

A Report from the *ENERGY AND THE WEST* Series by



# Impacts of Energy Development in Wyoming

With a Case Study of Sweetwater County

No. 7 in a Series of 8 Reports

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# Impacts of Energy Development in Wyoming

## With a Case Study of Sweetwater County

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### ABOUT HEADWATERS ECONOMICS

Headwaters Economics is an independent, nonprofit research group. Our mission is to improve community development and land management decisions in the West.



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## ABOUT THE *ENERGY AND THE WEST* SERIES

This report is the seventh in a series—*Energy and the West*—published by Headwaters Economics on the topic of energy development. This series is designed to assist the public and public officials in making informed choices about energy development that will benefit the region over the long term.

The reports in the *Energy and the West* series, listed below, cover the policy context for energy development in the West and the resulting impacts to states, counties, and communities viewed from the perspective of economic performance (i.e., jobs, personal income, wages) and fiscal health (i.e., state and county budgets, revenue and expenses). The series also includes state and local area case studies, which highlight benefits and costs in greater detail.

### **Titles in the *Energy and the West* series:**

- Energy Development and the Changing Economy of the West
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- Fossil-Fuel Extraction as a County Economic Development Strategy: The Performance of Energy-Focusing Counties in the West
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## INTRODUCTION

No other state in the Intermountain West is as reliant as Wyoming on energy industries to sustain its economy and tax base. For this reason, Wyoming offers a unique opportunity to consider the costs and benefits of energy development in the absence of competing economic forces. In this report, we use the case study of the state of Wyoming and the energy-surgingly county of Sweetwater County to ask what happens when an economy is focused on energy extraction.

Located atop two of the nation's most important domestic onshore energy reserves, Wyoming has a long history with the ups and downs of energy development. The national energy crisis in the 1970s sparked an oil and coal mining boom in Wyoming that led to a 52 percent increase in population during that decade. When the energy boom ended in the early 1980s, Wyoming was left highly exposed and suffered two decades of economic stagnation. In the 1990s, while other states in the region, such as Colorado, developed more diverse economies and led the nation in population and economic growth, Wyoming was unable to rebound from the energy bust and was the slowest growing western state (see page 8).

The current energy surge in Wyoming took off in the early 2000s, led by increases in natural gas production in the Powder River Basin and the Green River Basin. Between 2000 and 2006, the production value of oil and gas in Wyoming skyrocketed from \$7.3 billion to \$17.6 billion. Coal production values also increased at a more modest pace, rising from \$2.6 billion in 2000 to \$4.0 billion in 2006 (see page 16).

These increases in production have boosted tax revenue to the state and have created tremendous opportunities for employment in energy-producing areas of the state, shaking up local economies and attracting in-migrants from across the country. The long-term, broader economic effects of the current energy surge, however, are more uncertain. Real earnings per job in Wyoming in 2006, for example, were about \$2,000 less than what they were in 1979 (see page 12). Nor is it clear that the current energy surge has worked to slow outmigration from the state.

With a long history with energy booms and busts, many Wyoming leaders at the state and local level recognize the importance of economic diversification and seek to fit energy development into a larger economic development framework. In this case study, we explore how well this goal can be achieved at the local and state level given the existing policy and fiscal frameworks shaping energy development. Our local case study focuses on Sweetwater County, a site of rapid and extensive energy development.

### Questions Answered in this Report

1. How does the current surge in fossil fuel extraction fit into today's Wyoming's state economy?
2. What economic role does energy development play in Sweetwater County?
3. How has energy development affected the fiscal well being of Sweetwater County?
4. How well are Wyoming and Sweetwater County leveraging the recent energy surge to build a diverse and stable economic future?

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## SUMMARY FINDINGS

### **Wyoming is more energy-dependent than any other western state and this specialization could harm the outlook for long-term growth.**

The continued level of influence of fossil fuel development on Wyoming's economy is unique in the United States. Wyoming's Economic Analysis Division has determined that the state's reliance on energy means it is the most specialized economy in the nation.

This level of specialization is not new: Wyoming's economy has been highly specialized for the past 35 years. In 2006, earnings from mining constituted 13.7 percent of total personal income in the state and employment in the mining sector was 8 percent of total employment. While these figures have varied with surges and contractions in mining activities, mining's average share of total personal income from 1970 to 2000 in Wyoming was 13 percent.

Energy also plays a large role in state revenue. Between 2000 and 2006, the production value of oil and natural gas in Wyoming skyrocketed from \$7.3 billion to \$17.6 billion; while coal production values also increased, rising from \$2.6 billion in 2000 to \$4.0 billion in 2006. These increases boosted tax revenue. In 2006, oil and natural gas revenue (\$2.8 billion) accounted for nearly 40 percent of all state and local government revenue (\$7.2 billion) in Wyoming.

One benefit of Wyoming's mineral wealth is a low tax burden on citizens. For every \$1,500 of taxes paid by Wyoming residents, they receive \$7,800 worth of services. Wyoming also is doing a good job of capturing revenue from the state's mineral wealth and setting it aside for long-term investments. Last year, for example, Wyoming invested just under a half of a billion dollars (17% of oil and natural gas revenue) in its budget reserve fund.

Wyoming's population is strongly affected by surges and contractions in the energy industry. From 2004 to 2006, nonresidents made up almost 60 percent of new workers in the mining sector. While the 1990s saw increases in net population (40,194), the state lost nearly half that number of adults (18,874) between the ages of 25 to 39, a trend that has continued during the current energy surge.

Further adding to Wyoming's specialization is the fact that higher-skilled, higher-paying service occupations have not taken root in most parts of the state. This helps account for Wyoming's failure, despite high wages in natural resource and mining jobs, to sustain higher overall earnings. In 2006, for example, earnings were about \$2,000 less than what they were in 1979.

### **Sweetwater County remains a mining-dependent county but higher energy wages have not sparked wider growth.**

The technological advances in oil and natural gas extraction sparked a new episode in the region's mining history at the turn of the 21st century, and the pace and scale of subsequent exploratory and productive activities have been staggering. At the start of 2008, the Wyoming Oil and Gas Commission tallied 10,139 oil and gas wells operating in the four-county area of the greater Green

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River Basin—half of them constructed since 2000—and projections suggest tens of thousands of new wells in the next twenty to thirty years.

The mining sector, which includes oil and natural gas extraction, has been a steady contributor to the county's economy: providing 31 percent of personal income in Sweetwater County from 1970 to 2000, and 29 percent in 2006.

Like the state, Sweetwater County is growing in numbers of workers but still lost more people in the 25 to 39 year-old age group than the regional average, suggesting a failure to attract and retain younger workers by providing a variety of employment options.

Looking at revenues, 69 percent of property tax revenue in the county came from minerals (\$19.3 million), and 51 percent of mineral-related property taxes were generated from natural gas in 2008. Overall, since 2002, net annual taxable sales have nearly doubled (\$58 million to \$103 million in 2008).

While energy-related wages are high, this has not translated into higher wages across the county, and most local workers are relatively poorly paid. These low wages, and the disparity compared to higher energy-related personal income, have caused hardships for many through increased housing and other costs. Also, because few higher-wage jobs have been created outside of fossil fuels extraction, the county is at risk when activity in the energy industry eventually declines.

### **Local costs from energy development exceed Sweetwater County's revenues.**

Despite the high production value of mineral extraction in Sweetwater County, return to the county through state severance taxes is a small part of total county revenue. In 2007, state severance tax distributions of \$444,866 made up 7 percent of intergovernmental revenue, or 10 percent of total revenue. Across Wyoming, the state returns only a small portion of total revenue to local governments (7% to counties and 1% to cities and towns in 2008 or \$196 million and \$25 million respectively).

Local schools and the state government, by comparison, receive the largest share of all revenue generated by oil and natural gas extraction, a combined 81 percent of the total (more than \$1.1 billion each in 2008).

Revenues from the energy surge are neither strengthening Sweetwater County's fiscal health nor assisting efforts to improve long-term economic development. The county's ability to keep pace with increasing service demands—housing, crime, and infrastructure—is mixed, and its ability to fund capital improvements is especially weak. Because new expenditures are in excess of revenue, the county, municipal government, and local institutions (such as schools and hospitals) are scrambling to assemble critical funding from a variety of unreliable sources or downgrading their level of service provision.

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**Wyoming does an efficient job of collecting and saving energy-related revenue but local needs remain unmet.**

With a long history with energy booms and busts, many Wyoming leaders at the state and local level recognize the importance of economic diversification and seek to fit energy development into a larger economic development framework.

In a number of ways, Wyoming is taking advantage of increased energy revenue, with the highest effective tax rate in the Intermountain West. The state does an efficient job of collecting revenue from mineral production. Wyoming also is a regional leader in stockpiling reserves “for a rainy day,” and has strongly supported some important economic development efforts such as increased educational funding.

But Wyoming is not adequately mitigating the local impacts of the energy surge. The state could consider providing more reserves to county and municipal governments to help them meet growing social and capital investment needs.

Wyoming also faces a continuing danger represented by the volatility inherent in economic specialization. State reserve funds could be used to help spark greater economic diversification. Broadening income generation across a variety of sectors will increase the economy’s resilience, and such a diversification would place the state in a healthier long-term economic position.

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## METHODS

### ***Definition of Mining***

When we use the term “mining” in our *Energy and the West* series, we refer primarily to jobs and income associated with the development and extraction of oil, natural gas, and coal (fossil fuels). Because of restrictions placed on the level of detail available from the U.S. Department of Commerce and the Bureau of the Census, it is sometimes not possible to separate minerals mining from fossil fuels mining. In the five energy development states—Colorado, Montana, New Mexico, Utah, Wyoming—mentioned in this report, the bulk (over 80%) of “mining” is related to energy development. For more information, refer to [Appendix 1](#).

This report employs a combination of approaches including analysis of published social and economic data; research in secondary literature, government documents and the regional press; and qualitative interviews with local people.

Published data were obtained from:

- U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System (BEA/REIS).
- U.S. Department of Commerce, Bureau of the Census: 1990 and 2000 Census of Population and Housing (Census).
- U.S. Department of Commerce, Bureau of the Census: County Business Patterns (CBP).
- U.S. Department of Labor, Bureau of Labor Statistics (BLS).

Using the Economic Profile System (EPS), we produced detailed socioeconomic profiles for the case study county and detailed state-level data. These profiles are available for download from our web site: [www.headwaterseconomics.org/energy](http://www.headwaterseconomics.org/energy). We also pursued custom queries of a number of databases to explore certain economic dynamics more fully.

In addition, Headwaters Economics research staff conducted interviews with local leaders, local government staff, elected officials, and other individuals knowledgeable about development in Sweetwater County. In-person interviews were conducted in the summer of 2007 while phone interviews were conducted in the winter of 2008.

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## HOW DOES FOSSIL FUEL DEVELOPMENT FIT INTO TODAY'S WYOMING STATE ECONOMY?

The level of influence of fossil fuel development on Wyoming's economy is unique in the Intermountain West. This section begins by explaining Wyoming's economic diversity profile. It then presents state-level demographic and economic trends from the 1970s through the present and analyzes them from the perspective of what the state's high degree of economic specialization means for the residents and businesses of Wyoming in the broader context of economic growth and ability to recover from recessions. Where possible, the report offers comparisons between the current surge in fossil fuel extraction and development and the energy boom of the 1970s and early 1980s.

### **Mining (Including Energy Development) & Specialization in the Wyoming State Economy**

Mining is a larger employer and contributor to personal income in Wyoming than in any other Rocky Mountain state.<sup>1</sup> In 2006, (the year for which the latest figures are available) earnings from mining constituted 13.7 percent of total personal income in the state and employment in the mining sector was 8 percent of total employment.<sup>2</sup> While these figures have varied with surges and contractions in mining activities, mining's average share of total personal income from 1970 to 2000 in Wyoming was 13 percent.

Specialization in an economy means a focus on a limited number of industries or economic sectors. Economists believe the alternative, economic diversification, is a healthier position because it reduces the volatility that can come with over-reliance on a single industry. Spreading income generation across a variety of sectors increases an economy's resilience to recessions.<sup>3</sup>

Researchers at the state's Economic Analysis Division conducted a detailed examination of Wyoming's industrial specialization in 2002.<sup>4</sup> They employed a methodology that compares the relative share of employment of the mining industry in each of the United States to the share of mining employment in the nation as a whole.<sup>5</sup> The result is a system of scoring in which a lower score indicates a more diverse economy in the sense that is most closely mirrors the industrial makeup of the United States economy as a whole. The larger the score, the more specialized the economy.

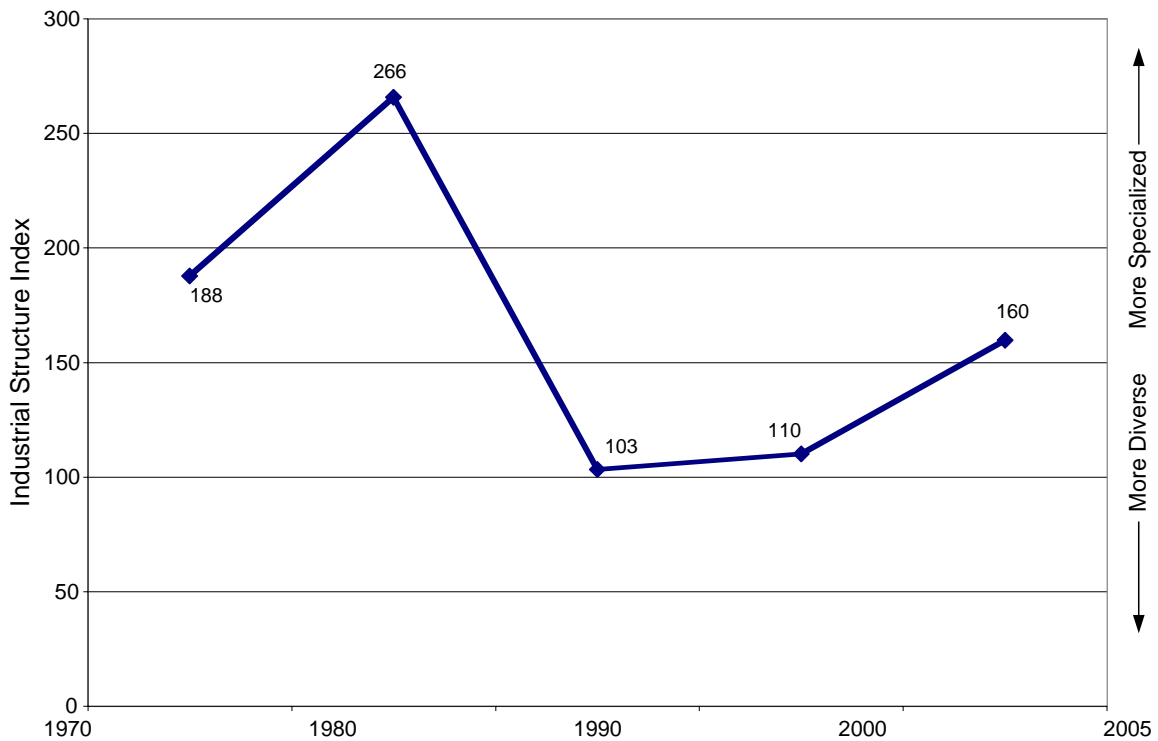
According to this definition of economic diversity, Wyoming has the most specialized economy in the nation. Table 1 indicates how the state compared with other Intermountain West states in 2005:

**Table 1. 2005 Industrial Diversity Scores, 7 Western States.<sup>6</sup>**

State	Industrial Diversification Index Score (2005)
Utah	1.61
Idaho	2.14
Colorado	4.20
Montana	11.961
New Mexico	15.53
Nevada	49.74
Wyoming	159.73

This level of specialization is not new: Wyoming's economy has been highly specialized for the past 35 years. Figure 1 charts high specialization scores throughout this time period, punctuated by episodes of extreme specialization coinciding with surges in energy development (as during the energy boom of the 1970s to early 1980s).<sup>7</sup>

**Figure 1. Wyoming Industrial Diversity Index, 1970-2005.<sup>8</sup>**



The following section, which discusses changes in the state's population and economy, helps to explain the particular economic opportunities and challenges inherent to specialization.

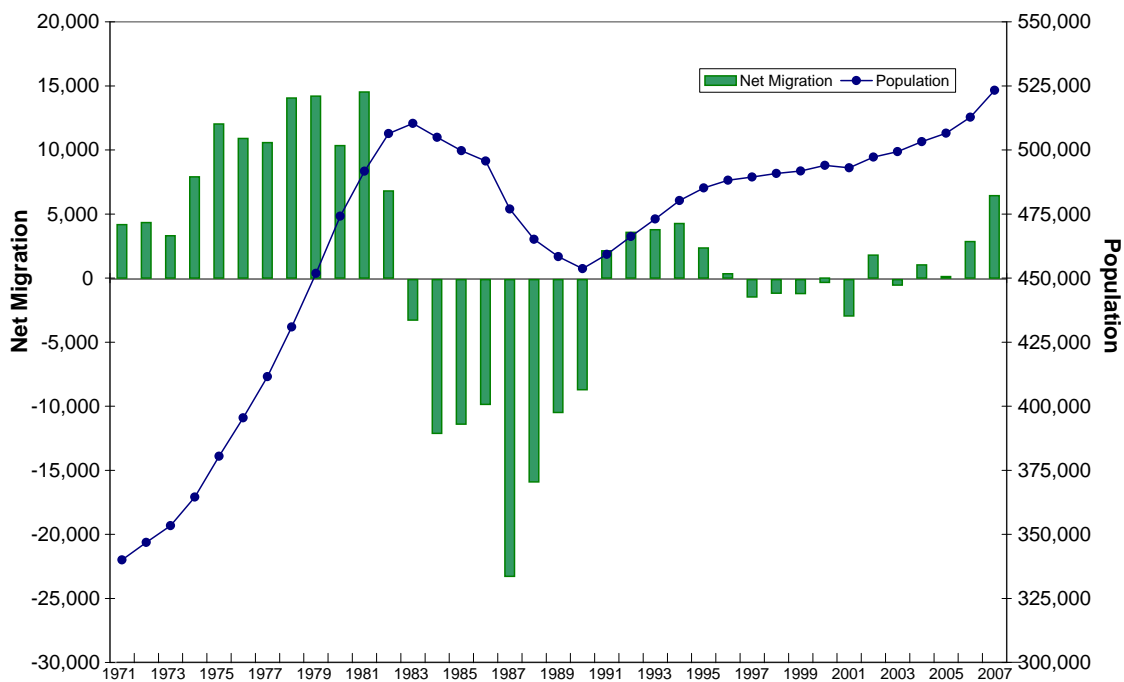
## Demographic and Economic Trends, 1970–2006

In terms of both population and income growth, Wyoming has experienced dramatic ups and downs over the past 35 years. The impact of specialization on the state's economic resilience can be clearly seen in Wyoming's difficulties retaining residents and maintaining income growth during recessions.

### Population & Migration

Figure 2 shows population (blue) and migration (green) trends for the state from 1971 to 2007.

**Figure 2. Population Growth and Net Migration in Wyoming, 1971–2007<sup>9</sup>**



The state saw a massive run-up in population in the last energy boom, adding 172,605 new people, a 52 percent increase in population, from 1970 to 1983. As the green bars indicate, much of that population growth was due to in-migration.

A period of significant population decline and net out-migration occurred during the ensuing energy bust. An estimated 94,071 people left Wyoming between 1983 and 1990.<sup>10</sup>

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Wyoming's population began to grow slowly again in the 1990s, and from 2000 to 2005 the state added 14,632 new residents, a 3 percent increase in population. Net migration hovered near zero in the late 1990s and early 2000, due to continued outmigration. While the 1990s saw increases in net population (40,194), the state lost nearly half that number of adults (18,874) between the ages of 25 to 39.<sup>11</sup>

However, more recent population estimate data show a marked increase in net migration rates (3,615 in 2006, 6,862 in 2007, and 5,692 in 2008).<sup>12</sup> Nonetheless, net migration is still relatively low compared to the previous energy boom, which is explained in part by the large role played by in-migrants and transient workers in today's natural resources and mining sector.

A 2007 report by the Wyoming Department of Employment found that in a two-year period, Wyoming's working population increased by 8.3 percent (27,094 persons). Significantly, "almost all of the new labor market growth in the state was nonresident labor." Nonresident refers to segments of the population without known demographics, typically in-migrants who have yet to establish residency. Whereas nonresidents made up 15 percent of the working population in 2004, by 2006 they represented 22 percent.<sup>13</sup>

### **Key Terms:**

#### **Services**

Much of the growth in labor earnings in the U.S. economy over the last two decades has been in "services," a term defined in various ways by different researchers and organizations. Historical data organized by the U.S. Department of Commerce according to the Standard Industrial Classification (SIC) did a poor job of describing the growth in services, particularly many of the modern, high-tech, and knowledge-based occupations. When using historical data (1970 to 2000), we define services broadly as "Services and Professional" to underscore that service occupations consist of a combination of high-paying and low-paying professions, mixing physicians with barbers, and chambermaids with architects and financial consultants.

After 2000, the U.S. Department of Commerce switched to the North American Industrial Classification System (NAICS). When using recent data, we display information on services the same way the U.S. Department of Commerce does, by each of its subcategories: Information, Finance and Insurance, Professional, Scientific and Technical Services, etc. (Part of the reason government agencies switched classification systems was to develop a better structure for reporting the rapid growth in service sectors.)<sup>16</sup>

#### **Non-labor Income**

Non-labor income consists of transfer payments, and dividends, interest, and rent. Transfer payments are commonly referred to as retirement money because the majority of transfer payments nationwide consist of retirement and age-related payments. It also includes public assistance, medical benefits, and veterans benefits, among others. Dividends, interest, and rent are referred to as money earned from investments. Dividends consist of payments by corporations to stockholders; interest is money earned from mutual funds, municipal bonds, private pension funds, and other earnings from deposits in financial institutions; and rent includes income from rental property, imputed rent of owners of farm dwellings, royalties from patents, and other similar income.<sup>17</sup>

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The prevalence of non-resident new workers helps to explain the state's outmigration has continued, even in the context of the current energy surge. There was an across-the-board decrease, from 2004 to 2006, in the number of residents under the age of 45.<sup>14</sup> The report goes on to document how the demand for labor in the energy sectors is being largely met by out-of-state residents.

The numbers are more dramatic in the natural resources and mining sectors. Here almost 60 percent of new workers from 2004 to 2006 were nonresidents. In 2006 nonresidents made up over 25 percent of the natural and resources and mining employment.<sup>15</sup> If these workers choose to leave the state when employment in the fossil fuel mining sector contracts, it is likely to heighten the demographic effects of the state's ongoing outmigration.

### ***Employment and Income***

Considering the period 1971 to 2006 cumulatively, Wyoming has experienced an average rate of job growth of 3.8 percent per year, just higher than the national average (2.65%).<sup>18</sup> However, this overall growth masks episodes of serious contraction in employment during bust periods. Wyoming suffered net loss in employment during the period from 1982 to 1990 (averaging -0.7% per year, while overall job growth in the nation was positive at an annualized average of 2.5%) and jobs also grew more slowly in Wyoming than in the nation during the period 1991 to 2001. In addition, trends in real earnings and income suggest some of the limits of Wyoming's ongoing dependence on the mining sector (see below).

Wyoming's economic contraction in the 1980s and slow growth in the 1990s are significant given that some of the state's neighbors, such as Colorado and Utah, experienced substantial growth during this period, as indicated in Figure 3 (next page). As discussed in our companion report *Impacts of Energy Development in Colorado*, Colorado was able to grow diverse sectors of its economy during the 1990s, giving the statewide-economy greater resilience to the ups and downs of fossil fuel prices.

Figure 3. Job Growth in Wyoming, 1970–2006, compared to U.S., Colorado, and Utah.<sup>19</sup>

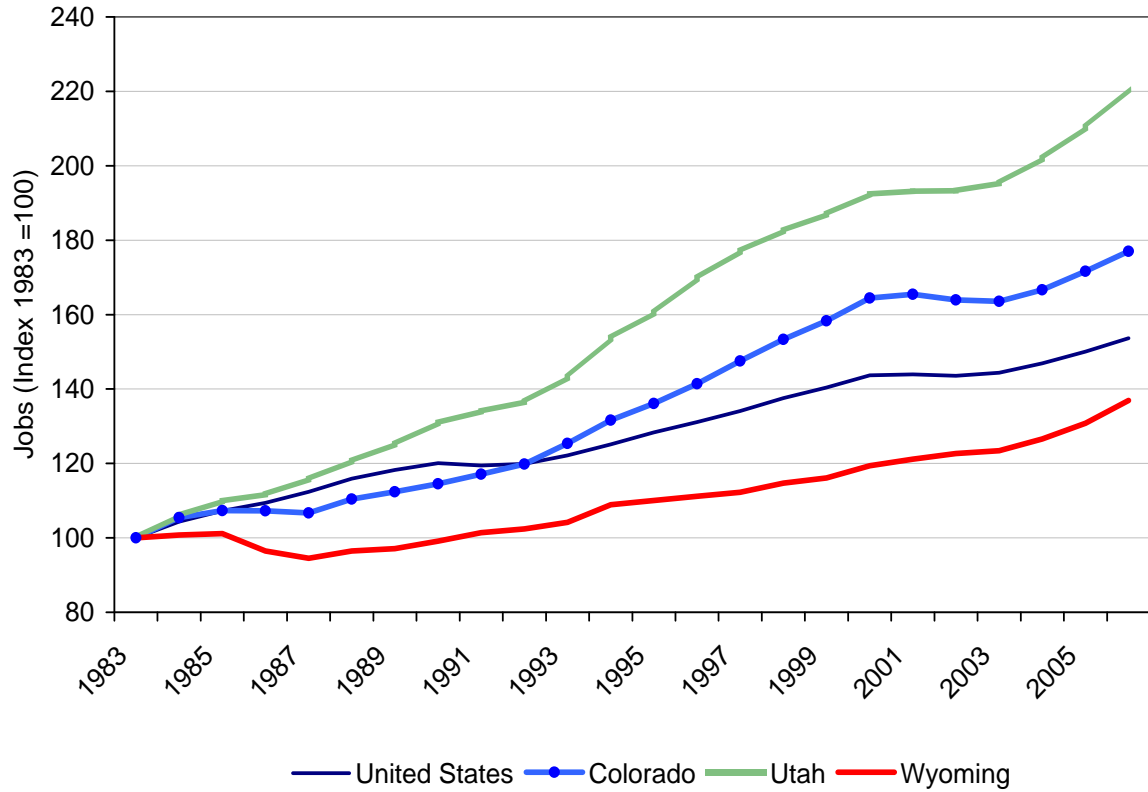
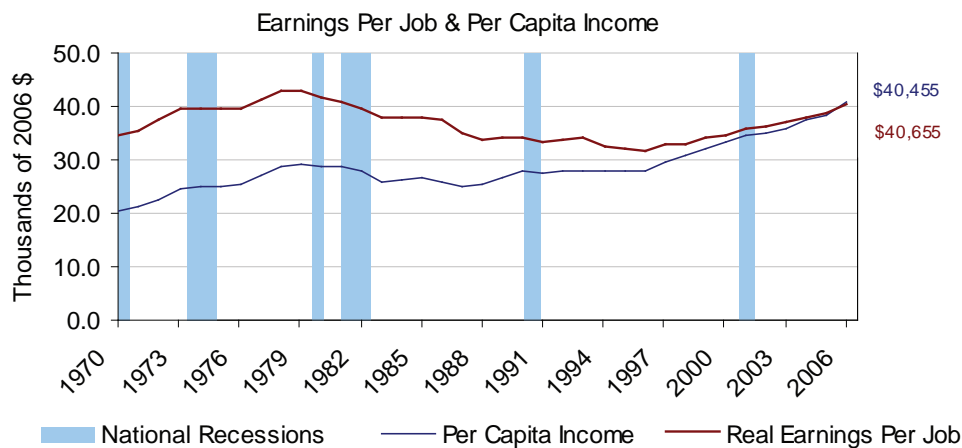


Figure 4 shows trends in earnings per job and per capita income in Wyoming over the past 35 years. (Vertical blue bars indicate national recessions.) Total per capita income grew by \$14,076 million in real terms between 1970 and 2006, reflecting an annualized growth rate of 3.2 percent. Average earnings per job, adjusted for inflation, have risen from \$34,573 in 1970 to \$40,455 in 2006. What is striking about Figure 4 is the fifteen-year period—from 1982 until 1997—during which average earnings per job was in decline or static in Wyoming. In fact, earnings per job in 2006 (\$40,455) was below the value in 1979 (\$42,775) at the height of the previous energy boom (numbers adjusted for inflation).<sup>20</sup>

**Figure 4. Earnings Per Job and Per Capita Income, Wyoming, 1970–2006.**<sup>21</sup>



That average earnings per job in Wyoming has been closely linked to trends in the mining industry is not surprising given the level of specialization in Wyoming’s economy.<sup>22</sup> Nor is the fact that Wyoming struggled to recover during the energy bust of the 1980s. What bears further consideration are trends in other sectors of the economy—particularly those on which the state will have to depend during future contractions in fossil fuel energy production.

### **Performance by Sector**

Figure 5 and Tables 2 and 3 explore the contribution of various employment sectors to total personal income in Wyoming. Wyoming’s profile is striking in several ways. First is mining’s historically prominent role as a source of personal income. Figure 4 suggests that mining was the greatest contributor to personal income in 1981 and 1982, when it generated close to 20 percent of personal income in the state. Since that time, it declined to a low of just under 10 percent of total personal income in the late 1990s, but has recently rebounded to 14 percent in the current energy development surge. By comparison, mining contributed 1 percent to total personal income in the United States in 2006.<sup>23</sup>

Second is the low-performing character of the services and professional sector in Wyoming. Although the sector doubled in volume as a source of personal income between 1970 and 2000, it has not grown significantly in terms of its *proportional* contribution to total personal income. The contributions of selected key sectors to personal income are shown in Figure 5. This is in exception to a general trend in much of the West which is discussed in our companion report, *Energy Development and the Changing Economy of the West*.

The sector that grew in importance as a share of total personal income in Wyoming during the 1980s and 1990s was non-labor income. Income growth led by non-labor income sources indicates two things. First, it is a sign that the state (more specifically, certain connected, high-amenity areas of the state, such as Teton County) are able to attract retirement and investment income.<sup>24</sup> However, when non-labor growth is high relative to other sources of personal income, it also may indicate underperformance in the labor sectors.

**Figure 5. Selected Sector Contributions as Share of Total Personal Income in Wyoming, 1970–2000 (SIC).<sup>25</sup>**

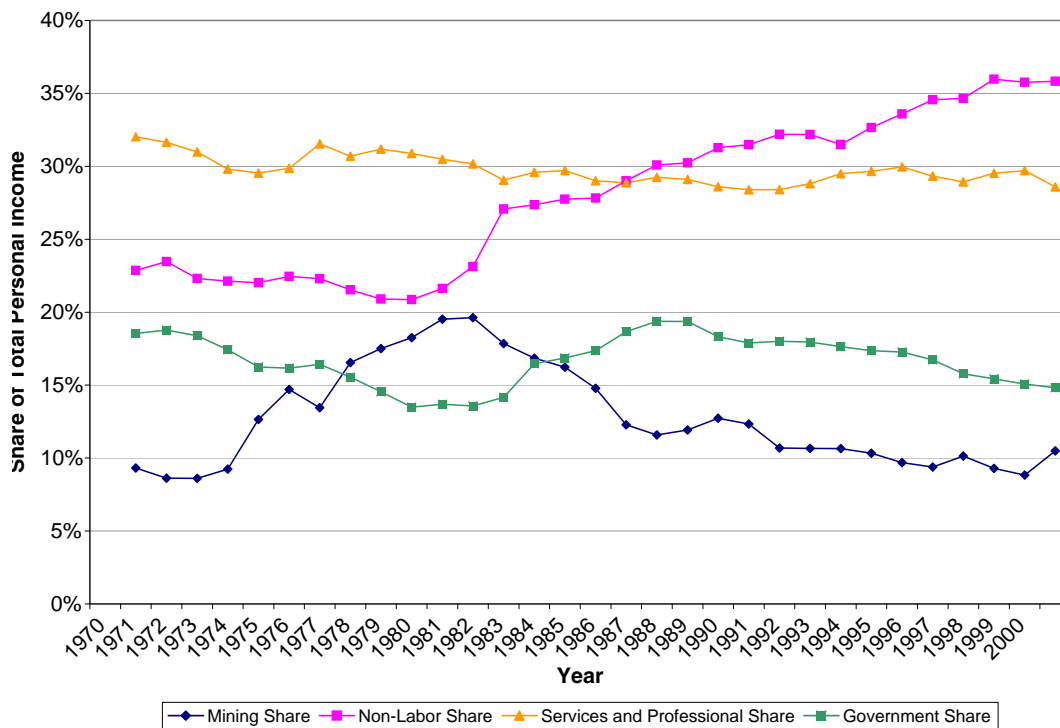
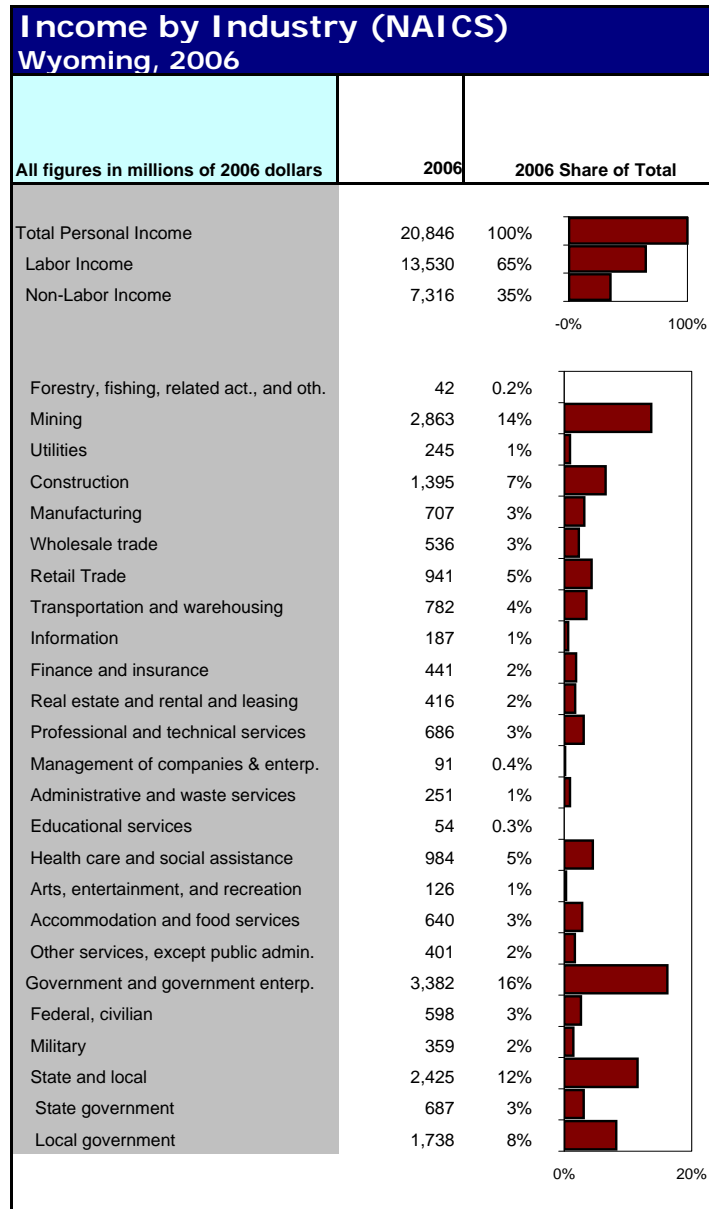


Table 2 documents the most recent (2006) data on share of personal income by source. In 2006, mining contributed 14 percent of personal income in Wyoming, services 22 percent, and non-labor 35 percent. A key message from the low contribution of the services sector to personal income is that higher-skill, higher-pay service occupations have not taken root in most parts of Wyoming.

**Table 2. Personal Income by Source in Wyoming, 2006 (NAICS).<sup>26</sup>**



As Table 3 below shows, no significant service-providing sector contributes to higher than average wages. On the whole, goods-producing industries pay almost \$20,000 more than service-providing industries in the state. This gap accounts for Wyoming's failure, despite high wages in natural resource and mining jobs, to sustain higher overall earnings. Real earnings per job in 2006 are lower than they were in 1979, and about \$6,000 less than in Colorado today, which has successfully developed its high-wage service economy—average wages in the Colorado service economy are \$10,000 higher than in Wyoming.<sup>27</sup> It also shows why wages rise during booms, then decline until the next surge.

**Table 3. State Wages and Employment by Sector (NAICS) in Wyoming, 2006.<sup>28</sup>**

<b>State Wages and Employment in 2006</b>			Average Annual Wages
	Employment	% of Total	
<b>Total Private &amp; Public</b>	266,894	100%	36,662
<b>Total Private</b>	207,465	78%	36,294
<b>Goods-Producing</b>	62,902	24%	51,541
Natural Resources and Mining	28,815	11%	64,407
Agriculture, forestry, fishing & hunting	2,313	1%	26,017
Mining	26,502	10%	67,758
Construction	23,942	9%	39,888
Manufacturing (Incl. Forest Products)	10,146	4%	42,497
<b>Service-Providing</b>	144,563	54%	29,660
Trade, Transportation, and Utilities	49,852	19%	32,083
Information	4,173	2%	33,221
Financial Activities	11,117	4%	39,039
Professional and Business Services	17,048	6%	37,991
Education and Health Services	21,561	8%	33,139
Leisure and Hospitality	32,611	12%	16,290
Other Services	8,200	3%	27,104
Unclassified	#N/A	#N/A	#N/A
<b>Total Public</b>	59,429	22%	37,948
Federal Government	7,277	3%	52,885
State Government	12,389	5%	42,197
Local Government	39,763	15%	33,890

Wages are shaded in green when they are more than 20% higher than the wages for all sectors and in red when they are less than 20% lower.

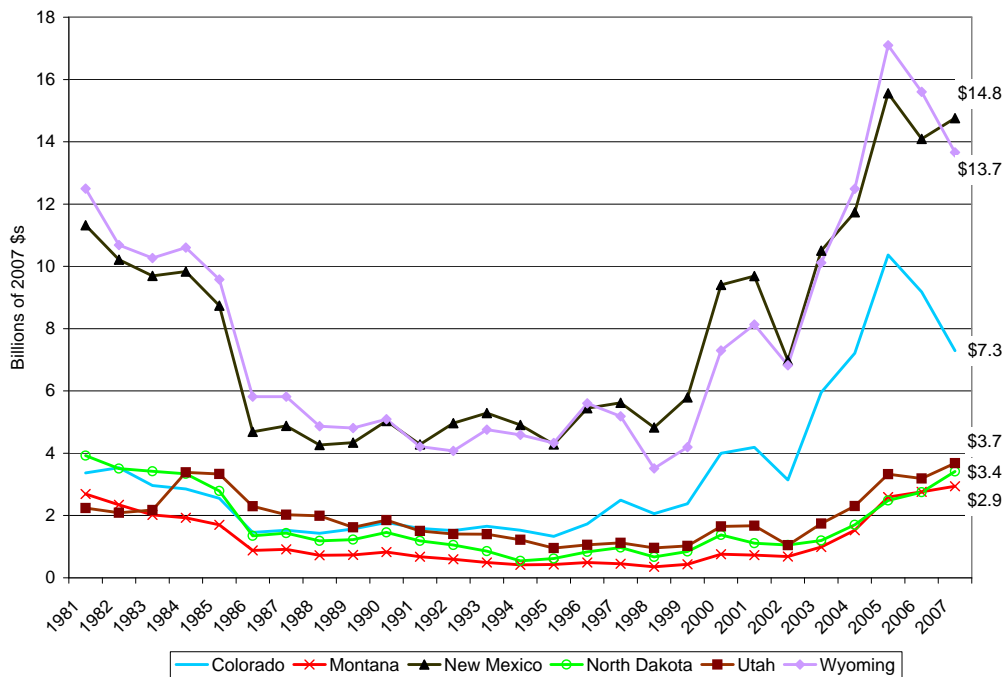
## State-level Fiscal Impacts of Fossil Fuel Extraction

This section profiles Wyoming’s mineral tax structure, and compares how well Wyoming is doing at taxing, saving and spending the resulting revenue relative to its energy-producing peers in the West. It begins with a review of production value from oil and gas extraction in Wyoming and a description of Wyoming’s tax structure and distribution formulas. It then compares total revenue and the effective tax rate to peers states, and discusses Wyoming’s distribution strategies and their implications.

### Production Value

Figure 6 shows that oil and natural gas extraction in Wyoming in 2007 was valued at \$13.7 billion, the second highest production value among the state’s energy-producing peers in the Intermountain West. The rapid increase and volatility of production value over the last decade are largely due to higher natural gas and oil prices, and significant new drilling for natural gas.

**Figure 6: Oil and Natural Gas Production Value in Colorado, Montana, New Mexico, North Dakota, Utah and Wyoming, 1981-2007.**<sup>29</sup>



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## **Wyoming Energy Tax Primer**

### **Severance Tax**

The severance tax is a tax on the value of oil and gas extracted, or “severed” from the earth. Because the production value that is taxed is the product of the volume of oil and natural gas extracted and the price, tax revenue is directly linked to the market value of oil and natural gas, and can be highly volatile.

Wyoming grants deductions for transportation and processing costs and federal mineral royalties paid from gross oil and natural gas production value to reach the net, or taxable value. The base tax rate is 6 percent, against which incentives and exemptions are offered to stimulate production or promote best practices (such as horizontal drilling).

### **Property Tax**

Wyoming’s property tax is essentially a “production” tax as well. Property taxes are calculated by the formula:

$$\text{Market Value} \times \text{Assessment Rate} \times \text{Mill Levy} = \text{Tax Bill}$$

- The Assessment Rate is the percent of the market value subject to property taxation (or the net market value). Wyoming’s assessment rate is 100 percent on oil and natural gas production.
- The Mill Levy is the “tax rate” levied by local government, including cities, counties, school districts, and special districts.

### **Federal and State Royalties**

Royalties are “production” taxes paid directly to the landowner where drilling takes place. Federal royalties are 12.5 percent and state royalties are 16.7%. Royalties are also paid to tribal governments and private landowners at varying rates. Roughly half of federal royalties are returned to Wyoming, while the other half is retained by the Federal treasury.

Fees and bonuses paid through the competitive leasing process (a premium paid by a company to win a leasing contract to drill in a specific area) are included in the federal and state royalty statistics we report.

### **Other Revenue**

The oil and gas industry also pays sales taxes on services and equipment directly associated with drilling activities.

### **Effective Tax Rate**

The effective rate is a ratio of actual tax collections to gross production value. The effective rate accounts for differences between tax structures, incentives and deductions. Wyoming’s effective tax rate is calculated by summing revenue from production taxes, property taxes, and royalties, but excludes sales taxes and investment income that are not directly based on production value.

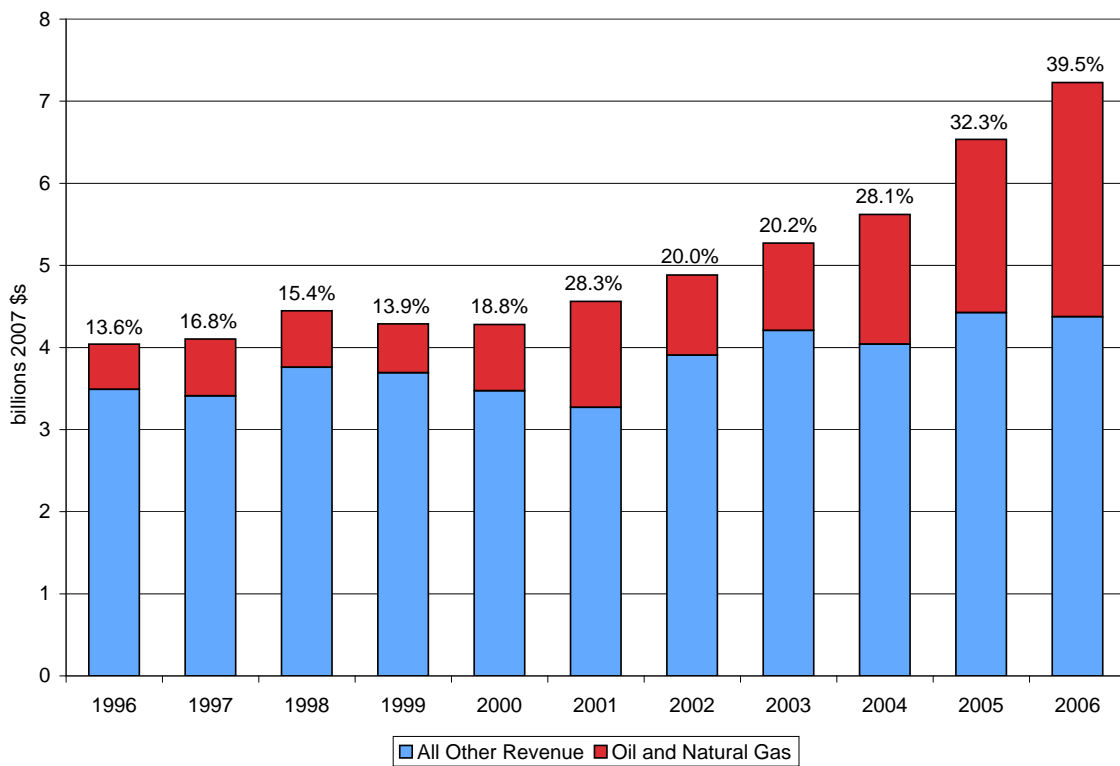
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## Total Revenue from Oil and Natural Gas

By any measure, revenue from oil and natural gas in Wyoming is significant. All state and local sources totaled nearly \$3 billion in 2008. Figure 7 shows just how important oil and natural gas is to Wyoming. Oil and natural gas revenue (\$2.8b) accounted for nearly 40 percent of all state and local government revenue (\$7.2 billion) in Wyoming in 2006 (the most recent year for which these data are available).

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**Figure 7: Oil and Natural Gas Revenue as a Portion of Total State and Local Government Revenue in Wyoming, 1996-2006.**<sup>30</sup>



**Figure 8: Total Revenue from Oil and Natural Gas by Type, Wyoming, 1996-2008.**<sup>31</sup>

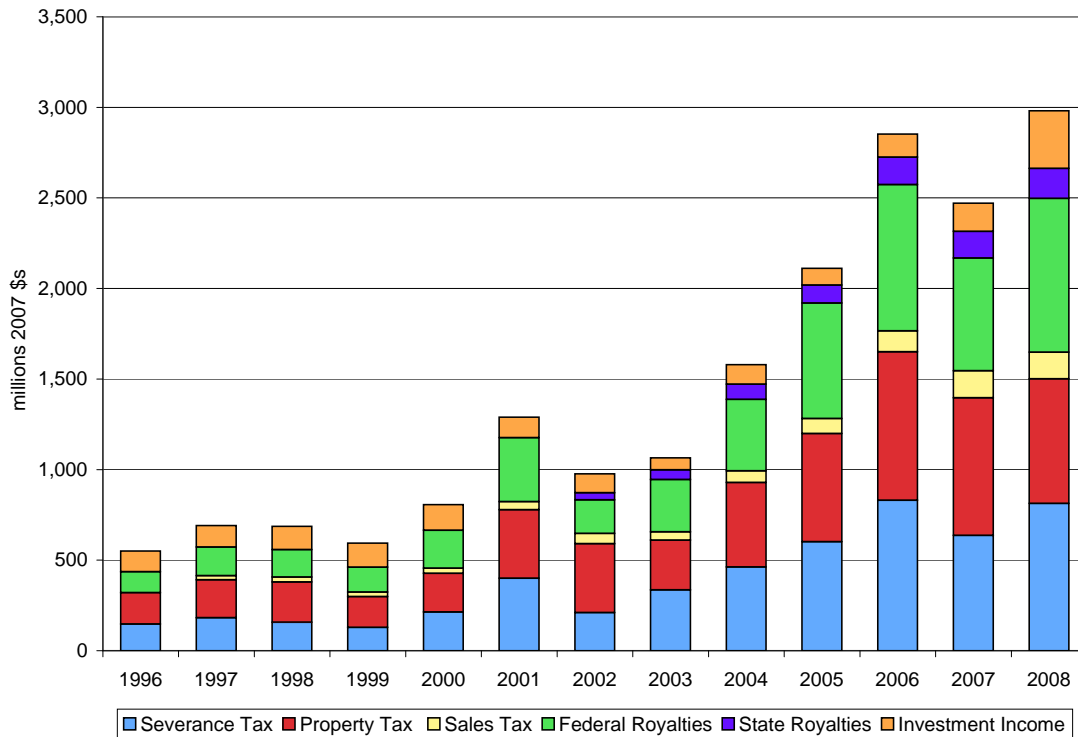


Figure 8 shows that Wyoming’s revenue from oil and natural gas is diversified across a range of different taxes and royalties. In 2008, federal royalties (\$849 million), the state severance taxes (\$813 million) and property taxes (\$688 million) from oil and natural gas made up the bulk of revenue—79 percent of the total. Interest income from the Wyoming Permanent Mineral Trust Fund was the next largest source, returning \$318 million in 2008, or 11 percent of the total. Sales taxes contributed the smallest proportion at \$148 million, or 5 percent of the total.

### **Effective Tax Rate**

Wyoming captures the highest effective tax rate relative to other energy producing state in the Intermountain West, meaning Wyoming generates more revenue per unit of production than peer state earn. The effective tax rate is a ratio of total tax revenue to gross production value (see sidebar, page 17).<sup>32</sup>

The effective tax rate accounts for differences between state tax structures, and allows for comparisons of the tax rate paid by industry across states. Higher effective tax rates capture more value from the same amount of production, providing government with more revenue. Wyoming’s high effective tax rate means Wyoming will have more resources to mitigate the

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impacts of oil and natural gas extraction on Wyoming's communities, and to invest in ways to generate long-term wealth for the state.

In 2006, the state's effective tax rate was 15.9 percent. It had dropped to 13.9 percent by 2007<sup>33</sup> Wyoming's effective tax rate is volatile over time, but will tend to be more stable when compared to some states because Wyoming's tax structure does not apply incentives based on commodity price (e.g., Utah's severance tax rate increases as prices rise) or allow deductions from state revenue for local taxes paid (e.g., Colorado's property tax deduction that exacerbates volatility in the state severance tax).

Some have argued persuasively that Wyoming ought to compare its tax structure not to its peers in the Intermountain West, but to Alaska, the only other state in the U.S. that relies as heavily as Wyoming on revenue from the oil and natural gas industry. Alaska's tax structure differs from Wyoming's in several key ways:

- Alaska targets incentives for exploration rather than production.<sup>34</sup>
- Alaska maintains a higher base tax rate on production (raised from 22.5 percent to 25 percent in 2007).
- Alaska's tax is progressive, ensuring the state shares in windfall profits (Wyoming's tax rate actually declines as prices rise).

Wyoming commissioned several academic studies that confirm why Alaska's approach is better tax policy (and should be considered by Wyoming). The studies argue that production is driven mainly by reserves, rather than by prices, production tax rates, or production tax incentives.<sup>35</sup> Incentives during exploration and drilling offer a more effective approach than reducing production taxes to stimulating industry activity, and ultimately, more production in the state.

While production taxes have little effect on the amount of production, they have a huge impact on the amount of revenue collected by the state. The studies estimated that doubling the severance tax rate would decrease production by only 6 percent, but increase revenue to Wyoming by 90 percent. Wyoming did not double its tax rate in response to the study findings. Instead, it rejected a proposed two percent decrease in the severance tax in 2000, and captured an additional \$1 billion in tax revenue between 2000 and 2006. For more on the Wyoming studies and the effect of production taxes on industry activities, see our companion report *Energy Revenue in the Intermountain West*.<sup>36</sup>

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## Volatility

Figure 9 shows the volatility in both production value and the revenue generated from production value. Wyoming has successfully dampened the volatility of revenue through consistent tax policy and investments in the state's severance tax permanent fund. However, revenue volatility remains high and changes in revenue show a short lag between extraction activities and tax and royalty collections. These factors combined place many basic Wyoming services at risk because of the uncertainty associated with budgeting from year to year.

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**Figure 9: Volatility of Production Value and Revenue from Oil and Natural Gas, Wyoming, 1996-2008.**<sup>37</sup>



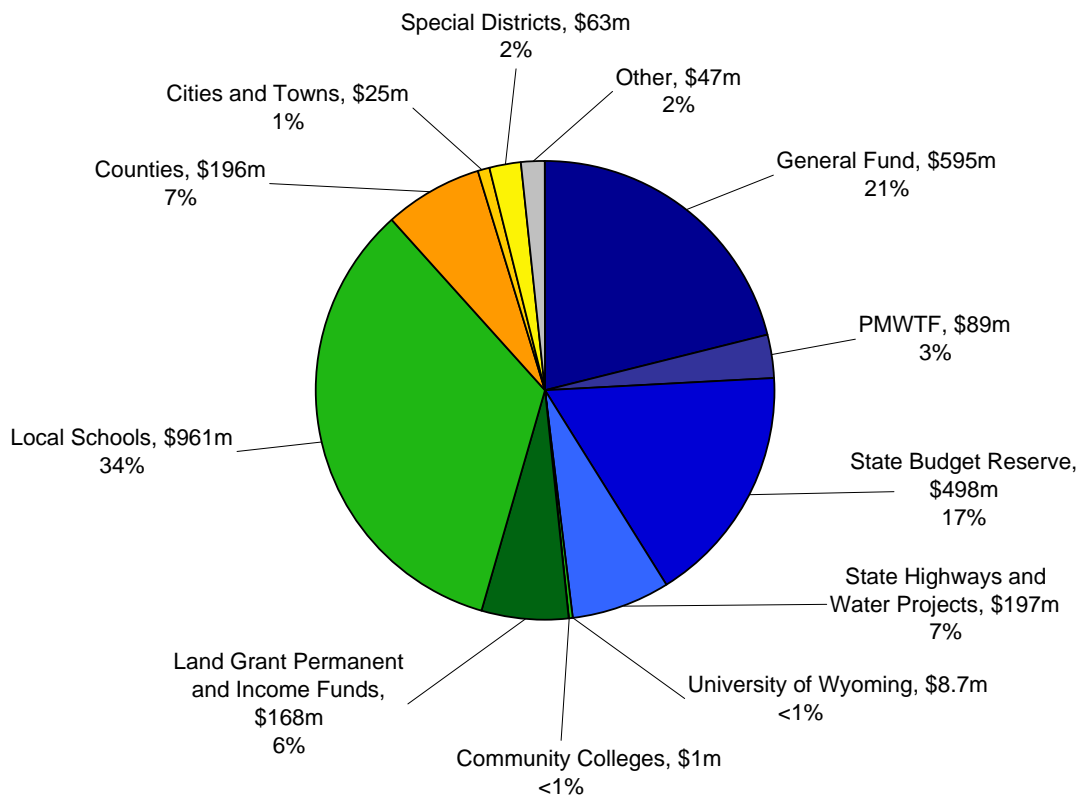
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## Distribution

Figure 10 shows how Wyoming distributed oil and natural gas revenue in 2008.<sup>38</sup> Local schools and state general government receive the largest share of all revenue generated by oil and natural gas extraction, 81 percent of the total combined (more than \$1.1 billion each in 2008).<sup>39</sup> Local government takes home a much smaller portion, with counties receiving only 7 percent and cities and towns only 1 percent of total oil and natural gas revenue (\$196 million and \$25 million respectively).

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**Figure 10. Distribution of Oil and Natural Gas Revenue in Wyoming, 2008.**<sup>40</sup>



**Figure 11. Allocation of Oil, Natural Gas, and Coal Revenue in Colorado, Montana, New Mexico, Utah, and Wyoming, 2006.**<sup>41</sup>

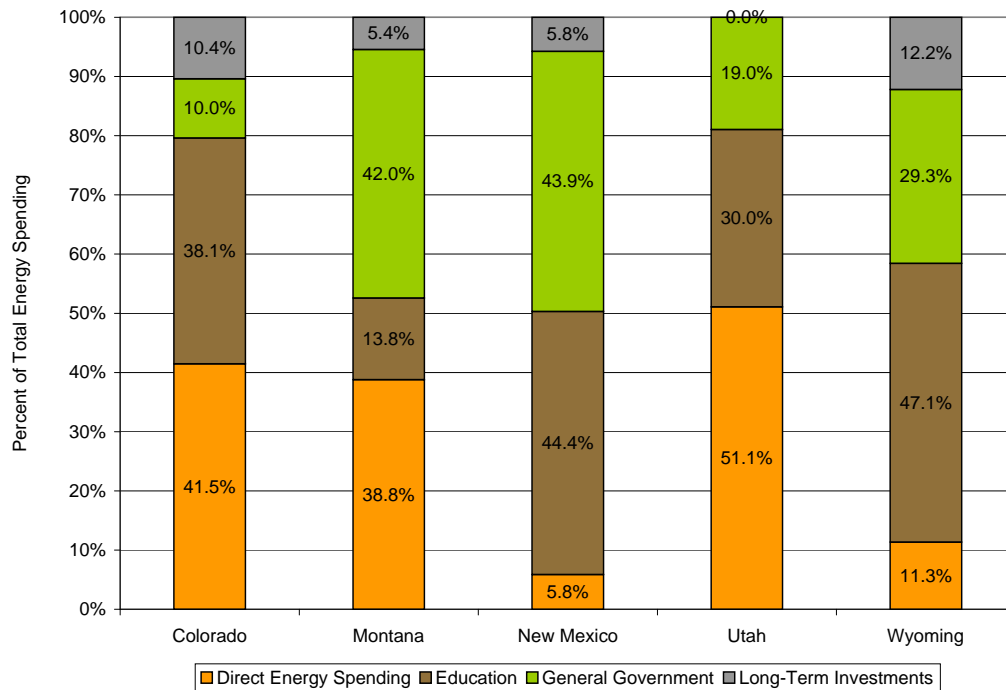


Figure 11 puts Wyoming’s 2006 allocation of fossil fuel revenues in perspective compared to five other western states. Relative to its peers, Wyoming does an excellent job of directing money toward education and long-term investments. However, it has among the lowest rates of “direct energy spending,”<sup>42</sup> meaning it is directing less money than peers toward mitigating the immediate impacts of the energy surge. The problems this creates for local governments are discussed in the following section this report.

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## Summary Findings

### *Economic specialization*

- Wyoming is the most specialized economy in the nation due to the prominence of mining and relative underperformance of other sectors.
- In 2006, earnings from mining constituted 13.7 percent of total personal income in the state and employment in the mining sector was 8 percent of total employment.
- Wyoming's high degree of specialization means that it has not been able to convert periods of energy boom into a more diverse economy, and it is highly vulnerable to the ups and downs of a single, highly volatile sector.

### *Demographics*

- Wyoming's population is strongly affected by surges and contractions in the energy industry.
- The state's population increased by over 50 percent from 1970-1983 and promptly contracted by 11 percent during the ensuing bust.
- Wyoming is affected by ongoing out-migration of the state's young working age population: While the 1990s saw increases in net population (40,194), the state lost nearly half that number of adults (18,874) between the ages of 25 to 39, a trend that has continued during the current energy surge.
- Net migration during the current energy boom is relatively low compared to the previous energy boom, explained in part by the large role played by in-migrants and transient workers in the natural resources and mining sector.

### *Income and employment*

- Dependence on mining and lack of diversification leave the state highly exposed during periods of recession, and dependent on non-labor income during periods of recession. The state has also failed to attract and cultivate higher-paying jobs in services (i.e., knowledge-based jobs).
- Together these trends explain why earnings per job were in decline for 15 years (1982-1997) and why real earnings per job in 2006 (\$40,455) was below the value in 1979 (\$42,775) at the height of the previous energy boom (numbers adjusted for inflation).<sup>43</sup>

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### ***Revenue from oil and natural gas***

- In 2006, the nearly \$3 billion in oil and natural gas revenue accounted for nearly 40 percent of all state and local government revenue in Wyoming in 2008. The state invested nearly \$1 billion in local schools in 2008.
- The benefit of Wyoming's mineral wealth is a low tax burden on citizens. For every \$1,500 of taxes paid by Wyoming residents, they receive \$7,800 worth of services.
- Wyoming is doing a good job at capturing revenue from the state's mineral wealth and setting it aside for long-term investments. Wyoming invested just under a half of a billion dollars (17% of oil and natural gas revenue) in its budget reserve fund in 2008.
- The state's distribution policy returns only a small portion of total revenue to local governments (7% to counties and 1% to cities and towns in 2008).

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## CASE STUDY INTRODUCTION: SWEETWATER COUNTY, WYOMING

Sweetwater County is located in the Red Desert country of southwestern Wyoming, a landscape that slopes off the Continental Divide in rugged folds of basin and range. The expansive size of the sheep and cattle ranches scattered around the county suggest the unforgiving nature of the desert high plains (Sweetwater is the only county in western Wyoming with no National Forest lands). Sheep, cattle and the area's ample wild ungulate populations range over vast distances to extract a living in an environment with extreme winter and summer temperatures.

The Great Divide Basin, a 3,800 square-mile no man's land between the east and west slopes of the Continental Divide, dominates in the county's eastern half. Frequented in winter by deer and antelope, the basin and the larger Red Desert system are southern anchors in the far-reaching ungulate migration routes that define the Greater Yellowstone Ecosystem. The Green River, a major tributary of the Colorado, winds through western Sweetwater County. The reservoir behind northwestern Colorado's Flaming Gorge Dam extends north into Sweetwater County and a large expanse of public land adjacent to it is designated a National Recreation Area. Decisions affecting management of public lands are felt acutely in Sweetwater County, where 4.9 million of the county's 6.7 million acres are publicly-owned.<sup>44</sup>

Transportation corridors—the historic Mormon Trail, Interstate-80 and the Union-Pacific Railroad—bisect the county east to west. The county's population centers of Green River (county seat, pop. 11,000) and Rock Springs (pop. 19,000) have historically and continue to function as vital links in these national transportation networks. Their importance in transportation dates back to the 1860s when labor camps and coal mines cropped up in Rock Springs to build and fuel the Union Pacific Railroad.<sup>45</sup>

The seeming severity of the surface landscape of Sweetwater County belies the richness of the resources below ground—the county sits squarely atop the coal seams and oil and gas reserves of the Greater Green River Basin, which by some estimates contains 10 percent of the nation's total onshore natural gas reserves, as well as the largest known trona (a source of sodium carbonate) deposit in the world. Tapping the area for its mineral riches and the booms and busts that are so much a part of mining (including energy development) are dominant motifs of local history.<sup>46</sup> Trona, uranium and coal mines in the area support a small, but stable local workforce. A strong union presence built on these industries helps to explain why Rock Springs is a Democratic stronghold in an overwhelmingly Republican state.

The technological advances in oil and natural gas extraction sparked a new episode in the region's mining history at the turn of the 21st century. And the pace and scale of subsequent exploratory and productive activities have been nothing short of staggering. At the start of 2008, the Wyoming Oil and Gas Commission tallied 10,139 oil and gas wells operating in the four-county area of the greater Green River Basin—half of them constructed since 2000. Projections suggest tens of thousands of new wells in the next twenty to thirty years: 8,000 to 9,000 new wells have been projected in the foreseeable future for just the eastern part of the Green River Basin,<sup>47</sup> 4,000 in the southern basin (including northwestern Colorado),<sup>48</sup> with potential for thousands elsewhere in the basin. When and if tar sands and oil shale extractive technologies are proven, the numbers are expected to multiply exponentially.

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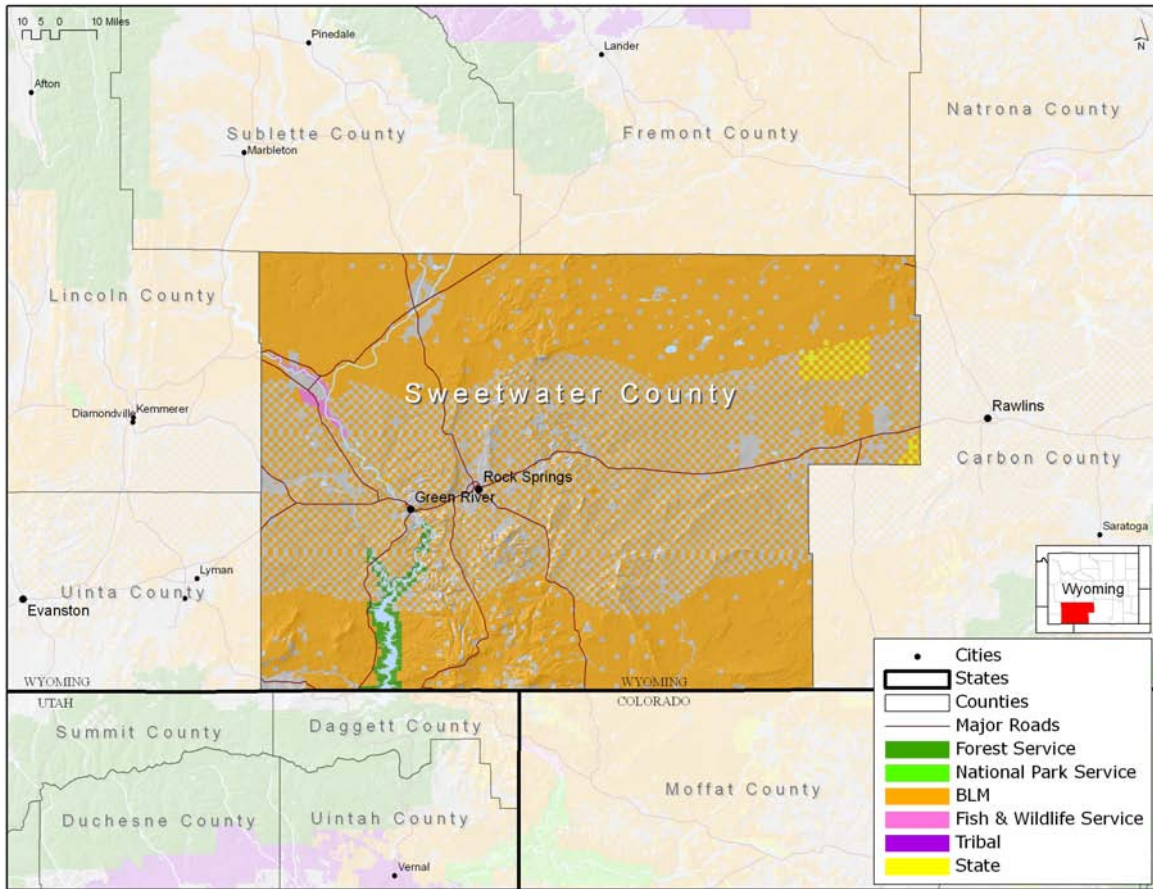
The breakneck speed of the energy development in the Greater Green River Basin has launched southwest Wyoming into the forefront of energy development in the West. In this report, we consider the impacts of rapid growth in Rock Springs and Sweetwater County, with a focus on the opportunities and constraints affecting the responses of local government and leaders.

The area's recent history speaks clearly to the opportunities and challenges inherent in Wyoming's relationship to energy development. During the previous energy boom, Sweetwater County's population grew by 147 percent and employment by over 200 percent.<sup>49</sup> The ensuing bust was painful. By the early 1980s, when world markets again favored foreign oil, the city was all but abandoned. The county's unemployment rate jumped from a 1975 low of less than 1 percent to nearly 12 percent in 1983.<sup>50</sup>

Local leaders have the experience and motivation to avoid repeating this recent history. As with the state as a whole, in the best case scenario, the county and its municipalities could link the prosperity created in a period of intensive energy development with existing amenities to diversify its economy to create resilience to future downturns in fossil fuel development. In this vision, Sweetwater County's population centers would offer residents a high quality of life alongside stable, high-paying blue- and white-collar jobs.

The key dynamic for Sweetwater County and its communities is redefining the terms of their relationship to energy development. Can the development be managed in ways that enable local people to protect their communities and landscapes—along with the area's stable, long-term resource-based economies—from the damaging aspects of the boom? At the same time, the volatility of the energy economy presents the challenge of how local communities can leverage the benefits of the current boom to build a diverse and secure post-energy future.

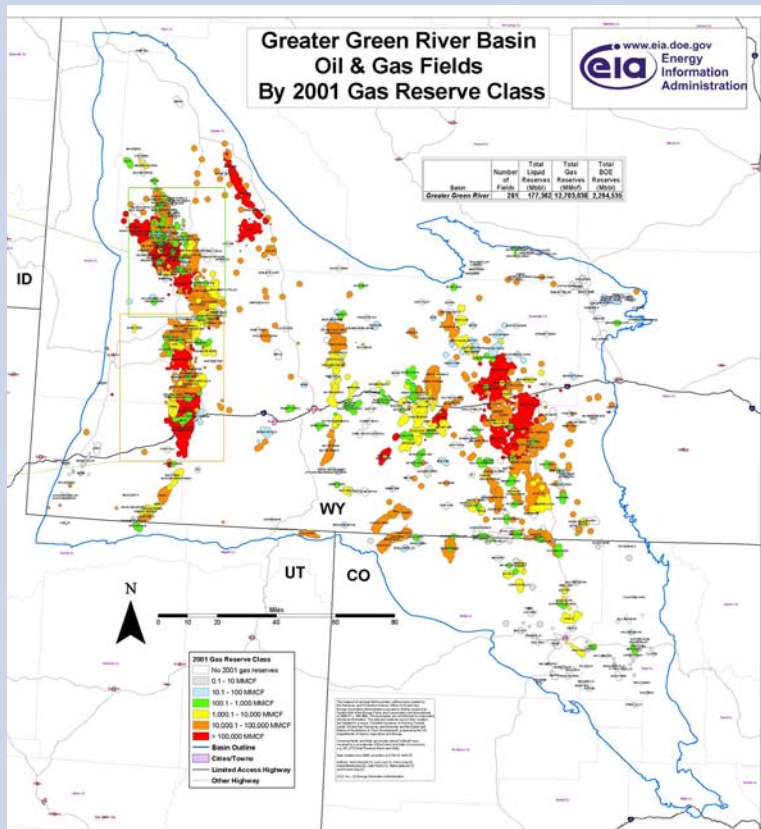
# Map 1. Sweetwater County, Wyoming



### ***Production and policy background.***

The federal “Scientific Inventory of Onshore Federal Lands Oil and Gas Reserves” (2001) found the Greater Green River Basin to have the richest reserves of the five basins (in the onshore U.S.) examined in the report.<sup>51</sup> Map 1 shows oil and natural gas fields in the basin, colored according to the volume of estimated natural gas reserves in each field. The greatest concentration of and richest fields have been located in two areas: in the western and upper Green River Basin and in eastern Sweetwater County along the Continental Divide.

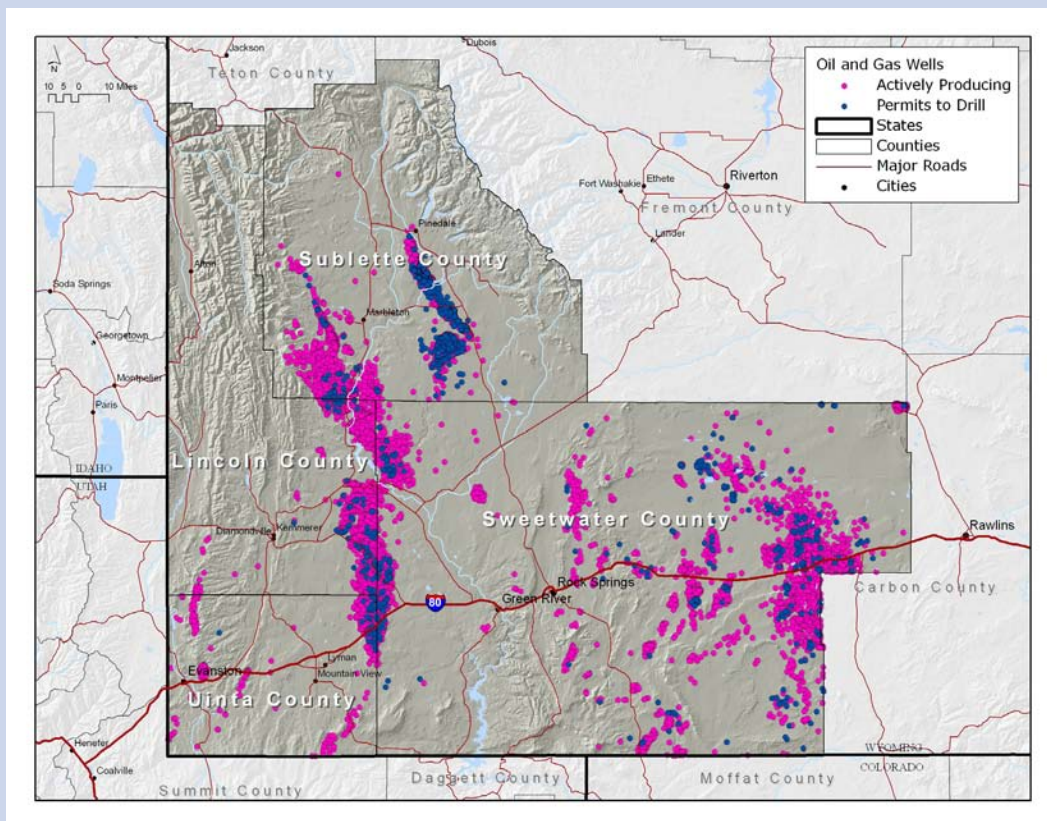
**MAP 2. Greater Green River Basin Oil & Gas Fields (courtesy EIA).<sup>52</sup>**



According to the 2001 inventory of oil and gas reserves on Federal Lands, the bulk of the basin is effectively open for exploration—just 19% of the federal land is specifically closed to leasing.<sup>50</sup> Jurisdiction for federal leasing within the Greater Green River Basin falls within multiple Wyoming (and Colorado) BLM Field Offices. The BLM’s National Pilot Program established an office in Rawlins in 2006 to help coordinate and accelerate the permitting and oversight process in the Greater Green River Basin.

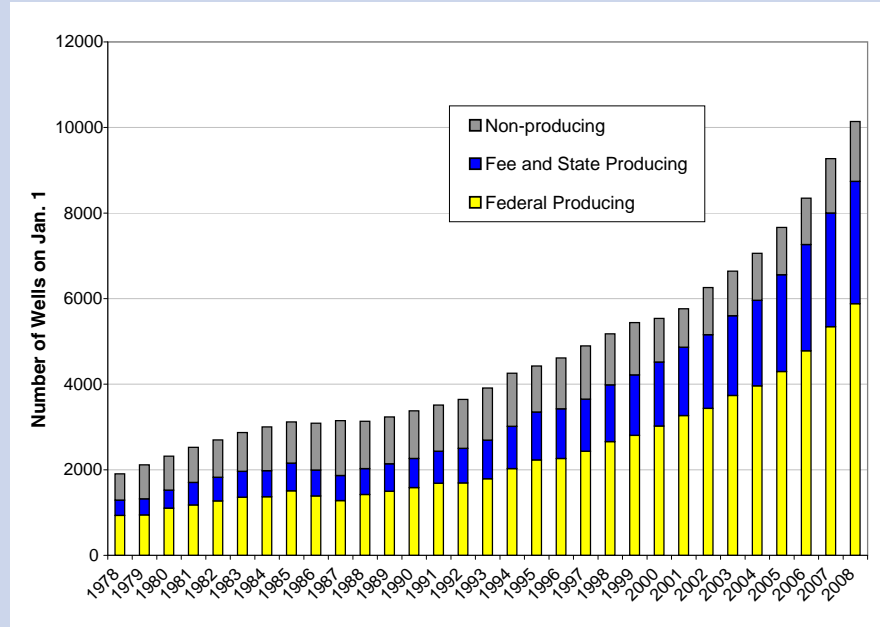
While oil and gas wells are currently dotted throughout the basin, some of the projects with the most dramatic impacts due to their pace and scale are those underway in the Pinedale Anticline (Sweetwater and Sublette counties), the Jonah Field (Sublette County), and Hiawatha areas (Sweetwater County, but concentrated in Northwest Colorado). The basin accounted for 63 percent of total natural gas production and roughly 20 percent of total oil production in Wyoming in 2006. See Map 2.

**Map 3. Active and Permitted Wells in Southwestern Wyoming, 2008**



The recent rush to extract oil and natural gas from the Green River Basin has involved the construction of thousands of wells and associated infrastructure (pipelines, processing and collecting facilities) since 2000. The chart below shows the total wells in the Wyoming portion of the Greater Green River Basin over a 30-year period, broken down according to productivity (idle versus active) and mineral ownership. It shows that federal leases are the basis of the lion's share of wells, although the relative proportion of drilling through state and privately-owned leases has grown in recent years.

**Figure 12. Total Oil and Natural Gas Wells, Greater Green River Basin in Wyoming, 1978-2008.**<sup>54</sup>



Figures 13 and 14 show the volume and value of oil and gas extracted in the Greater Green River Basin between 1978 and 2008.<sup>55</sup> The volume of oil production has rebounded from lows in 1983 and 1997, but the trend is relatively consistent when compared to natural gas. The volume of natural gas production in 2008 was 600 percent greater than in 1978. The impact of this is made clear by the values of each commodity: the value of natural gas extracted in the basin in 2007 was \$629 million compared to the total value of oil of \$73 million. These values represented 65 percent of the total production value of natural gas and 39 percent of total production value of oil for the state as a whole.

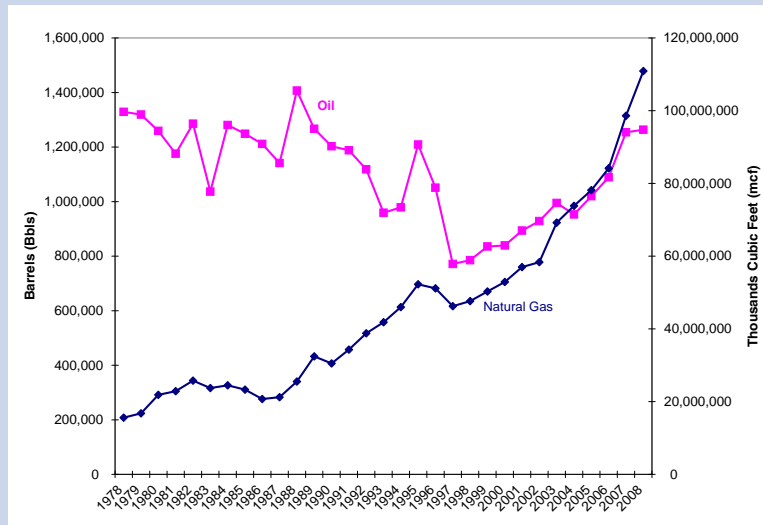
The scale of existing and future development in the Greater Green River Basin is enormous. Whether the rapid rate of development of new wells in the Greater Green River Basin of the past five years will continue in a changing economic and political context is difficult to predict. When a team of University of Wyoming social researchers visited the Pinedale and Rock Springs areas in 2004 to conduct interviews about the impact of the energy boom, they observed an “optimism that this boom will be better managed and sustained” (than the 1970s oil boom). Local leaders hoped that the current energy development surge would lead to more controlled and sustainable growth than the 1970s-1980s energy boom.<sup>56</sup>

However, as energy development has unfolded since the early 2000s, agency responses to industry demands have shifted from cautious to confident. The commitment to a moratorium on winter drilling, for example, played a key role in convincing local people that oil and gas exploration would be sensitive to wildlife—yet the BLM is increasingly granting exemptions to it in the Upper Green River Basin.<sup>57</sup> In the recent proposals affecting some of the region’s largest development projects on public land—in the

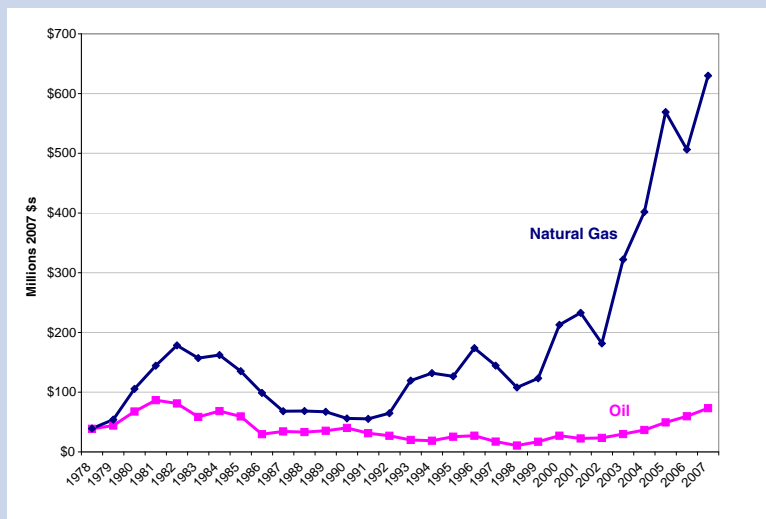
Hiawatha area, the Jonah Field and the Pinedale Anticline—proponents have consistently advocated a maximum rate of construction and extraction, coming back after original proposals to drill more wells, closer together, more quickly. This faster pace of extraction means the boom will be shorter-lived and is likely to create harder-to-manage local impacts.

Pace matters: it affects the time and means available to local governments entrusted with managing the impacts of rapid growth. In general, the more expedited the drilling schedule, the shorter the life of the project and thus the more quickly local economies will be pushed through the boom into the ensuing bust.<sup>58</sup>

**Figure 13. Volume of Oil and Natural Gas Produced in Greater Green River Basin in Wyoming, 1978-2008.**<sup>59</sup>



**Figure 14. Value of Oil and Natural Gas Produced in Greater Green River Basin in Wyoming, 1978-2007.**<sup>60</sup>



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## THE ROLE OF ENERGY DEVELOPMENT IN SWEETWATER COUNTY'S ECONOMY AND FISCAL HEALTH

### Population & Migration

Sweetwater County experienced a 105 percent increase in total population in the period between 1970 and 2006, outpacing average population increases (70%) for non-metro counties in the West. What particularly distinguishes Sweetwater County's population growth profile from the rest of the West is its volatility.<sup>61</sup>

The county has both added and lost people at rates well in excess of regional averages. For example, from 1970 to 1982, during the previous energy boom, Sweetwater County's population grew by 147 percent (27,214 people were added to a 1970 population of 18,536). This increase in population was five times the regional (non-metro West) average increase of 31 percent.<sup>62</sup> By contrast, Sweetwater County added only 1,449 people between 2001 and 2006, an increase of 4 percent—suggesting that this boom has yet to approach the dramatic rates of population growth experienced during the 1970s.<sup>63</sup>

Population dynamics following episodes of economic difficulty can be indicative of a region's economic resilience. Not surprisingly, Sweetwater County experienced net population loss following the last energy bust. Population growth was - 2.0 percent from 1982 to 1990 and 0.8 percent between 1991 and 2001. In contrast, the non-metro West experienced positive growth rates during these two periods of economic recovery (0.6% from 1982-1990 and 1.5% from 1991-2001).<sup>64</sup>

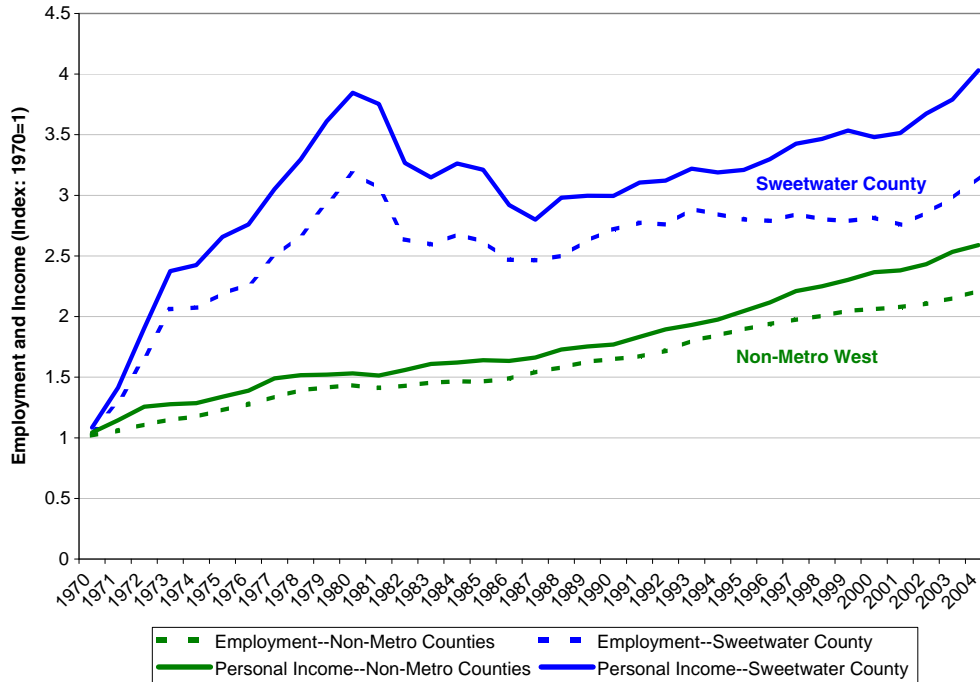
An exaggerated trend toward older residents also marks Sweetwater County's population profile. During the period 1990-2000, the share of the total population in the 25 to 39 year-old age group declined by 7.7 percent in Sweetwater County, compared to 4.3 percent in the non-metro West.<sup>65</sup> A shift toward an older demographic is partly tied up in the aging of the baby boom generation, but its extent in Sweetwater County also suggests a failure to retain the area's youth.

### Employment and Income

Figure 15 shows trends in the rate of growth, using 1970 as a baseline, in total employment and personal income for Sweetwater County (blue) and for the non-metro West (green). This chart makes it clear how much more closely Sweetwater County's economy is tied to trends in mining (including energy development) than is the economy of the rural West more generally. While the rural West as a whole grew relatively steadily from 1970 to 2006, employment and personal income in Sweetwater County were far more volatile. Again, the severity of the 1981-1982 recession and the area's difficulties in rebounding in the ensuing years are evident.

While Sweetwater County shows faster relative rates growth than the rural west as a whole, a closer look at trends in income sources and earnings (that follows) suggests some drawbacks to the county's economic profile.

**Figure 15. Historical Rates of Growth in Employment and Personal Income, Sweetwater County and the Non-Metro West, 1970-2006<sup>66</sup>**



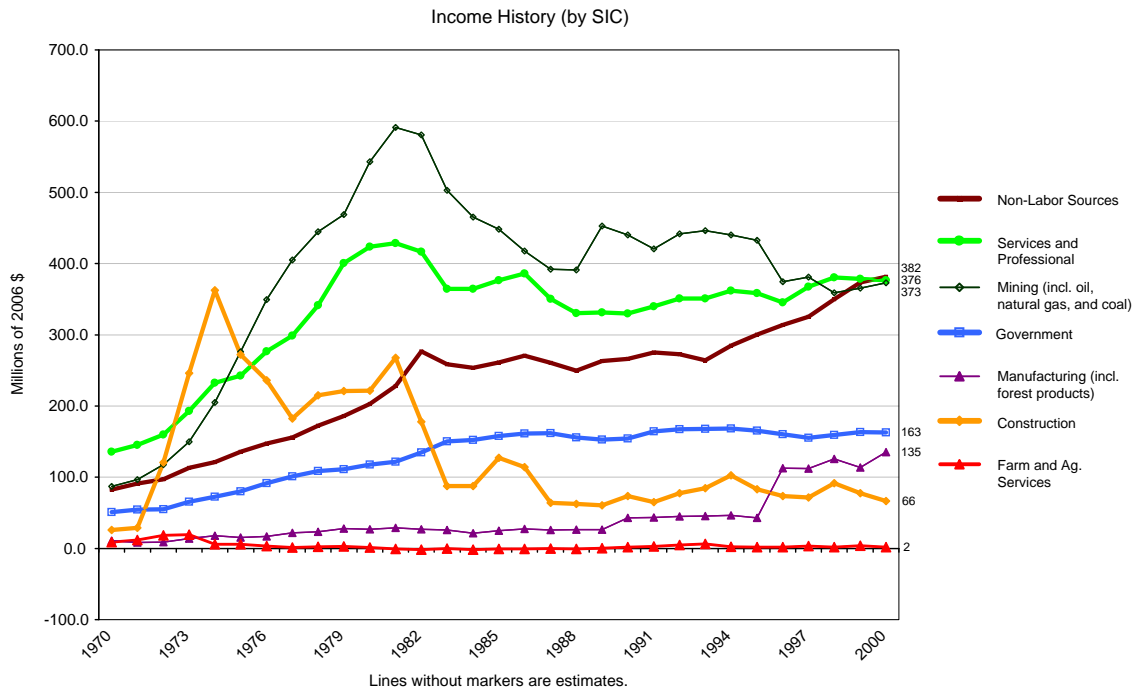
### Income Sources

Figure 16 shows the historical contributions of major economic sectors to total personal income in Sweetwater County for the period 1970 to 2000 (the chart ends in 2000 due to changes in data, see below for a discussion of current income sources). Here the dominant role of mining is especially clear as is the strong influence of the 1970s energy build-up, which benefitted not only the mining sector, but also construction (largely due to construction of the Jim Bridger Power Plant). Taking the period cumulatively, mining and energy development contributed 31 percent of new income in Sweetwater County, while adding less than one percent to new income created in the West as a whole.<sup>67</sup>

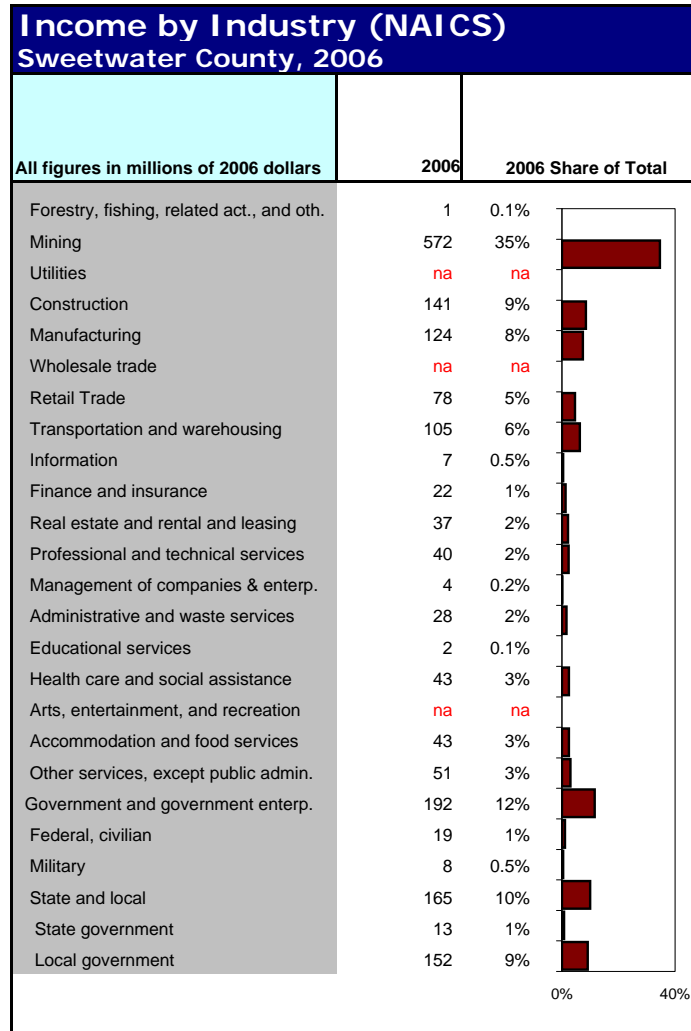
Figure 16 indicates that the post-1982 bust carried over into other income source categories such as services and professional sectors, which experienced declining and stagnant growth in terms of volume in Sweetwater County during the period 1982 to 2000. This is in marked contrast to the non-metro West as a whole, which saw steady, significant growth in the contribution of services and professional sectors to total income during the same time period. One implication of this is that growth in other sectors has failed to compensate for losses in income during declines in mining, making the region prone to especially hard times in periods of contraction in the energy industry.

Non-labor income has historically been the third most important contributor to personal income in Sweetwater County. From 1970 to 2000, non-labor income accounted for 32 percent of income growth in the county, 22 percent of which came in the form of dividends, interest and rent with the remaining 10 percent derived from transfer payments (primarily age-related benefits, such as pensions and Medicare).

**Figure 16. Historical Trends in Personal Income by Source in Sweetwater County 1970-2000 (SIC)<sup>68</sup>**



**Table 4. Personal Income by Source in Sweetwater County 2006 (NAICS)<sup>69</sup>**



The most recent (2006) data, shown in Table 4, indicates a continued strong role for employment in mining (including energy development), which contributed 29 percent of total personal income in Sweetwater County. Non-labor income in 2006 was just 19 percent of total income and government-related income (employment in the public sector) was 10 percent. That income from goods production constitutes 42 percent of total personal income in Sweetwater County, and service-related income 29 percent, sets the county distinctly apart from the non-metropolitan West, where service-related income was 33 percent of total personal income in 2005 and non-labor income was 40 percent of total personal income.<sup>70</sup>

## Employment and Wages

Table 5 reports wage and salary data (excluding proprietors) on total employment and average annual wages according to Bureau of Labor Statistics categories.

Employment trends mirror the breakdown of sources personal income closely, with Goods-Producing jobs constituting 37 percent of total employment in the county and the Natural Resources and Mining Sector constituting 23 percent of those jobs. Jobs in the public sector (federal, state, and local government) are 16 percent of total jobs and those in service-provision 46 percent.

Key information in Table 5 is the average annual wages in various sectors. Not surprisingly, jobs in mining (which includes oil and gas) pay well above the county's average wage (\$71,969 versus an average wage of \$46,041). The difference between the number of Service-Providing jobs (46%) and the sector's contribution to personal income (29%) is explained by the low average annual wages paid in the services sector relative to average wages, which are inflated by high wages in the mining sector. Jobs in the Public sector (federal, state, and county jobs) also pay more than 20 percent less than the county average (\$35,637 average for all public jobs).

**Table 5. Wages and Employment in Sweetwater County, 2006.**<sup>71</sup>

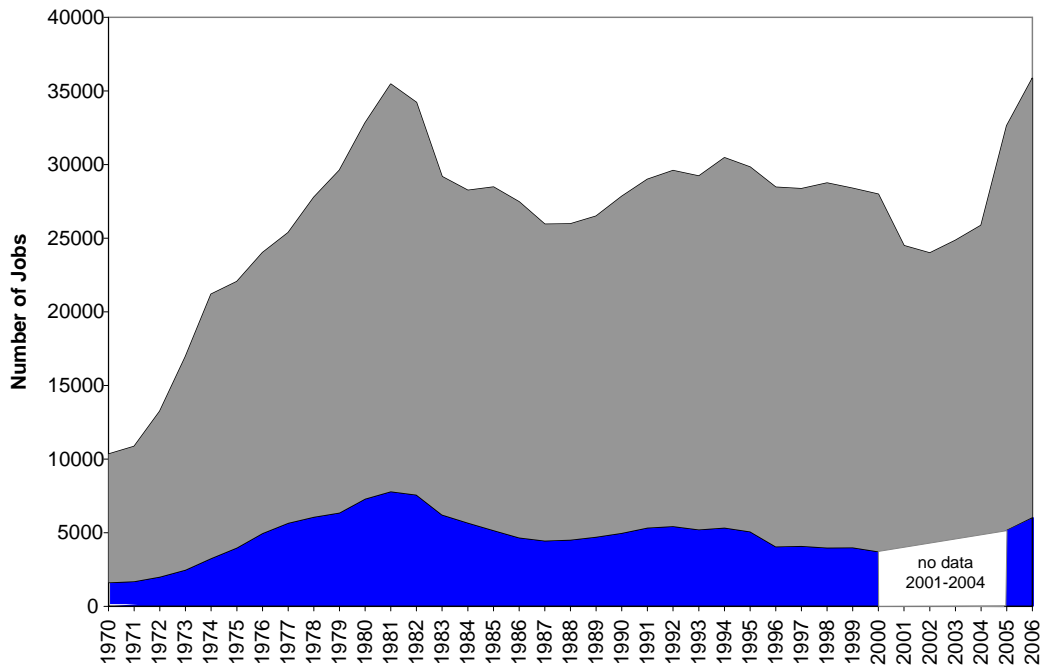
County Wages and Employment in 2006			
	Employment	% of Total	Average Annual Wages
<b>Total Private &amp; Public</b>	23,889	100%	46,041
<b>Total Private</b>	19,967	84%	48,086
<b>Goods-Producing</b>	8,893	37%	66,472
Natural Resources and Mining	5,562	23%	71,840
Agriculture, forestry, fishing & hunting	20	0%	36,611
Mining	5,542	23%	71,969
Construction	2,101	9%	49,291
Manufacturing (Incl. Forest Products)	1,229	5%	71,551
<b>Service-Providing</b>	11,074	46%	33,321
Trade, Transportation, and Utilities	4,754	20%	39,856
Information	210	1%	25,074
Financial Activities	814	3%	43,767
Professional and Business Services	1,174	5%	39,771
Education and Health Services	923	4%	29,674
Leisure and Hospitality	2,401	10%	13,815
Other Services	798	3%	39,326
Unclassified	#N/A	#N/A	#N/A
<b>Total Public</b>	3,922	16%	35,637
Federal Government	237	1%	51,680
State Government	252	1%	42,064
Local Government	3,433	14%	34,052

Wages are shaded in green when they are more than 20% higher than the wages for all sectors and in red when they are less than 20% lower.

The gap between what workers in the county's various mining industries earn and what those working in services or public employment earn has existed throughout the 1990s in Sweetwater County, as indicated in Table 5. The stability of jobs in the unionized coal and trona mines in the county likely account for the persistence of relatively high wages in mining during contraction in the natural gas and oil industries.

What matters as much as the size of the wage gap is the number of people working outside of mining, in other words, how much of the working population exists on the 'wrong' side of the wage gap. Figure 17 charts the number of jobs in mining (shown in blue) against all full- and part-time work in the county (shown in gray) from 1970 to 2006. During that time span, an average of 78 percent of the working population in the county has been employed in sectors other than mining in Sweetwater County. The most recent data (2006) suggest that just under 80 percent of working people in Sweetwater County work outside the mining sector. 62 percent of the workforce worked in sectors that as a whole pay 20 percent or more below average wages for the county.<sup>72</sup>

**Figure 17. Number of Jobs in Mining versus All Other Jobs, Sweetwater County, 1970-2006.<sup>73</sup>**



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In sum, while wages in mining and related fields pay high wages, the rest of Sweetwater County's employees earn average or below-average wages. This is because prosperity in mining has not led to the creation of higher-wage jobs in other sectors, putting the county's workers at risk when activity in the energy industry declines. When the energy economy is surging, workers outside the industry suffer because wages don't keep pace with inflated costs of living.

## **Local Fiscal Impacts of Fossil Fuel Extraction**

This section presents a brief digest of local government revenue and spending related to fossil fuel extraction in Sweetwater County. A detailed fiscal profile of Sweetwater County is offered as Appendix C for reference.

### ***Revenue sources***

In 2008, 74 percent of Sweetwater County's revenue came from local taxes and assessments. Property tax comprises the bulk of local taxes and sales tax is another important source of revenue. Intergovernmental revenue, comprised of payments and grants from the federal and state government to the county, make up the second largest source of revenue in the county (15% in 2008). Other revenue comes from licenses and permits, charges for services, investments, and miscellaneous sources (total, 3%).

Intergovernmental revenue consists of federal and state payments to the county, including programmatic payments such as PILT (Payment in Lieu of Taxes) payments and other public land-based revenue as well as state mineral severance taxes. The amount of programmatic payments tends to change little from year-to-year, with the exception of severance taxes which are based on volatile production values. One-time grants and special payments also fall into the category of intergovernmental revenue, making the total highly variable by year.

### ***Revenue from Fossil Fuels***

Mineral production (e.g., natural gas, trona, oil, and coal – trona not shown in Figure 18) dominates property tax revenue in Sweetwater County and has grown dramatically as a source of county revenue in the past five years.

Figure 18. Production Value of Oil, Natural Gas, and Coal in Sweetwater County.<sup>74</sup>

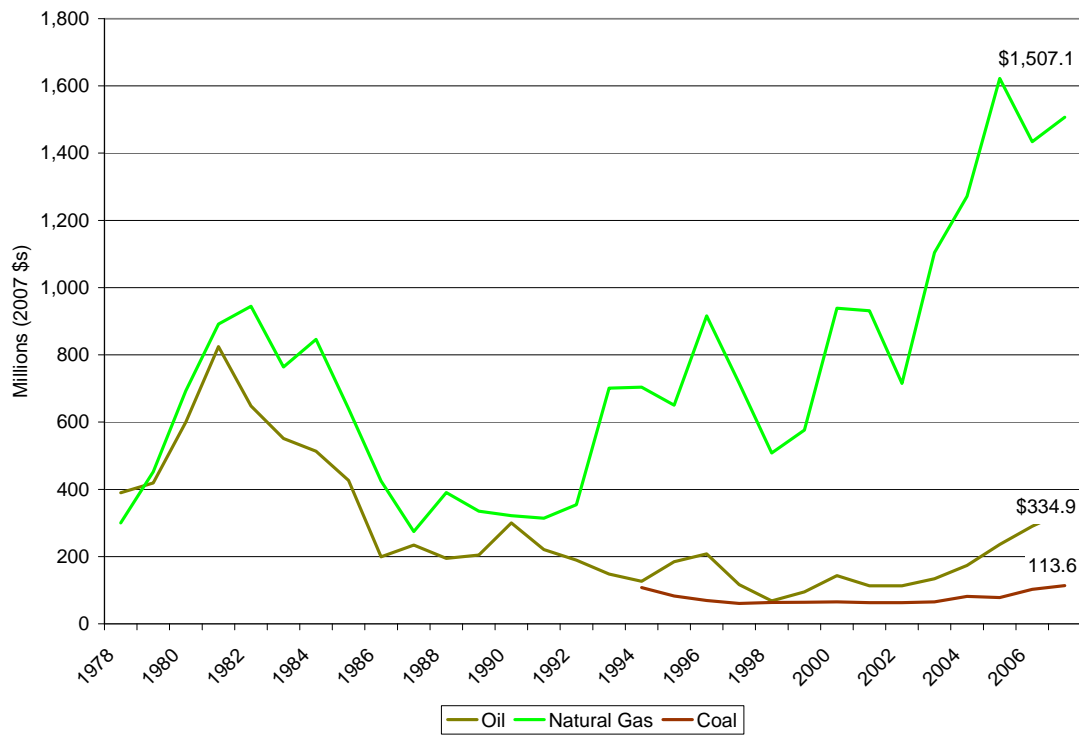
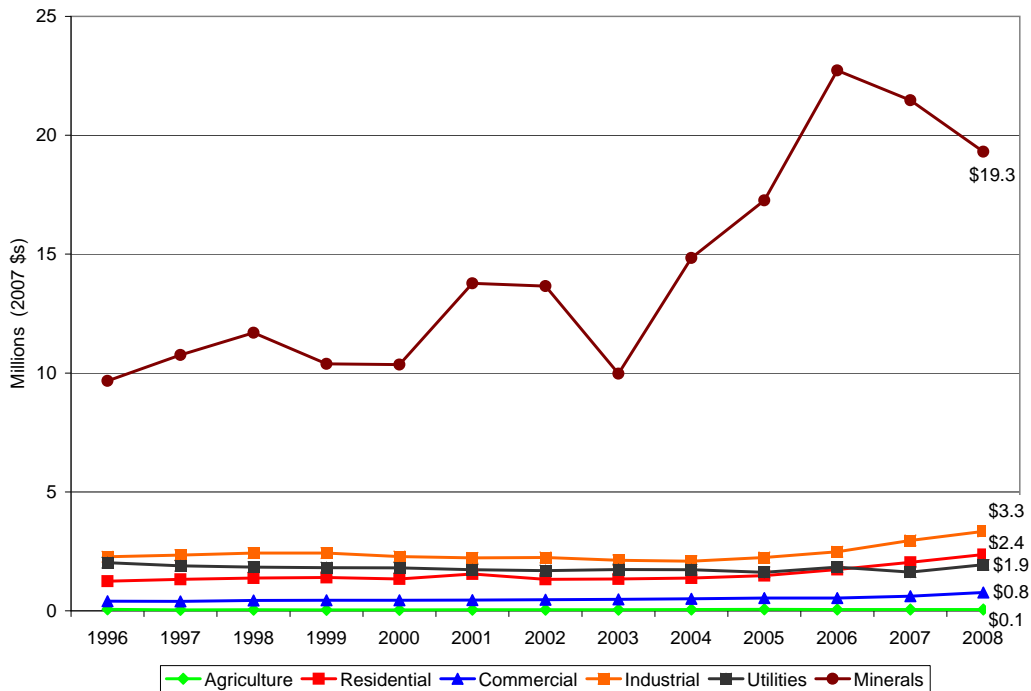


Figure 19 shows the breakdown of property tax by class. Sixty nine percent of property tax revenue in 2008 came from minerals (\$19.3 million).<sup>75</sup> Other leading sources of property tax include industrial property (12% in 2008), residential (9%), utilities (7%), commercial property (3%).

**Figure 19. Sweetwater County Property Tax Revenue by Class, 1996-2008.**<sup>76</sup>



As Figure 19 shows, the annual contribution of minerals to local taxes has grown with the current energy surge—it also shows considerable more volatility from year to year than other sources. Fifty-one percent of property taxes were generated from natural gas in 2008. The next largest sources of mineral-based property tax were oil (18%) and trona (18%) extraction. Other sources include coal (8% of property taxes in 2008) and hard rock and non-metallic mining (together 5% of property tax in 2008).

Sales tax revenue also shows considerable growth that is related to the current energy surge. Since 2002, net annual taxable sales have close to doubled (\$58m to \$103m in 2008 (2007 dollars)). The relative contribution of various sources has remained consistent.

Despite the high production value of mineral extraction in Sweetwater County, state severance tax returns to the county are a small part of total county revenue. In 2007, state severance tax distributions of \$444,866 made up 10 percent of total county revenue.

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Because many of the impacts of oil and natural gas extraction occur at the local level (e.g., impacts on county roads and increased demand for public safety and social services) local governments require a sufficient, timely and stable revenue stream to facilitate rapid growth and mitigate these impacts. Counties budgets are smaller than the state's, and are therefore more exposed to uncertainty.

Revenue from oil and natural gas in Sweetwater County is small and volatile compared to the state's revenue. Property taxes are levied on production value, and swing dramatically from year to year as prices and extraction activities surge and decline in concert. Sales taxes take in a broader sweep of economic activities, but have proven to be similarly volatile locally as industry activities and population growth change.

The next section turns to the question of how increased revenues at the local level comport with increased responsibilities and impacts of the energy surge.

## **Summary Findings**

### ***Demographics***

- Historically, from 1970 to 2006, Sweetwater County grew more quickly than the rural West in terms of employment and income, but was also harder hit during periods of recession, specifically:
- Population increase in 1970-1982 energy boom was five times greater than growth in the non-metro West, but in current boom increase is just 4% (1,449 people between 2001 and 2006).
- Sweetwater County lost population while the non-metro West was growing (-2% in county v.+0.6% region-wide from 1982-1990 and -0.8% v. +1.5% from 1991-2001).
- Sweetwater County lost more people in the 25 to 39 year-old age group than the regional average, suggesting failure to attract and retain younger workers.

### ***Employment and Income***

- Mining contributed 31 percent of new personal income in Sweetwater County from 1970 to 2000, and 29 percent in 2006.
- That income from goods production (construction, manufacturing, mining, farming, etc.) constituted 42 percent of total personal income in Sweetwater County in 2006, and service-related income 29 percent, sets the county distinctly apart from the non-metropolitan West, where service-related income was 33 percent of total personal income in 2005 and non-labor income (retirement and investment income) was 40 percent of total personal income. Sentence doesn't balance: goods and services for Sweetwater and

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service and non-labor for non-Metro West) Dependence on non-labor income can be indicative of a failure to diversify into high-paying service and professional sectors, making a regional economy more vulnerable during periods of recession, particularly large stock market adjustments.

- Average wages in mining and manufacturing are high, but in 2006, the majority of the county's workforce—roughly 72 percent—was employed in sectors other than mining, and 62 percent of the workforce worked in sectors that as a whole pay 20 percent or more below average wages for the county.

### ***Local Government Revenue from Energy***

- Sixty nine percent of Sweetwater County's property tax revenue in 2008 came from minerals (\$19.3 million). Fifty-one percent of mineral-related property taxes were generated from natural gas in 2008.
- Since 2002, net annual taxable sales have close to doubled (\$58m to \$103m in 2008).
- Despite the high production value of mineral extraction in Sweetwater County, return to the county through state severance taxes is a small part of total county revenue. In 2007, state severance tax distributions of \$444,866 made up 10 percent of total revenue.
- Revenue returned to Sweetwater County from the state of Wyoming is small and volatile, insufficient to mitigating the impacts of the current energy surge.

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## CULTIVATING LONG-TERM PROSPERITY IN AN ENERGY-SURGING COUNTY: OPPORTUNITIES AND CHALLENGES

In interviews conducted for this and related studies, community members and local leaders in Sweetwater County expressed a mix of concern and cautious optimism about the local challenges and potential benefits of the recent energy surge.

Long-term residents of the area feel they have a good quality of life, and seek sensible growth that maintains “a lifestyle where we can be happy and where the place we live enhances our ability to be happy,” as Joyce Corcoran, former Rock Springs City Councilor, put it.<sup>77</sup> A team of sociologists studying the impacts of the energy surge in 2004 reported that “[p]eople [in Sweetwater County] want to make sure that while the minerals are being extracted the land and wildlife are left intact to a large extent for the development of tourism and for “our way of life.”<sup>78</sup> The report also noted that “people who have been in the area since the 70s tended to want a manageable pace of development that will be sustainable for 10 or more years. In their minds, this will help to lessen the negative impact on the community and help stabilize the economy.”<sup>79</sup>

What are the realities of harnessing the current fossil fuel extraction surge for the long-term benefit of city and county? This section considers this question using interview, newspaper reporting, and impact studies along with fiscal analysis based on city and county budgets. We focus on the county and use the city of Rock Springs as an example of the challenges facing municipalities.

Rock Springs is the nearest large population center to the gas fields of southern Sublette and western Sweetwater County, which are located in rural areas with few amenities. “Everyone who works on the anticline (PAPA) lives in Rock Springs” said one interviewee.<sup>80</sup> To a large degree, the challenges facing Rock Springs also face the county’s other rapidly growing population center, Green River. (According to census estimates, roughly half of the county’s total population lives in Rock Springs and one third in Green River.<sup>81</sup>)

We found that local governments have gone to remarkable lengths to find quick and effective solutions to the problems related to the rapid start-up phase of the energy surge, despite very real fiscal challenges. However, we also found that as a consequence of the extent of the community resources devoted to mitigating local impacts, efforts to invest the windfall profits from energy development in order to achieve the hoped-for diversity and security of the local economy are often put on hold.

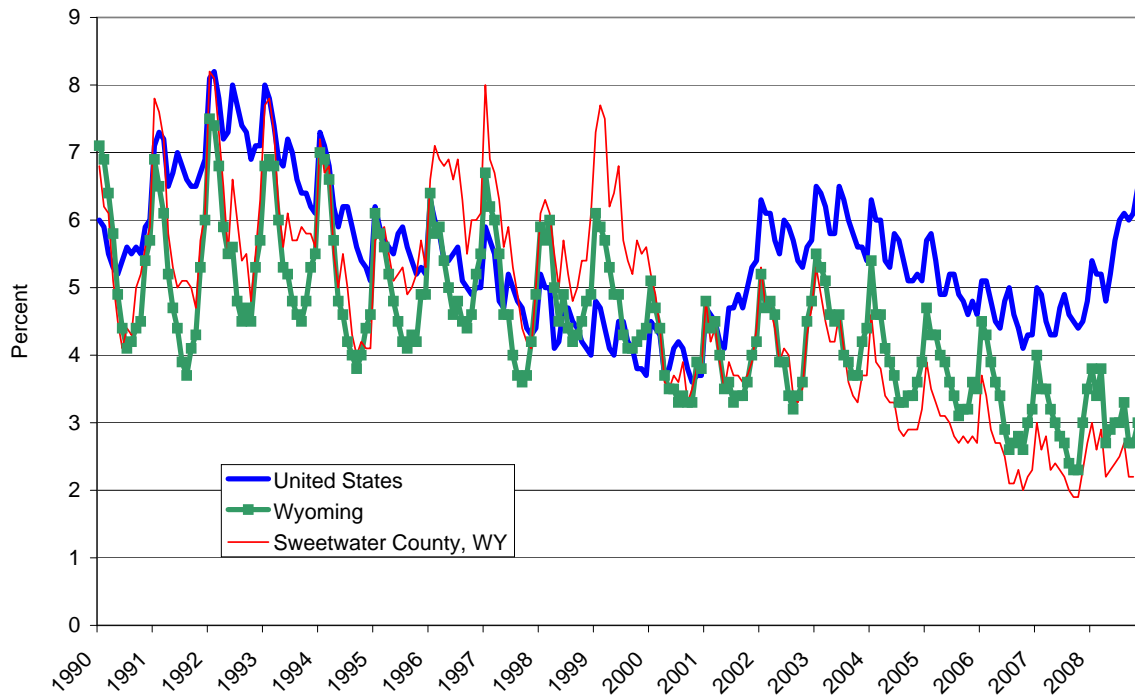
### Employment

Figure 20 shows that strikingly low unemployment rates have accompanied the current energy surge. While this is good news for job-seekers, it presents obvious problems for local employers. In 2007, a newly constructed Target store struggled to open due to shortages in available workers.<sup>82</sup>

Low unemployment also compounds the difficulties local governments face in mitigating the impacts of the energy surge. The City of Rock Springs lost its entire Engineering Department (3 employees) to higher-paying jobs in the oil and natural gas fields, reports Director of Public

Services, Vess Walker.<sup>83</sup> Difficulty filling the positions prompted the city to contract the work out on a semi-permanent basis. The city has also worked to use new revenue from energy to increase salaries by approximately 40 percent, but many private employers are not in a position to match salary increases. Even energy companies are turning to out-of-state crews (based in Colorado and Utah) to complete construction projects, according to Walker.

**Figure 20. Unemployment Rate, Sweetwater County, WY Compared to Wyoming and United States, 1988 to 2007 (Not Seasonally Adjusted).<sup>84</sup>**



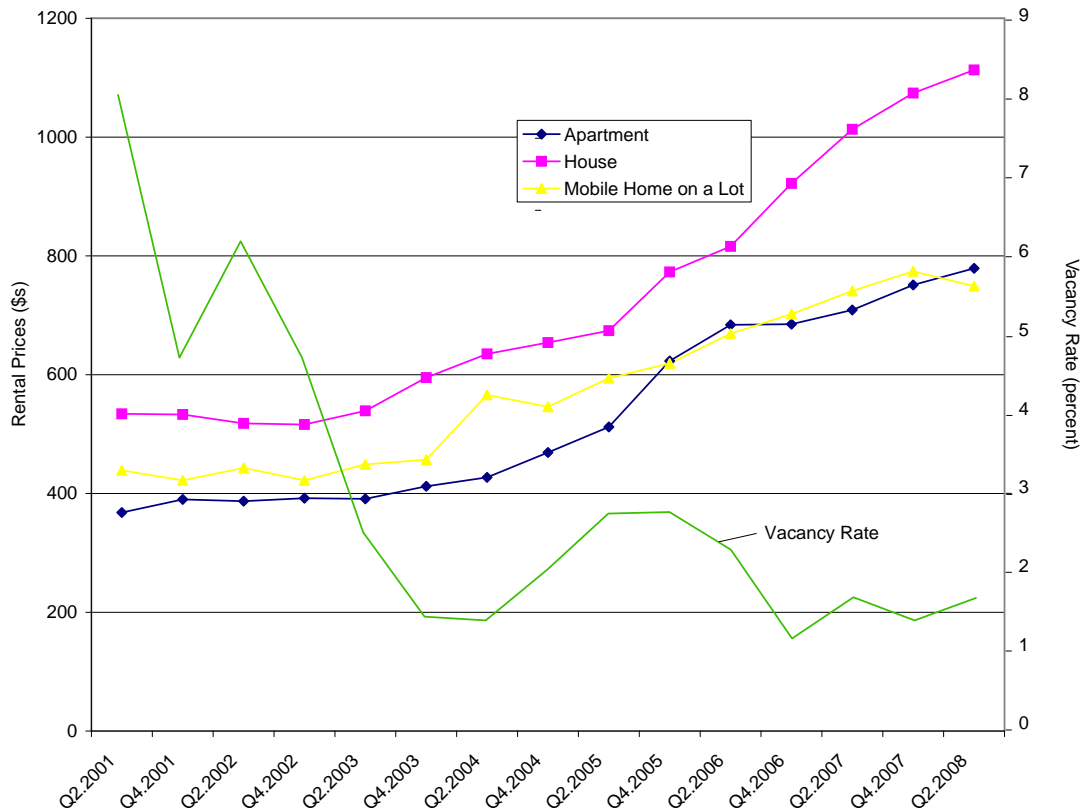
## Cost of Living & Infrastructure

Rapid in-migration of new workers and the high wages offered by jobs in energy development have contributed to a sharp increase in the cost of living in Southwest Wyoming. Sublette County and Sweetwater County rank second and fourth, respectively, in the state in comparative cost of living.<sup>85</sup> Housing costs show why this is the case.

The economic hardships of the 1980s and early 1990s contributed to below-average housing costs in Sweetwater County. More recently, there has been a marked turnaround in the cost of living in Rock Springs, with in-migration and the strong demand for housing contributing to rapid inflation in real estate prices. Those in need of affordable housing have been particularly

hard hit. As shown in Figure 23, rental vacancies have declined from a high of 18 percent in 2000 less than one percent in 2006. In real numbers, that meant that a worker seeking rental housing in 2006 would have found only nine units vacant. Meanwhile, the cost of renting an apartment has doubled (from \$392 per bedroom per month in 2002 to \$684 in 2006).<sup>86</sup> Rental property managers in Sweetwater County were surveyed by a state-sponsored study reported waiting lists of over 200 prospective renters.<sup>87</sup>

**Figure 21. Rental Prices and Vacancy Rates, Rock Springs, Wyoming, 2000-2008.**<sup>88</sup>



A high cost of living and housing represent roadblocks to economic diversification because they hinder the development of local institutions critical to attracting new businesses and investment such as hospitals and colleges. Sweetwater County Memorial Hospital CEO Kevin Hawk said in a 2006 news article that “The largest challenge [to recruiting] by far is the lack of housing and the escalation in the cost of housing.”<sup>89</sup> In 2006, the county’s economic development director opted

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not to go out-of-state on recruiting efforts noting, “We just don’t have anywhere to put [new workers] if they came here.”<sup>90</sup>

The local college, Western Wyoming Community College, is similarly affected by the housing shortage. Tex Boggs, former state senator and retired President of Western Wyoming Community College, said that there is a waiting list for student housing—reportedly 80 students long in fall 2008.<sup>91</sup>

In addition to dampening growth of non-energy related institutions and businesses, a housing shortage exacerbates poverty and homelessness. While workers earning higher wages in the energy industry can temporarily afford high rent prices, citizens living on fixed incomes, such as students and seniors, cannot bear a doubling in their rents in the space of five years. Quoted in the Casper Star Tribune, Lisa Parady, former director of the Rock Springs Housing Authority, said “workers in the thriving energy industries are snapping up homes once occupied by the poor.” In 2006, all of the 100 low-income housing units administered by Parady’s agency were full, while the city’s housing voucher program was running at capacity.<sup>92</sup>

The Rock Springs Housing Authority’s clients for housing assistance include the working poor as well as the truly indigent: it’s not only the mentally ill and elderly who cannot afford housing, but also teachers, nurses, and service workers who cannot afford to compete with energy workers salaries.<sup>93</sup>

### ***The Housing Problem: Solutions and Challenges***

Responses to the housing shortage and rising cost of living in Rock Springs and Sweetwater County have been driven by local initiative—private as well as governmental.

Initially, Rock Springs faced a basic problem with infrastructure. Both its wastewater plant and its road and sewer systems were not ready for rapid residential development and a revenue shortfall that was especially dramatic in the first few years of the boom (2003 and 2004). For reasons explained more fully below, the city and the county had few options but to use local taxes to respond to the housing shortage. County voters approved a one cent sales tax in Sweetwater County in 2006, funds from which were used to support infrastructure development in cities and towns as well as to help fund a new wing at the county hospital.<sup>94</sup> The one cent sales tax enabled the city of Rock Springs to update its wastewater plant.<sup>95</sup> The city also recently passed an impact fee program to tie road improvements to developments.

Still, these local responses are falling short of demand and have not yet helped to change vacancy rate or cost of living increases significantly. Help from other sectors—private industry and the state—has proved spotty.

In 2006, the housing situation was so desperate that a local developer purchased and moved 50 houses in an all-but abandoned town 60 miles east of Rock Springs. The vacant houses were relics of the 1980s energy bust, having provided employee housing related to mining and the construction of the Jim Bridger Power Plant in the 1970s.<sup>96</sup>

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Industry has contributed some funding. The town of Wamsutter received a total of \$4 million in funding from the company BP to provide a childcare center, support for infrastructure and seed money for a “community sustainability fund” in conjunction with the proposed construction of a large natural gas processing plant there.<sup>97</sup> The company has also built a \$12m “base camp” that will include some worker housing.<sup>98</sup> Industry funding is neither consistent in its geographic distribution, nor certain in terms of long-term commitments. Neither Rock Springs nor Green River, where most workers live, has received similar donations from industry.

In 2007, House Bill 138 proposed a Community Workforce Housing Program (eventually enacted as W.S. 9-12-901 through 9-12-905) represented an attempt by the state to respond to the pressing need for housing, not just in Southwest Wyoming, but also in other energy-booming areas in the state. The law created the Wyoming Workforce Housing Infrastructure Loan Program, a revolving loan program administered by the Wyoming Business Council to assist communities in developing the necessary infrastructure to support new residential development. Conditions of funding are designed to assure the program helps to create housing for workers and low-income funding. In its final form, allocation for the bill was just \$1 million, short of the \$30 million proponents were seeking. The program was restricted to loans, rather than grants to communities.<sup>99</sup>

A blue ribbon panel on Wyoming’s community colleges convened by the governor identified student housing as one of the community college system’s most pressing needs, leading the Wyoming (Community College Commission to request \$63 million in state funding for construction projects in 2007, short of the \$108 million requested from all seven colleges that year. Using general funds for capital construction on community college campuses is a new approach in Wyoming, one made possible by the energy surge. (Historically, projects have been primarily funded by local property taxes or bond initiatives.) But local areas still have to ante up, as matching funds are required for any state investment. Western Wyoming Community College has increased residence hall fees and asked for a local property tax increase to help cover the costs of housing construction.<sup>100</sup>

## **Social Services**

Many social problems, like crime, drug and alcohol abuse, and homelessness, have complex roots and are thus difficult to assign exclusively to the surge in energy development. Still, the population influx from the energy surge has exacerbated existing social problems, straining local service providers significantly.

As with previous mining booms, the recent oil and natural gas surge has been accompanied by a sharp increase in crime. County-wide crime statistics (as collected by the FBI in the uniform crime reporting scheme) showed a dramatic increase at the start of the boom—up 29 percent between 2003 and 2004. In an interview with Headwaters Economics, Mike Lowell, Chief of the Rock Springs Police Department, observed that his department made 90 narcotics-related arrests in 2002 and in 2006 the number rose to 450. He also estimated that 40 percent of the arrests his department makes are related to substance abuse.<sup>101</sup> Speaking to a conference of law enforcement professionals in 2007, Lowell stated that alcohol abuse and underage drinking are also a severe

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problem and appear to be “the No. 1 issue in the community.”<sup>102</sup> The county jail was expanded (with support from a local sales tax initiative in 1999) in 2005, but was nearing capacity by 2006.<sup>103</sup>

In 2007, a coalition of state judges and court officials went to Casper to describe the effect the energy boom is having on the function of state courts to the legislature. According to reporting in the Casper Star Tribune, judges in energy-surging regions have experienced a quadrupling in their caseloads between 2001 and 2006. Figures cited indicated a 23 percent rise in the volume of criminal cases filed in Sweetwater County from 2002 to 2006, and civil case filings rose 32 percent over that time (doesn't add up). “The judges all emphasized that the energy boom has brought a rapid influx of dysfunctional families which is also severely challenging the schools, the social service agencies, medical care facilities, and law enforcement.” As a result, according to Circuit Judge Dan Forgey in Rock Springs, 2007 case filings were predicted to exceed the numbers for 2006, in most categories, especially “in cases seeking protection orders arising from domestic violence and stalking situations.”<sup>104</sup>

Staff from the Wyoming Department of Family Services in Rock Springs described having a good case management and treatment programs in place that help them to cope with an escalating case load. What constrains the county's social service provisions, according to these staff, is a serious staffing shortage coupled with a lack of auxiliary programs, such as daycare and other child-focused daytime services and activities. Staffing shortages across social service agencies are directly related to the housing crunch brought on by the energy boom, while Linda Acker, Executive Director of Southwest Mental Health Services also noted that there is high turnover in clerical and other non-professional positions due to competition from the energy-sector. The real estate boom in town also affects social service providers, like Southwest Mental Health Services, that need to expand their facilities but cannot compete with current high prices for commercial real estate in the city.<sup>105</sup>

### ***Social Services & Crime: Solutions & Challenges***

Local governments are constrained in their ability to respond to increased demands for services by state-level decisions about the distribution of revenue. Ad hoc funding—industry donations, grants from various state programs, and special disbursements from the state permanent fund—is falling short, and voters show mixed commitments when it comes to using property tax for critical social services. Where Wamsutter received a \$400,000 gift from BP for a daycare, the city of Rock Springs recently fell \$250,000 short in fundraising efforts for a childcare center. The city is struggling to find funds to build a new senior center and has recently applied for a community development grant from the state for a tax credit scheme to develop a block of low-income housing units.<sup>106</sup> Voters do not always support necessary social services. Sweetwater County voters have twice turned down proposed tax increases designated for the construction of a regional methamphetamine treatment center.<sup>107</sup>

Elected officials and government staff in Rock Springs and Sweetwater County are working determinedly to keep up with the impacts of the energy surge. Despite the absence of new funds to mitigate new problems, the Rock Springs police department trained and deployed seven new

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staff and purchased 13 new police cars in 2004, “digging into [their] reserves,” according to one informant in the Blevins study.<sup>108</sup> In fact, Rock Springs went two million dollars into their municipal reserves to help meet the Sheriff department’s budget request. The city reports some inroads into the meth problem as one of the outcomes of ramping up its activities, meanwhile the Uniform Crime Report Index (a national measure of crime levels) dropped 15 percent between 2004 and 2005.<sup>109</sup>

However, local and county resources still fall short. Sweetwater County Treasurer Robb Slaughter noted that between 2006 and 2007, requests from county departments exceeded revenue by seven million dollars. The county commission responded by cutting the funding of most requests in order to balance the budget. While Slaughter emphasizes that the county is not “broke,” revenue has not kept up with new demands. “The Permanent Mineral Trust Fund is meant for a rainy day,” notes Slaughter. “Every time I go to the legislature, I tell them it’s pouring out here.”<sup>110</sup>

Slaughter provided an example of the difficulties of cobbling together local funding and one-time grants for capital improvements. The county faces federal requirements to update its circuit and district courts at an estimated cost of \$20 to \$50 million, but has no specific state grant program under which it can apply for such funds and no budget reserves to fund such an investment. Having just funded a sales-tax increase in 2006, it is unlikely that voters will agree to another tax increase in the near future.

## **Missed Opportunities**

These examples—housing, social services, crime, and infrastructure—all show that the energy surge is creating more demands on the county than it is providing in services. Counties and municipalities face escalating service demands that exceed available revenue. Short-term solutions—whether voter-approved tax increases, industry donations, or dipping into county reserves—are inadequate not only because they have not been able to make up the revenue gap, but also because they deflect money and attention from the important job of cultivating and investing in the area’s other economic assets.

Wally Johnson, Sweetwater County Commissioner, reported in an interview that Rock Springs was considered as a site for a major Wal-Mart distribution center in 2004. Because the project required improvements to the city’s water infrastructure that the city could not take on (until the passage of a voter-approved sales tax increase in 2006), the project went to northern Utah, along with an estimated 300 jobs.<sup>111</sup>

Another concern is the potential negative impact of high hotel occupancy rates on the tourism industry. A 2007 lodging survey, the Rocky Mountain Lodging Report, found Rock Springs occupancy rates well in excess of statewide averages in Rock Springs and other energy boom towns.<sup>112</sup> The lack of available short-term lodging could detract from the quality of tourist experiences.

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## CONCLUSIONS

Wyoming, both historically and today, is more reliant on fossil fuel extraction to sustain its economy and tax base than any other state in the Intermountain West. And while history has not looked favorably on Wyoming's ability to weather recessions, Wyoming still has an opportunity to diversify its economy and become more economically resilient.

Fossil fuel extraction and specialization seen during energy booms provide a number of benefits: rapidly increasing revenue, significant cash reserves, low unemployment, and the ability to fund specific goals such as increased state support for education.

But even during an energy development surge, Wyoming faces its share of challenges. Recent activity increased business expenses and the cost of living, dominated the labor supply, siphoned workers from other sectors, and made it more difficult to diversify the economy.

At the local level, Sweetwater County has experienced rapidly increasing social and capital costs that are beyond its current ability to meet despite the county's best efforts. Counties such as Sweetwater are a major source of the state's fiscal surplus, but they are not receiving adequate support from the state to offset energy production impacts.

Wyoming and Sweetwater County's dilemma is this: fossil fuel extraction brings short-term benefits, but has failed to yield long-term prosperity and now is limiting the ability to find other paths to wealth.

Can Wyoming and local governments look beyond the short-term benefits to secure a more stable and prosperous economic future? We think so and offer the following recommendations.

1. Target tax incentives to exploration and capture more revenue from the production phase of energy development. As in Alaska, Wyoming's closest energy-producing peer-state in terms of dependence on minerals for revenue, this would result in new, and timely, revenue to mitigate local impacts and support increased investment in more lasting forms of economic activity without affecting industry activities in the state.
2. Direct more state revenue to counties and communities where extraction takes place to redefine the terms of their relationship to energy development. This investment would enable local governments to do a better job of protecting communities and neighboring landscapes from the damaging aspects of the resource development.
3. Use energy revenue to spark economic diversification. Investing in infrastructure, education and renewable energy, for example, will broaden income generation across a variety of sectors and increase the economy's resilience while positioning the state and local areas for stronger long-term growth.
4. Protect Wyoming's quality of life. Safeguarding air and water quality, hunting grounds and access, view sheds, and safe communities will pay dividends. For example, Wyoming has an innovative higher education program, but its impact is lessened significantly because so many young graduates leave the state.

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## APPENDIX 1

### NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM (NAICS) DEFINITIONS

The language below is copied verbatim from the U.S. Census Bureau's 2002 NAICS Manual  
<http://www.census.gov/epcd/naics02/index.html>

#### **211 Oil and Gas Extraction**

Industries in the Oil and Gas Extraction subsector operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing, and equipping wells; operating separators, emulsion breakers, desilting equipment, and field gathering lines for crude petroleum and natural gas; and all other activities in the preparation of oil and gas up to the point of shipment from the producing property. This subsector includes the production of crude petroleum, the mining and extraction of oil from oil shale and oil sands, and the production of natural gas, sulfur recovery from natural gas, and recovery of hydrocarbon liquids.

Establishments in this subsector include those that operate oil and gas wells on their own account or for others on a contract or fee basis. Establishments primarily engaged in providing support services, on a fee or contract basis, required for the drilling or operation of oil and gas wells (except geophysical surveying and mapping, mine site preparation, and construction of oil/gas pipelines) are classified in Subsector 213, Support Activities for Mining.

#### **213111 Drilling Oil and Gas Wells**

This U.S. industry comprises establishments primarily engaged in drilling oil and gas wells for others on a contract or fee basis. This industry includes contractors that specialize in spudding in, drilling in, re-drilling, and directional drilling.

#### **213112 Support Activities for Oil and Gas Operations**

This U.S. industry comprises establishments primarily engaged in performing support activities on a contract or fee basis for oil and gas operations (except site preparation and related construction activities). Services included are exploration (except geophysical surveying and mapping); excavating slush pits and cellars, well surveying; running, cutting, and pulling casings, tubes, and rods; cementing wells, shooting wells; perforating well casings; acidizing and chemically treating wells; and cleaning out, bailing, and swabbing wells.

#### **2121 Coal Mining**

This industry comprises establishments primarily engaged in one or more of the following: (1) mining bituminous coal, anthracite, and lignite by underground mining, auger mining, strip mining, culm bank mining, and other surface mining; (2) developing coal mine sites; and (3) beneficiating (i.e., preparing) coal (e.g., cleaning, washing, screening, and sizing coal).

#### **213113 Support Activities for Coal Mining**

This U.S. industry comprises establishments primarily engaged in providing support activities for coal mining (except site preparation and related construction activities) on a contract or fee basis. Exploration for coal is included in this industry. Exploration includes traditional prospecting methods, such as taking core samples and making geological observations at prospective sites.

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## ENDNOTES

- <sup>1</sup> Headwaters Economics, “Energy Development and the Changing Economy of the West,” published online: <http://www.headwaterseconomics.org/energy/>, 2008.
- <sup>2</sup> Share of total personal income from: U.S. Bureau of Economic Analysis, Regional Economic Information System (BEA REIS) 2006 CD, Table CA05N; Share of employment in 2006 from BEA REIS 2006 CD Table CA25N.
- <sup>3</sup> Federal Reserve Bank of New York, “[Benefits of Trade](#),” The Basics of Foreign Trade and Exchange, September 4, 2002 (September 13, 2002). E.E. Malizia and K. Sahnzi, “The influence of economic diversity on unemployment and stability.” *Journal of Regional Science* 33:2 (2006), 221-235. P.B. Siegel, T. G. Johnson, and J. Alwang, “Regional economic diversity and diversification.” *Growth and Change* 26:2 (2006), 261-284.
- <sup>4</sup> Mark Harris, “Is Wyoming’s Economy Diversifying and Is Economic Diversity in Wyoming Desirable?” (online report), Wyoming Department of Employment, Research & Planning, 2002. <http://www.doe.state.wy.us/lmi/0902/a1.htm#1>.
- <sup>5</sup> According to the report, the methodology is adapted from Tim R. Smith, “The Relationship between the Tenth District Economy and the National Economy”, Federal Reserve Bank of Kansas City Economic Review Fourth Quarter 1996, 81, no. 4 (1996): 77-90. <http://www.kc.frb.org/publicat/econrev/pdf/4q96smit.pdf>.
- <sup>6</sup> Buck McVeigh, Economic Analysis Division, Wyoming State Government, “And the boom goes on....” (Presentation to the Amer. Assoc. of Petroleum Geologists, Rocky Mountain Section, Billings, Montana, June 11, 2006).
- <sup>7</sup> This information is discussed in the context of the West in our companion report. Headwaters Economics, “Energy Development and the Changing Economy of the West,” 2008.
- <sup>8</sup> U.S. Bureau of the Census, 2000 SF3 Table P49. See also, Headwaters Economics, “A Socioeconomic Profile: Wyoming (2008)” published online: <http://www.headwaterseconomics.org/energy>, page 23.
- <sup>9</sup> Chart based on data and concept provided by Wenlin Liu, Wyoming Economic Analysis Division, State of Wyoming. Net Migration was derived by Wyoming Economic Analysis Division based on U.S. Census Bureau’s population estimation and vital statistics from State of Wyoming Department of Health.
- <sup>10</sup> Ibid.
- <sup>11</sup> U.S. Bureau of the Census, Population Estimates. “1981 to 1989 Intercensal Estimates of the Resident Population of States, and Year-to-Year Components of Change, Sept. 1995” published online: <http://www.census.gov/popest/archives/1980s/8090com.txt>, U.S. Bureau of the Census, “ST-99-7 State Population Estimates and Demographic Components of Population Change: Annual Time Series, April 1, 1990 to July 1, 1999” published online: <http://www.census.gov/popest/archives/1990s/ST-99-07.txt>, U.S. Bureau of the Census, “Population, Population change and estimated components of population change: April 1, 2000 to July 1, 2008 (NST-EST2008-alldata)” published online: <http://www.census.gov/popest/datasets.html>. See also Headwaters Economics, “A Socioeconomic Profile: Wyoming (2008), page 4.
- <sup>12</sup> Ibid.
- <sup>13</sup> Wyoming Department of Employment, Research and Planning, “Demographic Effects of Wyoming’s Energy-Related Expansion.” *Wyoming Labor Force Trends*, 44: 4 (2007), 3.
- <sup>14</sup> Ibid, 4.
- <sup>15</sup> Ibid.
- <sup>16</sup> BEA REIS 2006 CD.
- <sup>17</sup> Ibid.
- <sup>18</sup> BEA REIS 2006 CD, Table CA30.

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- <sup>19</sup> Ibid.
- <sup>20</sup> Ibid.
- <sup>21</sup> Ibid.
- <sup>22</sup> Another illustration of the tie between wages and specialization is available in Mark Harris, “Is Wyoming’s Economy Diversifying and Is Economic Diversity in Wyoming Desirable?” (online report), Wyoming Department of Employment, Research & Planning, 2002. <http://www.doe.state.wy.us/lmi/0902/a1.htm#1>.
- <sup>23</sup> BEA REIS, 2006 CD, Table CA05N. For more information about mining’s relative economic performance see Headwaters Economics, “Energy Development and the Changing Economy of the West,” 12-17.
- <sup>24</sup> R. Rasker, et. al., “The Economic Importance of Air Travel In High-Amenity Rural Areas” (2008) article manuscript available online: [http://www.headwaterseconomics.org/3wests/Rasker\\_et\\_al\\_2009\\_Three\\_Wests.pdf](http://www.headwaterseconomics.org/3wests/Rasker_et_al_2009_Three_Wests.pdf)
- <sup>25</sup> BEA REIS, 2006 CD, Table CA25.
- <sup>26</sup> BEA REIS, 2006 CD, Table CA05N.
- <sup>27</sup> The average service industry wage in Colorado in 2006 was \$42,258 as compared with \$29,660 in Wyoming. Bureau of Labor Statistics, Quarterly Census of Employment and Wages (QCEW)
- <sup>28</sup> Ibid.
- <sup>29</sup> **Oil Production:** U.S. Department of Energy, Energy Information Administration, “Crude Oil Production by State, Annual-Thousand Barrels” ([http://tonto.eia.doe.gov/dnav/pet/pet\\_crd\\_crpdn\\_adc\\_mbb1\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_crd_crpdn_adc_mbb1_a.htm)). **Oil Price:** Energy Information Administration, “Domestic Crude Oil First Purchase Price by Area (Dollars per Barrel), 1987-2007” ([http://tonto.eia.doe.gov/dnav/pet/pet\\_pri\\_top.asp](http://tonto.eia.doe.gov/dnav/pet/pet_pri_top.asp)) **Natural Gas Production:** Energy Information Administration, Natural Gas Gross Withdrawals and Production by State (Volumes in Million Cubic Feet), [http://tonto.eia.doe.gov/dnav/ng/ng\\_prod\\_sum\\_dcu\\_NUS\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_prod_sum_dcu_NUS_a.htm). 2007 natural gas production figures from Wyoming Oil and Gas Conservation Commission, County Statistics <http://wogcc.state.wy.us/StatisticsMenu.cfm?Skip=%27Y%27&oops=49> **Natural Gas Price:** Energy Information Administration, “Natural Gas City Gate Price in Wyoming (Dollars per Thousand Cubic Feet), 1987-2007” (<http://tonto.eia.doe.gov/dnav/ng/hist/n3050wy3m.htm>)
- <sup>30</sup> For total state and local government revenues, see: U.S. Census Bureau, Census of Governments, “State and Local Government Finances by Level of Government and by State, 1996-2006,” (<http://www.census.gov/govs/www/estimate06.html>). State of Wyoming revenue information: Wyoming Department of Revenue Annual Reports (<http://revenue.state.wy.us/>); Wyoming State Government Revenue Forecast, January 2009, State of Wyoming Consensus Revenue Estimating Group (CREG) (<http://eadiv.state.wy.us/creg/>); Wyoming Trust Land and Investments Office Annual Reports (<http://slf-web.state.wy.us/>); State of Wyoming Treasurer’s Office Annual Reports (<http://treasurer.state.wy.us/publications.asp>).
- <sup>31</sup> Ibid.
- <sup>32</sup> Production Value: see note 29 above. Revenue: see note 30 above.
- <sup>33</sup> Specific tax incentives at the state level, such as lowered rates for certain types of wells, as well as the site of drilling (public versus private land) affect revenue collections, and by extension, effective tax rate, from year to year.
- <sup>34</sup> S. Western, 2009. “Does Wyoming Get Enough for Its Mineral Riches? Severance Tax Reform in the Cowboy State.” Online Report. February 8, 2009. [http://www.wyofile.com/reform\\_wyoming\\_severance\\_tax.htm](http://www.wyofile.com/reform_wyoming_severance_tax.htm)
- <sup>35</sup> S. Gerking, W. Morgan, M. Kunce, and J. Kerkvliet, 2000. “Mineral Tax Incentives, Mineral Production and the Wyoming Economy,” Report prepared for the Mineral Tax Incentives Subcommittee, Wyoming State Legislature. Published online: <http://eadiv.state.wy.us/mtim/StateReport.pdf> and, M. Kunce, S. Gerking, W. Morgan, and R. Maddux, 2001. “State Taxation, Exploration, and Production in the U.S. Oil Industry, report prepared for the Wyoming State Legislature.” Published online: <http://legisweb.state.wy.us/2001/interim/app/reports/oiltaxpaper%2011-26-01.pdf>.
- <sup>36</sup> Headwaters Economics, 2008. “Energy Revenues in the Intermountain West.”

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- <sup>37</sup> Production Value: see note 29 above. Revenue: see note 30 above.
- <sup>38</sup> General fund revenue is the sum of direct severance tax distributions, income distributions from the Permanent Mineral Trust Fund, and other miscellaneous distributions (e.g., the general fund receives a distribution from revenue generated on state trust lands).
- <sup>39</sup> Local school revenue is the sum of property taxes collected directly by school districts and distributions to state education funds including the Common Schools Permanent and Income funds, state aid to school districts capital construction and school foundation.
- <sup>40</sup> See note 30.
- <sup>41</sup> See note 30.
- <sup>42</sup> This category is the sum of collections and distributions to local governments where extraction takes place and to agencies with direct responsibility for regulating and monitoring the oil and natural gas industries.
- <sup>43</sup> BEA REIS, 2006 CD, Table CA30.
- <sup>44</sup> Sweetwater is one of just 14 out of a total 416 Western counties that depend on federal lands for more than 80% of total forage for ranching. U.S. Department of Agriculture, Economic Research Service, *Ag Outlook*, “Emerging Uses of Public Lands in the West,” *Ag Outlook* (June-July 2002), 4. Accessed online 4/2/2008, <http://www.ers.usda.gov/publications/agoutlook/JuneJuly2002/ao292g.pdf>
- <sup>45</sup> Total county population 41,575 in Jan. 2006. Sweetwater County Economic Development Association, “About Sweetwater County, Wyoming: 2007 Demographics” Accessed online 4/2/2008, <http://www.sweda.net/PDF/Demographics.pdf>.
- <sup>46</sup> T. LaTourrette, et. al., 2003. *Assessing Natural Gas and Oil Resources: an example of a new approach in the Greater Green River Basin*. Rand Corporation, (page xvi). Accessed online, 4/2/2008: [http://rand.org/pubs/monograph\\_reports/MR1683/MR1683.sum.pdf](http://rand.org/pubs/monograph_reports/MR1683/MR1683.sum.pdf).
- <sup>47</sup> “The Rawlins Pilot Office is seeing a significant increase in natural gas development, both conventional and coalbed natural gas (CBNG), and to a lesser extent, oil development in the central and eastern portions of the Green River Basin. Reasonable foreseeable development scenarios project 8,000–9,000 wells. The office is currently processing right-of-way applications and completing environmental impact statements for three proposed large-diameter natural gas pipelines.” BLM online description of Pilot Office program, [http://www.blm.gov/wo/st/en/prog/energy/oil\\_and\\_gas/pilot\\_project/rawlins\\_pilot\\_yr2.html](http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/pilot_project/rawlins_pilot_yr2.html).
- <sup>48</sup> “Hiawatha not done: Questar asks permission to expand drilling” *Craig Daily Press* (Craig, CO), April 4, 2008.
- <sup>49</sup> Headwaters Economics, “A Socioeconomic Profile: Sweetwater County, WY” (2008). Published online: <http://www.headwaterseconomics.org/energy>.
- <sup>50</sup> A. Blevins, et. al., “Social and Economic Impact Assessment of Oil and Gas Development in Sublette and Sweetwater Counties, for Shell Exploration & Production Company,” Laramie: University of Wyoming Sociology Department, 2004: 9. See also Samuel Western, *Pushed off the Mountain, Sold Down the River: Wyoming’s Search for its Soul*. Moose, WY: Homestead Publishing, 2002: 72.
- <sup>51</sup> U.S. Bureau of Land Management (BLM), Energy Policy and Conservation Act Fact Sheet, 2006. Published online: [http://www.blm.gov/nhp/spotlight/epca/EPCA\\_fact\\_sheet\\_draft06.htm](http://www.blm.gov/nhp/spotlight/epca/EPCA_fact_sheet_draft06.htm).
- <sup>52</sup> U.S. EIA, “Greater Green River Basin Oil and Gas Fields by 2001 Gas Reserve Class” (Map, 2001). Published online: [http://www.eia.doe.gov/pub/oil\\_gas/natural\\_gas/analysis\\_publications/maps/GGR\\_GAS.pdf](http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/maps/GGR_GAS.pdf)
- <sup>53</sup> U.S. BLM, Energy Policy and Conservation Act Fact Sheet, 2006.
- <sup>54</sup> Wyoming Oil and Gas Commission, Production by Basin statistics (<http://wogcc.state.wy.us/Basins2.htm>).
- <sup>55</sup> Value data is limited to 2007 as 2008 price data was not available at time of writing.
- <sup>56</sup> Blevins et. al., ‘Social and Economic Impact Assessment,’ 31.
- <sup>57</sup> On the Pinedale Anticline, energy companies were granted 98 percent of the exemptions from regulations designed to protect wintering big game animals on federal lands, a precedent that may have been excellent for workers and profits, but that guarantees controversy as the industry attempts to extend this precedent. H.

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- Herring, “Oil & Gas Symposium: Montana Cannot Become Another Wyoming” (Article on NewWest.net blog) Jan. 22, 2008. (<http://www.newwest.net/>)
- <sup>58</sup> The preferred alternative for the Jonah infill project in the BLM’s 2005 Record of Decision (ROD)—which increases the number of existing wells by a factor of 8—opted for a construction rate of 250 wells per year rather than the minimum 75 per year. According to BLM projections, this is the difference between a 12.5 and 40 year life of project. U.S. BLM, “Record of Decision: Jonah Field Infill Drilling Project, Sublette County, Wyoming,” (2005), Sect. 4.3 pp. 105 – 109. In the pending proposal to expand activities in the Pinedale Anticline, by a factor of about 6, the industry has advocated a rate of development in which the number of workers associated with well development would peak in 2009 and decline to zero in 2025. For the next 40 years, estimates are that the Pinedale Anticline would support as few as 300 workers to maintaining and operate the wells.
- <sup>59</sup> Wyoming Oil and Gas Commission, Production by Basin statistics.
- <sup>60</sup> Ibid.
- <sup>61</sup> BEA REIS, 2006 CD, Table CA30.
- <sup>62</sup> Ibid.
- <sup>63</sup> It is possible that this figure is misleadingly low—because it is based on census estimates and also because lack of housing, discussed later in this report, deters workers from establishing residency in the county.
- <sup>64</sup> BEA REIS, 2006 CD, Table CA30.
- <sup>65</sup> U.S. Bureau of the Census, 1990 and 2000.
- <sup>66</sup> Personal Income: BEA REIS, 2006 CD, Table CA05N and CA30; Employment: BEA REIS, 2006 CD, Table CA30.
- <sup>67</sup> Headwaters Economics, “Energy Development and the Changing Economy of the West,” 4.
- <sup>68</sup> BEA REIS, 2006 CD, Table CA05.
- <sup>69</sup> BEA REIS, 2006 CD, Table CA05N.
- <sup>70</sup> Headwaters Economics, “Energy Development and the Changing Economy of the West,” 7. (2006 data not available for Non-Metro West.)
- <sup>71</sup> Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW).
- <sup>72</sup> Ibid.
- <sup>73</sup> Ibid
- <sup>74</sup> Mineral property tax is based on the production value of minerals extracted in the county. For a complete description of mineral taxes in Wyoming, see page 16.
- <sup>75</sup> Ibid.
- <sup>76</sup> Ibid
- <sup>77</sup> Headwaters Economics Interview, Jul. 11, 2007.
- <sup>78</sup> Blevins et. al., 31.
- <sup>79</sup> Ibid, 33.
- <sup>80</sup> Headwaters Economics Interview, Jana Weber, local rancher, 7/10/2007.
- <sup>81</sup> Wyoming Economic Analysis Division, “Wyoming Incorporated Place Population Estimates, 2000 to 2007” (reporting U.S. Census Bureau data), <http://eadiv.state.wy.us/pop/SUB-07EST.htm>.
- <sup>82</sup> Headwaters Economics Interview, Pauline Carpenter, Wyoming Department of Family Services, 7/11/2007.
- <sup>83</sup> Headwaters Economics Interview, 12/04/2008.
- <sup>84</sup> U.S. Bureau of Labor Statistics.
- <sup>85</sup> Wyoming Community Development Authority, “2008 Wyoming Profile of Demographics, Economics and Housing, Semiannual Report, Ending June 30, 2008.”
- <sup>86</sup> Ibid.

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- <sup>87</sup> Wyoming Housing Database Partnership, “Final Report: August 2008,” 38.
- <sup>88</sup> Ibid.
- <sup>89</sup> “Hospital: Shortage of housing making it hard to recruit workers” *Casper Star-Tribune*, Nov. 4, 2006
- <sup>90</sup> “Developer moves houses to Rock Springs to accommodate demand,” *Casper Star Tribune*, Sept. 3, 2006
- <sup>91</sup> Headwaters Economics, Interview, Tex Boggs, President WWCC, Jul. 11, 2007 and “WWCC seeks property tax increase for dorms” *Casper Star-Tribune*, Oct. 20, 2008.
- <sup>92</sup> (Casper Star-Tribune, Nov 26, 2006)
- <sup>93</sup> Headwaters Economics Interview, June Schumaker, Rock Springs Housing Authority Director, Oct. 30, 2008.
- <sup>94</sup> Headwaters Economics Interview, Robb Slaughter, County Treasurer, Oct. 31, 2008.
- <sup>95</sup> Headwaters Economics Interview, Vess Walker, Director of Public Services, City of Rock Springs, Dec. 4, 2008.
- <sup>96</sup> “Developer moves houses to Rock Springs to accommodate demand,” *Casper Star-Tribune*, Sept 3, 2006.
- <sup>97</sup> “Wamsutter sees rapid growth” *Casper Star-Tribune*, Sept 21, 2008.
- <sup>98</sup> “BP plans to spend \$2.2B over 15 years in Wamsutter area,” *Casper Star-Tribune*, Oct 14, 2005.
- <sup>99</sup> As Governor Dave Freudenthal commented, the legislature “made a little gesture, but they made sure it wasn’t enough to do much.” (“Business council sets rules for housing loans” *Casper Star-Tribune*, Apr. 27, 2007). Opposition appears to have been largely ideological, with one legislator commenting that “We’ve been able to deal with these problems all these many, many years without sucking at the public trough.” (Sue Wallis, R-Recluse (Campbell County), quoted in “Workforce housing bill loses funds” *Wyoming Tribune-Eagle* Jan. 31, 2007).
- <sup>100</sup> “WCC seeks property tax increase for dorms” *Casper Star-Tribune* Oct 20, 2008.
- <sup>101</sup> Headwaters Economics Interview, Mike Lowell, Jul. 10, 2007.
- <sup>102</sup> *Casper Star-Tribune* Jun. 16, 2007.
- <sup>103</sup> “Police try to cope with growing crime from energy boom,” AP wire, Mar. 1, 2006.
- <sup>104</sup> *Casper Star-Tribune*, Aug. 13, 2007.
- <sup>105</sup> Headwaters Economics Interview, Linda Acker, Executive Director, Southwest Mental Health Services, Nov. 1, 2008.
- <sup>106</sup> Headwaters Economics Interview, June Schumaker.
- <sup>107</sup> Ibid.
- <sup>108</sup> Blevins et. al., 30.
- <sup>109</sup> Federal Bureau of Investigations (FBI), Uniform Crime Report data (Table 10), 2007.
- <sup>110</sup> Headwaters Economics Interview, Oct. 31, 2008.
- <sup>111</sup> Headwaters Economics Interview, Jul. 11, 2007.
- <sup>112</sup> Ehrhardt Keefe Steiner & Hottman, *The Rocky Mountain Lodging Report, Dec. 2007 (Wyoming edition)*. Accessed online: [http://www.wyomingbusiness.org/pdf/tourism/WY\\_Dec08.pdf](http://www.wyomingbusiness.org/pdf/tourism/WY_Dec08.pdf).



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