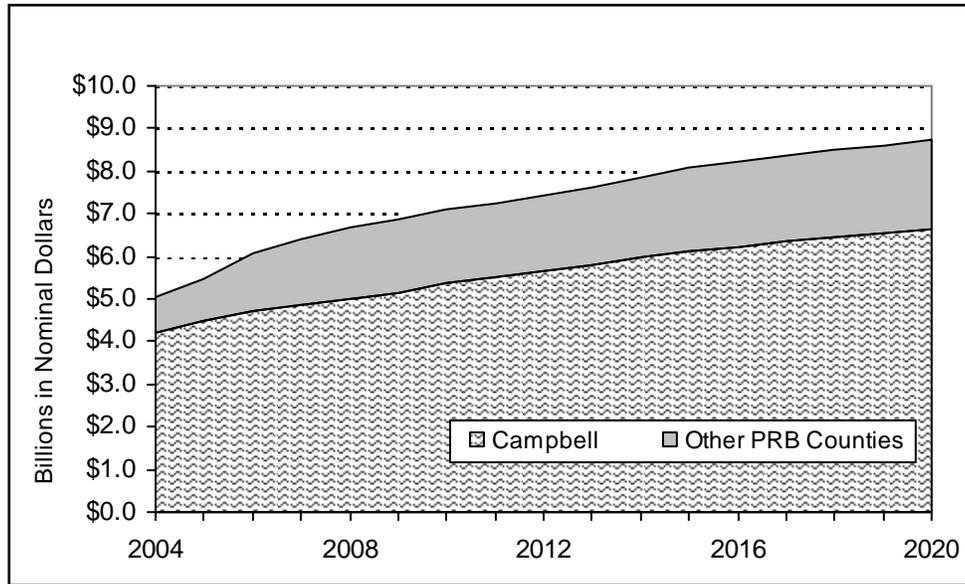


Figure 3-5. Value of Energy Resource Production in Campbell and Other Counties in the PRB from 2004 to 2020 Under the Lower Production Scenario

**Table 3-21
Projected Value of Energy Resource Production in Selected PRB Counties
(millions in nominal dollars)**

County	2005 Amount	2005 Share (percent)	2010 Amount	2010 Share (percent)	2015 Amount	2015 Share (percent)	2020 Amount	2020 Share (percent)
Lower Production Scenario								
Campbell	\$4,413.0	80.7	\$5,298.0	73.3	\$5,980.0	74.1	\$6,469.0	73.9
Converse	\$416.5	7.6	\$335.4	4.6	\$189.2	2.3	\$220.8	2.5
Johnson	\$329.8	6.0	\$964.5	13.3	\$1,116.7	13.8	\$1,198.2	13.7
Sheridan	\$310.6	5.7	\$630.0	8.7	\$783.7	9.7	\$870.6	9.9
Total	\$5,469.9	--	\$7,227.9	--	\$8,069.6	--	\$8,758.6	--
Upper Production Scenario								
Campbell	\$4,642.0	81.5	\$5,794.0	75.0	\$6,452.0	75.5	\$7,006.0	74.3
Converse	\$416.5	7.3	\$335.4	4.3	\$189.9	2.2	\$335.8	3.6
Johnson	\$329.8	5.8	\$964.5	12.5	\$1,116.7	13.1	\$1,198.2	12.7
Sheridan	\$310.6	5.5	\$630.0	8.2	\$791.3	9.3	\$886.6	9.4
Total	\$5,698.9	--	\$7,723.9	--	\$8,550.0	--	\$9,426.6	--

Projected production values under the upper production scenario mirror the profiles shown in **Figure 3-5**, with slightly more rapid growth beyond 2010. Most of the incremental value would accrue in Campbell County as most of the additional production would come from mines in the Gillette area.

The composition of mineral production value would shift over time due to increased CBNG production. Under the lower production scenario, the annual value of CBNG production would more than double from \$1.86 billion in 2004 to \$3.75 billion in 2020. Expanded coal production would be responsible for another \$1.53 billion, raising the total annual value to \$4.1 billion (**Figure 3-6**).

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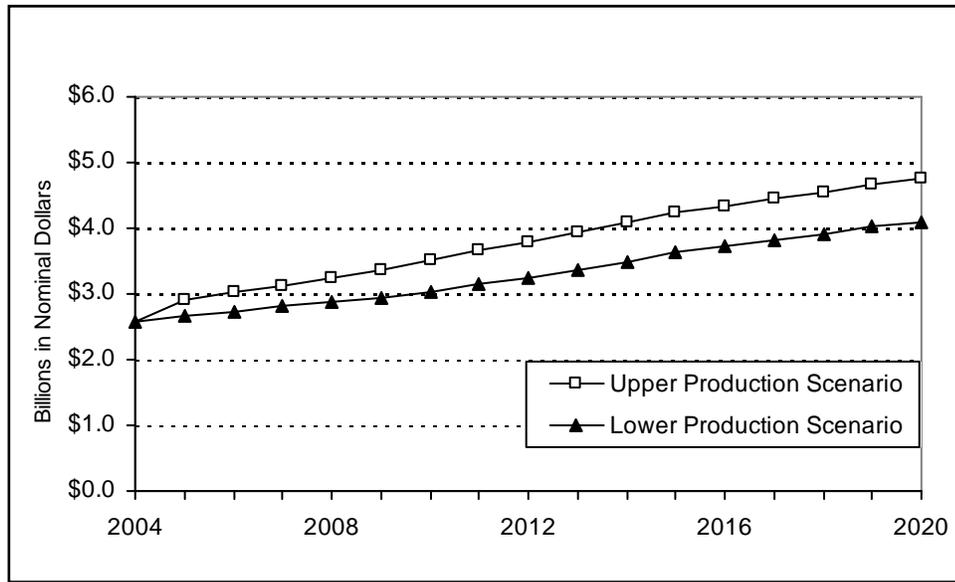


Figure 3-6. Annual Value of Coal Production in the Wyoming PRB

More than 9,600 new conventional oil and gas wells are projected to be drilled in the PRB through the end of the cumulative analysis period (by 2020). Of those, approximately 60 percent are expected to be successful, adding almost 5,800 new producing wells. While resulting in short-term production increases, those gains would be offset by declining production from existing wells. Consequently, the value of gas from conventional wells is projected to decrease by 14 percent over the period, to approximately \$149 million by 2020. The value of oil production is expected to peak at approximately \$688 million in 2015, before declining to \$682 million in 2020, still above the \$456 million produced in 2004. Probably more so than coal, the production values for both oil and gas could be dramatically affected by market forces. (Note: the projections of the value of oil are based on a price of \$35 per barrel.)

As a result of the above changes and as depicted in **Figure 3-7** for the lower production scenario, coal would account for approximately 47 percent of the total mineral production value in 2020, compared to 51 percent in 2004. The share of mineral production value attributable to CBNG would increase from 39 to 43 percent, with conventional oil and gas accounting for 10 percent of the total value in 2020, compared to the current 12 percent.

Under the upper production scenario, the share of total annual value from coal would increase to 51 percent of the total, as nearly \$4.8 billion in annual production is projected. The estimated \$3.8 billion in CBNG, the same as under the lower production scenario, would account for 40 percent of the \$9.4 billion annual total, with conventional oil and gas accounting for 9 percent.

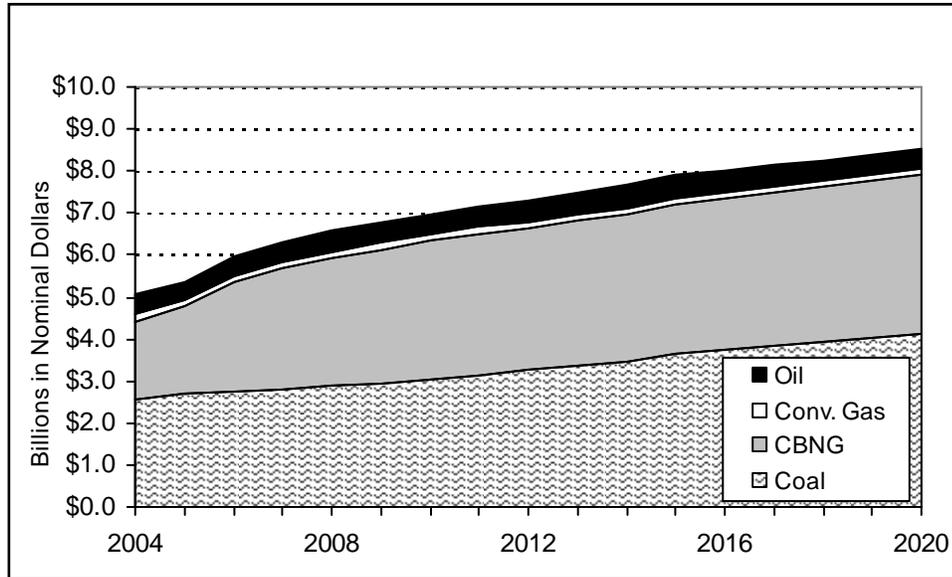


Figure 3-7. Value of Energy Resource Production to 2020 by Major Resource Group Under the Lower Production Scenario

Projected increases in the level and values of mineral production would have dramatic implications for future mineral development revenues. These revenues, which include federal and state mineral royalties, as well as state severance and local ad valorem taxes, would accrue to federal, state, and local governments. Future leasing of federal coal reserves would produce coal lease bonus bid revenues. Energy resource production also would generate substantial sales and use taxes, which would benefit state and local governments. However, future receipts of such tax revenues are not projected as part of this study due to the complexities associated with developing assumptions of the underlying relationships between development activity, the taxable elements and locations of those activities, locations of those activities or events, and tax receipts.

Between 2005 and 2020, total projected receipts derived from the selected revenue sources are \$21.1 and \$22.6 billion, for the lower and upper production scenarios, respectively, exclusive of any coal lease bonus bids. Receipts derived from coal production would account for the majority of the totals under either scenario, with Federal Mineral Royalties (FMR) representing the single largest revenue source; ranging from \$4.9 to \$5.7 billion (nominal dollars), for the lower and upper production scenarios, respectively (**Table 3-22**). Net of an administrative processing fee, these revenues accrue on a 50/50 basis to the Federal Treasury and the State of Wyoming. The revenues returned to the state are distributed to multiple funds according to a legislatively established formula as discussed in Section 2.5 of this report.

The combined revenues on future coal production derived from property taxes and state royalties would be comparable to the FMR revenues, with \$2.8 billion in state severance taxes and \$2.3 billion in cumulative property tax revenues paid to local counties and school districts under the lower production scenario. Such revenues under the higher production scenario are projected at \$3.2 billion in state severance taxes and \$2.7 billion in cumulative property tax revenues.

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Table 3-22
Selected Tax Revenues Associated with Energy Resource Production in Campbell,
Converse, Johnson, and Sheridan Counties
(millions in nominal dollars)

Resource/Taxes	2005-2010	2011-2015	2016-2020	Total
Coal: Lower Production				
Severance Tax	\$868.8	\$875.7	\$1,034.2	\$2,778.7
Federal Mineral Royalties	\$1,543.7	\$1,556.0	\$1,837.6	\$4,937.2
State Mineral Royalties	\$0.0	\$0.0	\$0.0	\$0.0
Ad Valorem Tax-Counties	\$186.0	\$185.6	\$219.5	\$591.0
Ad Valorem Tax-Schools	\$566.3	\$561.6	\$665.1	\$1,793.0
Subtotal	\$3,164.7	\$3,178.9	\$3,756.3	\$10,099.9
Coal: Upper Production				
Severance Tax	\$977.0	\$1,022.3	\$1,200.3	\$3,199.6
Federal Mineral Royalties	\$1,735.9	\$1,816.5	\$2,132.7	\$5,685.1
State Mineral Royalties	\$0.0	\$0.0	\$0.0	\$0.0
Ad Valorem Tax-Counties	\$204.1	\$214.7	\$251.7	\$670.5
Ad Valorem Tax-Schools	\$621.1	\$649.4	\$765.6	\$2,036.1
Subtotal	\$3,538.2	\$3,702.8	\$4,350.3	\$11,591.3
CBNG				
Severance Tax	\$907.2	\$913.8	\$981.5	\$2,802.4
Federal Mineral Royalties	\$1,071.3	\$1,147.9	\$1,190.4	\$3,409.5
State Mineral Royalties	\$181.4	\$174.1	\$197.9	\$553.4
Ad Valorem Tax-Counties	\$192.4	\$215.9	\$236.4	\$644.7
Ad Valorem Tax-Schools	\$563.0	\$624.6	\$682.6	\$1,870.3
Subtotal	\$2,915.2	\$3,076.4	\$3,288.7	\$9,280.3
Conventional Oil and Gas				
Severance Tax	\$219.9	\$222.8	\$233.6	\$676.4
Federal Mineral Royalties	\$139.1	\$135.5	\$138.4	\$413.0
State Mineral Royalties	\$52.1	\$51.7	\$53.5	\$157.3
Ad Valorem Tax-Counties	\$39.2	\$41.4	\$46.9	\$127.6
Ad Valorem Tax-Schools	\$118.1	\$124.9	\$141.6	\$384.7
Subtotal	\$568.5	\$576.4	\$614.0	\$1,759.0
Grand Totals				
Lower Production Scenario	\$6,648.5	\$6,831.7	\$7,659.0	\$21,139.2
Upper Production Scenario	\$7,022.0	\$7,355.7	\$8,253.0	\$22,630.6

Projected revenues on future CBNG production total \$9.3 billion between 2005 and 2020. FMR of \$3.4 billion would account for the single largest share (37 percent) of the total, followed by severance taxes of \$2.8 billion or 30 percent, and ad valorem taxes for public education of \$1.9 billion, or 20 percent. The state would receive an estimated \$553 million in mineral royalties on state mineral interests. Projected revenues from CBNG are the same under both RFD production scenarios.

Public sector tax and royalty revenues to be derived from conventional oil and gas production are estimated at \$1.8 billion through 2020. Severance taxes and FMR would account for the largest shares of those revenues, \$676 million (38 percent) and \$413 million (23 percent), respectively. Ad valorem taxes, to support public education, paid on conventional oil and gas production are estimated at \$385 million through 2020, with \$157 million in state mineral royalties and \$128 million in ad valorem taxes paid to county governments.

3.0 Cumulative Social and Economic Effects

Campbell County would be the principal beneficiary of the higher property tax payments to local counties, with Converse, Sheridan, and Johnson counties also benefiting. School districts whose boundaries encompass the mineral production areas also would benefit from additional revenues. However, Campbell #1 would realize only part of the benefits due to the recapture provisions of the WSFP. Under those provisions, revenues generated locally that are in excess of certain limits are forwarded to the state for redistribution to other districts. It is anticipated that property taxes accruing to Campbell #1 would continue to exceed the limits, with the surplus revenues benefiting district across the entire state.

Future development of energy and mineral resources in the PRB would generate other federal revenues beyond those outlined above and the sales and use tax revenues that are not analyzed in this analysis. Two of those revenue sources, payments-in-lieu of taxes and coal lease bonus bids, portions of which are returned to the state or affected counties, are described below.

Payments in Lieu of Taxes

Payments in lieu of taxes (PILT), is a federal programming administered by the BLM that makes annual payments to local governments containing federal lands within their jurisdictional boundaries. In the PRB, a county's eligibility for PILT is based primarily on the acres of federal lands in the National Forest and National Park systems, and lands administered by BLM (section 6902). PILT payments are to help offset the diminished property taxes receipts due to nontaxable federal lands within their boundaries. Eligibility for PILT is reserved for local governments (usually counties) that provide services related to public safety, environment, housing, social services, and transportation. PILT receipts may be used for any governmental purpose and are not required to be further distributed to other local government units such as school districts or cities.

As provided for in the legislation, the BLM computes the eligible PILT payments authorized under section 6902 using two alternative approaches, with the higher of the two amounts establishing the base entitlement. Payments are subject to a population ceiling limitation computed by multiplying the county population times a corresponding dollar value (adjusted annually for inflation). Actual PILT payments are affected by Congressional appropriations with any funding limitations resulting from such appropriations pro-rated equitably across all jurisdictions in the program.

In fiscal year 2005, PILT payments to counties in the PRB ranged from \$125,029 for Weston County to \$568,276 for Johnson County. PILT payments to Campbell County were \$343,904. Among the study area counties, the population limitations only affect payments to Johnson County (Foulke et al. 2005).

Acreages of federal land ownership in the PRB are not expected to change substantially under the cumulative development scenarios, leaving the basic PILT entitlements and subsequent revenues unaffected for most counties. Population increases in Johnson County would raise its population-related cap on PILT revenues by approximately 6 percent in 2008 or 2009 when its population would exceed 8,000, with a further 5 percent increase after 2015 when its resident population would exceed 9,000.

3.0 Cumulative Social and Economic Effects

Coal Lease Bonus Bids

Coal producers are liable for FMR and state severance taxes on all production from federal coal reserves. In addition, operators must submit competitive bids to secure additional reserves. To be accepted by the BLM, the winning bid must meet or exceed a minimum established by the agency, with that minimum representing the estimated fair market value of the resource allowing for future mine development and production costs and a reasonable profit. Bonus bids have risen over time, with recent bids in the \$0.60 to \$1.00 per ton range. One-half of the successful bid amounts are returned to the state, with payments due within 5 years of the sale even if the time required to mine the resources extends for a longer period. Coal lease bonus bids are tied to individual leasing actions, which occur periodically but not necessarily on a regular schedule. Consequently, the state's receipts of coal leases are used to fund the state's highway fund, school construction, community colleges, and other non-recurrent capital construction projects for cities, towns, counties, and special districts.

Future coal lease bonus bid revenues would be subject to the timing and size of future leasing actions. With up to 9.2 billion tons of production projected through 2020 and current estimated reserves of 8 to 9 billion tons under lease, leasing of 2.5 to 3.0 million tons is foreseeable in order to maintain an adequate level of reserves for mine planning and operational purposes. In turn, such leasing would generate \$1.5 to \$3.0 billion in bonus bid revenues. Net an administrative processing fee, these revenues would accrue to the Federal Treasury and the State of Wyoming on a 50/50 basis.

3.6.1 Lower Production Scenario

The future production of coal, CBNG, and conventional oil and gas would climb steadily over time, exceeding \$7.2 billion in 2010 and approaching \$8.9 billion by 2020. Over the entire cumulative analysis period (2003 through 2020), total production of these three resources would approach \$119 billion (all in nominal dollars) (Table 3-23).

Table 3-23
Annual Mineral Production in the PRB Under the Lower Production Scenario
(millions in nominal dollars)

	2010	2015	2020	Total
Value of Annual Mineral Production	\$7,227.9	\$8,069.6	\$8,758.6	\$118,770.0

Mineral development revenues derived from that production, excluding coal lease bonus bids and state and local sales and use taxes, are projected to total \$21.1 billion. Of that total, approximately \$4.6 billion would accrue to the Federal Treasury (50 percent of the FMR), and \$17 billion would accrue to state and local coffers (Table 3-24). Under state revenue distribution formulas established by the Wyoming legislature, revenues collected by the state ultimately benefit the entire state.

3.0 Cumulative Social and Economic Effects

Table 3-24
Summary of Mineral Development Tax Revenues Associated with Energy Resource
Production Under the Lower Production Scenario
(millions in nominal dollars)

Resource/Taxes	2005-2010	2011-2015	2016-2020	Total¹
Coal ²	\$3,164.7	\$3,178.9	\$3,756.3	\$10,099.9
CBNG	\$2,915.2	\$3,076.4	\$3,288.7	\$9,280.3
Conventional Oil and Gas	\$568.5	\$576.4	\$614.0	\$1,759.0
Totals	\$6,648.4	\$6,831.7	\$7,659.0	\$21,139.2
Severance Tax	\$1,995.9	\$2,012.4	\$2,249.3	\$6,257.5
Federal Mineral Royalties	\$2,754.1	\$2,839.4	\$3,166.3	\$8,759.8
State Mineral Royalties	\$233.5	\$225.8	\$251.4	\$710.7
Ad Valorem Tax-Counties	\$417.6	\$443.0	\$502.8	\$1,363.3
Ad Valorem Tax-Schools	\$1,247.5	\$1,311.1	\$1,489.3	\$4,047.9
Totals¹	\$6,648.6	\$6,831.7	\$7,659.1	\$21,139.2

¹Totals may differ due to rounding.

²Coal-based revenues exclude coal lease bonus bids due to uncertainties regarding the amount and timing of coal leases and the bonus bids received.

Year 2010

Energy and coal production in the PRB is projected to generate more than \$6.6 billion in severance, royalties, and property taxes between 2005 and 2010. Average annual revenues over the 6-year period would be \$1.1 billion. Revenues derived on coal production would account for 48 percent of the total, with CBNG contributing 44 percent of the total and conventional oil and gas accounting for the remaining 8 percent.

Of those total revenues, approximately \$1.4 billion would accrue to the Federal Treasury, \$3.6 billion to the state, and \$1.7 billion to local governments and school districts, the latter including revenues collected on development and activity in Campbell County, but distributed to other districts under the provisions of the WSFP recapture program.

Year 2015

Revenues derived from the selected sources on production between 2011 and 2015 (5 years) would be \$6.8 billion, or \$1.4 billion per year on average, and 23 percent higher than during the preceding period. CBNG would account for a slightly higher increased share of the total, with the gains offset by a comparable decline on revenues derived from coal.

The cumulative revenue accruing to the Federal Treasury during the period, excluding coal lease bonus bids, would be approximately \$1.4 billion, approximately \$284 million per year on average and 24 percent higher than the \$229 million annual average during the preceding period.

Revenues totaling \$3.7 billion would accrue to the state between 2011 and 2015 from projected energy and mineral development included in the lower production scenario, with another \$1.8 billion in property taxes.

3.0 Cumulative Social and Economic Effects

Year 2020

Revenues derived from the selected sources on production between 2016 and 2020 would climb to \$7.7 billion, or \$1.5 billion per year on average, and 12 percent higher than during the preceding period. Coal revenues derived on increased coal production would account for 49 percent of the total, with CBNG contributing 43 percent of the total and declining conventional oil and gas production accounting for the remaining 6 percent.

The cumulative revenue accruing to the Federal Treasury during the period would be approximately \$1.6 billion, approximately \$316 million per year on average, compared to \$284 million annual average during the preceding period.

Revenues totaling \$4.1 billion would accrue to the state between 2016 and 2020 from projected energy and mineral development included in the lower production scenario, with another \$2.0 billion in property taxes.

3.6.2 Upper Production Scenario

Future production of coal, CBNG, and conventional oil and gas would climb steadily over time, exceeding \$7.7 billion in 2010 and exceeding \$9.4 billion by 2020. The difference in production value between the lower and upper production scenarios in 2020 is \$668 million annually, or 8 percent relative to the lower value. Over the entire cumulative analysis period, total production of these three resources would approach \$127 billion (in nominal dollars) (**Table 3-25**), that difference attributable entirely to higher coal production.

Table 3-25
Annual Mineral Production in the PRB Under the Upper Production Scenario
(millions in nominal dollars)

	2010	2015	2020	Total
Value of Annual Mineral Production	\$7,723.9	\$8,550.0	\$9,426.6	\$126,900

Mineral development revenues derived from that production, excluding coal lease bonus bids and state and local sales and use taxes, are projected to total \$22.6 billion, excluding coal lease bonus bids. Of that total, approximately \$4.8 billion would accrue to the Federal Treasury (50 percent of the FMR), with \$13.8 billion accruing to state and local coffers (**Table 3-26**). Under state revenue distribution formulas, the revenues collected by the state ultimately benefit the entire state.

3.0 Cumulative Social and Economic Effects

Table 3-26
Summary of Mineral Development Tax Revenues Associated with Energy Resource
Production Under the Upper Production Scenario
(millions in nominal dollars)

Resource/Taxes	2005-2010	2011-2015	2016-2020	Total¹
Coal ²	\$3,538.0	\$3,703.0	\$4,350.0	\$11,591.0
CBNG	\$2,915.2	\$3,076.4	\$3,288.7	\$9,280.3
Conventional Oil & Gas	\$568.5	\$576.4	\$614.0	\$1,759.0
Totals	\$7,021.7	\$7,355.8	\$8,252.7	\$22,630.3
Severance Tax	\$2,104.1	\$2,159.0	\$2,415.4	\$6,678.5
Federal Mineral Royalties	\$2,946.3	\$3,099.9	\$3,461.4	\$9,507.6
State Mineral Royalties	\$233.5	\$225.8	\$251.4	\$710.7
Ad Valorem Tax-Counties	\$435.8	\$472.0	\$535.0	\$1,442.8
Ad Valorem Tax-Schools	\$1,302.3	\$1,398.9	\$1,589.8	\$4,291.0
Totals¹	\$7,022.0	\$7,355.6	\$8,253.0	\$22,630.6

¹Totals differ due to rounding.

²Coal-based revenues exclude coal lease bonus bids due to uncertainties regarding the amount and timing of coal leases and the bonus bids received.

Year 2010

Energy and coal production in the PRB is projected to generate nearly \$7.0 billion in severance, royalties, and property taxes between 2005 and 2010, approximately 6 percent more than under the lower production scenario. Average annual revenues over the 6-year period would be approximately \$1.2 billion. Revenues derived on coal production would account for 50 percent of the total, with CBNG contributing 42 percent of the total and conventional oil and gas accounting for the remaining 8 percent. Coal lease bonus bids on future coal leasing would generate additional revenues that would be shared between the federal and state governments.

Of those total revenues, approximately \$1.5 billion would accrue to the Federal Treasury (excluding coal lease bonus bids) \$3.8 billion to the state, and \$1.7 billion to local governments and school districts, the latter including revenues collected on development and activity in Campbell County, but distributed to other districts under the provisions of the WSFP recapture program.

Year 2015

Revenues derived from the selected sources on production between 2011 and 2015 (5 years) would be \$7.4 billion, or \$1.5 billion per year on average, 26 percent higher than during the preceding period and 8 percent higher than projected under the lower production scenario for the same time period. CBNG would account for 42 percent of the total, coal 42 percent and conventional oil and gas the remaining 8 percent.

The cumulative revenue accruing to the Federal Treasury during the period would be approximately \$1.5 billion, approximately \$309 million per year on average and 26 percent higher than the \$246 million annual average during the preceding period.

3.0 Cumulative Social and Economic Effects

Revenues totaling \$3.9 billion would accrue to the state between 2011 and 2015 from projected energy and mineral development included in the upper production scenario, with another \$1.9 billion in property taxes.

Year 2020

Revenues derived from the selected sources on production between 2016 and 2020 would climb to \$8.3 billion, or \$1.7 billion per year on average, and 12 percent higher than during the preceding period. Revenues derived on increased coal production would account for 53 percent of the total revenues during the period, with CBNG contributing 40 percent of the total and declining conventional oil and gas production accounting for the remaining 7 percent.

The cumulative revenue accruing to the Federal Treasury during the period would be approximately \$1.7 billion (excluding coal lease bonus bids) or approximately \$346 million per year on average.

Revenues totaling \$4.4 billion would accrue to the state between 2016 and 2020 from projected energy and mineral development included in the upper production scenario, with another \$2.1 billion in property taxes.

3.7 Community and Social Effects

The BLM's goal of social assessment is to estimate the effects of a proposed action on the well being of people over both the short and long term (Branch et al. 1982). Virtually any action has the potential to affect community social conditions. Social effects can be positive or adverse, major or minor, long-term or temporary. Examples of potential positive social effects associated with energy development include higher standards of living and better quality of life associated with increased income, enhanced economic opportunities, expanded shopping alternatives, and improved community and health care services resulting from economic and population growth and increased tax revenues. Examples of potential adverse social effects associated with energy development include rapid population growth resulting in housing shortages, overwhelmed community facilities and services, increases in social problems such as crime, substance abuse and domestic violence, conflicts between new and existing cultures, and disruptions of community social fabric and ways of life. In many cases, an action can result in both positive and adverse social effects.

Given the broad geographic scope and time frame of the PRB Coal Review, this study does not focus on specific types of social change; rather it assesses the potential for change in each affected county and community, considering the energy development assumed for each production scenario.

The social effects of RFD activities in the PRB would vary from county to county and community to community under the production scenarios developed for this study, based on the existing social setting and the type of development that is projected to occur. A key theme of this study is that the energy development activities associated with either production scenario are not new to the affected communities; rather they are continuations of activities that have been occurring for decades, with the exception of CBNG development.

Other sections of this report discuss topics that influence social change, including:

- Employment and income
- Population growth
- Housing demand
- Public education
- Local government facilities and services
- Local, state, and federal tax and royalty revenues and their distribution to local governments

3.7.1 Lower Development Scenario

2010

Campbell County, the City of Gillette, and the Town of Wright. The populations of Campbell County, the City of Gillette, and the Town of Wright each would grow between 26 and 38 percent from 2003 and 2010 under assumptions associated with the lower production scenario. This accelerated rate of growth would be higher than the recent past but lower than occurred between the mid-1960s and mid-1980s. Much of the projected growth in Campbell County would be generated directly by energy development from the coal, CBNG, and electric power generation industries.

Campbell County has had more recent experience with growth from diverse types of energy development than perhaps any other area in the country. However, this relatively high rate of growth could be accompanied by an array of social effects in any community, regardless of the source/growth and regardless of the community's experience with growth.

Over the last 50 years, the county has seen the development of coal mines and the expansion of railroads to move the coal, the drilling and development of conventional oil and natural gas and CBNG fields and pipelines, the development and closure of uranium mines, and the development and operation of electric power generating facilities.

The local experience with energy development and Gillette's evolution from a small, predominately ranching community to the self-proclaimed "Energy Capitol of the Nation" has helped prepare it for ongoing energy development. Similarly, the Town of Wright came into being as a coal mining community, and it was designed to accommodate additional population as mines in the southern part of Campbell County developed.

Factors that would shape the social effects of the RFD activities under the two RFD scenarios considered for this study include the following:

- The RFD activities identified for both development scenarios are continuations of activities that have been occurring locally for decades, with the exception of CBNG, which has been more recent. Consequently, these activities and the growth resulting from them are part of the social fabric of Campbell County and its municipalities. Many current residents came to Campbell County specifically to take advantage of the economic opportunities associated with these industries, and any resident of the county for more than a few years has experienced the social

3.0 Cumulative Social and Economic Effects

and community effects of CBNG development, coal mine expansion, and power plant construction.

- Energy workers immigrating to Campbell County are likely to have economic, demographic, educational, and vocational characteristics similar to those of many current residents.
- Campbell County, its communities, and the range and capacity of public services, facilities, and management have grown to the point that individual energy developments are more easily accommodated. Any individual project is more likely to be a part of the ongoing social and community evolution in Campbell County and much less likely to dominate local conditions.
- Over the past 30 years, the State of Wyoming has put in place numerous programs and mechanisms to assist communities in dealing with energy and industrial growth. These include the Wyoming Industrial Information and Siting Act (designed specifically for large industrial projects; conventional oil and gas and CBNG development are exempt from the Act), the Joint Powers Act, and the various loan and grant programs administered by the Wyoming State Land and Investment Board. As noted elsewhere in this report, these mechanisms are more effective with discrete projects such as coal mines and power plants and less effective with more diffuse projects such as CBNG development.

The above notwithstanding, the capabilities of the county and its municipalities to accommodate growth likely would be challenged given the anticipated high rate of growth, particularly if development of multiple, large-scale energy projects were to occur simultaneously, or if the more diffuse conventional oil and gas or CBNG industries were to ramp-up substantially without adequate coordination and planning. Similarly, if the Town of Wright were to host construction camps for one or more power plant construction projects, the proponents, the town, and the county would need to cooperate to maximize the benefits and minimize potential adverse social effects of a large, single status, temporary work force.

The lower production scenario assumes the addition of one re-opened coal mine and three new electric power generating facilities in Campbell County during the 2003 to 2010 period, as well as an acceleration and subsequent stabilization of conventional oil and gas and CBNG drilling and field development activities and some expansion of railroad capacity. Between 2003 and 2010, Campbell County would add an estimated 9,500 residents under the assumptions used for the lower production scenario, Gillette would add nearly 7,300, and Wright would add approximately 530. During periods of coal mine re-opening and power plant construction, the county and its communities also might host substantial numbers of temporary construction workers.

As a city and urban service area of approximately 25,000, Gillette has substantial public, commercial, and recreational infrastructure in place. The city's population includes a large energy industry work force that is mobile in nature, and the city is accustomed to hosting large numbers of temporary industry and construction workers. Gillette supports many churches, social organizations, and recreational opportunities. Consequently, assimilation into the social fabric of the community can be easy for newcomers, and there would be few barriers to community integration for most new residents.

Similarly, Wright was built to house coal mine workers, and many current community residents are employed in the energy industries. The town actively has solicited the development of construction

3.0 Cumulative Social and Economic Effects

worker housing facilities in the past, and newcomers would encounter few barriers to community integration.

The estimated 5,500 new jobs that would be created in Campbell County between 2003 and 2010, many in the high-paying energy industries, would create economic opportunities for newcomers and existing residents alike. There are likely to be employment opportunities for graduating high school students, which could stem the exodus of young residents common in many rural communities, although the abundance of job opportunities also is cited as a reason for some students to drop out prior to graduation.

During this period, CBNG-related employment is anticipated to increase and subsequently stabilize. The duration of anticipated CBNG development may change the nature of the work force, which historically has included a large single-status, temporary component. The prospect of long-term work and the gradual consolidation of the industry may encourage more CBNG workers to relocate to Campbell County with their families, reducing social issues associated with a temporary, single status work force. However, seasonal wildlife restrictions and other lease stipulations on federal lands may reduce the potential for this transition.

It is important to note that, given the relatively high rate of growth (26 percent or higher in 7 years), it is likely that Campbell County and its municipalities may experience housing shortages during the 2003–2010 period without substantial intervention from the energy industries. Housing shortages could result in stress for in-migrating families and encourage some workers to relocate to Campbell County on a single-status, work-week basis, returning to their home communities and households on days off, increasing the service demands associated with a single-status work force.

It also is possible that the accelerated rate of growth in Campbell County and its communities could result in strained community services and crowding in some public facilities. Key public facilities such as water and wastewater systems generally would be adequate, although summertime shortages in Gillette would be possible during the 2006-2010 period as growth likely would occur before planned water system expansions have been completed.

Campbell County provides some human services and provides funding for a number of non-profit human service providers. Given the accelerated rate of growth anticipated between 2003 and 2010, demands on human service agencies are likely to increase substantially, requiring new staff, equipment, and potentially some facility improvements. The county would receive substantial energy-related tax revenues during this period, which it could use to expand services; however, there is a concern that increased demand may precede commensurate revenue increases.

It would require time and substantial fiscal resources to plan for and expand public services and facilities in advance of anticipated growth in Campbell County and its municipalities by 2010 (which already is occurring). It also would be challenging to recruit, train, and equip staff in advance of growth and to retain staff, given the higher energy industry wage scales.

As noted in Sections 3.5 and 3.6 of this report, municipalities in Wyoming receive a limited amount of direct energy-related tax revenues, primarily sales and use tax revenues and a small amount of severance tax and federal energy royalty revenues. The provisions of the Wyoming Industrial Information and Siting Act also would provide affected municipalities with IAPs from new power plants and a re-opened mine as well as a mechanism to cooperate with industry to develop plans to

3.0 Cumulative Social and Economic Effects

more effectively accommodate construction work forces. Nevertheless, Gillette and Wright may face challenges in securing funding to improve and maintain facilities and services in the face of rapid energy-related population growth.

Historically, familiarity with energy development and management capacity to deal with growth and development are qualities of Campbell County and its communities that would facilitate the accommodation of the relatively high level, energy-related growth associated with the RFD activities under the lower production scenario without widespread social and community effects. However, with the high level of anticipated growth, the fact that population growth already is occurring, and the substantial challenges facing the county and its communities in providing housing, expanding facilities and adding staff could contribute to adverse community social effects, particularly if several large construction projects occur at once. In such a case, it would be important for industry and state and federal agencies to cooperate with Campbell County and its municipalities to plan and implement measures to accommodate the development.

Even with appropriate planning, it is likely that some individuals and families would have problems with relocation and integration into the community. Moreover certain groups likely would experience conflict with the accelerated pace of energy development. Conflicts would be most likely to arise over split estate and water issues associated with CBNG and oil and gas development, and over environmental concerns given the magnitude of development anticipated. These conflicts likely would occur between ranchers and the CBNG and conventional oil and gas industries in the first case and between the environmental community and energy companies in the second case. In both cases, it is likely that the conflicts would involve institutional responses, such as appeals to the judicial system and legislative proposals, both at the state and federal levels.

Converse County, the City of Douglas, and the Town of Glenrock. Like Campbell County, Converse County and its municipalities are accustomed to energy development and have developed community infrastructure and management capabilities to accommodate growth. Local economic development organizations are actively recruiting energy-related development, specifically coal technologies.

The addition of approximately 800 residents during this period would result in a 6 percent increase in population in the county and approximately 10 percent increase in Douglas and Glenrock. At the end of the study period (2020), all communities still would be below their previous high populations experienced in the 1980s. The moderate rate of growth plus the familiarity with energy-related growth would result in few negative social affects for Converse County, Douglas, and Glenrock during this period. However, if power plant construction were to occur in the southern part of Campbell County, Douglas could host a number of construction workers, with the potential for social issues that sometimes accompany a single status work force. Neither Douglas nor Converse County would receive direct revenues from construction of a Campbell County power plant to offset the costs of providing service to construction workers; however, both entities could be eligible for IAPs.

Crook County and the Town of Moorcroft. Crook County would grow by an estimated 556 residents between 2003 and 2010 and Moorcroft would grow by 70 residents under the lower production scenario. Although these are relatively small numbers, the percentage of growth would be approximately 9 percent for both the county and the Town of Moorcroft.

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Both the county and the town are familiar with energy development. Perhaps the largest potential for social effects in Crook County and the Town of Moorcroft stems from the construction of electric power generating facilities. Moorcroft is one of the closer communities to the Black Hills/Wyodak power plant/coal mine complex and is therefore familiar with the social and community effects of power plant construction projects. However, neither the county nor the town would receive direct revenues from power plant construction to offset the costs of increased service demand, although both likely would be eligible for IAPs and also would see some increase in sales tax revenues. Nevertheless, both the county and the city would be limited in their ability to expand services in anticipation of power plant construction projects.

Crook County is indirectly affected by energy development in two ways. First, many people employed in Campbell County have chosen to live in Crook County, particularly in and around Moorcroft and in the Pine Haven area. This circumstance results in added demand for local government services without an increase in tax base and, in the case of Pine Haven, potential social conflict as residential development encroaches on agricultural lands and a recreational area.

Second, an increasing number of Campbell County residents recreate at Keyhole Reservoir in Crook County generating some minor problems and public service demands associated with recreation attractions.

Johnson County and the City of Buffalo. Johnson County and the City of Buffalo are projected to grow by 837 and 477 residents, respectively, between 2003 and 2010 under the lower production scenario, which would translate into overall growth of 11 percent for the county and 10 percent for Buffalo. The energy component of this growth would be associated with CBNG, as the areas of concentrated new development proceed westward. Other growth influences would include economic and non-economic migration attracted by the area's quality of life amenities.

The largest potential for social effects would stem from the expanding level of CBNG activity (an industrial land use) onto historically agricultural lands. Split estate conflicts and the concern for environmental affects of CBNG development are likely to continue to generate organizational and institutional response in both the legislature and the courts.

Both Johnson County and the City of Buffalo have been growing in recent years. As a result, the energy component of anticipated population growth is unlikely to generate specific social effects.

Sheridan County and the City of Sheridan. Sheridan County would be anticipated to grow by 1,344 residents or 5 percent between 2003 and 2010 under the lower production scenario, and the City of Sheridan would grow by 933 residents, also 6 percent. The energy-related component of this growth would be associated with the projected construction and operation of the P&M Ash Creek coal mine in the northern part of the county and with some additional oil and gas development. As with neighboring Johnson County to the south, economic and non-economic migration unrelated to RFD activities would contribute to growth in Sheridan.

The construction of a new coal mine holds potential for certain social effects associated with a temporary, single status work force, although the county's established familiarity with coal mining and the size of Sheridan relative to the anticipated work force likely would result in few negative social affects.

3.0 Cumulative Social and Economic Effects

As with Johnson County, the potential for energy-related social effects lies primarily with CBNG development and conflicts with split estate and development of areas increasingly valued for their scenic and residential potential.

Weston County and the Towns of Newcastle and Upton. Weston County and the towns of Newcastle and Upton are anticipated to grow by 437 (7 percent), 200 (6 percent), and 17 (2 percent) residents, respectively, during the 2003–2010 period under the lower production scenario. The energy component of this growth would result from the proximity of Newcastle and Upton to coal mines in the southern and central portion of Campbell County. Weston County and its communities also could host power plant construction workers, if a plant is built in the southern part of Campbell County, with the potential for social effects associated with a temporary, single status work force.

Given the relatively moderate rate of energy-related population growth, substantial social effects are not anticipated during this period.

2015

Campbell County, the City of Gillette, and Town of Wright. Population growth would moderate during the 2010–2015 period under the lower production scenario. Campbell County would grow by 6 percent during the 5-year period, while Gillette's growth would be slightly less at 5 percent. Wright could experience some temporary population gains associated with the construction of the DM&E railroad, although the forecast for the overall period is for little change in population. Given the anticipated stable energy economy during this period, Campbell County and its municipalities would enjoy a period of relative stability in terms of population growth. Substantial energy development-related social issues would not be anticipated during this period.

Other Study-area Counties and Communities. As with Campbell County, energy development is anticipated to stabilize and population growth would moderate during the 2010–2015 period under the lower production scenario. Substantial energy development-related social issues are not anticipated during this period.

2020

Campbell County, the City of Gillette, and Town of Wright. Campbell County and Gillette would grow by less than 5 percent between 2015 and 2020, and Wright's projected population growth would be approximately 2 percent. Community social conditions would continue to stabilize, and the relatively high energy industry salaries and substantial tax revenues would be positive influences on community social conditions.

Other Study-area Counties and Communities. Population growth in other PRB study area communities similarly would continue to moderate during the 2015–2020 period under the lower production scenario. Community social conditions would be little affected by energy development during this period, under the energy industry development assumptions associated with the lower scenario.

3.7.2 Upper Production Scenario

2010

Campbell County, the City of Gillette, and the Town of Wright. Under the upper production scenario, Campbell County and its municipalities would grow by 31 to 43 percent between 2003 and 2010. This accelerated growth rate would increase the potential for community social issues during this period, considering that Campbell County and its communities could host the construction work force associated with a re-opened coal mine and three new power plants in addition to ongoing CBNG development and railroad improvements. The potential for housing shortages and crowding in commercial public facilities, coupled with the challenges that local governments would have in enhancing services to anticipate demand could result in stress on newcomers and long-term residents alike. While Campbell County and its municipalities are perhaps better equipped to deal with social issues associated with rapid growth from energy development, substantial planning and coordination between industry and local, state, and federal officials in anticipation of growth would be required to reduce the potential for negative social effects.

Other Study-area Counties and Communities. Differences in estimated rates of growth between the lower and upper production scenarios are negligible for other study area counties and communities during the 2003–2010 period; therefore, differences in social effects of energy development between the two scenarios also would be negligible.

2010 – 2015

Campbell County, the City of Gillette, and the Town of Wright. Under the upper production scenario, the populations of Campbell County and Gillette would grow by 3,926 and 1,481 residents (8 and 7 percent), respectively, and Wright would grow by 2 percent (32 residents). While this rate of growth would be less than the previous period, the assumed construction of a new railroad would introduce an additional single status work force into the community. Nevertheless, social conditions in Campbell County and its communities likely would stabilize during this period.

Other study-area Counties and Communities. Differences in estimated rates of growth between the lower and upper production scenarios are negligible for other study area counties and communities during the 2010–2015 period; therefore, differences in social effects of energy development between the two scenarios also would be negligible.

2015 – 2020

Campbell County, the City of Gillette, and the Town of Wright. Campbell County and the City of Gillette would continue to grow during the 2015–2020 period under the upper production scenario, although at the more moderate rate of 7 percent, 3,355 and 1,208 residents, respectively. Wright would grow by an estimated 4 percent (69 residents). Under this scenario, an additional electric power plant would be constructed, temporarily adding a single status work force to Campbell County and its communities. However, during this period, social effects generally would moderate under the assumptions associated with the upper production scenario, and the county and its communities would enjoy a period of relative stability and economic prosperity given the higher than average energy industry wages and tax revenues.

3.0 Cumulative Social and Economic Effects

Other Study-area Counties and Communities. Differences in estimated rates of growth between the lower and upper production scenarios are negligible for other study area counties and communities during the 2015–2020 period; therefore, differences in social effects of energy development between the two scenarios also would be negligible.