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

HEADWATERS ECONOMICS

SENATE TAXATION
EXHIBIT NO. 19
DATE 3.20.09
BILL NO. Na

Potential Impacts of Energy Development in Montana

With a Case Study of the Powder River Basin

No. 6 in a Series of 8 Reports

March 2009

Potential Impacts of Energy Development in Montana

With a Case Study of the Powder River Basin

Headwaters Economics

Bozeman, Montana

March, 2009

PUBLISHED ONLINE:

www.headwaterseconomics.org/energy

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.

HEADWATERS
ECONOMICS

P.O. Box 7059
Bozeman, MT 59771
406-599-7425
www.headwaterseconomics.org

Cover design and layout by Michael Cutter.

ABOUT THE *ENERGY AND THE WEST* SERIES

This report is the sixth 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 forthcoming 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
- U.S. Energy Needs and the Role of Western Public Lands
- Fossil-Fuel Extraction as a County Economic Development Strategy: The Performance of Energy-Focusing Counties in the West
- Energy Revenue in the Intermountain West: State and Local Taxes and Royalties from Oil, Natural Gas, and Coal
- Impacts of Energy Development in Colorado, with a Case Study of Mesa and Garfield Counties
- Impacts of Energy Development in Wyoming, with a Case Study of Sweetwater County
- Potential Impacts of Energy Development in New Mexico, with a Case Study of Otero County
- Potential Impacts of Energy Development in Montana, with a Case Study of the Powder River Basin

To access these reports, go to: www.headwaterseconomics.org/energy.

TABLE OF CONTENTS

Introduction 1
Questions Answered in this Report 1
Summary Findings 2
Methods 5
Study Area 5
How Does Fossil Fuel Energy Development Fit Into Today's Montana Economy? 7
Diversification 13
State Fiscal Contributions of Oil and Natural Gas Extraction 14
Production Value 16
Total Revenue 17
Effective Tax Rate 20
Volatility 21
Distribution of Oil and Natural Gas Revenue 22
Montana's Economic Development and Oil and Natural Gas Extraction Policies 25
Policy Context 25
Existing and Potential Fossil Fuel Extraction in Montana 26
Montana's Powder River Basin 27
Summary Findings 28
Case Study: Economic and Fiscal Potential of Coal Bed Methane Extraction in the Powder River Basin 29
Population 30
Employment and Personal Income 32
Wages by Industry Sector 34
Employment Benefits from CBM Extraction in the Powder River Basin 36
Fiscal Contributions of CBM to Montana 38
Current County Revenue 39
Timing of Revenue 46
Summary Findings 52
Conclusions 53
Appendix 1 54
Endnotes 55

INTRODUCTION

Montana's Governor, Brian Schweitzer, calls energy independence the most important issue of our time. Schweitzer's energy policy aims to position Montana as a leader in meeting U.S. and Montana's energy needs while also creating jobs and generating revenue for the state.[1] In recent years, federal energy policy has similarly encouraged oil and natural gas development on public lands in Montana and the West to meet energy independence goals.[2]

This report focuses on the economic and fiscal contributions of the oil and natural gas industries in Montana. It takes a close look at how oil and natural gas contribute to Montana's economy and the economic potential of new coal bed methane natural gas (CBM) extraction in the Powder River Basin. The report also examines the state's taxing and spending policies to assess how oil and natural gas extraction contribute to Montana's fiscal health.

In the 1990s and 2000s, Montana's economy grew and diversified significantly, thanks to growth in industries associated with the West's services and professional economy, and in non-labor income (e.g., retirement and investment income). More recently, the state's oil and natural gas industries experienced a surge in production resulting from higher commodity prices, new technology, and polices friendly to fossil fuel energy development.[3]

The recession that began in late 2008 is creating economic and fiscal hardship around the West. Recovering from this recession will require Montana to leverage its natural resource wealth—by capitalizing on public lands, rivers, streams, and open spaces as assets that make Montana an attractive place to live and do business and through sensible development policies that maximize the return on a one-time opportunity to extract non-renewable natural resources such as oil and natural gas.[4]

Montana's current oil and natural gas taxation polices do not maximize production or revenue to the state, particularly when compared to its neighbors in the Intermountain West. Taxing the oil and natural gas industries is important to ensure that state and local government have the resources necessary to facilitate and mitigate the impacts of extraction activities, and to replace wealth that is removed from Montana by the extraction of natural resources. Reforming how Montana invests and distributes revenue generated by extraction will maintain the quality of existing services and amenities, and promote long-term economic growth and fiscal health.

Questions Answered in this Report:

1. How does oil and natural gas extraction contribute today's Montana economy?
2. How does oil and natural gas extraction contribute to state and local government fiscal health?
3. What are the projected economic and fiscal contributions of coal bed methane extraction in Montana's portion of the Powder River Basin?

SUMMARY FINDINGS

Oil and natural gas extraction generates relatively few but high-paying jobs in Montana while the rest of the state's economy has grown and diversified significantly.

Montana's mining industries, including oil and natural gas, accounted for just 1.4 percent of all state employment in 2006 (down from 3.2 percent in 1970). Wages in the mining industry are among the highest in the state; although they account for only a small portion of all jobs these are important jobs for Montanan's.

The rest of Montana's economy generated more than 300,000 new jobs between 1970 and 2006 (from 301,000 to 637,000 jobs), and total personal income more than doubled. High-wage service-providing jobs now account for more than three times the number of high-wage mining jobs in the state.

These findings for Montana are consistent with two important West-wide trends: the economy of the West has grown and diversified in recent decades, and states are less reliant on resource extraction for jobs and income than in the past. The principal sources of prosperity in the region are now related to a modern service, or knowledge-based, economy, along with retirement and investment dollars.

Resource extraction industries are still important in some rural and isolated counties in Montana. Relying on oil and natural gas as an economic development strategy, however, creates challenges. Specialization in these sectors and impacts from extraction activities can leave local economies vulnerable to volatility and may lead to slower than average long-term growth.

Montana does not do a good job of managing the volatility of oil and natural gas tax revenue, placing government services at financial risk. In addition, incentives targeted at stimulating new production have not worked and have reduced tax revenue to Montana.

Oil and natural gas contributed $288 million in revenue to state and local governments in 2006, making up 4.3 percent of all government revenue in Montana. These are important revenues to the state. They are also inherently volatile because tax and royalty revenue are linked directly to the price of oil and natural gas.

Montana is the only state in the West that does not manage revenue volatility by investing a portion of production taxes into a permanent fund. Instead, the state uses production taxes to directly fund annual governmental operations on a pay-as-you-go basis. This exposes basic government services to the volatility of oil and natural gas prices.

Montana's production tax incentives (such as the first-year exemption and a reduced tax rate adopted in 1999) have not achieved the intended goal of stimulating additional exploration, drilling, and production in the state. As a result of misdirected incentives, Montana has forfeited over half a billion dollars in tax revenue between 2003 and 2007. In addition, the first-year exemption for newly completed wells introduces a revenue lag that makes it difficult for local

governments to provide critical local infrastructure and services to industry concurrent with exploration and drilling.

Reforming the tax structure to target incentives to exploration and drilling will better maximize production in Montana, and economic and fiscal returns for Montanans.

Coal bed methane extraction in the Powder River Basin will create few new jobs for Montanans. Tax and royalty revenue will accrue to Montana, but the state's tax policies reduce the total amount of revenue, expose the state to volatility unnecessarily, and do not direct revenue to local governments in a timely fashion.

The Bureau of Land Management's Resource Management Plan for the Powder River Basin in Montana forecasts 4,800 to 14,000 new coal bed methane wells in Big Horn, Powder River and Rosebud counties during the next twenty three years. Most of these new wells will be clustered along the state's southern border with Wyoming.

The employment and income benefits of this new development will be minor. The BLM projects that most of the new jobs will locate in Sheridan and Gillette, Wyoming where drilling and related service companies and their employees are already established.

Production taxes and royalties, unlike jobs, will accrue to Montana, generating an estimated $1.8 billion to $5.4 billion over 22 years (based on the BLM's low and high reasonably foreseeable development scenarios). Montana's existing tax policies significantly reduce the potential benefit of these tax dollars.

For example, the first-year exemption from state production taxes means revenue will not arrive in time to assist local government provide necessary infrastructure and services during the exploration and drilling phase of development. In the first year of production, revenue to Big Horn, Powder River and Rosebud counties combined will be only $300,000 to $900,000 (the combined budgets of these counties was over $23 million in 2007).

The lag between service demands and revenue collection will have significant impacts on local governments in the Powder River Basin which are not prepared to facilitate development without timely new resources (paving a single mile of county road costs upwards of $1 million).

Because Montana does not invest any production tax revenue into a permanent investment fund, counties, local schools, and the state's general fund will be exposed to annual volatility in the price of coal bed methane, putting essential government services at risk.

Taxing oil and natural gas production is important to ensure state and local government have necessary resources to facilitate and mitigate the impacts of extraction activities, and to replace wealth that is removed from Montana from the extraction of natural resources. Production tax incentives that were introduced in 1999 have worked to reduce and delay revenue collections in ways that undermine these two goals.

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.

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 and state government decision-makers and staff.

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).

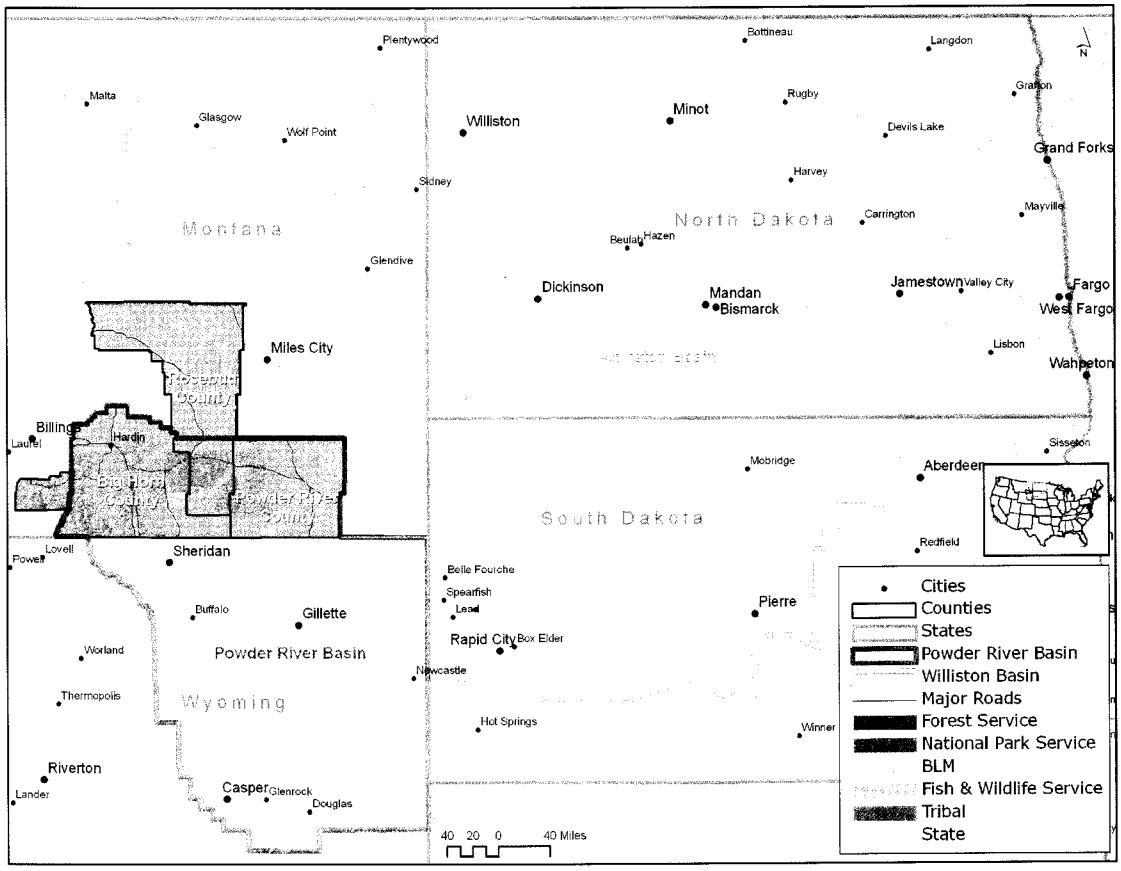
Study Area

This report profiles the state of Montana, with a case study of Big Horn, Powder River and Rosebud Counties located in the Powder River Basin in southeastern Montana. Montana has some oil and natural gas extraction currently, with significant potential for new drilling to occur in both the Powder River Basin and the Williston Basin in the northeast portion of the state.

Using the Economic Profile System (EPS), we produced detailed socioeconomic profiles for the three case study counties, an aggregate profile of the three-county area, and detailed state-level data.[5] These profiles are available for download from our web site: www.headwaterseconomics.org/energy. We also pursued custom queries of a number of databases to explore certain economic dynamics more fully.

Headwaters Economics' *Energy and the West* series includes four state-based reports, each with a county-level case study. Each report looks at a slightly different aspect of energy production in the West. This report uses the potential for significant new coal bed methane extraction in the Powder River Basin as a way of assessing how well Montana's current economic development and tax policies prepare the state to realize benefits from this new activity.

Map 1. Montana's Powder River Basin.



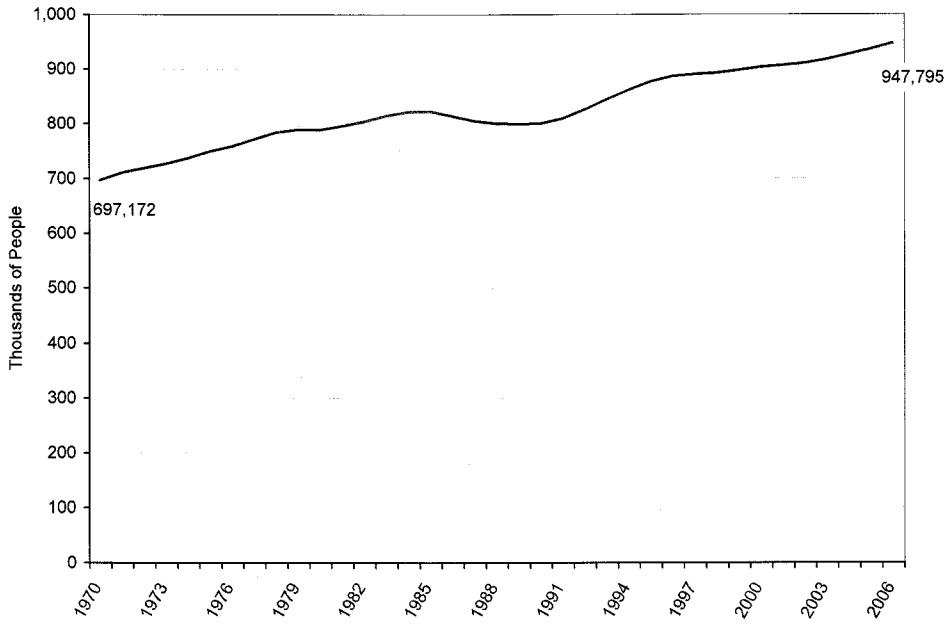
HOW DOES FOSSIL FUEL ENERGY DEVELOPMENT FIT INTO TODAY'S MONTANA ECONOMY?

To grasp the role of the current energy economy, and the potential contribution of projected oil and natural gas production for the state of Montana, it is useful to consider the broader economic history of the state over the past few decades. Here we provide a snapshot of key trends in demographics, employment and personal income, and diversification that offer a context for understanding the role of energy development at the state level. Later in this report, we profile the local economies of three Montana counties in the Powder River Basin to learn more about how communities may experience new oil and natural gas extraction.

Population

Montana's population grew steadily from 1970 to 2006, with the exception of the national recession and energy bust in 1982. Figure 1 shows that total population in Montana grew by 34 percent between 1970 and 2006, slightly slower on average than the nation (0.8% annually in Montana compared to 1.1% annually for the nation). The early 1990s saw population growth begin again and accelerate. In the 1990s alone, Montana added over 134,000 new people, and grew as fast as the nation (at an average annual rate of 1.1 percent).[6]

Figure 1: Population Growth in Montana, 1970–2006.[7]



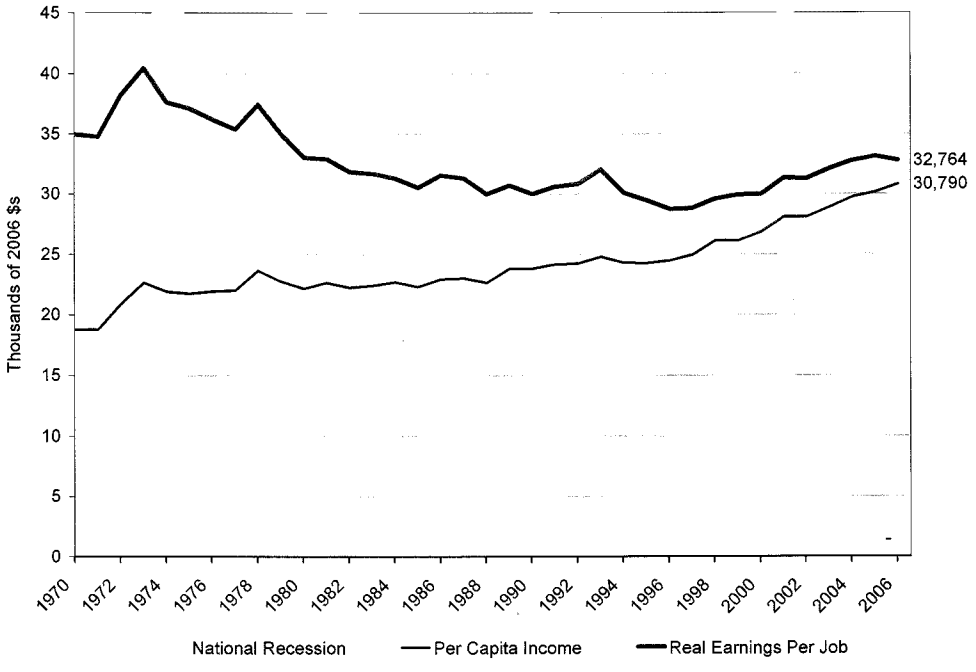
Employment and Income

From 1970 to 2006, the total number of jobs in Montana nearly doubled (more than 250,000 new jobs). Total personal income also nearly doubled, adding $10.8 billion in new personal income. Figure 2 shows that per capita income (dark blue line), adjusted for inflation, has increased steadily over time, but that real earnings per job (red line) began to grow only in the mid 1990s, after a long period of decline. (Vertical blue bars represent national recessions.) In 2006, state average earnings per job were $32,764, below the national average of $47,286.[8]

Montana is for the most part a rural state. The state's biggest county, Yellowstone County (Billings) has a population of less than 140,000. Compared to other Western states with large metropolitan areas (e.g., Denver in Colorado, Salt Lake City in Utah) Montana's economy does not appear strong. When compared to its rural peers—all Western counties with populations of 140,000 or less—Montana's economy is performing well.

From 1990 to 2005, Montana's rate of job growth was the same as the rest of the (small-sized) West (2.3% per year). The same is true for the rate of growth in real personal income (5% per year). Where Montana really excelled was in per capita income growth. While in the rest of the rural West, per capita income grew by 1.3 percent per year from 1990 to 2005 ($27,770 in 2005), Montana's grew by 5.7 percent per year ($29,015 in 2005). From 1990 to 2006, the average annual wage in Montana grew by 3.4 percent per year. In similarly sized peer counties in the West, the average annual growth was only 0.4 percent per year.[9]

Figure 2: Montana Earnings Per Job and Per Capita Income, 1970-2006.[10]



Montana's higher than average wages and faster income growth is largely due to growth in high-wage service industries in the western portion of the state. Montana's western communities with airports, universities, and access to public lands are outperforming eastern Montana's small cities and towns, and the rest of the small-sized West. We will discuss later in this report what Montana's diverse geography and uneven economic performance means for economic development and energy policy.

Performance by Industry Sector

Figures 3 and 4 show Montana's income trends by major industry sector for the period 1970 to 2000, and for 2006 (the break represents a change in way income data has been collected and reported at the industry level since 2001, from the Standard Industrial Classification System to the North American Industry Classification System, by government agencies). The fastest growing employment sectors were a mix of service and professional industries—jobs in these sectors generated 45 percent of all new personal income from 1970 to 2000, and amounted to 40 percent of total personal income in 2000. Non-labor income grew at a faster pace (56% between 1970 and 2006), and accounted for 34 percent of total personal income in 2006.[11]

Figure 3: Historical Trends in Personal Income by Source in Montana, 1970–2000 (SIC).[12]

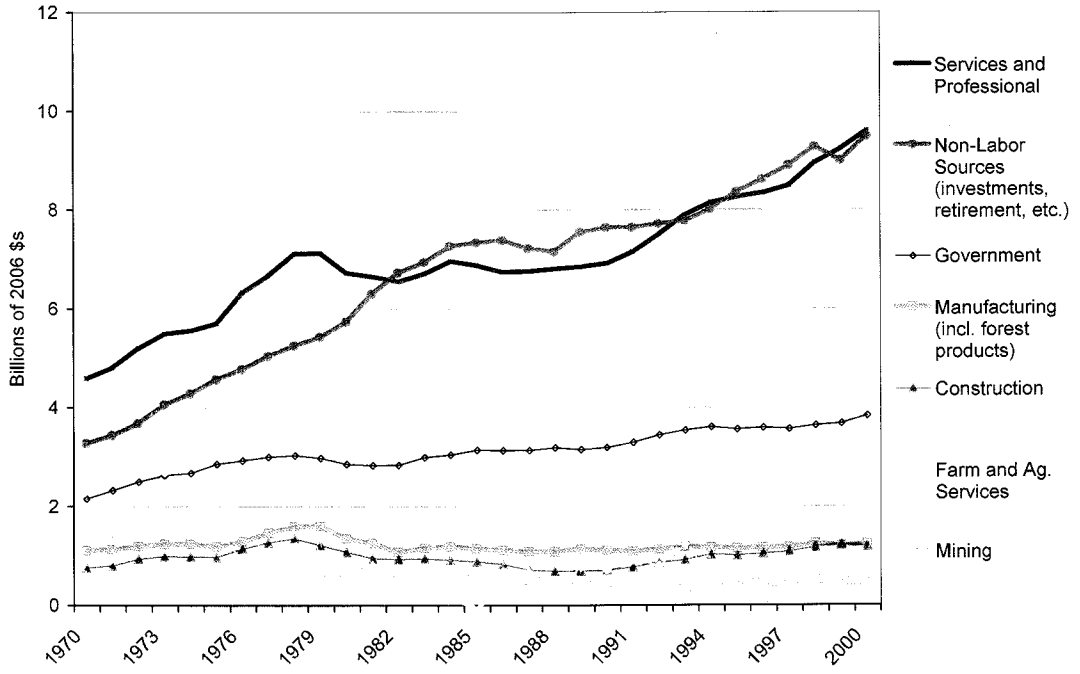
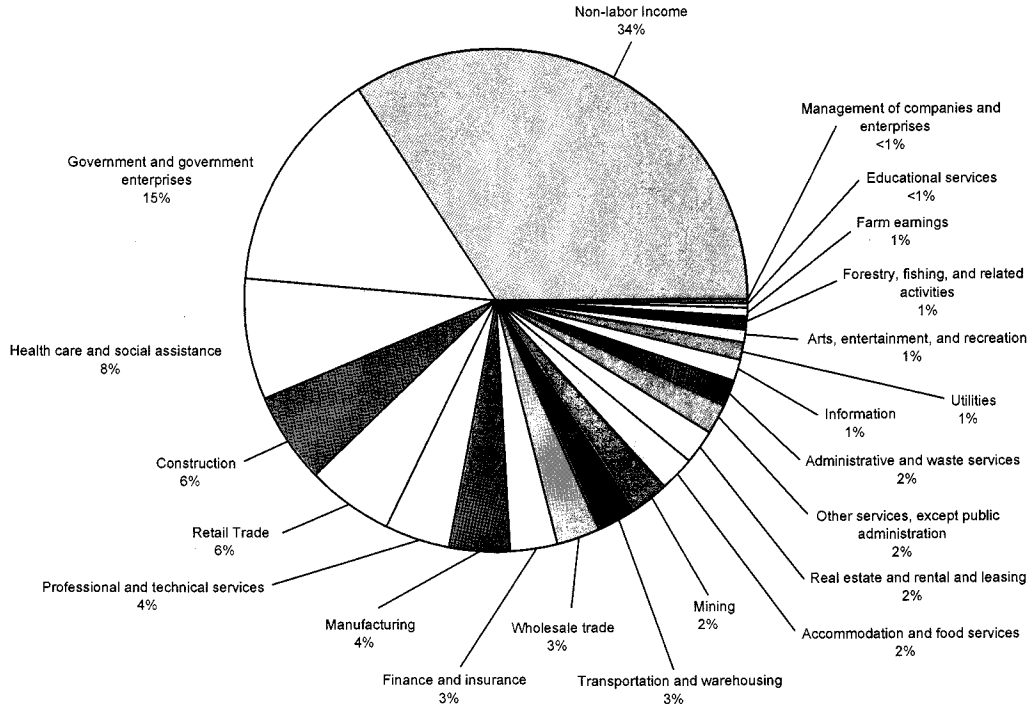


Figure 4: Sources of Personal Income in Montana, 2006 (NAICS).[13]



The mining sector, which includes energy development, declined in its relative importance between 1970 and 2000, accounting for 2.7 percent of total personal income in 1970 and 1.8 percent in 2000. Figure 4 shows that by 2006 the mining sector had grown slightly, accounting for 2 percent of personal income in Montana.

Energy development and other mining sectors are relatively volatile industries characterized by large swings, both upwards and downwards (much of the volatility in the oil and natural gas industries is due to changing commodity prices that have an effect on exploration and production activities). Since 1970, the industries in this sector have contributed a high of 4.1 percent of total personal income in 1981 and a low of 1.6 percent in 1998. While important, especially to local areas, mining and energy development constitute a small proportion of the overall Montana economy.[14] Only six of Montana's 56 counties can be described as "energy-focusing"—defined as counties with 7 percent or greater of total employment in energy production.[15] In the entire West, the proportion of energy-focusing counties is even lower at just six out of every 100 counties.

These findings for Montana are consistent with two important West-wide trends. The economy of the West has grown and diversified in recent decades and, with only a few exceptions (most notably Wyoming), has made a transition away from a heavy reliance on resource extraction. The principal sources of prosperity in the region are now related to a modern service, or knowledge-based, economy, and retirement and investment dollars.

The economic role of public lands has also changed since the 1970s. Rather than simply serving as a repository of raw materials to be extracted, today's public lands play an important role by providing recreational opportunities and scenery that attract and retain a growing population and businesses increasingly free to choose their location.

To put the changing economic role of public lands in perspective, it helps to see what proportion of the West's economy relies on industries that, at least in part, depend on various uses of public lands. Activities normally associated with various uses of public lands—travel and tourism, mining (including oil and natural gas development), and the timber industry—constitute approximately 7 percent of all jobs in the West (using 2006 numbers, the latest available). Ninety-three percent of employment, by contrast, has no direct link to the use of public lands.[16] For more on the changing competitive position of the economy and public lands in the West, see our companion report *Energy Development and the Changing Economy of the West.*[17]

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.)

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.

Wages by Industry

Earnings per job and per capita income have risen in Montana since the mid 1990s. The growth of higher-paying service industries, and retirement and investment income account for most of this increase, particularly before 2001.[18] In the last few years, new mining jobs have helped boost already growing wages in the state. Table 1 shows wages by industry for major industries in 2006. The employment and wage figures only count wage and salary employees (i.e., not proprietors) and exclude the value of benefits such as health care. Sectors with wages that are 20 percent above or 20 percent below the average wages across all sectors are marked by green and red highlighting respectively.

Table 1: Wages and Employment by Sector in Montana, 2006 (NAICS).[19]

	Employment	% of Total	Average Annual Wages
Total Private & Public	426,182	100%	30,596
Total Private	346,275	81%	29,386
Goods-Producing	62,030	15%	
Natural Resources and Mining	11,726	3%	
Agriculture, forestry, fishing & hunting	4,430	1%	27,844
Mining	7,296	2%	
Construction	30,136	7%	35,400
Manufacturing (Incl. Forest Products)	20,168	5%	
Service-Providing	284,245	67%	27,270
Trade, Transportation, and Utilities	86,444	20%	28,412
Information	7,736	2%	
Financial Activities	22,008	5%	
Professional and Business Services	38,016	9%	32,760
Education and Health Services	57,184	13%	32,412
Leisure and Hospitality	56,759	13%	12,484
Other Services	15,833	4%	20,971
Unclassified	266	0.06%	
Total Public	79,907	19%	35,841
Federal Government	13,488	3%	
State Government	21,697	5%	
Local Government	44,722	10%	29,648

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

Table 1 shows that mining, which includes energy development, pays the highest average wages in the state at $64,905. In 2006, mining accounted for 2 percent of wage and salary jobs. Montana has also cultivated higher-paying service jobs, such as financial services ($38,821 annual wage with 22,008 employees), information services ($37,439 annual wage with 7,736 employees), and professional and business services ($32,760 annual wage with 38,018 employees). Overall,

high-wage services account for more than nine times the number of jobs in mining. The federal and state government also pay significantly higher than average wages ($54,569), with 35,000 employees in 2006.[20]

Many of Montana's jobs are in low-paying service sectors which are often part time and/or seasonal, notably leisure and hospitality services ($11,826 annual wage with 56,759 employees). Local governments are also a major employer in Montana (e.g., local police, road departments, planners, and county government staff), and these jobs too provide lower than average wages ($29,648 annual wage with 44,722 employees).[21]

High-wage jobs account for a small portion of total jobs in Montana. This suggests that Montana should encourage high-wage jobs in all industries. As we discuss later, oil and natural gas extraction needs to be pursued in a way that can co-exist with the high-wage services sectors. If environmental amenities attract knowledge-based workers (engineers, architects, etc.) then mining and oil and natural gas extraction should not degrade these qualities if Montana's economy is to continue to diversify.

Diversification

One key to long-term economic prosperity is broadening the diversity of economic sectors. Sector diversity supports economic resilience, especially when a leading economic sector declines, and allows economies to adapt more successfully to changing competitive pressures.[22] Montana's economy has been vulnerable to volatility in single industries in the past, though it is more diverse today. For example, the national recession of the early 1980s and the corresponding energy bust resulted in stalled economic growth West-wide and in Montana during the middle years of that decade.

Growth of service-related occupations, and retirement and investment income in the 1990s—driven in large part by the shifting competitive advantage of the U.S. economy and Montana's success at attracting and competing for a portion of these high skill jobs and income—account for this growth and industry diversification. In 2005, the Federal Reserve's Industrial Structure Index score for Montana was 16.51, better than Wyoming (132.56) and New Mexico (22.83), but behind Colorado (4.74) and Utah (2.33). A lower score means the state's economy more closely resembles that of the nation, which is a benchmark for industry diversity. A higher score indicates greater variance from the U.S. industry mix and points to single-industry dependencies.[23]

Compared to the U.S., Montana has more low-wage jobs in agriculture, forestry, fishing and hunting, and accommodation and food service as a portion of total jobs. The U.S. has proportionally more jobs in high-wage manufacturing and professional, scientific, and technical services. Montana does have many more high-wage mining jobs as a share of total. This is largely a reflection of the very small contributions of mining to the national economy—only three-tenths of one percent of all jobs nationally. As we illustrated earlier, mining is still a small sector in Montana, too.[24]

Economic diversification should increase the proportion of high-wage jobs in sectors where Montana is underrepresented, without compromising the state's existing strengths. As we have

shown, Montana's economy is beginning to show signs of diversification, more so than the state's rural peers, but not yet on par with the West's large metropolitan centers. Montana's trajectory is toward a more diverse and skilled economy, but it has a ways to go.

As this report shows in the next section, the economic growth and diversification that Montana has enjoyed in the last 20 years also means the state has a more diverse tax base. Even with recent increases in energy prices and new drilling, revenue from oil and natural gas amounts to a small portion of the state's total tax revenues (4.3 % in 2006).

State Fiscal Contributions of Oil and Natural Gas Extraction

Fossil fuel energy development entails the one-time removal of a valuable, non-renewable natural resource from the ground. Taxes on extracted resources enable state and local government to accomplish two objectives directly related to fossil fuel extraction:

- fund government provision of support services, infrastructure, and oversight for energy development along with impact mitigation;
- provide seed funds for investments that can help to replace wealth from resource extraction with future economic opportunities, including economic diversification.

In addition to these purposes, oil and natural gas tax and royalty revenue is also used to support basic government services at the state and local level (e.g., state and local government general fund activities) and education (royalties from state lands are used to fund the state's public schools).

What are the elements of a best-case energy tax scenario? Revenue should be sufficient, and arrive in the time and form necessary, to enable local government to keep pace with demands on infrastructure and services. In addition, the structures for distribution and investment of energy revenue should be designed and operated with promoting long-term economic competitiveness in mind. The depletion of non-renewable resources removes wealth from Montana, and tax revenue should be applied to generating new wealth by investing in Montana's citizens and businesses. We apply these two criteria to assessing how well Montana's tax policies perform.

This section profiles Montana's tax structure and revenue from oil and natural gas, and how the state distributes money to state funds, local schools, and county governments. It concludes that Montana's tax structure

- unnecessarily exposes government services to volatility in the oil and natural gas sector
- artificially delays the timing of revenue (when revenue is received), a concern of particular importance for local governments
- is not equivalent with its neighbors, losing money for Montana that could be invested in economic development opportunities.

This report also concludes that the state can fix these issues without risk of losing jobs or production in the state.

Tax Policy Primer: Basic Terms and How Montana Taxes Energy Resources

Energy Revenue

Refers to taxes and royalties paid to federal, state and local governments that are derived directly from the extraction of oil, natural gas, and coal. The majority of energy revenue comes from production and severance taxes, state and federal royalties, each linked directly to the production value of extracted energy resources.

Production Value

Energy revenue is generated from taxes and royalties levied against the production value of oil, natural gas, and coal extraction. Production value is the sum of the price and the production volume, and can vary dramatically from year to year.

Production Taxes

Production taxes are taxes on the value of oil and natural gas extracted or severed, from the earth. Montana levies several production taxes including the oil and natural gas production tax and Resource Indemnity Tax. The oil and natural gas production tax rate is about 9 percent of production value.

Montana grants a number of deductions and incentives against the base tax rate, including standard deductions for transportation and processing costs and mineral royalties. Montana also has a first year incentive that lowers the production tax to less than one percent for 12 or 18 months depending on the type of well. The first year incentive reduces the effective tax rate and exaggerates the volatility of tax revenue in Montana.

Production value of oil and natural gas in Montana is highly volatile, and so too is tax revenue from these commodities.

Property Taxes

Montana is the only state in the West that does not charge a property tax on oil and natural gas, eliminating the lag in revenue generated from these highly volatile resources.

Federal and State Royalties

Royalties are "production" taxes paid to the land owner, including federal and state governments, Indian tribes, and private individuals. Federal and state royalties on oil and natural gas are 12.5 percent on production value. Roughly half of federal royalties are returned to the state where drilling takes place. Royalty figures include bonuses paid through the competitive leasing process (a premium paid by a company to win a leasing contract to drill in a specific area) and fees or rents paid to maintain a lease.

Corporate Income Taxes

The oil and gas industry also pays corporate taxes on net profits. Montana does not have a sales tax.

Effective Tax Rate

The effective tax rate is a ratio of tax revenue to production value:

$$\frac{\text{Production Value}}{\text{Tax Revenue}} = \text{Effective Tax Rate}$$

The effective tax rate measures the proportion of production value captured as tax revenue, after all exemptions, deductions, and incentives are accounted for. The effective tax rate is calculated using production taxes (including severance) and royalties. (Corporate income taxes are omitted because they are not directly based on production value, in other words, they have a different numerator).

Production Value

Oil and natural gas taxes and royalties are levied against production value. This section shows how Montana's production value has changed over time, and how Montana compares to other energy-producing states in the Intermountain West.

Figure 5: Oil and Natural Gas Production Value in Colorado, Montana, New Mexico, North Dakota, Utah, and Wyoming, 1981-2007.[25]

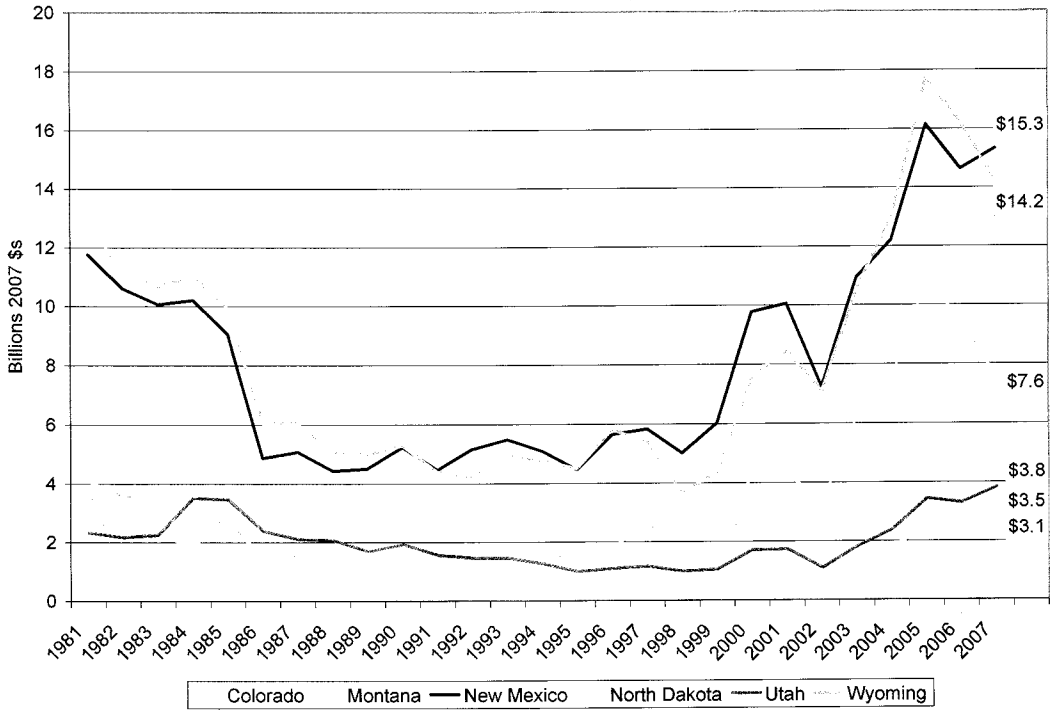


Figure 5 shows that oil and natural gas extraction (including coal bed methane) in Montana in 2007 was valued at $3 billion. Only North Dakota had lower production values in 2007 at $2.9 billion in the same year.

Figure 6: Production Value of Oil, Natural Gas, and Coal in Montana, 1981-2007 (2007 dollars).[26]

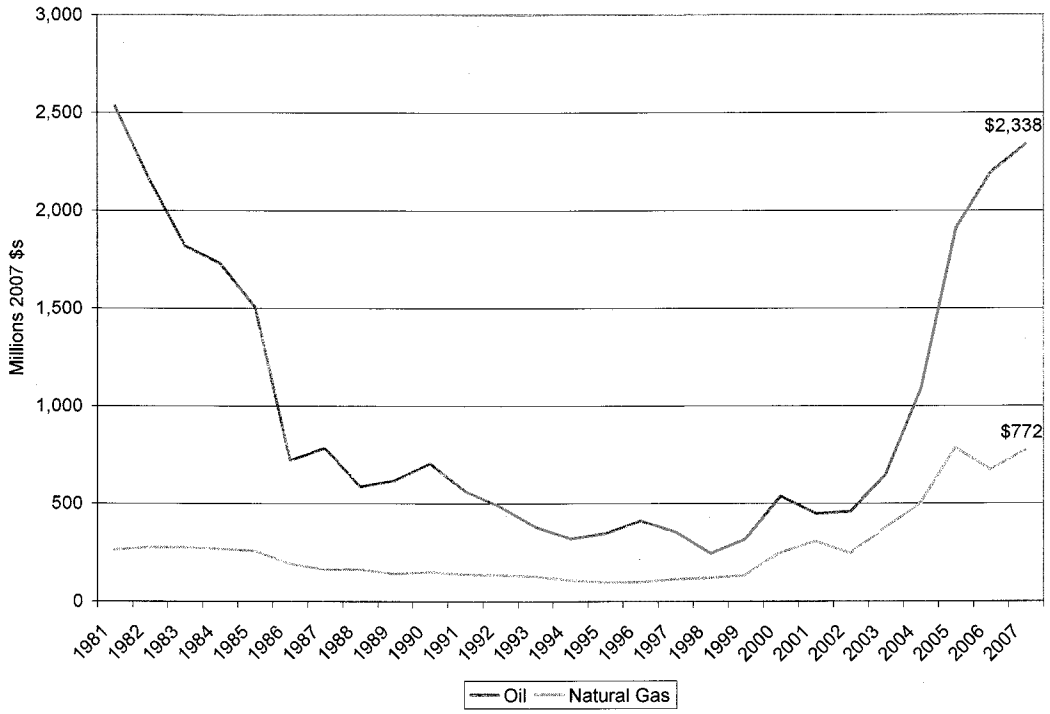


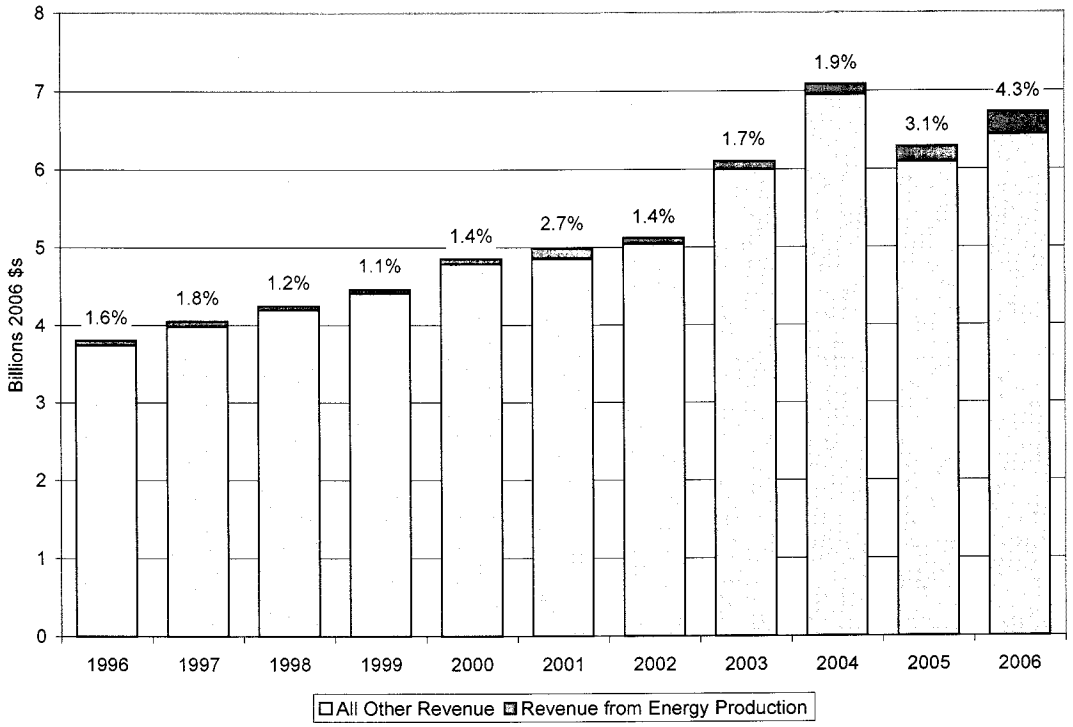
Figure 6 shows that production value of oil and natural gas (including coal bed methane) in Montana has increased by nearly 350 percent since 2002. Oil generated $2.25 billion in value in 2007 compared to $772 million in natural gas.

Total Revenue

Figure 7 shows that revenue from oil and natural gas extraction made up 4.3 percent of all state and local government revenue in Montana in 2006 (the latest data available from the U.S. Census of Governments on total state and local government revenue. We use these data for ease of comparison between states and over time).

The late 1990s saw energy playing a decreasing role as the rest of Montana's economy and government revenue began to grow. The recent surge in commodity prices and new drilling has increased the contribution of oil and natural gas to total state revenue. Oil and natural gas revenue is still a small portion of state revenue, particularly because of significant growth in the rest of Montana's economy and tax base over the last 20 years. Figure 7 shows that oil and natural gas provided $218 million more in revenue in 2006 than in 1996 while total revenue for state and local government was $2.7 billion higher in 2006 than 1996.

Figure 7: Revenue from Energy Development as a Portion of Total Governmental Revenue in Montana, 1996-2006 (2006 $s).[27]



Despite low production values relative to other energy-producing states, oil and natural gas revenue is a larger share of total revenue than in Colorado or Utah, where much larger state economies overshadow the contributions of the oil and natural gas industry sector. For example, in 2006, total revenue in Colorado from oil and natural gas was more than twice that in Montana, but accounted for less than 2 percent of total governmental revenue.

Figure 8: Total Energy Revenue by Type in Montana, 1996-2008 (2007 $s).[28]

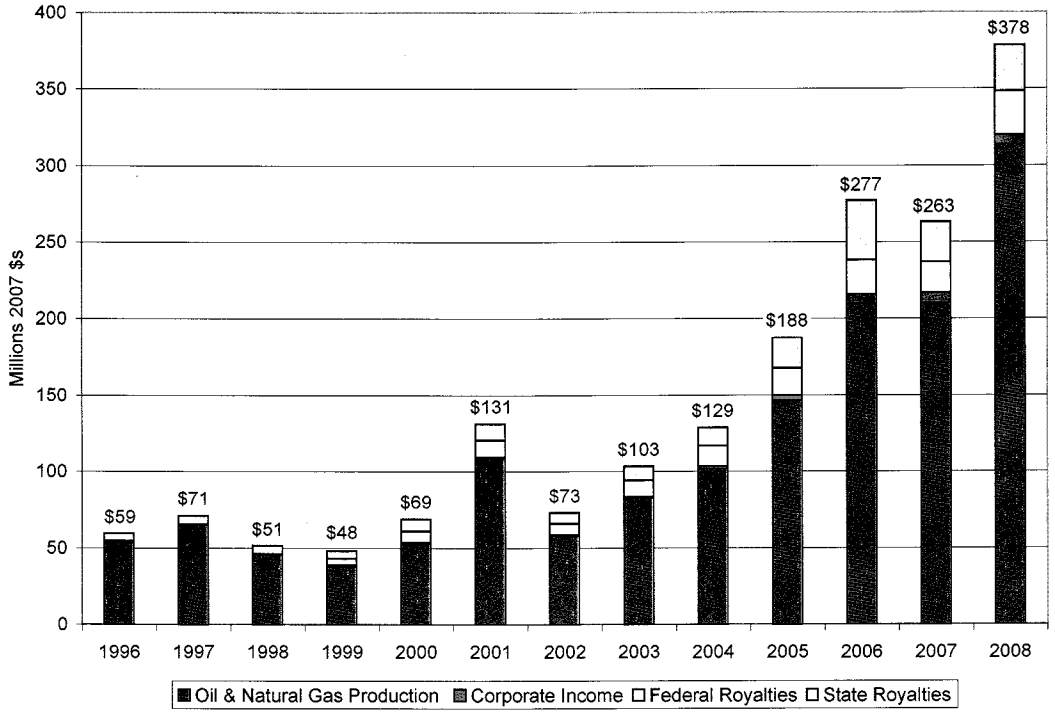


Figure 8 shows that the majority of revenue from oil and natural gas is generated by production taxes (green bar, $314 million and 83% in 2008). State royalties (blue bar) make up the second largest source, accounting for $30 million in 2008 (8%). Federal royalties accounted for $29 million in 2008 (8%), and corporate income taxes are estimated at $6 million in the same year (2%).

Montana is the only energy-producing state in the West that does not rely heavily on property taxes for revenue from energy production. In states that do, such as Colorado, the lag between assessments and tax collections can be problematic for local governments that bear the cost of providing infrastructure and services to the oil and natural gas industry and to increased populations (see Headwaters Economics report, *Energy Revenue in the Intermountain West* for more[29]).

Montana's production tax reduces this lag on producing wells (the tax is assessed and collected quarterly). However, as this report demonstrates in a later section, the first-year exemption from the oil and natural gas production tax (for 12 months on vertically completed wells and 18 months on horizontally completed wells, new wells are taxed at 0.76% instead of 9%) introduces a lag between extraction activities and when revenues begin to flow. The lag can become

problematic during surges in energy development when new production is a large share of total production, particularly in new areas of extraction and when new infrastructure and services are in highest demand.

Effective Tax Rate

The effective tax rate is a simple means of assessing how much value a particular tax, or suite of taxes, captures from gross production value (see sidebar on page 15 for more on the effective tax rate). Montana's effective tax rate on oil and natural gas in 2007 was 11.4 percent, including all production taxes and royalties (corporate income taxes are excluded from the effective tax rate calculation because they are not levied directly against production value).

Table 2: Effective Tax Rate in Montana, 2002-2007.[30]

	Production Value	Total Revenue	Effective Tax Rate
2002	$459,113,362	$75,322,309	16.4%
2003	$647,911,318	$106,721,252	16.5%
2004	$1,085,765,073	$132,175,227	12.2%
2005	$1,907,348,992	$191,300,258	10.0%
2006	$2,195,420,747	$281,739,532	12.8%
2007	$2,337,788,139	$266,445,619	11.4%

Table 2 shows that Montana's effective rate has been dropping in recent years since the production tax on oil and natural gas was lowered in 1999 from 15 percent on oil and 12 percent on natural gas to 9 percent on both commodities (the effective tax rate is higher than the base rate of the oil and gas production tax because it includes all taxes and royalties on oil and natural gas). Before the recent surge in production value, the effective tax rate averaged around 16 percent (it was 16.5 percent as recently as 2003 and had been over 20 percent in the 1990s). As new production (eligible for the state's first-year tax exemption and lower base tax rates) becomes a larger share of total production, the effective tax rate will necessarily decline, and may continue to do so for some time (pre-1999 wells paying the higher tax rate may produce for as long as 20 years).

Montana's effective tax rate for all fossil fuels (oil, natural gas, and coal) is in the middle of its peers in the West in 2006.[31] The state's relative position has also declined. In 2000, Montana was roughly equivalent to Wyoming and New Mexico (the two states with the highest effective tax rates in 2006), but has fallen behind.

In a later section of this report, we show that higher and lower tax rates have very little to do with the amount of exploration and production that each state attracts, and that different rates do little more than return higher or lower revenue to state and local governments in each state.

Volatility

Volatility in energy production value is a function of two factors: price and production volume. An increase in price or production volume will result in higher production values, and vice versa. Production value is volatile on an annual basis largely because commodity prices can rise and fall dramatically.[32] Over time, production volume responds to changes in price, demand, technology, and other factors, introducing long-term volatility into production value ("boom-bust" cycles).

Volatility in tax revenue is a function of both production value and tax policy. Poor tax policy can exaggerate revenue volatility, and good tax policy can dampen it. Montana's effective tax rate is volatile largely because a variety of reforms and incentives have most wells paying different tax rates. Wells drilled before 1999 are still paying higher production tax rates (12% to 15%) while newer wells pay lower rates (9%). The first-year incentive on oil and natural gas development both lowers the effective tax rate and introduces volatility as the number of qualifying wells will change from year to year. For example, during a surge in energy production, the number of newly completed wells will be a higher proportion of total wells than during "busts" or periods of slow growth. As the ratio of each type of well changes (e.g., fewer pre-1999 wells, fewer or greater numbers of newly completed wells), the effective tax rate changes and the amount of revenue generated from the same value of production varies significantly (see Figure 9).

Figure 9: Volatility of Production Value and Production Taxes from Oil and Natural Gas, 1999-2007.[33]

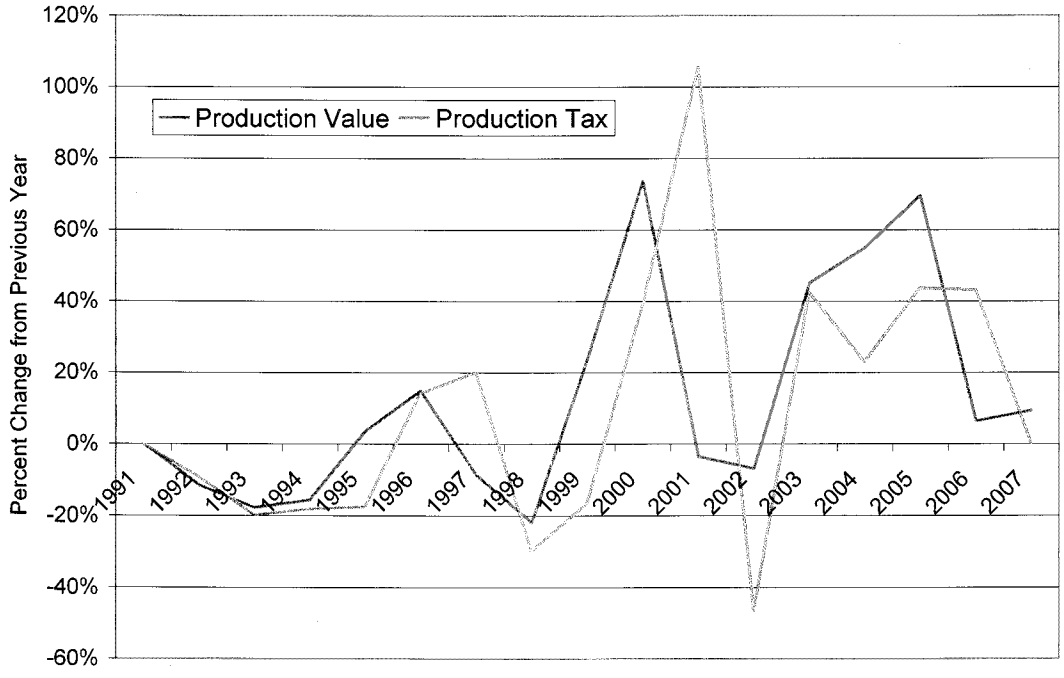


Figure 9 shows that until about 2001 or 2002, Montana's production taxes more or less shadowed production value—peaking in the year after spikes in production value, and dropping along the same pattern. In more recent years, production taxes have not seen the same increase concurrently with production value, illustrating the effect of the new lower tax rates and the first-year exemption from the oil and gas production tax.

Volatility is problematic for two reasons:

- the state tends to fund annual operations and maintenance expenditures with oil and natural gas revenue, exposing basic programs to volatility,
- local governments who rely on revenue from production to address impacts from drilling and associated population increases often do not have necessary resources to cover new infrastructure and service demands.

Montana is doing little to manage the of volatility of oil and natural gas revenue. The most common approach around the West is to invest a share of annual revenue into a permanent investment fund that will return a relatively stable amount to the state over time, both smoothing and extending revenue derived from the extraction of non-renewable resources.

Montana does not currently invest any of the oil and natural gas production tax or federal royalties into a permanent investment fund, meaning the state is funding basic governments services and infrastructure on a pay-as-you-go basis, exposing the state to the maximum amount of volatility from oil and natural gas extraction.

Distribution of Oil and Natural Gas Revenue

We identified earlier in the report two main purposes for tax revenue generated from the oil and natural gas industries:

- fund government provision of support services, infrastructure, and oversight for energy development along with impact mitigation;
- provide seed funds for investments that can help to replace wealth from resource extraction with future economic opportunities, including economic diversification.

In addition to these purposes, oil and natural gas tax and royalty revenue is also used to support basic government services at the state and local level (e.g., state and local government general fund activities) and education (royalties from state lands are used to fund the state's public schools).

Figure 10: Distribution of Oil and Natural Gas Revenue in Montana by Government and Fund Type, 2008.[34]

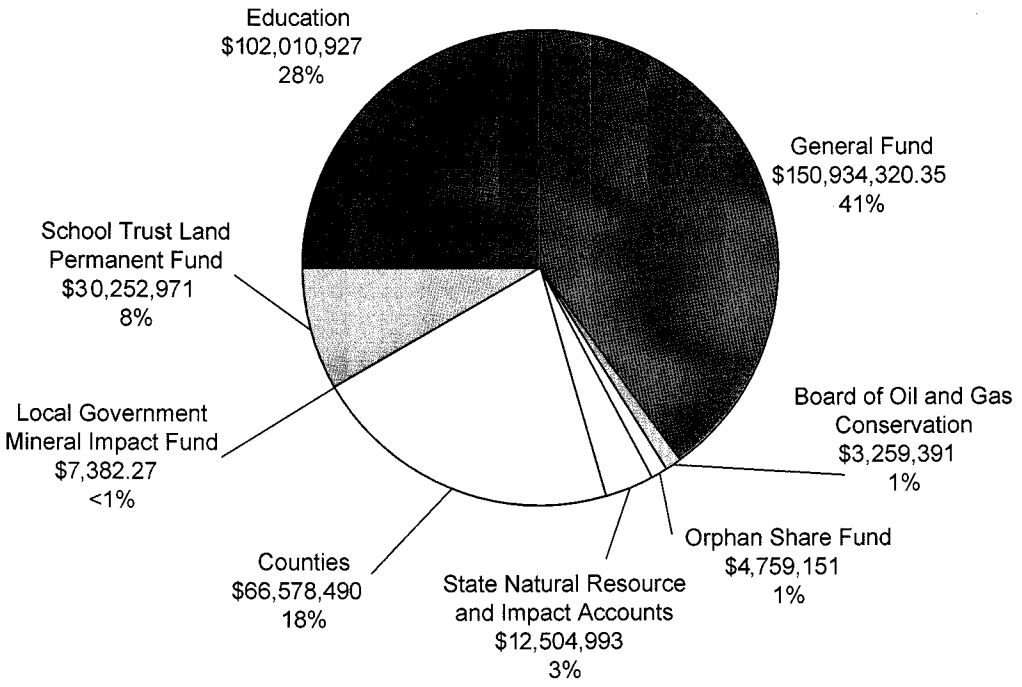


Figure 10 shows that the state general fund is the single largest beneficiary of oil and natural gas revenue (including CBM), receiving 41 percent in 2008 ($151 million).[35] Education, including local schools and state-funded universities receive 28 percent of oil and natural gas revenue ($102 million[36]). County governments receive the smallest portion of oil and natural gas revenue (18 %, $85 million). Local governments receive a portion of the oil and gas production tax, distributions of federal mineral royalties (the state returns 25 percent of federal royalties to the county of origin), and state assistance through the mineral impact fund.

In a companion report *Energy Revenue in the Intermountain West*, we assessed how well five energy-producing states in the Intermountain West, including Montana, were meeting our stated taxation purposes.[37] That report concluded that Montana does a decent job of distributing revenue to local government—where the impacts of oil and natural gas extraction are felt most acutely—but the state was performing poorly in managing volatility or ensuring long-term returns from one-time extraction of natural resources.

This report shows that while local governments may receive a larger share of total revenue from oil and natural gas than do their peers in other states, it is still a relatively small portion, and the first-year exemption unnecessarily delays when these revenues are received.

Summary Findings

Montana's economy has grown and diversified significantly over the last 10 years, particularly when compared to its rural peers. Montana has done a good job of capturing employment and income from services industries associated with the West's modern economy that trades on environmental and quality of life amenities. High-wage jobs in the services industries account for more than 16 percent of total wage and salary employment in 2006. These jobs in services and non-labor income account for about 44 percent of total income in Montana in 2006. Mining accounts for 2 percent of all wage and salary jobs (although these are high-wage jobs) and 2 percent of total personal income in Montana in the same year.

As Montana's economy has grown, so too have tax revenues and other sources of income for state and local governments. Total state and local government revenue in Montana was $2.7 billion higher in 2006 than they were in 1996. Revenue from oil and natural gas has grown by $218 million over the same period, and accounted for 4.3 percent of total state and local government revenue in 2006.

Montana uses oil and natural gas revenue to fund annual operations and maintenance activities of the general government. Forty-one percent of all revenue goes to the general fund, and no revenue from the production tax or federal royalties is invested in a permanent savings fund. This has exposed basic state programs to volatility and funding shortfalls in years when energy prices are low.

Montana's tax reforms of the late 1990s have reduced the effective tax rate (returning fewer revenues to the state by half a billion dollars between 2002 and 2007), and introduced additional volatility into an already uncertain revenue stream. Some revenue should be invested into a permanent fund to ensure a stable return during inevitable and often abrupt downturns in the oil and natural gas sector.

The first-year exemption for new well completions in Montana introduces a time lag that makes it very difficult for local governments to keep pace with new service and infrastructure demands during times of rapid expansion in oil and natural gas drilling. Removing the first-year exemption would benefit local governments tremendously.

MONTANA'S ECONOMIC DEVELOPMENT AND OIL AND NATURAL GAS EXTRACTION POLICIES

The previous section showed that the oil and natural gas sector of Montana's economy is relatively small, but remains an important source of high-wage employment for some communities. At the same time, production taxes, royalties, and corporate income taxes contribute hundreds of millions of dollars annually to state and local governments. These revenues are somewhat more significant than the contributions to personal income (oil and natural gas extraction accounts for 2% of total personal income, and 4.3% of total government revenue in 2006) and can contribute to meeting the state's economic development goals if they are used wisely.

This section provides a brief review of the state's economic development and energy policies, particularly regarding oil and natural gas to provide context for the following section that looks at expected coal bed methane development in Big Horn, Powder River, and Rosebud counties in Montana's portion of the Powder River Basin.

Policy Context

The U.S. Energy Policy Act of 2005 calls for a rapid increase in production of fossil fuel energy resources in order to increase energy independence and security, and to reduce energy prices. One outcome has been a rapid increase in leasing of public lands for oil and natural gas extraction. The 2005 Energy Policy Act establishes the federal policy framework for Bureau of Land Management (BLM) planning and leasing in the Powder River Basin (for more on the Energy Policy Act of 2005 and leasing and extraction on public lands, see Headwaters Economics' report *U.S. Energy Needs and the Role of Western Public Lands*[38]).

At the state level, Montana's Governor lists three main goals for the state's energy policy[39]:

- securing energy independence for the nation,
- providing safe and affordable energy for all Montanans,
- economic development from energy production including jobs and tax revenue for the state.

In recent public appearances, including his January, 2009 State of the State Address, Governor Schweitzer promoted his energy development goals by arguing that Montana's energy resources in coal, oil and natural gas, wind, and biofuels are second to none in the nation and the world. The Governor expects that all of these energy sources will be required to meet his ambitious policy goals, and that each can be pursued independently of the others.

Taken together, strong promotion of oil and natural gas extraction at the state and federal level means that continued and increased extraction of oil and natural gas in Montana is possible. The release of the Bureau of Land Management's BLM Record of Decision in December, 2008, makes possible a major expansion of coal bed methane (CBM) extraction in the Powder River Basin.

With regulatory hurdles largely cleared, if and when these resources are tapped now depends largely on economic factors, including commodity prices, access to markets (e.g., pipeline capacity), and competition from other energy sources (less expensive oil and natural gas plays coming online in other locations, or new capacity from renewable energy sources).

Existing and Potential Fossil Fuel Extraction in Montana

In 2007, Montana produced 43.4 thousand short tons of coal or about 4 percent of the nation's total coal production.[40] A significant portion of the state's coal production occurs in the Powder River Basin, and the coal-fired power plants at Colstrip add significantly to the economy in Rosebud County.

Future development of most fossil fuels in Montana will be located in the far eastern portion of the state, in the Williston and Powder River Basins. As indicated on Map 1 (on page 6 of this report), both basins are actually centered in other states, with only small portions located within Montana.

Table 3 shows the expected number of wells under the high development scenario for eastern Montana.

Table 3: Expected Total Wells, High Development Scenario for Eastern Montana.[41]

	Oil		Natural Gas		Coal Bed Methane	
Production Area	# of Wells	% of total	# of Wells	% of total	# of Wells	% of total
Williston NE	1,520	26.3%				
Cedar Creek Anticline	3,149	54.5%	2,683	95.5%		
Poplar Dome	105	1.8%				
Williston other	28	0.5%				
Powder River Basin	844	14.6%	126	4.5%	15,635	100.0%
Porcupine Dome	67	1.2%				
Other	66	1.1%				
Total	**5,779**		**2,809**		**15,635**	

The Williston Basin spills into eastern Montana from its concentration in North Dakota. Table 3 shows that the Williston Basin (which includes Williston NE, Cedar Creek Anticline, Poplar Dome and Williston other) is projected to account for about 80 percent of future oil development and the majority of non-CBM natural gas production in eastern Montana.[42]

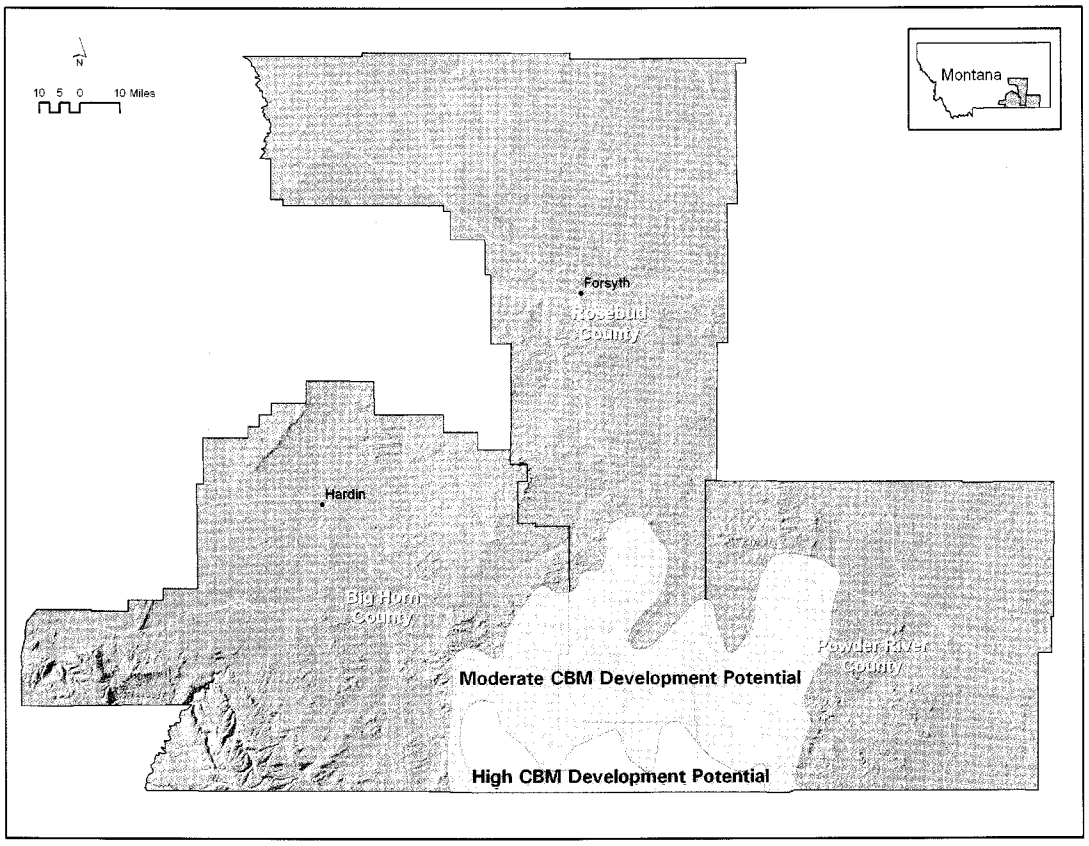
The Powder River lies mainly in Wyoming, but extends into Montana's southeastern corner. The vast majority of new drilling in the Powder River Basin will involve the development of CBM natural gas wells, which is the focus of this case study.[43]

Montana's Powder River Basin

Coal bed methane (CBM) is produced in the basin by pumping water into coal bed reservoirs in order to release methane from coal seams. CBM production increased dramatically in the late 1990s, with the Wyoming portion of the Powder River Basin being among the most productive CBM areas in the U.S. Roughly 92 percent of the coal volume in the Powder River Basin falls within Wyoming. Still, BLM documents predict that the total wells drilled for the Powder River Basin in Montana would range from a low of 5,800 to a high of 16,400, with associated infrastructure.[44]

Current CBM development in southeastern Montana is limited to the CX field in Big Horn County just north of the Wyoming border, where there were 555 wells in 2005.[45]

Map 2: Coal Bed Methane Potential in the Powder River Basin, Montana.[46]



A final plan for development of the Powder River Basin oil and gas reserves was released by the BLM in late 2008 after a series of court challenges to an oil and gas development plan first released in 2001 put CBM development on hold.[47] The preferred alternative, Alternative H, projects the highest number of wells (among alternatives considered), but applies a phased development model that limits the pace and scale of development and subjects the approval of drilling permits to a set of prescribed screens intended (according to language in the federal environmental impact statement) to protect water, wildlife, air quality, and Native American interests.

Map 2 shows that the projected development in the Montana portion of the Powder River Basin will be concentrated in Big Horn County (7,000 wells projected), Powder River County (6,700 wells projected), and Rosebud County (2,800 wells projected). Approximately 4,000 of the Powder River Basin's total projected wells are expected to occur on the Northern Cheyenne reservation and 4,000 on Crow lands.[48]

A critical feature of the BLM's 2008 Record of Decision (ROD) is the phased approach to development, which is intended not only to insure adequate analysis, monitoring, and oversight of drilling activities, but also to encourage sustained development—wells are projected to be drilled over a 23-year period, each with an average production life of 15 years. The implications of this approach for the regional economy of southeastern Montana are considered in the following section.

Summary Findings

The U.S. Energy Policy Act of 2005 promotes increased fossil fuel leasing and extraction on federal public lands, setting the policy context for much of the oil and natural gas production projected for Montana. The Bureau of Land Management recently released its final Record of Decision on oil and natural gas leasing and drilling for Eastern Montana, clearing the way for new production.

Montana's economic development and energy policies are similarly encouraging of increased extraction of fossil fuels in addition to developing new renewable sources of energy to secure energy independence for the nation, supply low-cost energy to all Montanans, and create jobs and generate tax revenue in the state.

With sympathetic federal and state policies in place, economic factors will largely determine the pace and scale of new exploration and production in Eastern Montana. The BLM's Reasonably Foreseeable Development Scenario (RFD) indicates that 80 percent of all new oil and natural gas wells are projected in the Williston Basin in northeast Montana. The Powder River Basin could see up to 15,000 new coal bed methane (CBM) wells drilled over a 23-year phased development period according to the RFD. The Powder River Basin lies mostly in Wyoming, and new extraction in Montana will be focused in the southern portions of Big Horn, Powder River and Rosebud counties where resources are concentrated.

CASE STUDY: ECONOMIC AND FISCAL POTENTIAL OF COAL BED METHANE EXTRACTION IN THE POWDER RIVER BASIN

The Powder River Basin in Montana covers parts of Big Horn, Custer, Powder River, Rosebud, and Treasure Counties. This section provides a socio-economic and fiscal profile of the three counties where most of the new oil and natural gas extraction activities are projected to take place—Big Horn, Powder River, and Rosebud counties—in order to provide context for a discussion of the projected employment and revenue contributions of new coal bed methane (CBM) extraction.

The Crow and Northern Cheyenne reservations make up parts of Big Horn and Rosebud Counties. The socioeconomic profile presented here includes population, employment, and personal income data for the portion of each reservation in the three counties. While it is beyond the scope of this report to distinguish between jobs and population on and off the reservation, economic profiles for the Crow and Northern Cheyenne reservations are available at Headwaters Economics website: www.headwaterseconomics/energy.

An earlier section describing the state economy showed that Montana's economic performance is dramatically different from county to county, and from region to region. The three counties in the Powder River Basin profiled here offer a case in point.

Population

Figure 11 shows that the Powder River Basin counties have lost population in aggregate since the mid 1980s. Compared to other non-metropolitan areas on the West, the Powder River Basin shows a more dramatic boom-and-bust population cycle, and ultimately slower long-term growth. The peaks in population in the 1970s and 1980s correspond with the construction of four coal-fired electric power plants in Rosebud County. The long-term trends are consistent with West-wide population declines in rural counties. The rapid increase and decline around construction projects also shows the volatility of growth in areas focused on natural resources.

Figure 11: Population Growth of Big Horn, Powder River, and Rosebud Counties Compared to All Non-Metro West Counties, 1970–2006.[49]

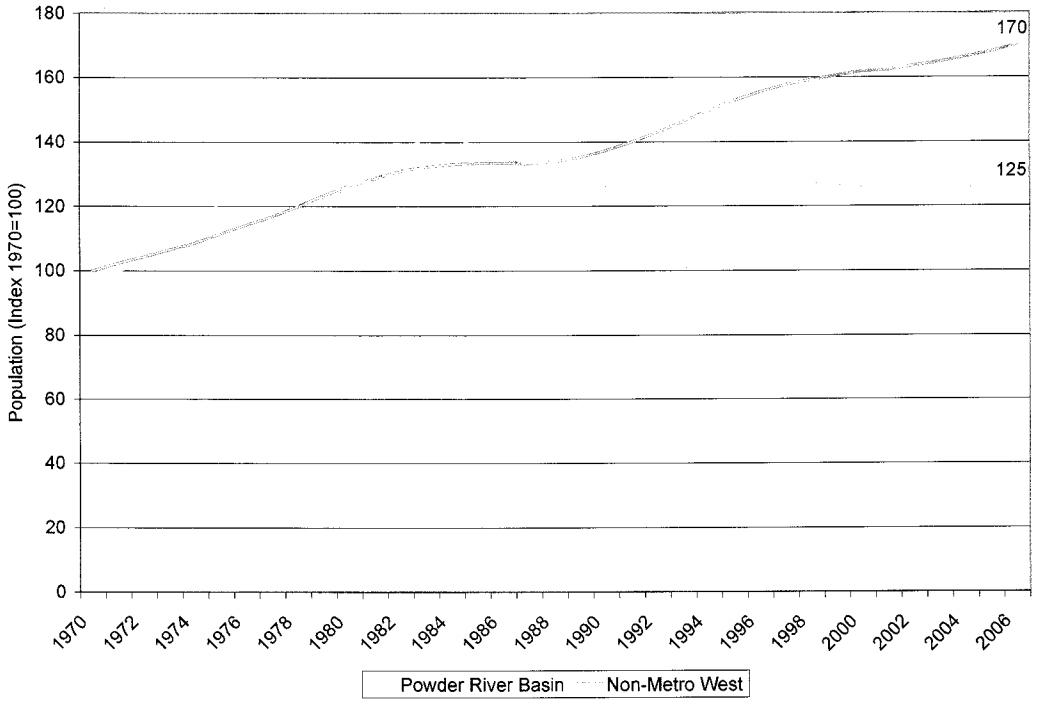
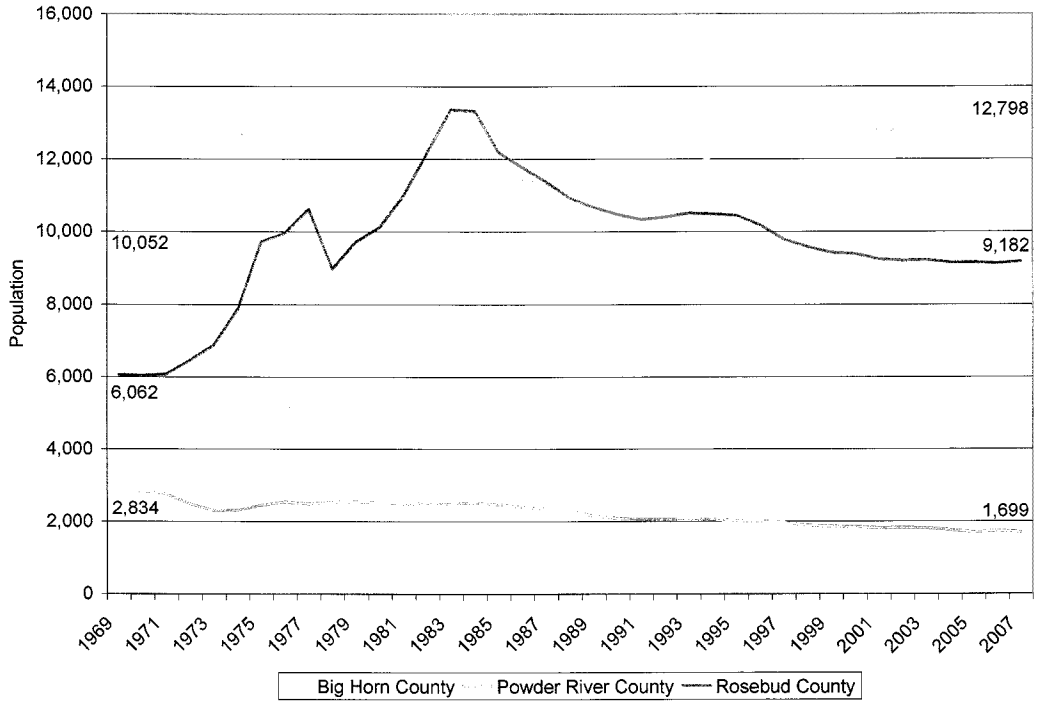


Figure 12 shows that Big Horn County is the only county that has not lost population since the national recession and energy bust of the early 1980s, but it added only 57 people between 1998 and 2006. Rosebud County's population increased dramatically during two periods when the Colstrip electric power plants were constructed, but has lost population in nearly every year since the mid 1980s. Powder River County is the only county to have lost population over the entire period from 1970 to 2006.

Figure 12: Population in Big Horn, Powder River and Rosebud Counties, MT. 1969–2007.[50]

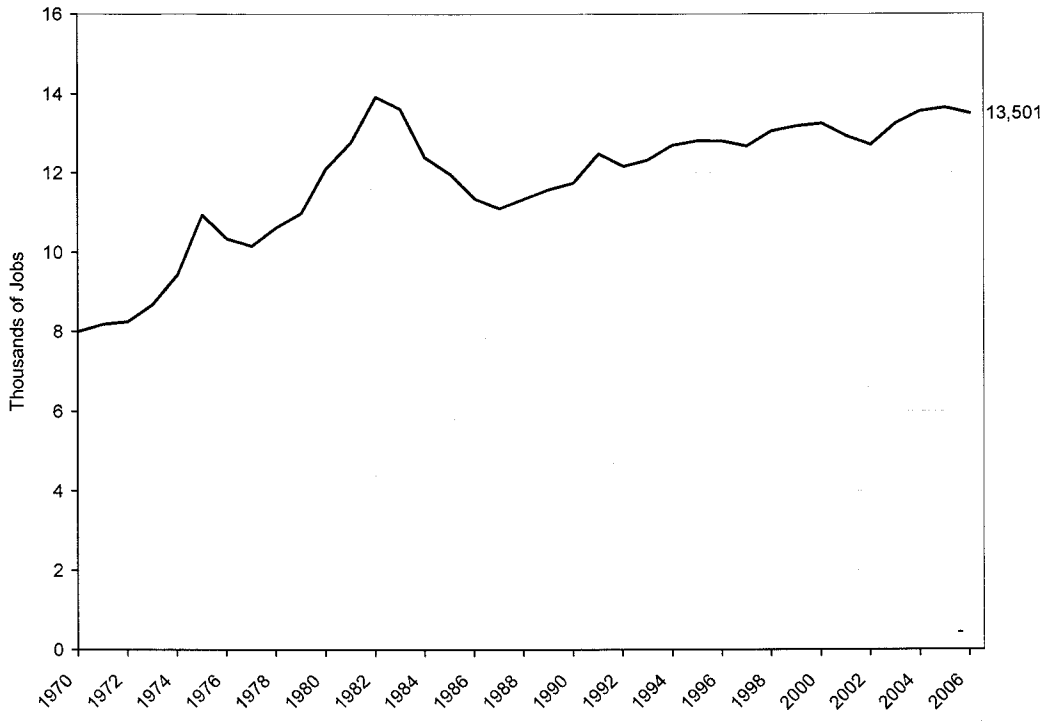


Employment and Personal Income

Figure 13 illustrates that there were 5,490 more jobs in the three counties of the Powder River Basin in 2006 than there were in 1970, a 69 percent increase. However, job growth has not been steady over the last several decades, but punctuated by a boom and bust cycle. There were more jobs in the three counties in 1982, at the height of construction of the Colstrip power plants 3 and 4, than there were in 2006. Rosebud County accounted for a majority of the new jobs (3,203) over the period, but also experienced the largest gains and losses. Big Horn County added 2,441 new jobs, and also experienced some of the volatility associated with the mining and construction industries. Powder River County is the only one to have lost jobs in absolute terms over the entire period, ending with 154 fewer jobs in 2006 than existed in 1970.

Compared to the non-metro West, the region added jobs at a slower rate, and experienced more volatility associated with mining and construction booms and busts.

Figure 13: Employment Trends in the Powder River Basin, 1970–2006.[51]

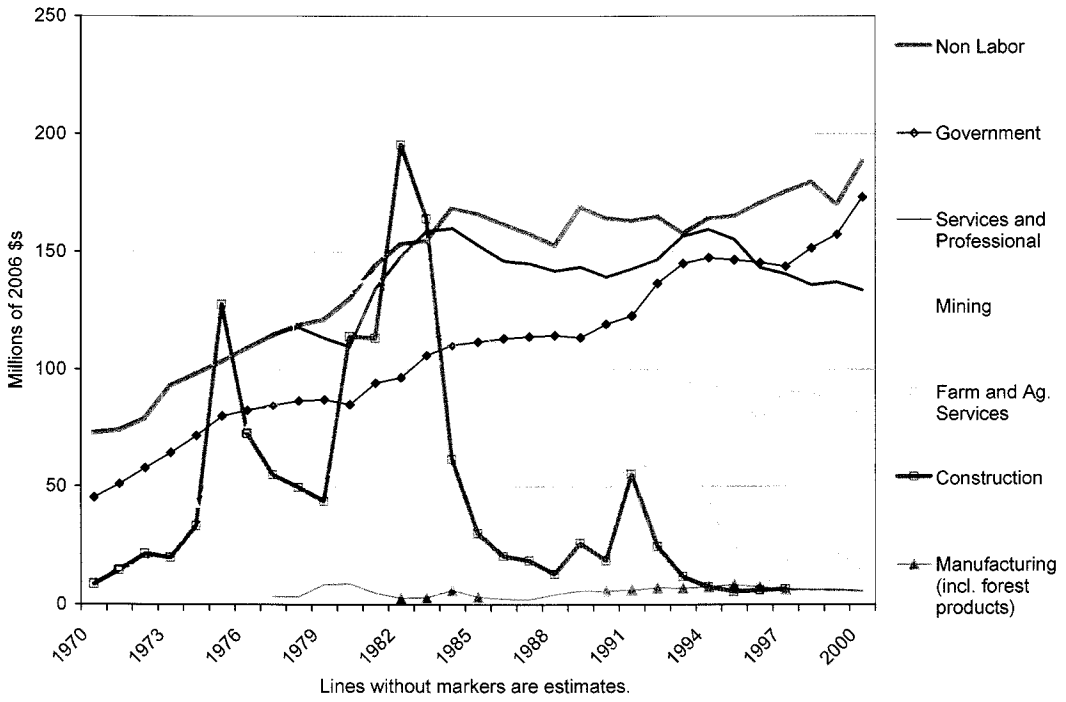


Blue bars represent periods of national recession.

Figures 14 and 15 show that non-labor income is currently the single largest source of personal income, and has been for more than 20 years, in the Powder River Basin, accounting for 30 percent of total personal income in 2006 (see sidebar on page 11 for a description of non-labor income). Government employment contributed the largest single wage and salary sector, and among the most stable, accounting for 27 percent of total personal income in 2006. Many of these jobs are located in local government (*e.g.*, local schools, health services, and county employees).

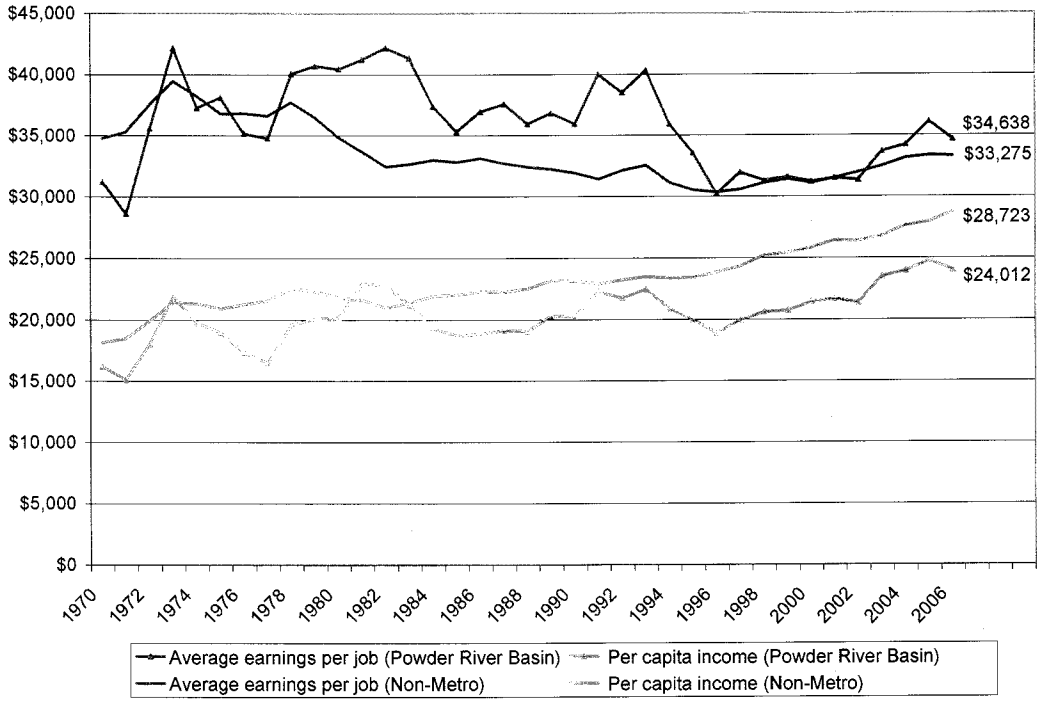
Data disclosure restrictions imposed by the U.S. Department of Commerce make it difficult to parse out contributions from many other industry sectors. However, Figure 14 illustrates that that in general terms, income has been highly volatile in the three counties from 1970 to 2000. Construction in particular has experienced dramatic booms and busts associated with the coal-fired power plants in Rosebud County, at times accounting for the largest single share of total income, and more recently, among the smallest. Mining and agriculture have also seen significant volatility over the period, the former closely related to coal mining to supply the power plants, and the latter rising and falling along with commodity prices.

Figure 14: Personal Income by Industry Sector, Powder River Basin, 1970–2000.[52]



Average earnings per job, adjusted for inflation, has grown from $31,209 in 1970 to $34,639 in 2006. This bucks the trend of declining earnings in the rest of the non-metro West where average earnings per job, adjusted for inflation, has fallen from $34,276 in 1970 to $33,276 in 2006. However, per capita income of $24,012 is lower in the Powder River Basin than in the Non-Metro West ($28,723). This suggests that more people in the Powder River Basin are working part-time or hold multiple jobs to make ends meet.

Figure 15: Earnings Per Job and Per Capita Income in Powder River Basin and Non-Metro West, 1970–2006.[53]



Wages by Industry Sector

Many of the most volatile industries (construction and mining) also pay the highest wages. Some stable employment sectors contribute higher than average wages, most notably the federal government. Overall the region has relatively few stable and high-wage sectors. Table 4 shows that educators receive a wage that is more than 20 percent below the average wage for the region, while construction pays more than 20 percent above average wages.

Table 4: County Wages and Employment in Big Horn, Powder River, and Rosebud Counties in 2006.[54]

	Employment	% of Total	Average Annual Wages
Total Private & Public	8,950	100%	33,590
Total Private	5,109	57%	36,562
Goods-Producing	1,587	18%	[illegible]
Natural Resources and Mining	1,133	13%	[illegible]
Agriculture, forestry, fishing & hunting	122	1%	20,415
Mining	992	11%	[illegible]
Construction	401	4%	[illegible]
Manufacturing (Incl. Forest Products)	32	0%	22,848
Service-Providing	3,522	39%	26,867
Trade, Transportation, and Utilities	1,251	14%	39,933
Information	103	1%	30,817
Financial Activities	179	2%	27,631
Professional and Business Services	177	2%	27,197
Education and Health Services	794	9%	24,729
Leisure and Hospitality	902	10%	10,536
Other Services	111	1%	21,129
Unclassified	7	0.08%	35,891
Total Public	3,841	43%	29,636
Federal Government	699	8%	[illegible]
State Government	102	1%	33,302
Local Government	3,040	34%	24,946

A Closer Look at Energy-Focusing Counties

Other reports in Headwaters Economics' *Energy and the West* series take a closer look at "energy-focusing" counties. EF counties are those with 7 percent or more of total employment in energy-related sectors.

For energy-focusing counties, the series looks at the consequence of energy development as an economic development strategy, measuring such things as job creation, personal income, education rates, economic diversity, and ability to attract investment dollars. Energy-focusing counties are compared to their peers in the West who, either by choice or lack of resources, have not made energy development part of their economic development strategy.

Of the 414 counties in the West today, only 26 (6% of all counties) can be called energy-focusing. In other words, the majority of the counties of the West—94 percent—are not significantly engaged in energy development. This is not to say energy development is unimportant, but that it is not representative of the broader economic experience of most places in the West today.

For more about the economic implications of energy development as an economic development choice, see the report: *Fossil-Fuel Extraction as a County Economic Development Strategy: The Performance of Energy - Focusing Counties in the West.*[55]

The socioeconomic challenges faced by the counties in the Powder River Basin (stagnant or declining population and a volatile and low-wage economy) make new development activities attractive. However, the boom and bust history of resource extraction in the region and lessons learned from across the West should temper expectations about the potential for new oil and natural gas development to generate new employment and income growth. As we show in the next section, the local employment benefits of projected drilling are expected to be low as most jobs will be taken by the skilled labor force already in place in Wyoming's Powder River Basin. Gillette and Sheridan are closer to the areas where new wells are likely to be drilled than populations centers in Montana.

Revenue generated by extraction will accrue to Montana state and local governments, and there may be more opportunity to maximize these revenues and apply them to create economic development opportunities in the region.

Employment Benefits from CBM Extraction in the Powder River Basin

The Supplemental Environmental Impact Statement for the Resource Management Plan for Miles City Field Office of the BLM estimates that 49 jobs will be created per 160 wells during initial development, 9 jobs per 160 wells annually during the 15-year average production life of the wells, and 12 jobs per 160 wells for abandonment—or 0.3 workers per year are associated with initial development of each well, 0.05 jobs with production and maintenance on each well, and abandonment is projected to create 0.07 jobs per well per year.[56]

Figure 16: Projected Employment Benefits from CBM Extraction in the Powder River Basin, Montana.[57]

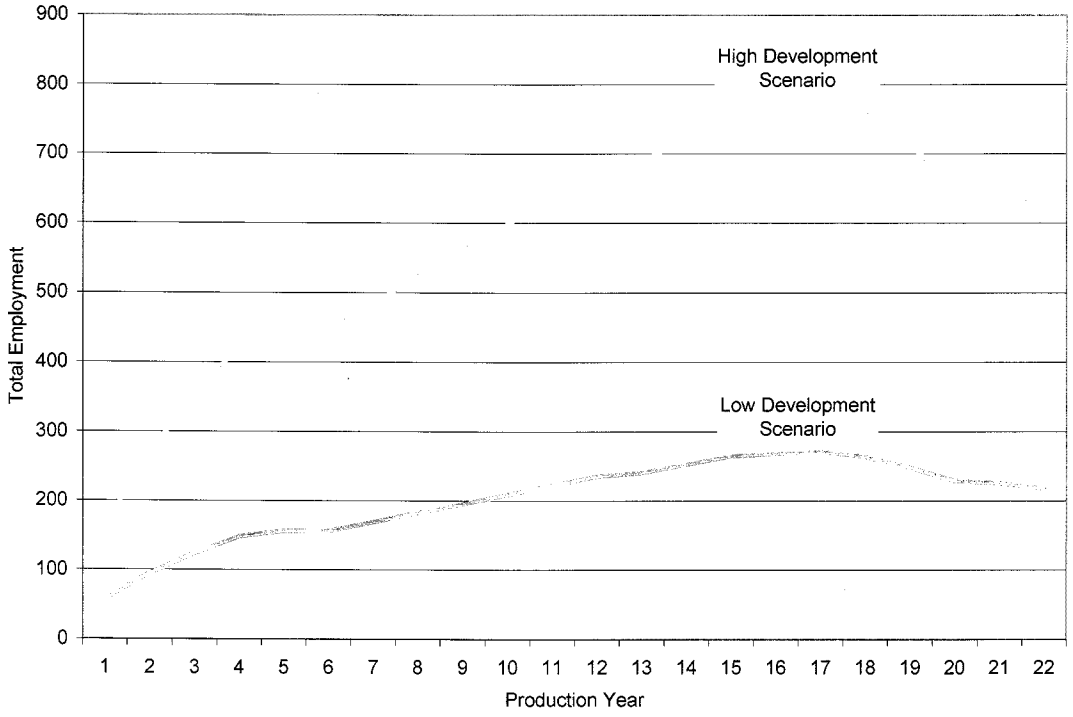


Figure 16 shows that drilling in year one would create 57 to 163 jobs (or 0.6 to 1.8 percent of total wage and salary jobs in 2006). Employment would grow to a high 270 to 777 jobs 16 years later, or 3 to 9 percent of total wage and salary employment, and then begin to decline[58] (total wage and salary employment does not include the self-employed, so the actual number of working people is underestimated by these data).

It is also likely that many of these jobs will not locate in Montana, further reducing the likely employment benefits from CBM development. The RMP cites interviews with current operators in the area to say that "workers from Sheridan and Gillette, Wyoming, would fill most of the new jobs generated."[59] The existing large labor pool and the number of support industries already located in Wyoming, combined with the fact that travel times to the main coal bed methane fields in Montana are actually shorter from Wyoming that from Miles City, Hardin, or Billings reinforces this finding. In addition, it appears that the phased development proposed in Alternative H favors a smaller, more stable labor pool, making it less likely that significant new hiring or migration will occur on the Montana side of the state line within the Powder River Basin.

Because many of these jobs will locate outside of Montana, direct local CBM employment will only amount to one or two percent of total employment in the Powder River Basin, even at peak production. As a result, the expected multipliers will similarly be low because most employees' income will be spent and taxed in Wyoming.[60]

The next section turns to the fiscal benefits of new coal bed methane extraction in the Powder River Basin. Production taxes from coal bed methane will be captured by the counties and the state of Montana, and these revenues are likely to be much more significant than the employment benefits of production.

Fiscal Contributions of CBM to Montana

This section projects how much revenue will be generated and the amount collected by Big Horn, Powder River, and Rosebud counties, local school districts, and the state of Montana. Revenue from CBM extraction in the Powder River Basin will flow to the counties where extraction takes place, but also to the federal government, the State of Montana, and to school districts.

Reasonably Foreseeable Development Scenario

The final record of decision includes a "reasonably foreseeable development scenario" that projects the amount of coal bed methane that may be extracted over the next 23 years in the Powder River Basin. This scenario includes an assessment of the CBM resource and how much of it is expected to be recovered. By applying an estimate of average well productivity and the phased development alternative in the plan, the reasonably foreseeable development scenario projects the total number of wells that could be drilled in each year. It includes both a high development scenario and a low development scenario because of the uncertainty about how much of the CBM could ultimately be recovered.

Table 5 shows that 90 percent of all wells drilled are expected to be productive (14,072 under the high development scenario, and 4,895 under the low development scenario) and 10 percent of wells drilled for exploration or may fail to produce (e.g., dry holes). Of the producing wells, 94 percent are projected to be CBM wells in each scenario. Another important point is the dramatic difference between the high and low development scenarios, nearly a 300 percent difference between the two scenarios.

Table 5: Projected Wells Under the High and Low Development Scenarios, Powder River Basin[60]

	High Development Scenario		Low Development Scenario	
	Total Wells	Producing Wells	Total Wells	Producing Wells
Oil Wells	844	805	192	183
Natural Gas Wells	126	120	29	28
CBM Wells	15635	14,072	5485	4,895
Total Wells	**16,605**	**14,997**	**5,706**	**5,106**

This kind of uncertainty should not go unnoticed by state and local government decision makers. Previously in this report we highlighted the difference between policy decisions that facilitate CBM development, and the economic conditions that actually determine if and when drilling will take place. In the current economic climate with low commodity prices (in March, 2009), it is possible that no drilling will begin at all, or that production activities will more closely track the low rather than the high development scenario projections.

Figure 17: Total Projected Revenue by Type of Government.[62]

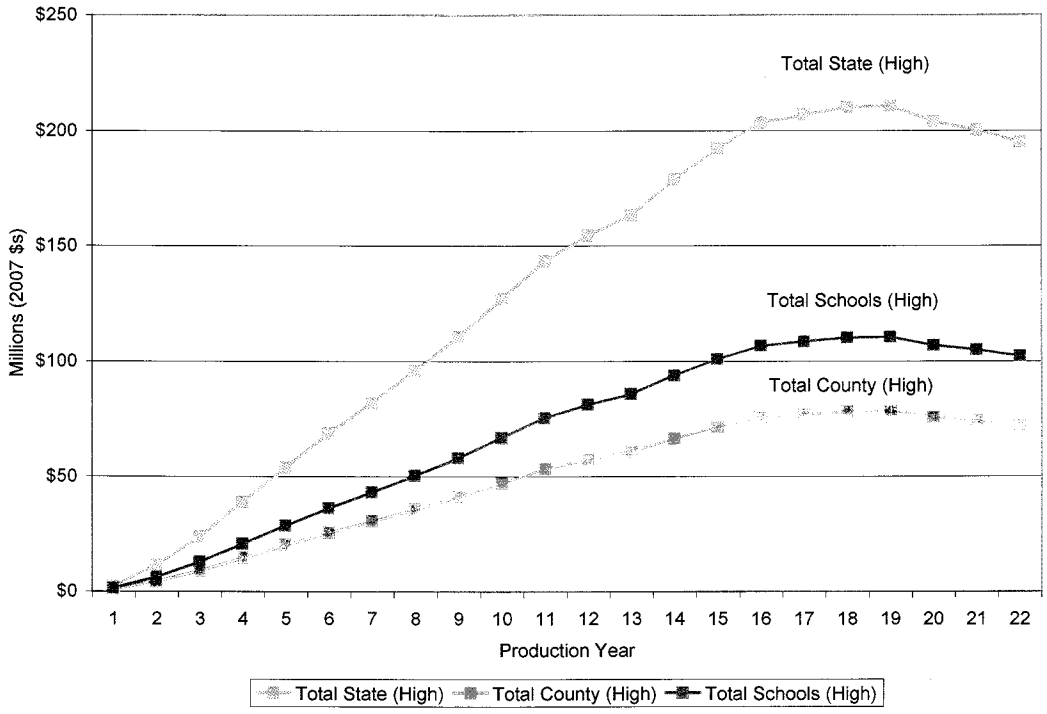


Figure 17 shows that state government will retain the largest share of total revenue generated from production, up to $2.3 million possible in the first year of extraction under the high development scenario, and growing to more than $200 million annually at peak production under the high development scenario. Even under the low development scenario, CBM extraction from the Powder River Basin could contribute over $70 million annually at peak production after 16 years of drilling.

Schools receive the next largest share, growing to more than $100 million annually after 15 years under the high development scenario. Local governments will receive the smallest share of total tax and royalty revenue, but this still may be significant under the high development scenario.

The key message from Figure 17 is that revenue begins at low levels for all recipients and grows slowly over time. This is a function of both the phased development approach preferred by the BLM RMP, and the effect of Montana's first-year tax exemption for newly completed oil and natural gas wells. The effective tax rate in the first year is projected to be only 3.9 percent. The effective tax rate climbs as new production becomes a smaller share of total producing wells, but never exceeds 11.7 percent over the entire period of drilling activity. Wyoming's effective tax rate on CBM is 13.7 percent in 2007, and the state does not offer industry a first-year exemption on newly completed wells.[63] Figure 18 details these scenarios for each county.

Figure 18: High and Low Development Scenario Revenue Projection for Big Horn, Powder River and Rosebud Counties.

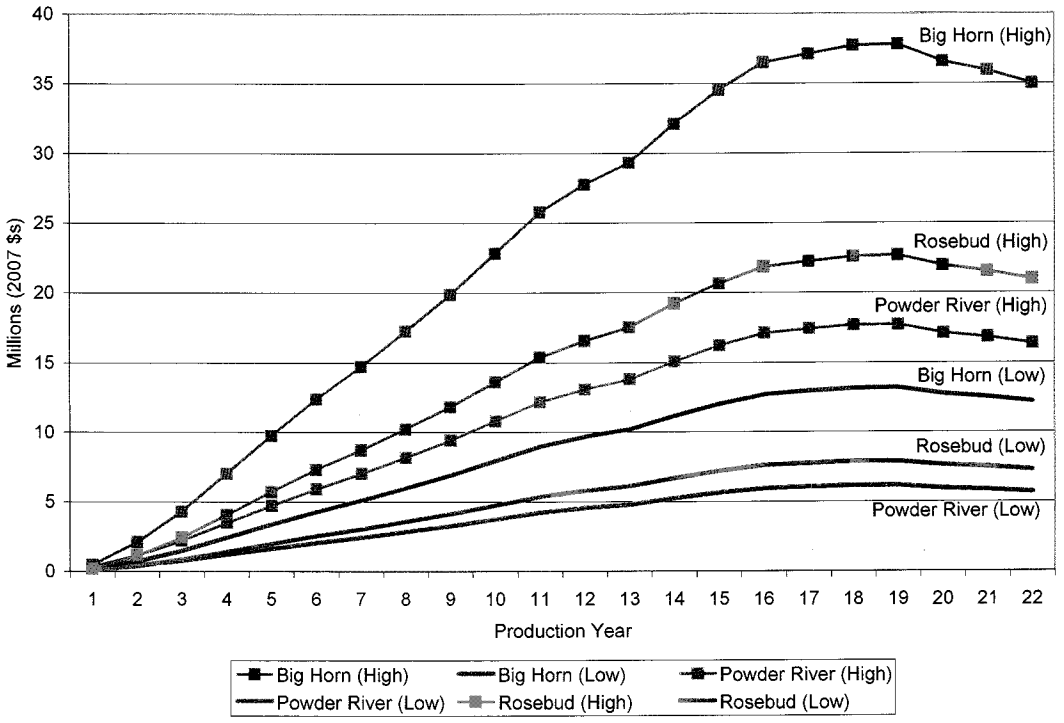


Table 6: High and Low Development Scenario Revenue Projection for Year 1 in Big Horn, Powder River, and Rosebud Counties.[64]

	County	Local Schools	State Government	School Trust Fund
Big Horn (High)	$451,725	$101,822	$963,039	$507,905
Big Horn (Low)	$157,134	$35,419	$334,997	$176,677
Powder River (High)	$334,964	$107,902	$824,138	$424,320
Powder River (Low)	$116,518	$37,534	$286,680	$147,601
Rosebud (High)	$186,533	$29,409	$442,356	$177,328
Rosebud (Low)	$64,886	$10,230	$153,875	$61,684
Basin Total (High)	**$973,222**	**$239,134**	**$2,229,533**	**$1,109,554**
Basin Total (Low)	**$338,539**	**$83,184**	**$775,552**	**$385,963**

Table 6 shows that in the first year of production, county governments could receive anywhere from $338,539 to $973,222 in revenue from oil and gas production taxes and federal mineral royalties distributed back to the county of origin. Big Horn County is likely to receive the highest revenue amount, with between $157,134 to $451,725 possible. Rosebud is projected to receive the smallest share of projected revenue, with something between $64,886 and $186,533 projected.

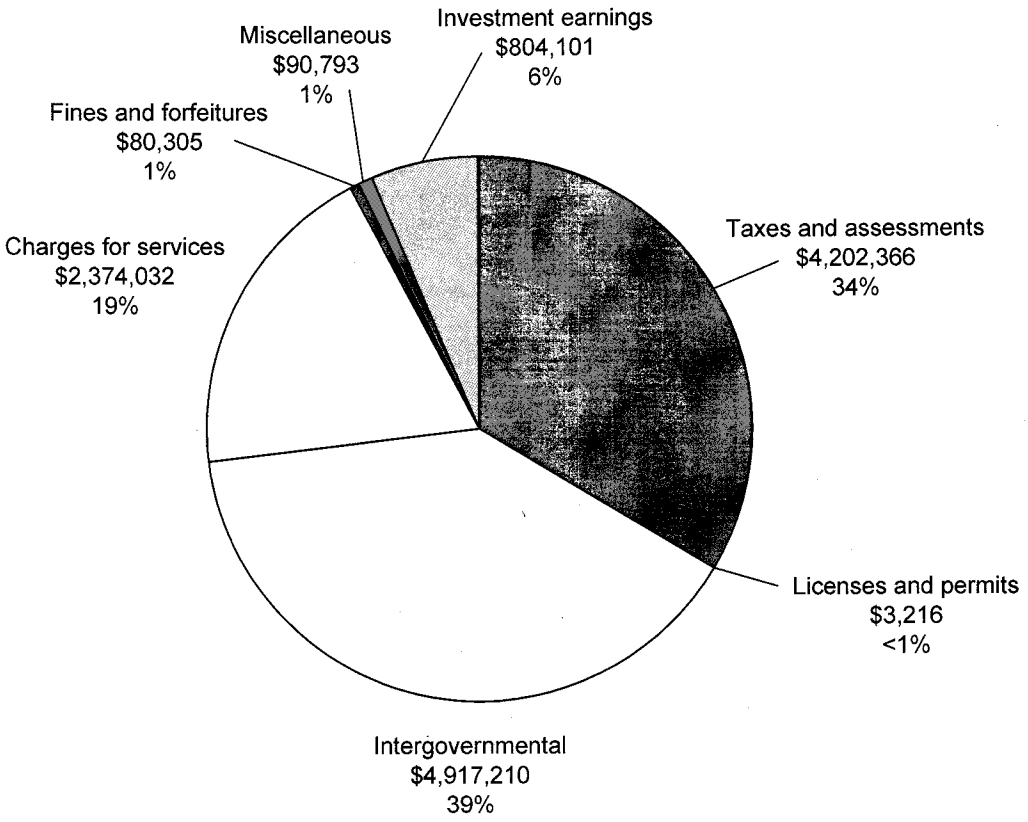
Current County Revenue

This section provides a very brief overview of each county's fiscal position to provide context for understanding the significance of projected revenue from CBM extraction.

Big Horn County

Big Horn County's total budget in 2007 is $12.4 million. Figure 20 shows that intergovernmental transfers are the single largest source of revenue, accounting for 39 percent of total revenue. Nearly $3.2 million (or 25 percent of total revenue) are from federal mineral royalties distributed to the county from the state (Montana returns 25 percent of federal royalties to the county of origin).

Figure 20: Total Revenue by Source, Big Horn, MT. 2007.[65]



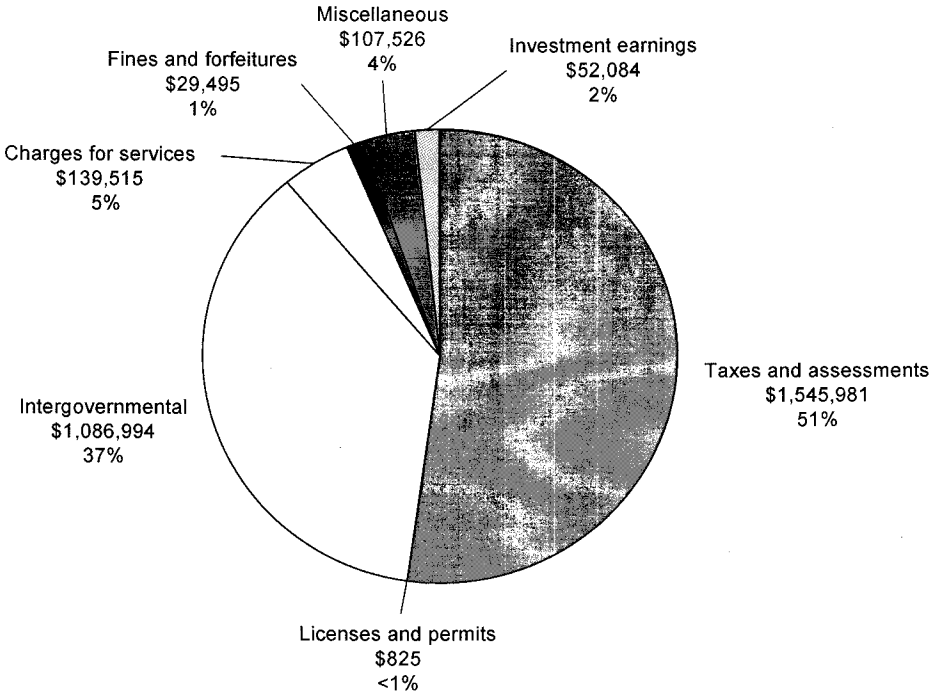
New CBM extraction will increase federal royalties returned to the county and generate new production tax revenue. Table 6 shows that Big Horn County can expect to receive between $150,000 and $450,000 in year one from production taxes and federal royalties, or between 1.2 percent and 3.6 percent of total revenue in 2007.

Powder River County

Powder River County's local economy is the smallest of the three counties, and the local government's budget is the smallest as well. In 2007, total county revenue amounted to $2.9 million. Figure 21 shows that local taxes and assessments made up more than half the total at $1.5 million, 60 percent of which derived from property taxes collected from agricultural land and activities.

Nearly half a million dollars came from oil and gas production taxes in 2007 ($462,207), or 15.6 percent of total revenue. Again, these revenues are reported as part of intergovernmental revenue because the oil and nature gas tax is collected by the state and distributed to counties based on percentage formulas set out in state statute.

Figure 21: Total Revenue by Source, Powder River County, MT. 2007.[66]



Because of its small budget, Powder River County stands to gain the most from new coal bed methane development based strictly on the percent increase in revenue. In the first year,

Powder River County can expect to earn between $117,000 and $335,000 (between 3.9 percent and 11.3 percent of total revenue) in new revenue from oil and natural gas taxes and federal royalties combined. It is also likely that the county will face the biggest challenges providing new infrastructure and services to the coal bed methane companies because of its size and rural character.

The first-year exemption that delays how quickly revenue accrues to local government will also hit Powder River County the hardest because it has the fewest resources at hand, and the lowest bonding capacity to plan and construct infrastructure and beef up its service capacity to facilitate the exploration and drilling phase of development before production revenue begins to flow.

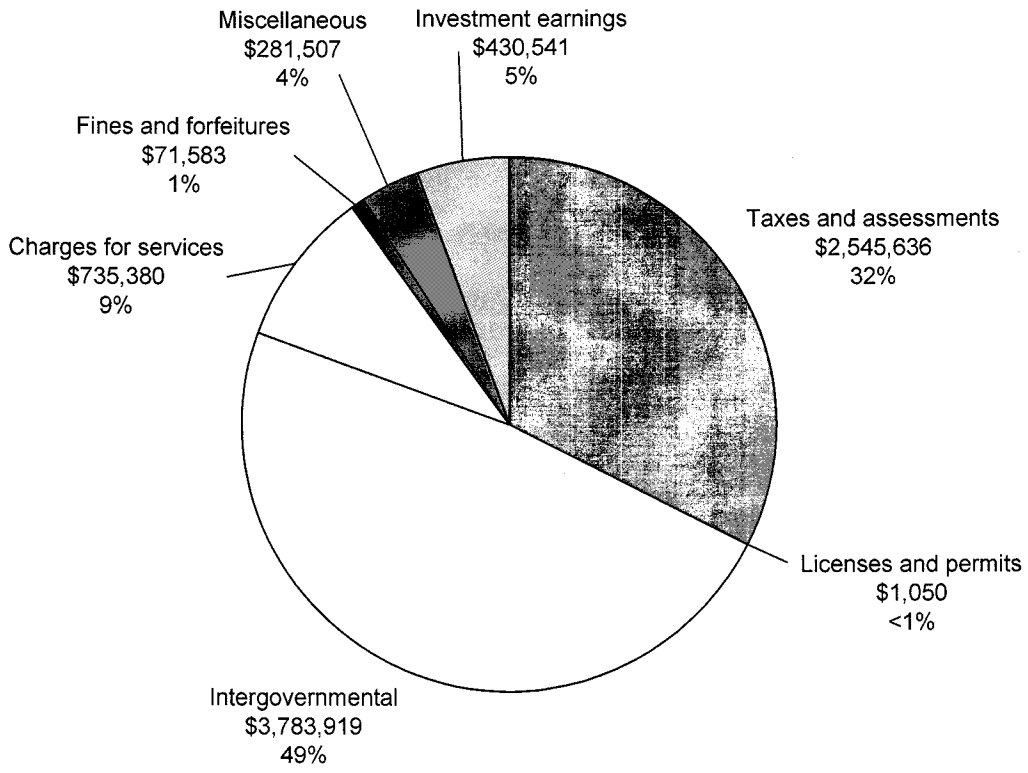
Headwaters Economics' report, *Impacts of Energy Development in Colorado*, and research by BBC Consulting in Northwest Colorado confirm this conclusion that the fiscal capacity of local governments vary considerably, and a lack of fiscal capacity exposes local governments to significantly more risk from energy development when tax structures and regulations do not ensure timely flow of resources or mitigate for adverse impacts up front.[67]

Rosebud County

In 2007, total county revenues amounted to $7.8 million. Figure 22 shows that local taxes and assessments accounted for 32 percent of total revenue. More than $1 million of total revenue is from federal mineral royalties distributed to the county from the state, and is captured in the intergovernmental revenue category. As a whole, intergovernmental transfers make up nearly half of total revenue, and federal mineral royalties account for 13.1 percent of total revenue.

The Colstrip power plants in Rosebud County accounted for more than 75 percent of total taxable value in 2007. As a result, the local property tax mill levy (or property tax rate) is very low as the burden is shifted from residential and commercial to the industrial property in the county. The average county mill levy in the state in 2007 was 240. Rosebud County's mill levy in the same year was 37 (one mill is equal to one-one thousandth of a property's assessed value. A higher mill levy equates to higher property taxes).[68]

Figure 22: Total Revenue by Source, Rosebud County, MT. 2007.[69]



New coal bed methane extraction is projected to generate between $65,000 and $187,000 in the first year (between 0.8 percent and 2.4 percent of total revenue) based on the BLM's high and low development scenarios. Rosebud County is projected to have the fewest wells of the three counties, and it already has a significant industrial and mining activity, and for these reasons, new coal bed methane will contribute the smallest share of new revenue relative to current total revenues.

Timing of Revenue

In the previous description of how new CBM extraction will contribute to the three counties' budgets, we discussed the lag between exploration, drilling, and production, and when revenue is received in the county courthouse. Over time, CBM extraction in the Powder River Basin will generate a significant amount of tax revenue. However, the timing of revenue is critical for local communities who will experience the impacts on local infrastructure and services acutely.

Figure 23: Total Revenue from CBM Extraction, First-year exemption vs. No First-year exemption.[70]

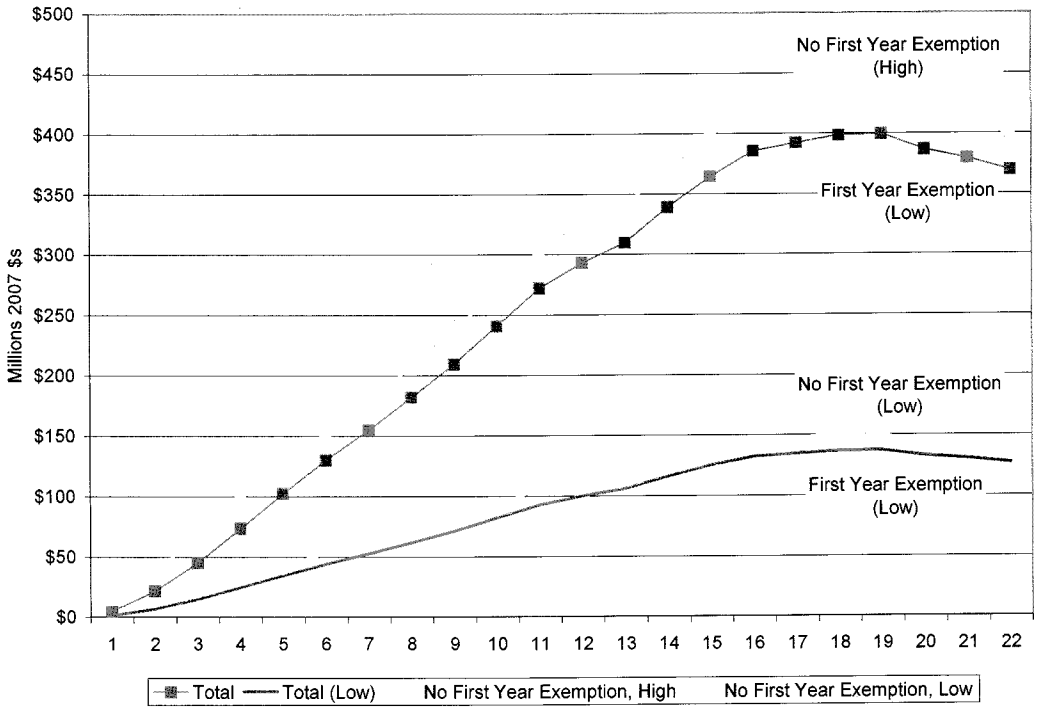


Figure 23 shows the difference between revenue generated under the current tax structure that includes the first-year exemption on new CBM wells and the revenue potential of the same amount of extraction without the first-year exemption in place. The difference shows the value of the first-year exemption to producers in the Powder River Basin. Compared to total revenue, the value of the first-year exemption is small, but in the first five years, it becomes significant.

Table 7: Value of the First-Year Exemption, First Five Years of Production.[71]

Year	High	Low	Percent of Total Revenue
1	$10,384,019	$3,612,121	228.1%
2	$16,787,995	$6,305,656	77.1%
3	$20,680,179	$7,808,274	45.9%
4	$24,251,013	$9,203,342	32.9%
5	$23,939,247	$9,150,976	23.4%
Total	**$96,042,454**	**$36,080,369**	**38.8%**

Table 7 shows that the first-year exemption from the state oil and gas production tax is worth $3.6 to $10.4 million in the first year of projected CBM extraction in the Powder River Basin (more than double actual revenue collections). Over the first five years, the exemption is worth $36 to $96 million, and adds up to between $237 million to $605 million over the 22 year development phase for the low and high development scenarios, respectively.[72]

The first-year exemption is harmful to communities because the major impacts of oil and natural gas extraction occur during the exploration and initial drilling phases of production. Revenue does not begin to flow until after production begins, and the first-year exemption delays revenue generation by a year or more.

In Wyoming's portion of the Powder River Basin, Campbell County (Gillette) experienced significant increases in truck traffic on state and county roads that resulted in higher road maintenance costs, required new capital facilities projects (e.g., widening, re-surfacing, and other improvement projects), and a 40 percent increase in emergency service calls.[73]

North Dakota has a first-year exemption similar to Montana, but with a trigger price—for example, if the price of oil drops below $49.50 for five consecutive months, the tax rate for extraction on all wells would drop to five percent. If prices stay low and the exemption kicks in, the state could "lose" up to $200 million annually.

Over the last few years, local communities in North Dakota have not been able to keep pace with increased demands, particularly on county roads. The North Dakota Department of Transportation conducted a study showing that the 17 North Dakota counties with oil and natural gas extraction are incurring large infrastructure costs and declining levels of service.[74] The study shows that each well requires 150 to 230 truckloads of water and 24 to 48 truckloads of sand during the drilling phase. In addition, 65 percent of all the oil leaving the state does so by truck. In sum, 800 oil and natural gas wells in North Dakota (between 6 and 17 percent of the total wells projected for the Powder River Basin) generated 4,605 truckloads a day, or 1.7 million truckloads over the full production period for these wells.

The North Dakota studies have established that one 100,000-pound five-axle truck has the same impact on county roads as 27,000 automobiles. Because the average well is located more than a quarter mile from a state highway, these impacts are felt directly on county roads which are not designed to handle such high volume and heavy loads. The county share of oil and natural

gas revenue has not been sufficient to allow counties to make the necessary improvements to the road system, and the state has capped payments to counties for transportation projects at just $3 million annually. Montrail County, North Dakota alone has $80 million in outstanding transportation infrastructure needs.

Pederson Planning Consultants interviewed a range of local elected officials and staff in Wyoming's Powder River Basin on behalf of the Wyoming Energy Commission to identify planning and fiscal strategies that encourage energy development and meet local government needs. Campbell County officials stressed repeatedly to the consultants that local revenue from extraction is not sufficient, and state assistance is not forthcoming.

Campbell County received no revenue from production until almost two years after the impacts on roads, police and fire services began occurring (because these impacts are concurrent with exploration and drilling, before extraction begins). In addition to the road impacts described above, the booming energy industry also placed new demands on the fire department, which found itself understaffed and underfunded when the mostly part-time and volunteer force left to take jobs in the energy industry.

Figure 24 illustrates the lag between demand for infrastructure and services during exploration and drilling, and when revenue flows after wells begin to produce.

Figure 24: Timing of Infrastructure Needs vs. Availability of Revenue from Property Taxes.[75]

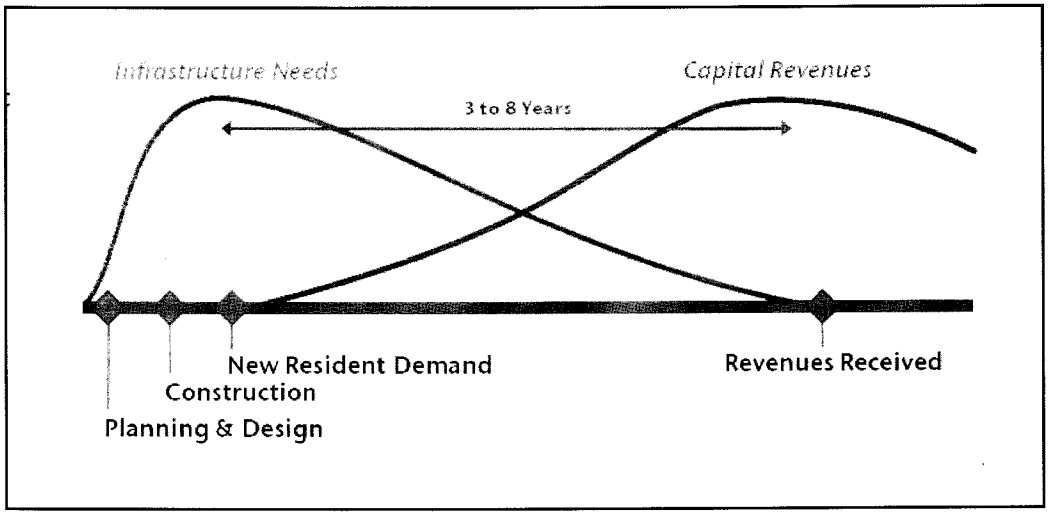


Figure 24 was prepared by a consulting group working for the Northwest Colorado Council of Governments which identified many of the same fiscal shortfalls experienced in Wyoming. Specifically, the report projected that $300 million to $1 billion of capital facilities needs would go

unmet based on projected drilling, tax revenue, and community impacts.

In our companion report Fossil-Fuel Extraction as a County Economic Development Strategy we document that energy-focusing counties grow more slowly than their non-energy producing peers. The inability to provide adequate infrastructure because of the revenue lag may be one reason.

For example, Rock Springs, Wyoming was forced to turn away a Wal-Mart distribution center because the city did not have the funds to upgrade its sewer system stressed by the increased demands of the recent energy surge. With oil and natural gas rigs leaving the state in 2009 (due to collapsing prices and demand), the city is left with one less stable source of jobs and tax revenue.

In another example, Garfield County, Colorado saw a decline in retirement migration and associated income because of the perceived decline in quality of life and affordability brought on by the rapid industrialization of the rural landscape in the Piceance Basin.

The experiences of other energy-focused counties around the West suggest that options for dealing with unfunded demands are limited. Some communities bond to provide necessary infrastructure, but this exposes them to downturns in the economy or in commodity prices. Communities in Wyoming and Colorado have had to raise property or sales taxes elsewhere to meet ongoing debt and infrastructure obligations brought on by rapid oil and natural gas development. Some larger cities and counties have the flexibility to avoid issuing debt by spending down reserves or borrowing from internal enterprise funds. More commonly, communities and counties simply allow the level of services to decline.

As noted before, the options available to Big Horn, Powder River and Rosebud counties are limited because of their small size and limited budgets. Larger cities and counties can avoid tax increases or bonding because when they can meet short term demands with existing resources (e.g., Mesa County, Colorado with annual revenues of over $130 million in 2007 borrowed from enterprise funds for capital facilities upgrades).

Taxes and Energy Production

Montana introduced new tax incentives in the late 1990s hoping to stimulate new drilling during a time of low commodity prices and little exploratory activity. In the five states profiled in Headwaters Economics' *Energy in the West* series, we find little evidence to suggest that tax incentives have influenced the amount of production, or location decisions over the last 10 years. Several academic studies come to a similar conclusion (see sidebar on Taxes and Energy Activity on page 15).

The Montana Department of Revenue estimates that the state's incentives were worth half a billion dollars to between 2003 and 2007 (the Department estimated the difference between actual tax revenue and what would have been collected if the incentives had not been adopted).[76] The loss of revenue from a lower tax rate is easy to calculate. What is less certain is if the production increases that have occurred are due to the incentives, or due to new technology, price, and regulations more

friendly to extraction on public lands brought in by the Bush Administration.

At the same time Montana reduced it's tax rates by 5 percent on oil and nearly 3 percent on natural gas, Wyoming chose not to reduce its severance tax by 2 percent as proposed. Wyoming has experienced a five-fold greater increase in production value than Montana between 2000 and 2006 ($10 billion in Wyoming vs. $2 billion in Montana). Wyoming's tax revenue grew by 335 percent from 2000 to 2006, compared to a 280 percent increase in Montana over the same period.

If the first-year exemption were removed, it would make Montana's effective tax rate 12.7 percent on Powder River Basin production, compared to Wyoming's 13.9 percent effective tax rate in 2007. Even so, tax equivalency comparisons are not particularly valuable in understanding industry behavior. For one, effective tax rates can be volatile over time. Montana's first year exemption, differing pre-1999 and post-1999 tax rates, low-producing well incentives, and deductions for processing costs mean that nearly every well in Montana could be paying a different tax, sometimes dramatically so. As the ratio of different types of wells changes from year to year, the effective tax rate will go up and down.

More importantly, different effective production tax rates between states seem to have very little if any influence over the total amount of production. Instead, economic factors including price and access to markets (e.g., pipeline capacity) drive when and where development takes place.[77] Taxes and subsidies for exploration, not production, also have a larger influence on industry's investment decisions. Alaska, the Western state most dependent on oil and natural gas extraction for state revenue, maintains much higher production taxes than any of the lower 48 states, instead providing significant incentives for exploration.

Specifically, Alaska's tax structure differs from Montana's in several key ways:

- Alaska targets incentives for exploration rather than production.
- Alaska maintains a higher base tax rate on production (raised from 22.5 percent to 25 percent in 2007, Montana lowered its rate from 15 percent and 12 percent on oil and natural gas respectively to 9 percent on each).
- Alaska's tax is progressive, ensuring the state shares in windfall profits (Montana has a flat tax rate. Interestingly, Wyoming's flat, albeit higher, tax rate actually declines when prices rise, and Montana may show similar reactions to increasing prices).[78]

While production taxes have little effect on production, they do have a huge impact on the amount of revenue collected by the state. The studies described in the text box below estimated that doubling Wyoming's severance tax rate would decrease production by only 6 percent, but increase revenue to Wyoming by 90 percent. Learning from Alaska, Wyoming, and from others, Montana may find that shifting incentives from production to exploration activities will maximize both production and tax revenue for Montanans.

TAXES AND ENERGY ACTIVITY: *ACADEMIC STUDY FINDINGS*

In the late 1990s, the Wyoming state legislature commissioned two academic studies to evaluate the likely impact of tax and/ore incentive policies on the pace and scale of energy activities. Key findings of the Wyoming research include:

- Production tax incentives have little effect on where energy companies choose to explore and drill. The oil and natural gas industries are guided chiefly by the location of reserves, and are less able to relocate than are industries with mobile capital resources (such as textile mills or auto-makers).
- Production taxes are deductible from federal income tax liability so industry does not feel the full benefit of tax increases, or pay the full increase in tax hikes. When taxes are raised, revenue is shifted from the federal to the state government, and vice-versa.
- Production taxes are "downstream" taxes, meaning they are levied only on successfully producing wells. As a result, production taxes have little effect on exploration. Tax policy can change the timing of extraction. A tax on reserves in the ground tends to accelerate extraction as energy companies attempt to "mine out from under the tax." Taxes on production (i.e., severance taxes) slow production as industry may hold reserves and wait for high prices or other market advantages.
- Other factors such as price, access to markets (e.g., oil and natural gas pipelines), technology, and regulations have more significant effects on industry activities. Considering tax policy alone cannot fully explain industry choices and the resulting geography and pace of energy exploration and production in the Intermountain West.

Sources: S. Gerking, *et. al., Mineral Tax Incentives, Mineral Production and the Wyoming Economy*, 2000 and M. Kunce, *et. al., State Taxation, Exploration, and Production in the U.S. Oil Industry, 2001.*[79]

Summary Findings

The Powder River Basin lies mainly in Wyoming, and the most productive portions in Montana lie along the border in the southern portions of Big Horn, Powder River, and Rosebud Counties. Because of this geography, most of the labor and support services for drilling and production will locate in Wyoming where a large labor pool and number of support industries already exist. Travel time to the region where most new wells will be drilled is shorter from Sheridan and Gillette than from Miles City or Billings. In addition, the phased development alternative will favor a smaller more stable labor force than other alternatives that could have allowed for a massive build-up that normally would require companies to hire locally.

Revenue generated by production will eventually be significant, returning between $25 and $75 million to counties annually. However, it will take up to 15 years to reach these revenue levels, and they will begin to decline shortly thereafter.

Reductions in Montana's tax rates on oil and natural gas combined with new incentives granted in 1999 mean the state does not capture all that it could from new extraction. The first-year exemption from the oil and gas production introduces a lag between extraction activities and production revenues. As a result, total revenue is reduced by between $3.6 million and $10.4 million in the first year (twice the amount of actual revenue collections), and between $36 to $96 million over the first five years of extraction.

The first-year incentive is particularly difficult for counties who must provide infrastructure and services concurrent with extraction and drilling activities, but will not see significant revenue from oil and natural gas development until 12 to 18 months after production begins. Production revenue in the first year will amount to between $300,000 and $900,000 for all three counties combined. This is after exploration and drilling activities are complete on 607 wells, and another 910 are in the development phase. This level of drilling activities will require significant infrastructure, particularly county road maintenance, public safety, and services to any population growth that may accompany the drilling activities (likely to be minimal).

Big Horn, Powder River, and Rosebud counties have markedly different local economies and local government budgets. As a result, they are not all evenly prepared to absorb new demands for infrastructure and services from new coal bed methane production. Powder River County in particular has a very small budget and may have trouble keeping up with new demands if revenue does not materialize in time.

CONCLUSION

Montana has an opportunity to expand oil and natural gas production in the state. This would help create much-needed employment jobs in eastern Montana and generate tax and royalty revenue for the state. Revenue can be used to mitigate the impacts of extraction and invest in future energy development and other economic development opportunities. However, Montana is currently not positioned to take full advantage of the employment and revenue benefits of new drilling.

The oil and natural gas industry's growth is slow and volatile over time, making up just two percent of total employment in Montana in 2006. The industry does pay high wages, but because most of Montana's high-quality CBM reserves are located on the state's border with Wyoming, the employment benefits of new extraction in the Powder River Basin are likely to accrue to Wyoming communities. As a result, the expected direct and indirect employment benefits will be modest.

Significant tax and royalty revenue will accrue to Montana, but the state's taxation and distribution policies do not maximize benefits to industry or to Montana. The state has granted significant production tax incentives that have failed to generate new employment or drilling in Montana while other states that have targeted incentives to exploration (Alaska) and maintained higher production taxes (Wyoming) have generated more exploration, drilling, and production while retaining more revenue. Montana has forfeited half a billion dollars in revenue between 2003 and 2007 without benefit of new jobs or increased drilling.

Oil and natural gas, done responsibly, can contribute to Montana's economic recovery, particularly in the eastern portions of the state. However, several reforms will be necessary to ensure maximum benefits are realized:

1. Ensure energy development is done responsibly, and secure sufficient resources for local governments to facilitate and mitigate the impacts of industry activities. Eliminating the first-year exemption is key to generating adequate and timely revenue.

2. Invest a portion of production taxes into a permanent investment fund to manage volatility in oil and natural gas prices, and secure a long-term revenue stream for Montana. Wyoming, New Mexico, Alaska have amassed significant "rainy day" funds with oil and natural gas revenue while Montana continues to watch its revenue estimates decline.

3. Maximize revenue from energy production by raising taxes to be equivalent with the state's neighbors, and target incentives to exploration. Apply revenue generated from the depletion of Montana's natural resources to continue Montana's long-term trend toward a modern and diverse economy.

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/naicod.htm

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, redrilling, 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.

ENDNOTES

[1] Tapping Montana's Power Potential, The Schweitzer Energy Policy. Montana Governor's Office of Economic Development - Energy. http://www.business.mt.gov/govsenergypage.asp Downloaded March 3, 2009.

[2] The complete text of the Energy Policy Act of 2005 is online: http://www.epa.gov/oust/fedlaws/publ_109-058.pdf.

[3] Headwaters Economics, *Energy Development and the Changing Economy of the West*, 2008. Published online: http://www.headwaterseconomics.org/energy

[4] Headwaters Economics, *Fossil-Fuel Extraction as a County Economic Development Strategy: The Performance of Energy-Focusing Counties in the West,* 2008. Published online: www.headwaterseconomics.org/energy

[5] The Economic Profile System creates detailed 32-page socio-economic profiles of counties, states, and regions. On our web site, you may browse and access EPS profiles for any county and state in the West, request custom profiles, or download a free copy of the automated EPS software www.headwaterseconomics.org/eps.

[6] Bureau of Economic Analysis, Regional Economic Information System, 2006. Table CA30

[7] Ibid.

[8] Ibid.

[9] Ibid.

[10] Ibid.

[11] BEA REIS 2006 Table CA05

[12] Ibid.

[13] BEA REIS 2006 Table CA05N.

[14] Ibid.

[15] *Fossil-Fuel Extraction as a County Economic Development Strategy: The Performance of Energy-Focusing Counties in the West.* Headwaters Economics Energy and the West series, 2008. www.headwaterseconomics.org/energy

[16] U.S. Census Bureau, *County Business Patterns (CBP), 2007.* Travel and Tourism is defined using the approach outlined by Kuhbach et al. in "US Travel and Tourism Satellite Accounts for 1998–2003." Bureau of Economic Analysis, U.S. Department of Commerce, Washington, DC, September 2004. Timber Related includes NAICS industry codes (113, 1153, 321, 322) that include forestry and lumber, and paper and wood products manufacturing. Mining is defined as major NAICS code 21: Mining, Quarrying, Oil and Gas Extraction.

[17] *Energy Development and the Changing Economy of the West.* Headwaters Economics Energy and the West series, 2008. www.headwaterseconomics.org/energy

[18] Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW). See also page 32 of the Economic Profile System (EPS) *SocioEconomic Profile of Montana* available at www.headwaterseconomics.org/energy.

[19] Ibid.

[20] Ibid.

[21] Ibid.

[22] Federal Reserve Bank of New York, "Benefits of Trade." The Basics of Foreign Trade and Exchange, September 4, 2002 (September 13, 2002). Malizia, E.E and Sahnzi, K. (2006) The influence of economic diversity on unemployment and stability. Journal of Regional Science. 33 (2), 221-235. Siegel P.B., Johnson T.G. and Alwang J. (2006) Regional economic diversity and diversification. Growth and Change. 26 (2), 261-284. For a discussion of the performance of "energy-focusing" counties, see *Fossil-Fuel Extraction as a County Economic Development Strategy: The Performance of Energy-Focusing Counties in the West.* Headwaters Economics Energy and the West series, 2008. www.headwaterseconomics.org/energy

[23] This information is discussed in the context of the West in our companion report, *Energy Development and the Changing Economy of the West.* Headwaters Economics Energy and the West series, 2008.

www.headwaterseconomics.org/energy. T. R. Smith, "The Relationship between the Tenth District Economy and the National Economy", Federal Reserve Bank of Kansas City Economic Review Fourth Quarter, 81 (1996): 77–90. http://www.kc.frb.org/publicat/econrev/pdf/4q96smit.pdf. B. McVeigh, Wyoming Economic Analysis Division, "Wyoming Economic Outlook," presentation to the American Association of Petroleum Geologists, Billings, Montana, June 11, 2006.

[24] For a detailed economic profile of Montana and how the state compares to the nation, see the Economic Profile System (EPS) *A SocioEconomic Profile of Montana* available at www.headwaterseconomics.org/energy. See also Headwaters Economics *The Three Wests* study that provides detailed economic summaries and comparisons for every county in Montana to all other counties in the Western U.S. www.headwaterseconomics.org/3Wests.

[25] **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_mbbl_a.htm. Oil Price: Energy Information Administration, Domestic Crude Oil First Purchase Price by Area (Dollars per Barrel), Wyoming, 1987-2007. 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. 2007 natural gas production figures from Montana DNRC, Montana Board of Oil and Natural Gas, Annual Reports. Montana County Oil and Natural Gas Drilling and Production Statistics, 2000-2007. http://bogc.dnrc.mt.gov/annualreviews.asp. 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/n3050wc3m.htm

[26] Ibid.

[27] **For total state and local government revenue, see:** U.S. Census Bureau, Census of Governments, "State and Local Government Finances by Level of Government and by State, 2006," http://www.census.gov/govs/www/estimate06.html.
For Federal mineral royalty distributions to states, see: U.S. Department of the Interior, "Mineral Management Service Disbursement Tables for 2006," http://www.mrm.mms.gov/MRMWebStats/Home.aspx.
For revenue information for Montana, see: Montana Office of Budget Programming and Planning, *2007 Executive Budget*, http://mt.gov/budget/budgets/2007_budget/2007_budget.asp. Montana Department of Revenue, *2005-2006 Biennial Report*, http://mt.gov/revenue/publicationsreports/biennialreports/2005-2006biennialreport.pdf. Montana Trust Land Management Division, *Fiscal Year 2006 Annual Report*, http://dnrc.mt.gov/About_Us/publications/2006/dnrc06ar.pdf.

[28] Ibid.

[29] *Energy Revenue in the Intermountain West.* Headwaters Economics Energy and the West series, 2008. www.headwaterseconomics.org/energy

[30] Production Value, see note 25. Montana Revenue data, see note 27.

[31] *Energy Revenue in the Intermountain West.* Headwaters Economics Energy and the West series, 2008. www.headwaterseconomics.org/energy.

[32] *U.S. Energy Needs and the Role of Western Public Lands* Headwaters Economics Energy and the West series, 2008. www.headwaterseconomics.org/energy.

[33] See notes 25 and 27.

[34] See note 27.

[35] Includes distributions from the oil and natural gas production tax, federal mineral royalties, and corporate income tax revenue.

[36] In 2008, total revenue from oil and natural gas extraction on state trust lands (reported here as state royalties) was $30 million. The majority of these revenues are deposited in the Trust Land Permanent Fund. The permanent fund in turn earns interest on the principal balance which is then distributed to local schools and other state programs. In 2008, local schools received $70 million in distributions from the Permanent Fund.[34] Figure __ reports both the annual revenue derived from oil and natural gas on state lands that are

distributed to the Permanent Fun, and the subsequent interest earned by investing these funds. State Trust Land Annual Report, see note 27.

[37] Energy Revenue in the Intermountain West, Energy and the West Series, Headwaters Economics. 2008. www.headwaterseconomics.org/energy

[38] U.S. Energy Needs and the Role of Western Public Lands. Headwaters Economics Energy and the West Series, 2008. www.headwaterseconomics.org/energy

[39] Tapping Montana's Power Potential, The Schweitzer Energy Policy. Montana Governor's Office of Economic Development - Energy. http://www.business.mt.gov/govsenergypage.asp Downloaded March 3, 2009.

[40] Energy Information Administration, Coal Production and Number of Mines by State and Mine Type, 2007. http://www.eia.doe.gov/cneaf/coal/page/acr/tab61.html

[41] See Table 6-2 in the Bureau of Land Management Miles City Resource Management Plan and Environmental Impact Statement, Reasonably Foreseeable Development Scenario for the Williston and Powder River Basins in Eastern Montana. September, 2005 (included as part of the BLM's Final Record of Decision and Final Environmental Impact Statement for the Williston and Powder River Basin, 2008). Figures in the Final Supplemental Environmental Impact Statement for Powder River Basin are slightly higher than those reported in the 2005 Miles City Resource Management Plan and Environmental Impact Statement because they include the Billings Field Office numbers that include Big Horn County.

[42] Ibid.

[43] Ibid.

[44] Minerals Appendix to Final Supplementary Environmental Impact Statement, 2008, page 18. Infrastructure includes compressors and gathering lines. See also Minerals Appendix page Min-33

[45] Miles City RMP and EIS, RFD 2005, page 6-1.

[46] Energy Information Administration (EIA) data: Index page,
http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/maps/maps.htm
Southern PR Basin.
http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/maps/PRB_S_GAS.pdf
Northern PR Basin
http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/maps/PRB_N_GAS.pdf
Williston Basin NE,
http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/maps/Williston_NE_BOE.pdf
Williston Basin NW,
http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/maps/Williston_NW_BOE.pdf
Williston Basin S,
http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/maps/Williston_S_BOE.pdf
Final SEIS of Miles City RMP, 2008, page 3-23.
http://www.blm.gov/eis/mt/milescity_seis/feis/doc/chap3.pdf

[47] One of the major legal issues holding up development has been water quality. CBM extraction requires first pumping water out of coal seams to release pressure that holds the CBM in place. Once the water is removed, CBM will separate from the coal and it can be extracted through a conventional natural gas well. The water extracted can be highly saline and is considered a pollutant under the U.S. Clean Water Act. In 2003 the Montana Board of Environmental Review adopted new water quality rules relating to CBM product water in the Tongue River, Powder River, and Little Powder Rivers which originate in Wyoming and flow North to Montana. Several energy companies and the State of Wyoming sued to overturn Montana's regulations, but have recently lost in both state and federal courts—upholding Montana's right to regulate CBM water in surface streams. Other lawsuits by individual landowners and regional interest groups over the Bureau of Land Management's previous Record of Decision have also recently been resolved, and the new Record of Decision is not in place.

[48] Minerals Appendix, Table Min-1, page 2.

[49] BEA REIS 2006 Table CA30

[50] Ibid.

[51] BEA REIS 2006 CD Table CA05

[52] Ibid.

[53] Ibid.

[54] Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW)

[55] *Fossil-Fuel Extraction as a County Economic Development Strategy: The Performance of Energy-Focusing Counties in the West.* Headwaters Economics, 2008.

[56] The RMP cites a 2001 study done by a Billings CPA to estimate jobs. See Table 4-58, p 4-173 in Draft Supplement to the Montana Statewide Oil and Gas Environmental Impact Statement and Amendment of the Powder River and Billings Resource Management Plans. http://www.blm.gov/eis/mt/milescity_eis/seis/doc/chap4.pdf.

[57] Ibid.

[58] Bureau of Labor Statistics, see note 27.

[59] Idem. (p. 4-169)

[60] Ibid.

[61] BLM RFD, 2005. See note 41.

[62] Calculated from revenue data and well projections cited in notes 27 and 41.

[63] Calculated from data presented in *Energy Revenue in the Intermountain West*, Headwaters Economics, 2008.

[64] See note 61.

[65] Big Horn County Audited Financial Reports, FY 2007.

[66] Powder River County, Broadus Montana, Financial and Compliance Report Year Ended June 30, 2007.

[67] *Impacts of Energy Development in Colorado*, Headwaters Economics, 2008.

[68] Montana Department of Revenue Annual Report, see note 27.

[69] Rosebud County Annual Audited Financial Report, FY 2007.

[70] Calculated from revenue data and well projections cited in notes 27 and 41.

[71] Ibid.

[72] Headwaters Economics calculation using previous sited data in notes. Returning the base tax rate to pre-1999 rates (15 percent on oil and 12 percent on natural gas) would generate an additional $736 million to $2 billion under the high and low development scenarios.

[73] Pederson Planning Consultants, 2001. Appendix D in the Wyoming Energy Commission, Preliminary Progress Report to the Wyoming Legislature, Joint Minerals, Business and Economic Development Committee, December 14, 2001. PageD-1. Report commission by the Wyoming Energy Commission.

[74] Personal Communication with Jack Olson, North Dakota Department of Transportation and Greg Boschee, Montrail County Commissioner. .

[75] BBC Research and Consulting, *NorthWest Colorado Socioeconomic Analysis and Forecasts*, prepared for the Associated Governments of NorthWest Colorado, 2008. Page 13 of the executive summary..

[76] Montana Department of Revenue, 2008.

[77] See *U.S. Energy Needs and the Role of Western Public Lands* Headwaters Economics, 2008 and note 79.

[78] Samuel Western, Does Wyoming Get Enough for Its Mineral Riches? Severance Tax Reform in the Cowboy State. February 8, 2009. http://www.wyofile.com/reform_wyoming_severance_tax.htm. Downloaded on March 4, 2009.

[79] S. Gerking, W. Morgan, M. Kunce, and J. Kerkvliet, *Mineral Tax Incentives, Mineral Production and the Wyoming Economy*, report prepared for the Mineral Tax Incentives Subcommittee, Wyoming State Legislature, 2000, http://eadiv.state.wy.us/mom/StateReport.pdf and, M. Kunce, S. Gerking, W. Morgan, and R. Maddux, *State Taxation, Exploration, and Production in the U.S. Oil Industry*, report prepared for the Wyoming State Legislature, 2001, http://legisweb.state.wy.us/2001/interim/app/reports/oiltaxpaper%2011-26-01.pdf

www.headwaterseconomics.org