

A Report by



Fossil Fuel Extraction and Western Economies



April 2011

Fossil Fuel Extraction and Western Economies

Headwaters Economics, Bozeman, Montana

April 2011

PUBLISHED ONLINE:

<http://headwaterseconomics.org/energy/western/maximizing-benefits>

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.

Acknowledgments

Headwaters Economics is grateful to Buck McVeigh, Peter Morton, Roy Allen, Judy Jordan, and Jeffrey Jacquet for providing constructive criticism that helped to improve this report. We would also like to thank the numerous staff and elected officials from local and state government who contributed time and energy in interviews and providing access to necessary data.



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Cover photo: Rig worker in Western Colorado. Photo ©Ed Kosmicki/photosourcewest.com.

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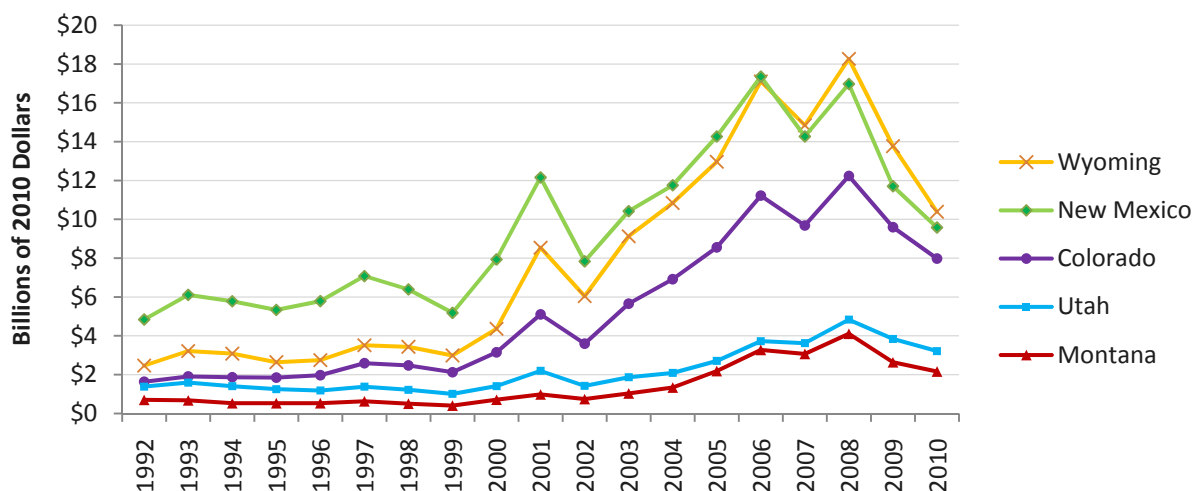
Fossil Fuel Extraction and Western Economies: Executive Summary

This report assesses the performance of the fossil fuel industry in five energy-producing states in the Rocky Mountain West—Colorado, Montana, New Mexico, Utah, and Wyoming—in the context of the energy surge of the mid-2000s and the recent recession. The 2003-2008 natural gas surge and slump is then considered in depth through a case study analysis of local experiences with natural gas development on Colorado’s Western Slope and in southwestern Wyoming.

Background

Natural gas development boomed in the Rocky Mountain West over the course of the 2000s. A growing economy, supply shortages in major markets, and technological innovations that expanded the feasibility of tight sands gas production helped create strong prospects for “Rockies Gas” extracted in Colorado, Montana, New Mexico, Utah, and Wyoming. Drilling activity surged from 2003 to a 2008 peak, creating a new episode of growth in the long history of commodity boom-bust cycles in the American West. The value of the oil and natural gas produced in the five states between 2003 and 2008 was more than 300 billion dollars. Headwaters Economics examined the costs and benefits of the boom years in a series, *Energy in the West*, published in 2008 and 2009.¹

Figure ES-1. Production Value of Oil and Natural Gas, 1992–2010



Sources: U.S. Energy Information Administration, *Natural Gas Withdrawals, Crude Oil Production, Natural Gas Wellhead Prices by Area, Crude Oil Wellhead Acquisition Price by First Purchasers by Area*.

¹ Headwaters Economics, 2008-2009. *Energy in the West* series.
<http://headwaterseconomics.org/topic/energy/western>.

The severity of the 2007–2009 recession was unprecedented in recent history. The downturn resulted in an inevitable slump in energy production in the region, marked by slowdowns in drilling activity in the gas fields, job losses in mining, and massive devaluation of natural gas revenue. With some of the fast-growing regions of the West among the nation’s worst hit economies and with energy prices undergoing a new episode of volatility, there is a risk of public dialogue suffering from confusion about the role of fossil fuels in the region’s economic well-being.

Fossil fuel development involves the extraction of enormously valuable resources, which are largely publicly owned. Development of fossil fuels also involves significant costs and risks. Private energy companies assume many of these risks, while the public bears others. This purpose of this report is to evaluate whether the approach taken to fossil fuel development in the Rocky Mountain West in the decade of the 2000s worked to maximize benefits and minimize costs to the region’s public.

The report contains three chapters, each of which addresses a core component of the performance of the fossil fuel economy.

1. What is the Role of Fossil Fuel Development in the Regional Economy?

Chapter 1 provides a background of key economic trends that places the 2007–2009 recession in perspective in the region’s broader economic history, presents trends in the economies of fossil fuel production in the region, and discusses the role of fossil fuel-related employment and income in the five study-area states.

2. What is the Role of Fossil Fuel Revenue in State Budgets?

Chapter 2 describes the fiscal impacts of the 2003–2008 natural gas surge and slump in the five study-area states and discusses the relationship between the recession, state budget trends, and fossil fuel revenues.

3. Do Local Communities Benefit from Fossil Fuel Development?

Chapter 3 focuses on the natural gas surge in the Piceance Basin in Colorado and the Greater Green River Basin in Wyoming and developments since the recession. Case studies of municipal and county trends in Garfield and Mesa counties in Colorado and in Sublette and Sweetwater counties in Wyoming highlight the opportunities and challenges related to integrating volatile fossil fuel industries within a broader program of economic development.

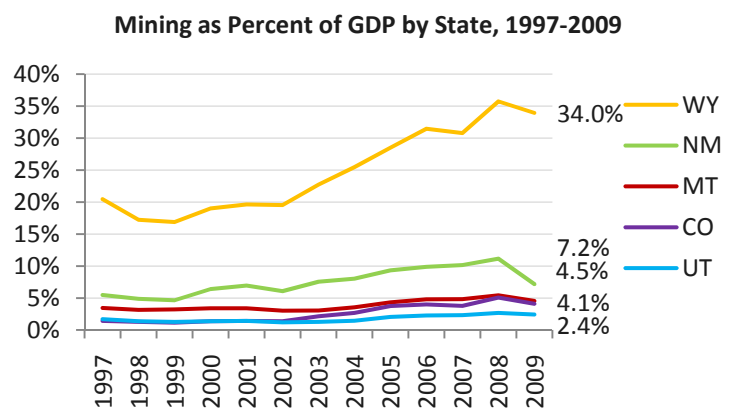
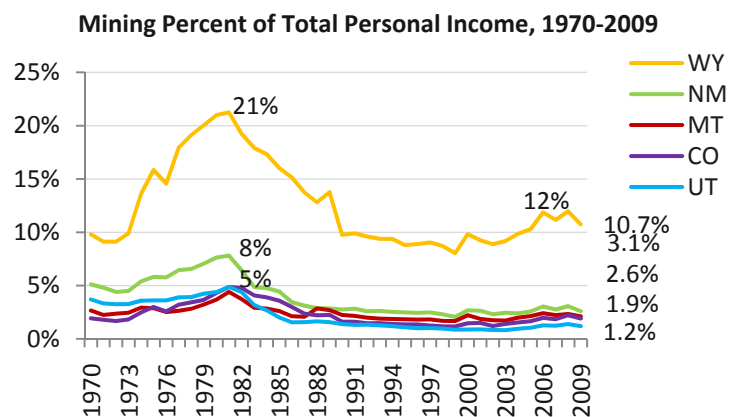
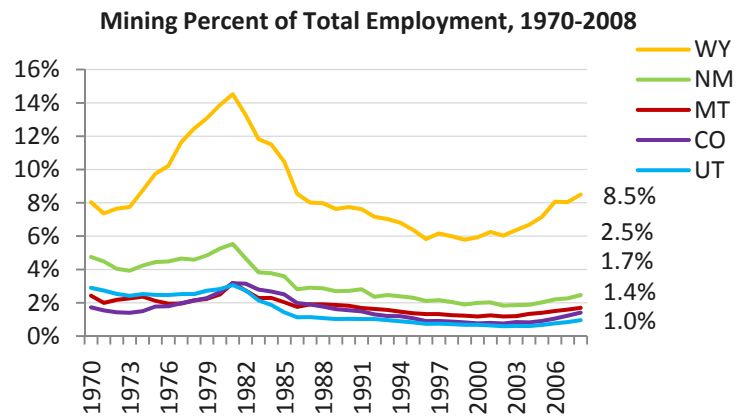
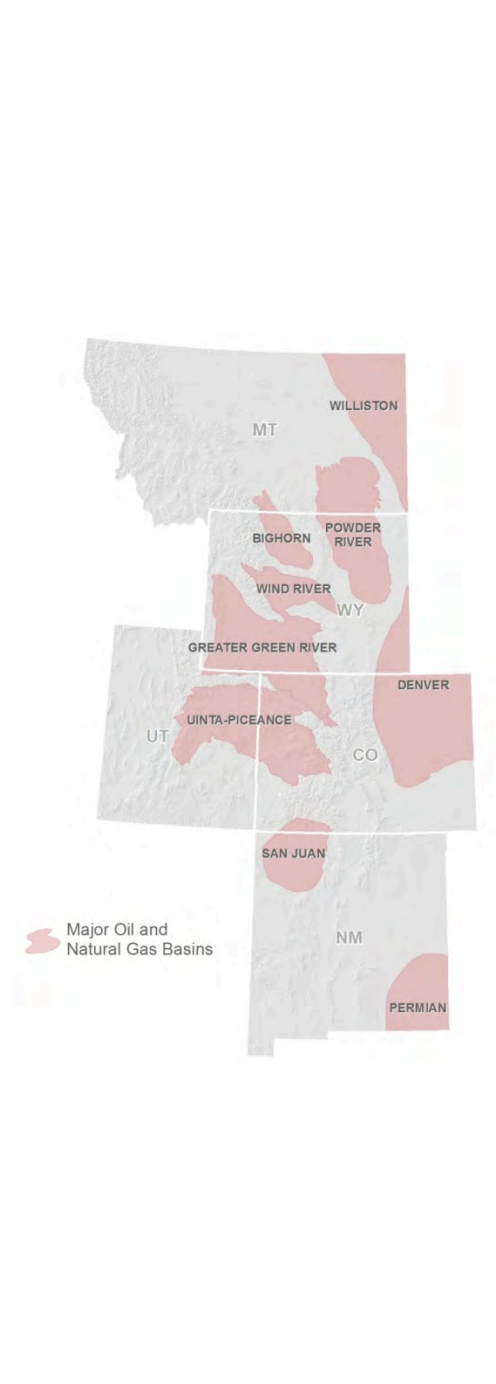
Summary Findings

The Role of Fossil Fuel Extraction in the Regional Economy

Fossil fuel extraction has a limited influence at the state level on economic indicators such as GDP by State, personal income, and employment. This means that while small groups of employees and certain mining areas within the Rocky Mountain States are heavily exposed to volatility in the oil and natural gas prices, the performance of state economies overall is tied to the broader economy.

Study Geography

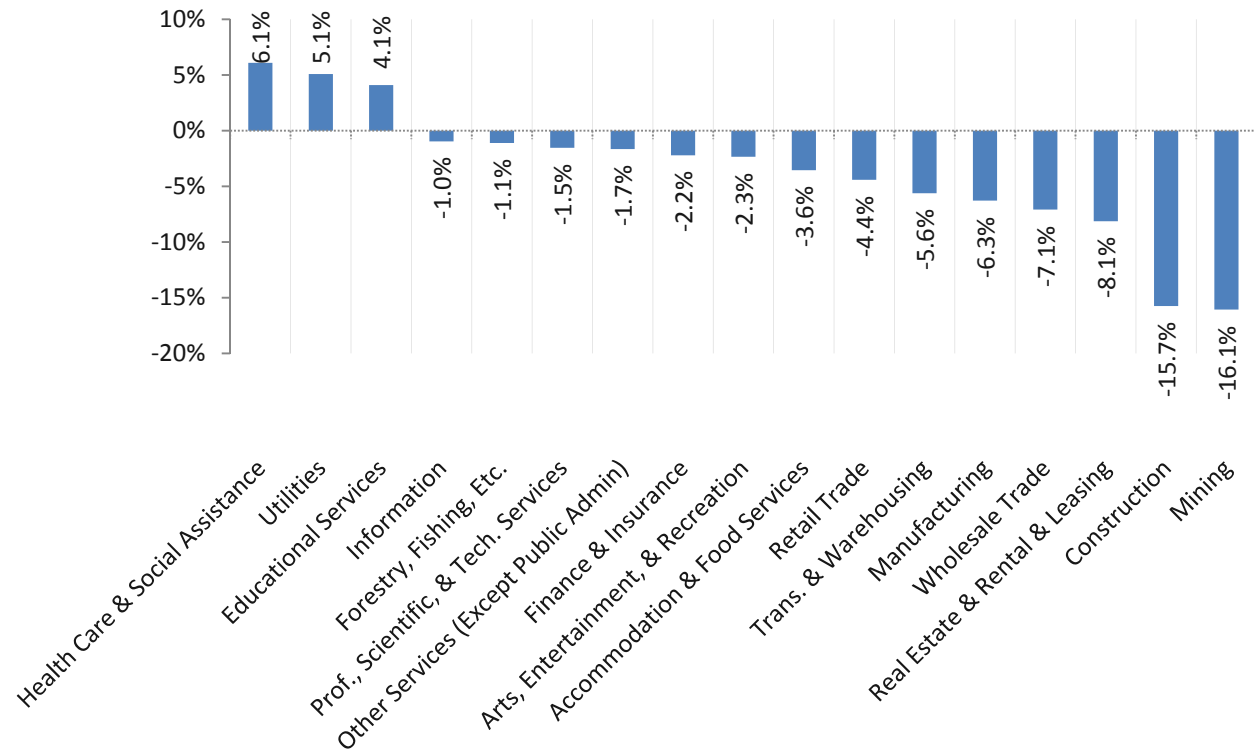
Map ES-1, Figures ES-2, ES-3, & ES-4



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Tables CA25 & CA25N. U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Tables SA05 & SA05N. Mining as Percent of GDP calculated in 2009 dollars.

In the recent recession, construction, manufacturing, and real estate represented the bulk of compensation loss in the five states. However, mining, including energy development, compensation shrank by the largest percent (16.1% decline from 2008 to 2009) of any sector, demonstrating the continued volatility of this industry.

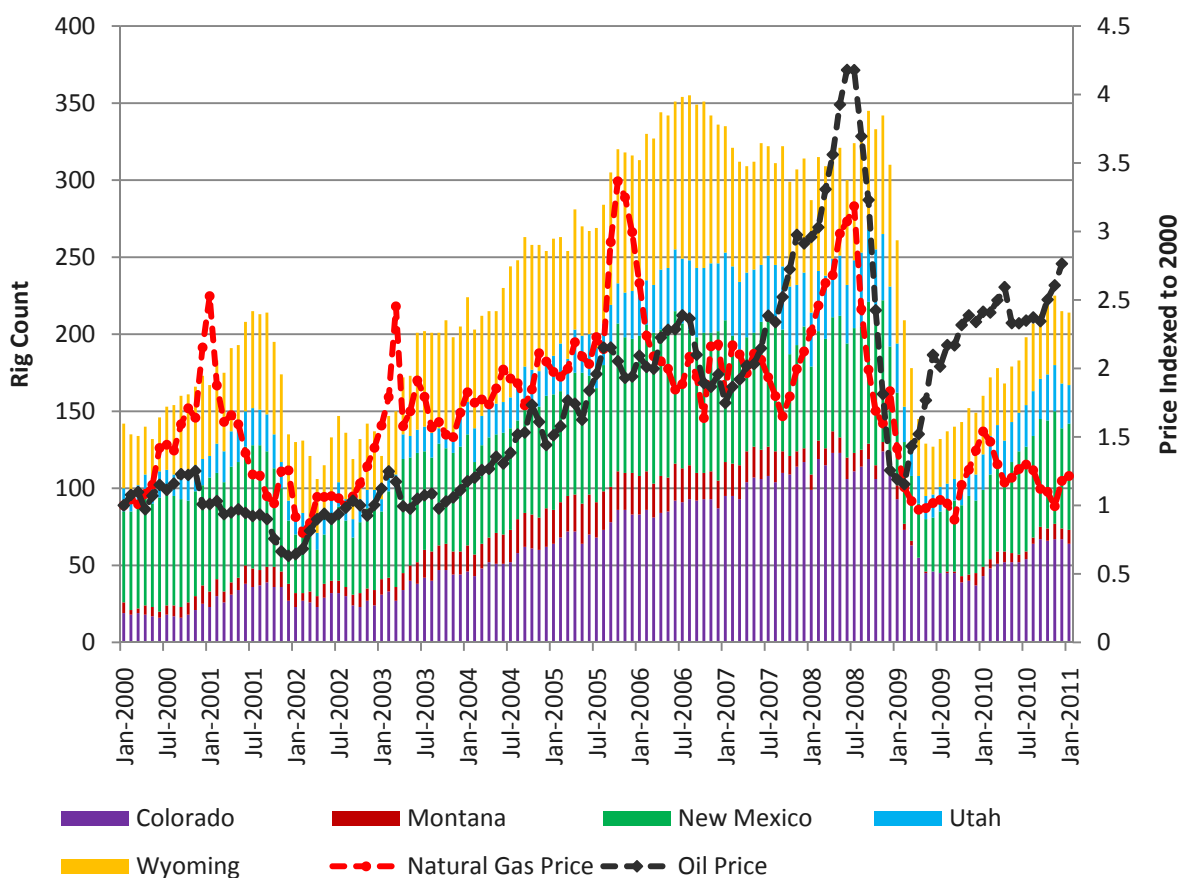
Figure ES-5. Percent Change in Total Compensation by Industry in CO, MT, NM, UT, and WY, 2008–2009



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Table SA06N.

Employment and income from mining in the five-state region track closely with commodity prices. Oil and natural gas jobs are more volatile than coal jobs because oil and natural gas prices tend to fluctuate more widely than coal prices. The bulk of the growth in mining employment over the past decade has been in the oil and natural gas sector, along with the bulk of lost mining jobs. As the rig activity charted in ES-6 demonstrates, price—not policy—is the primary driver of oil and gas development activity.

Figure ES-6. Monthly Drilling Rig Count, with Monthly Natural Gas and Oil Prices, January 2000 to February 2011



Source: Baker Hughes Rig Counts, Accessed 2-28-2011. U.S. EIA Oil and Natural Gas Price Monthly. Prices shown are in 2010 dollars, then indexed to 2000.

The Role of Fossil Fuel Revenue in State Budgets

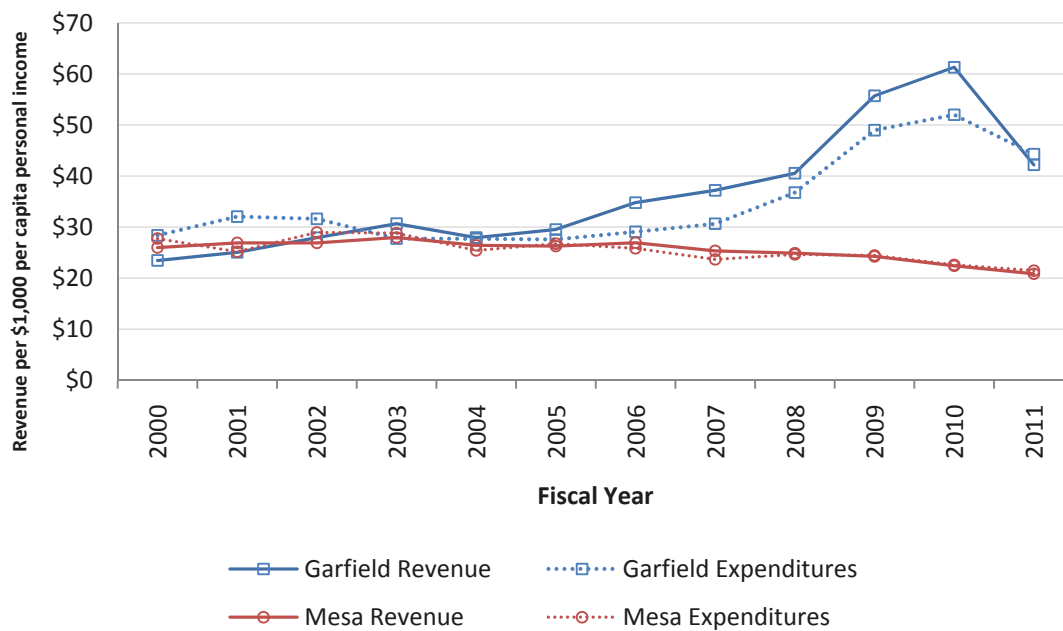
Fossil fuel production has not insulated energy-producing states from fiscal crisis. Energy-producing states outperformed their peers fiscally at the start of the recession, but ultimately the decline of fossil fuel prices and reduced revenue exposed Colorado, Montana, New Mexico, Utah, and Wyoming to the impacts of the recession. As a result, each state has faced budget shortfalls to some extent, and has made significant cuts to state services to make ends meet.

Several other factors, including structural and policy issues, exposed energy-producing states to deeper impacts than might be expected based on the wealth generated through fossil fuel extraction. To varying degrees, each state, in its way, made decisions that left them exposed to one or more impacts of the recession.

Mixed Local Community Benefits from Fossil Fuel Development

The local costs and benefits of energy development are experienced unevenly: “fossil fuel prosperity” is more likely to occur in places that are the exception rather than the rule in the U.S. West. Predominantly rural areas with high levels of drilling and limited economic diversity may be the most overwhelmed by the buildup phase of an energy boom, but also are the places that ultimately may see the greatest long-term fiscal gain from energy development.

Figure ES-7. County Government Revenue and Expenditures in Garfield County and Mesa County, Colorado per \$1,000 of Per Capita Personal Income



Source: Garfield and Mesa counties, Audited Financial Statements.

The ability of communities and their leaders to use increased revenue to diversify and stabilize their economic future varies based on state revenue distribution systems, and on local politics and decision-making. As Figure ES-7 shows, Mesa and Garfield counties received vastly different levels of revenue during the natural gas surge in western Colorado, despite both playing important roles as bases for employees and workers.

Community economic success in energy development also depends on an ability to understand and address cumulative impacts of development on those amenities essential to long-term economic prosperity such as scenery, water, and air quality. Experiences with air quality and groundwater impacts in the study areas raise concerns about cumulative impacts that, unmitigated, threaten to foreclose opportunities for economic diversification. Local, regional, and state governments vary in their capacity and success with anticipating, monitoring, and responding to such impacts.

Conclusions & Policy Recommendations

The volatility of fossil fuel markets poses obstacles to the stability and long-term security of economic growth in energy-producing regions. Fossil fuel extraction, especially when prices are high, creates an enormous amount of wealth, most of which currently leaves the region. Employment in fossil fuel extraction also is driven by price, which changes rapidly. In the recent recession, mining, including energy development, fell hard and fast: compensation for mining employment shrank by the largest percent (16.1% decline from 2008 to 2009 in the five-state region) of any economic sector.

Ultimately, the tax revenue from fossil fuel extraction is the longest-lasting economic legacy of fossil fuel development. While revenue varies because of price volatility, it continues to accrue long after most jobs have left a region. Severance taxes are designed to ensure the public receives a lasting benefit from the depletion of non-renewable resources. By maximizing collection of fossil fuel revenue and ensuring it is adequately distributed, states increase the benefits of energy development. One lesson from the natural gas surge is that there is significant room for improvement in this arena in the Rocky Mountain West.

None of the states in this report has a perfect energy tax structure. Each state does a few things well, and could improve in other areas. Wyoming, for example, has saved a significant amount in a permanent fund that could support the state General Fund for more than six years, but the state currently shares little with communities where development is taking place. Colorado has done a good job directing revenue back to energy-producing communities, but it taxes at a low rate and has not saved for the future. (Colorado's permanent fund would finance the state's General Fund for only two weeks.)

As this report goes to press, oil prices are encouraging interest in unconventional oil, and natural gas is enjoying renewed attention as an ideal fuel in the wake of the Pacific Tsunami. At the outset of potential boom episodes in fossil fuel extraction, the West and the nation would benefit from policies designed to insure that fossil fuel extraction proceeds in a way that maximizes benefits and minimizes costs to energy-producing regions. Policy updates fall into three general areas: (1) increasing revenue collection, (2) improving energy revenue management and distribution, and (3) mitigating or avoiding costly negative impacts of energy production.

Increasing Revenue Collection

- Raise base tax rates and remove production incentives. Examples include a Colorado tax incentive that allows producers to write off local property tax against state severance tax liability and Montana's oil and gas tax holiday that reduces rates for the first 12 to 18 months on vertical and horizontal drilling respectively. Oil and gas development are exempt from Wyoming's Industrial Siting Act, limiting opportunity to collect revenue specifically intended to mitigate harmful impacts of industrial development at the local level.
- Shift incentives from production to exploration and research and development (R&D). Studies have shown that production incentives perform weakly compared to efforts to facilitate exploration and R&D when it comes to actual production levels.
- Avoid a race to the bottom regionally-similar tax rates. For example, effective tax rates on fossil fuel production range from about 6 to about 16 percent across the five states.

Improving Revenue Management and Distribution

- Reform tax policies that exacerbate the lag between the timing of impacts and actual revenue availability. Revenue may not accrue until up to one to two years after production begins, at which point many local impacts have already occurred. Montana eliminated local property taxes on production and replaced them with an oil and gas production tax, reducing the lag. However, Montana also introduced a tax holiday on oil and gas production that delays revenue to local governments by 12 to 18 months.
- Avoid the use of severance taxes to fund basic government services.
- Establish permanent funds to dampen the negative effects of revenue volatility. For this reason, permanent funds are a better source of funds for basic government services and can provide principal for grants and loans to address impacts of energy development. Wyoming and New Mexico have established the largest permanent funds in the region, while Montana does not invest any oil and gas revenue into a permanent fund.
- Reform distribution of revenue to ensure state support where needed. Colorado revamped its energy assistance program in 2007, improving local government access to energy revenue for both impact mitigation and long-term economic development efforts. Revenue distribution in Wyoming, in contrast, remains problematic.
- Eliminate state-imposed revenue and spending limitations that force communities to forgo revenue from oil and natural gas production. Colorado's Taxpayer Bill of Rights (TABOR) has been especially detrimental in Mesa County, Colorado.
- Ensure that local and regional governments have access to energy revenue to support long-term economic diversification and development. For example, the state of Colorado made energy revenue funding available for regional clean energy initiatives. In Garfield County, the funding helped launch an effort that has grown businesses and jobs and has funded clean energy infrastructure.

Avoiding Costly Impacts

- Protect air and water quality through a precautionary approach to leasing and development plans.
- Direct oil and gas development to appropriate areas, and permanently protect vulnerable areas, through proactive planning that engages private landowners, local, regional, and state representatives as well as federal agencies.
- Establish threshold measures of cumulative impacts that include biological as well as socioeconomic metrics. Enforce moratoriums or other checks on the pace and scale of development linked to such triggers.
- Set money aside for impact mitigation at multiple scales of government. Impacts such as loss of water quality and air pollution may be likely to exceed local resources. Successful mitigation typically requires coordination and funding across agencies.

Chapter 1: Fossil Fuels, the Recession, and the Economies of Colorado, Montana, New Mexico, Utah, and Wyoming

Introduction

Chapter 1 provides an economic overview of trends in fossil fuel production and its role in state economic performance in terms of employment, income, and gross domestic product by state (GDP by State). This chapter addresses three questions:

1. How does the recent recession fit into the overall pattern of economic growth for the region?
2. How do fossil fuel development trends affect the overall economy of the five states?
3. What was the significance of the fossil fuel industry to state-level economic performance in the recent recession?

Colorado, Montana, New Mexico, Utah, and Wyoming play an important role in providing energy for the nation, with several of the states ranking in the top ten nationally in the production of key fossil fuels: coal, natural gas, and oil. Despite their significance, the majority of these fossil fuel industries are only one among many sectors that together shape the economic performance of the five states. This chapter analyzes the relationship between the mining and other economic sectors and also the ways in which one state, Wyoming, is an exception to a general pattern of economic diversification in the region.

Chapter 2 considers how the decline in fossil fuel values has affected state revenue and state fiscal performance, particularly in the context of the recession and related state budget crises. Chapter 3 focuses more explicitly on the link between fossil fuel markets and the economy by documenting local-level impacts of energy development in places that were at the center of the natural gas surge in the 2000s.

Key Findings

- The 2007–2009 recession yielded the first absolute declines in job growth for the five-state region in decades. The region’s fastest growing state economies are found in Colorado, New Mexico, and Utah, where income from mining contributed 2.6 percent or less of total personal income in 2009.
- Employment and income from mining in the five-state region trend with commodity prices. The bulk of the growth in mining employment over the past decade has been in the oil and natural gas sector, along with the bulk of lost mining jobs.
- In late 2010, drilling activity had recovered to about two-thirds of heights reached in 2006 and 2008. Rig activity trends during the recovery indicate that price—not policy—is the primary determinant of levels of oil and gas development activity
- Colorado, Montana, New Mexico, Utah, and Wyoming play an important role in providing energy for the nation, yet mining-related employment and income are a small component of the overall economy in each of these states, with the exception of Wyoming. Thus, while particular

sectors and certain regions within the five-state region are heavily exposed to volatility in oil and natural gas prices, the performance of state economies overall is tied to the broader economy.

- In the recent recession, construction, manufacturing, and real estate represented the bulk of compensation loss in the five states. However, mining compensation shrank by the largest percent (16.1% decline from 2008 to 2009) of any sector, exemplifying the volatility of this industry.
- The exception is Wyoming, with its heavy specialization on mining. The recession appeared to arrive late in Wyoming, where employment losses were less severe than elsewhere in the region—possibly due to the extreme labor shortage in the state going into the recession. However, for the duration of the recession, Wyoming experienced the largest percentage decline in personal income of the five states.

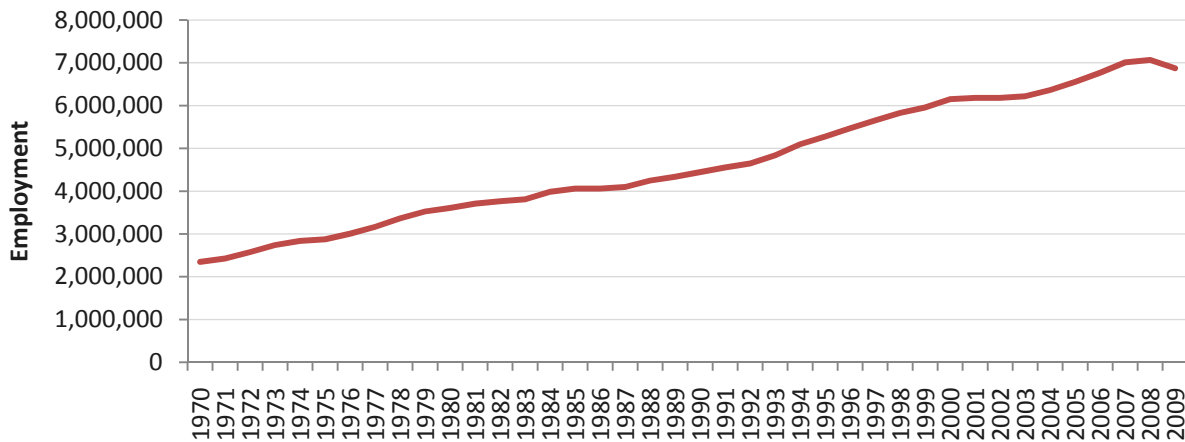
The Current Recession in Context

During the last forty years, the economies of Colorado, Montana, New Mexico, Utah, and Wyoming—the energy-producing states in the Intermountain West—have grown enormously and have become less subject to the volatility of cycles within particular economic sectors (with some exceptions).

First Absolute Employment Declines in 30 Years

As Figure 1-1 shows, growth in total employment for the five states combined was remarkably steady and strong, adding more than 4.5 million new jobs (about 200 percent growth) from 1970 to 2009. The national recessions in the early 1980s and 2000s flattened employment growth temporarily and in the most recent recession (officially ended in June 2009, chart data goes to year-end 2009) led to absolute employment declines.²

Figure 1-1. Total Employment CO, MT, NM, UT, and WY in Aggregate, 1970–2009

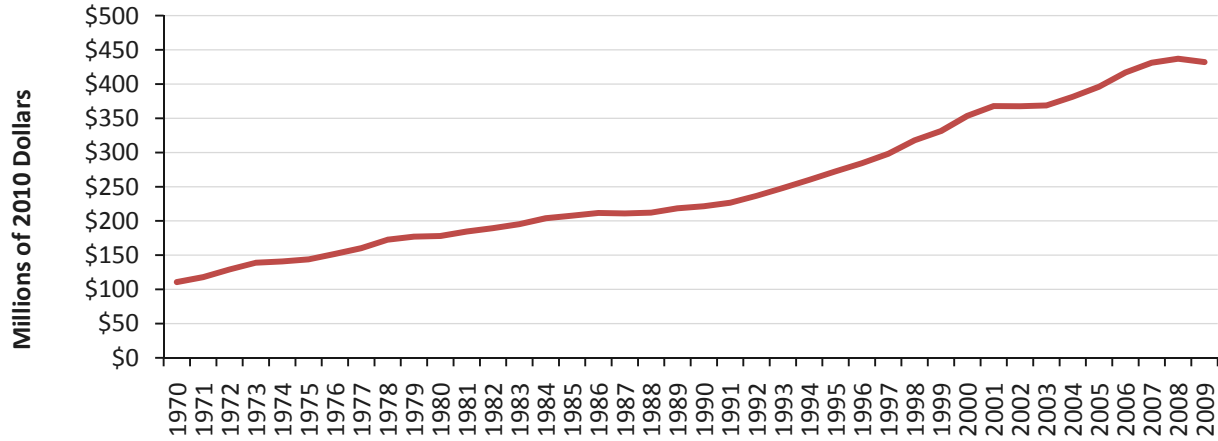


Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Table CA30.

² U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System (REIS), State Income and Employment Summary, Table SA04. The National Bureau of Economic Research (NBER) officially designates the start and end dates of economic cycles. See <http://www.nber.org/cycles.html>.

Similar patterns are evident in personal income. Figure 1-2 shows that real total personal income for the five states combined grew steadily and strongly, increasing by \$320 million or nearly 300 percent over the same period.³ Despite this strong growth, the last several recessions demonstrate that vulnerabilities remain.

Figure 1-2. Total Real Personal Income CO, MT, NM, UT, and WY in Aggregate, 1970–2009



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Table CA30.

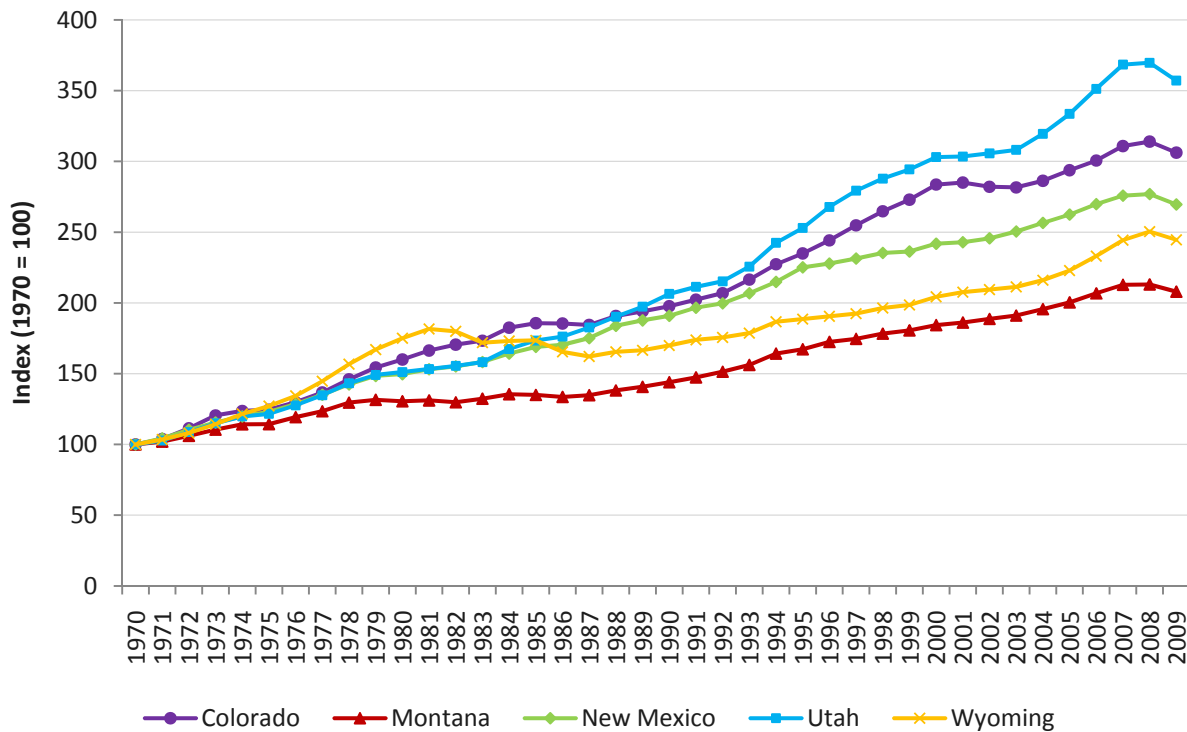
In order to see how each state economy performed over time, we also looked at the indexed employment growth by state for the same time period.

³ Ibid.

Strongest Employment and Income Growth in Utah, Colorado, New Mexico

Figure 1-3 shows that Utah experienced the fastest employment growth and Montana the slowest from 1970 to 2009. It also shows that Wyoming was the only state economy to experience a net job loss in the recession of the early 1980s in which oil and uranium prices both fell dramatically: 11 percent of all jobs in Wyoming were lost between 1981 and 1987.⁴ In the early 2000s recession, the economies in Utah and Colorado, especially along the Utah’s Wasatch Front and Colorado’s Front Range, revealed vulnerability to the “technology bubble.” In the most recent recession, every state in the region had net job losses, indicating the breadth and severity of the downturn.

Figure 1-3. Change in Total Employment for CO, MT, NM, UT, and WY, 1970–2009 (indexed, 1970=100)

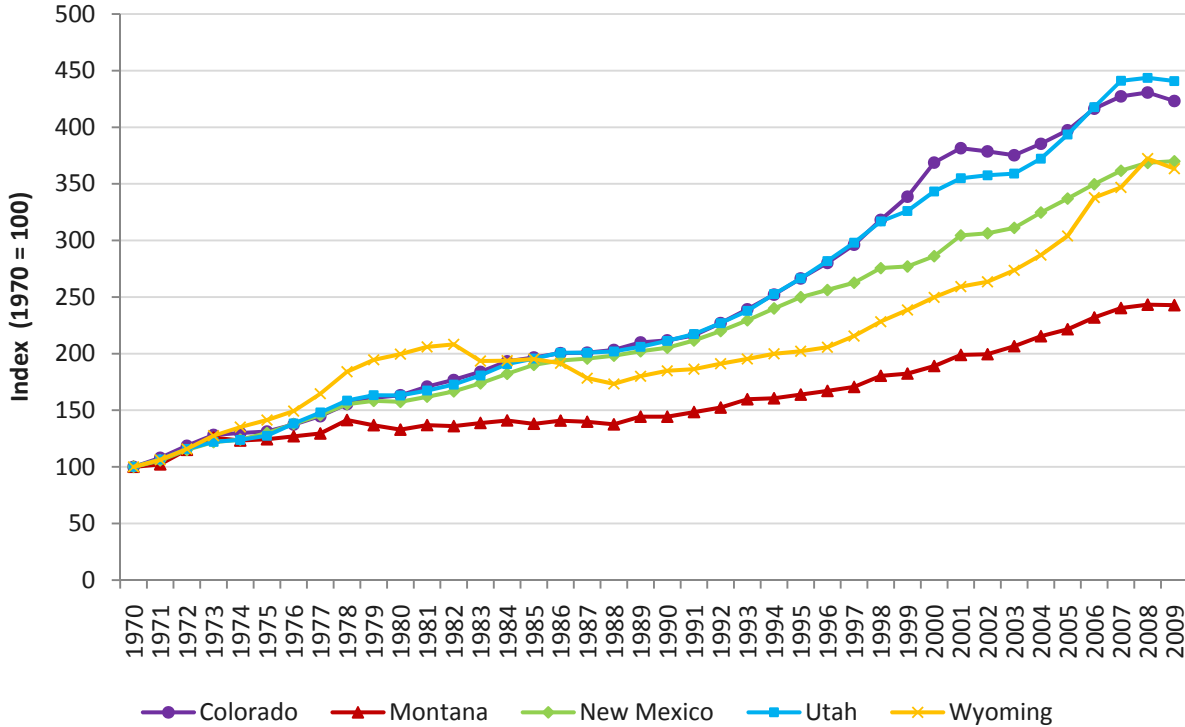


Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Table CA30.

⁴ Ibid.

The same trends are evident in personal income by state. Figure 1-4 shows that Utah narrowly outpaced Colorado in real personal income growth while Montana, with its comparatively rural economy, lagged. Wyoming’s real personal income, which was heavily dependent on mining and energy sectors leading up to the recession in the early 1980s, fell by 17 percent from 1982 to 1988 before recovering sharply in the 1990s and 2000s. New Mexico observed a steadier and more predictable growth trajectory.⁵

Figure 1-4. Change in Total Real Personal Income for CO, MT, NM, UT, and WY, 1970–2009 (indexed, 1970=100)



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Table CA30.

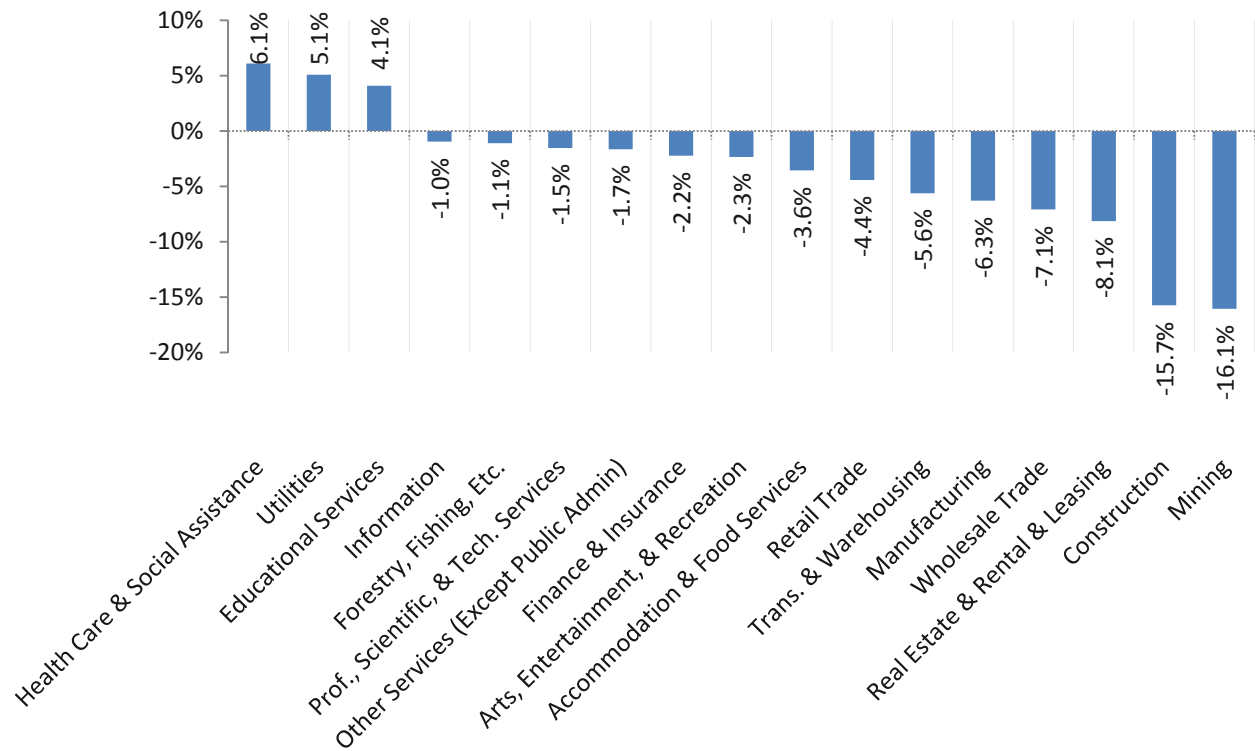
⁵ Ibid.

Mining Experienced Largest Percent Loss in Compensation from 2008 to 2009

Despite the extent of the latest recession, not all industries performed the same during the downturn.

Figure 1-5 shows that some sectors such as health care and utilities compensation grew from 2008 to 2009. The industries most closely associated with the last recession were construction, manufacturing, and real estate and in fact they represent the bulk of compensation loss. However, mining, including energy development, compensation shrank by the largest percent (16.1% decline from 2008 to 2009) of any sector, demonstrating the continued volatility of this industry.⁶

Figure 1-5. Percent Change in Total Compensation by Industry in CO, MT, NM, UT, WY, 2008–2009

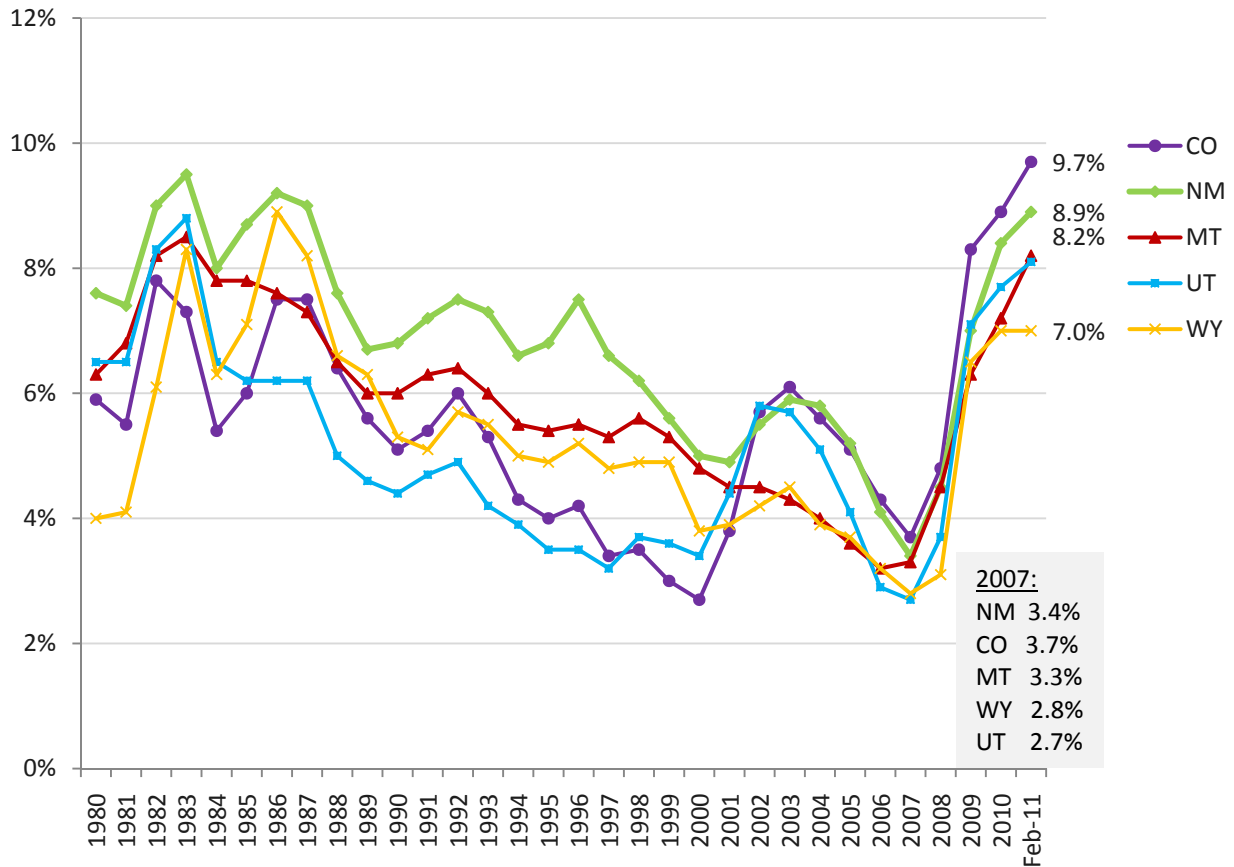


Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Table SA06N.

⁶ U.S. Department of Commerce. 2010. REIS, Compensation by Industry, Table SA06.

The rise in unemployment rates during the recession, illustrated in Figure 1-6, shows vulnerabilities to larger business cycles, the hardship that resulted from the most recent recession, and the speed at which the economies of the region slowed down. In March 2011, Colorado’s unemployment rate was 9.7 percent, followed by 8.9 percent in New Mexico, 8.2 percent in Montana and in Wyoming, and 7.0 percent in Utah.⁷

Figure 1-6. Unemployment Rate (Percent), CO, MT, NM, UT, WY, 1980–2010



Source: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics, 2011.

⁷ U.S. Department of Labor. 2010. Bureau of Labor Statistics (BLS), Local Area Unemployment Statistics.

Regional Fossil Fuel Economic Trends

Colorado, Montana, New Mexico, Utah, and Wyoming play an important role in providing energy for the nation, with several of the states ranking in the top ten nationally in the production of key fossil fuels: coal, natural gas, and oil. Rankings for total energy production from fossil fuels among other energy-producing U.S. states are noted in Table 1-1.

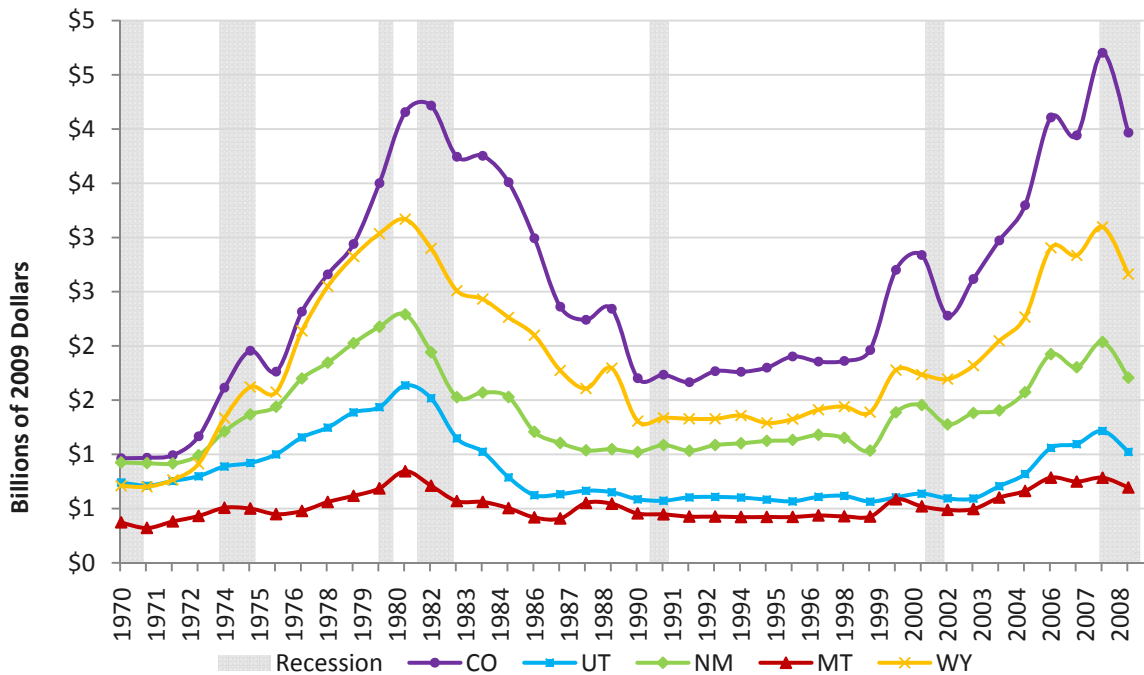
Table 1-1. Fossil Fuel Energy Production (in Total Physical Units) by Source, Ranked by State, 2008

| | Coal | Natural Gas | Crude Oil |
|------------|-----------------|-----------------|-----------------|
| State | Rank (among 25) | Rank (among 32) | Rank (among 26) |
| Colorado | 9 | 6 | 11 |
| Montana | 5 | 18 | 10 |
| New Mexico | 12 | 5 | 7 |
| Utah | 14 | 8 | 13 |
| Wyoming | 1 | 3 | 8 |

Source: U.S. Energy Information Administration, State Energy Production Estimates, State Energy Data System, June 20, 2010 Release.

Figure 1-7 shows that the mining sector, which in these states consists mainly of fossil fuels development (see sidebar), has been and continues to be marked by volatility, with the fluctuations corresponding to periods of national recession (indicated with gray vertical bars) and to mineral and energy prices.

Figure 1-7. Personal Income from Employment in Mining, 1970-2009



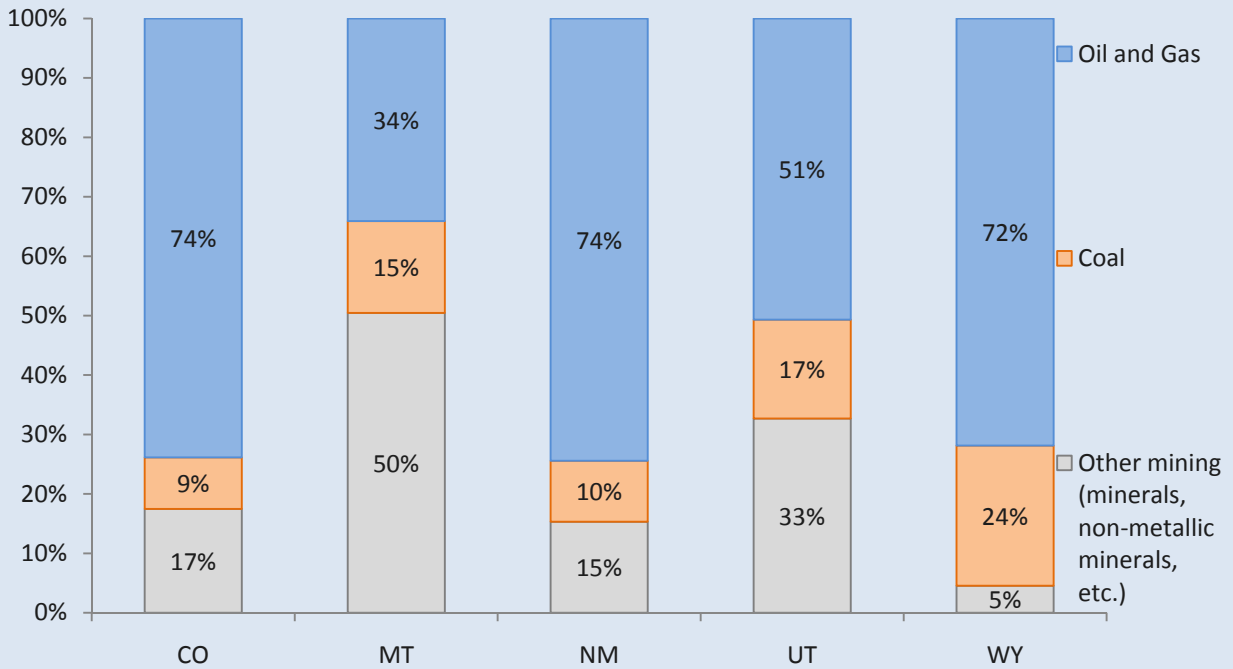
Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Tables SA05 & SA05N.

The last significant “boom and bust” period for mining occurred in the 1970s and 1980s, corresponding to the run-up in energy prices that broke with the national recession that started in July of 1981. There were also noticeable declines in mining-related income during recessions that took place in 1990, and again in 2001. While the current recession officially began in December of 2007 and ended in June 2009, energy prices remained high during the first part of the recession (see Figures 1-9 and 1-10 below), so the mining industry, particularly oil and gas extraction responded later but was still negatively affected by the recession.⁸

Definition of Mining

The term Mining includes oil, gas and coal development, as well as minerals and nonmetallic mining. As Figure 1-8 illustrates, the majority of people employed in mining in the five-state area, with the exception of Montana, work in fossil fuels development. Oil and natural gas contribute the highest proportion of fossil fuels income: 74 percent in Colorado, 74 percent in New Mexico, 51 percent in Utah, and 72 percent in Wyoming. The smallest proportion working in oil and natural gas are in Montana (34%). Wyoming has the largest component of the mining workforce (24%) involved in coal mining, and Colorado has the smallest (9%).⁹

Figure 1-8. Type of Mining as Percent of Total Mining Employment, 2008



Source: Department of Commerce, 2010. Census Bureau, County Business Patterns.

⁸ National Bureau of Economic Research. See Footnote 2.

⁹ A significant portion of mine employment in Montana is in metal ore mining, such as molybdenum. Department of Commerce, 2010. Census Bureau, County Business Patterns.

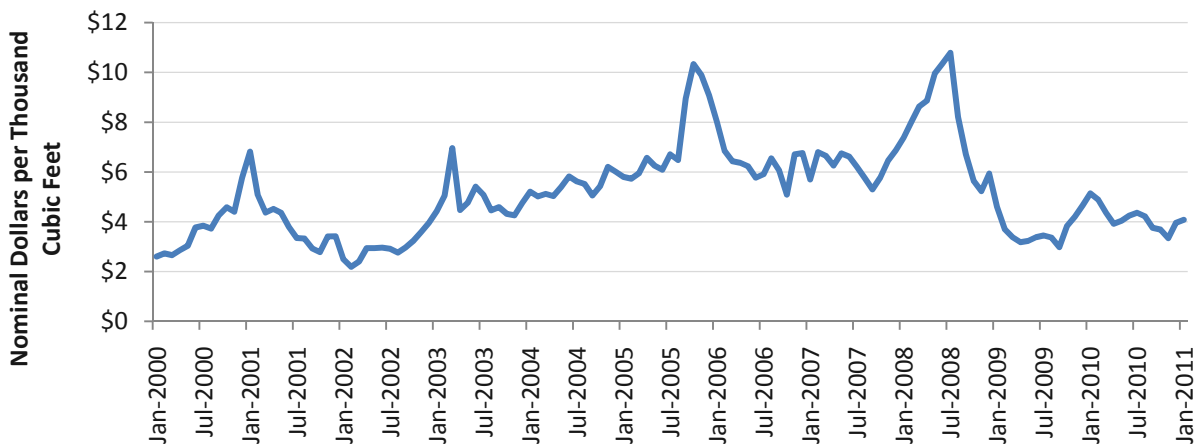
Fossil Fuel Development is Closely Tied to Energy Prices

Trends in fossil fuel employment and earnings track closely with energy prices. Oil and natural gas demonstrate high volatility in price that translates into swings in employment and income trends, while coal, which is purchased almost exclusively by electricity-generating facilities, tends to be more stable in price and in related employment.

Oil and Natural Gas

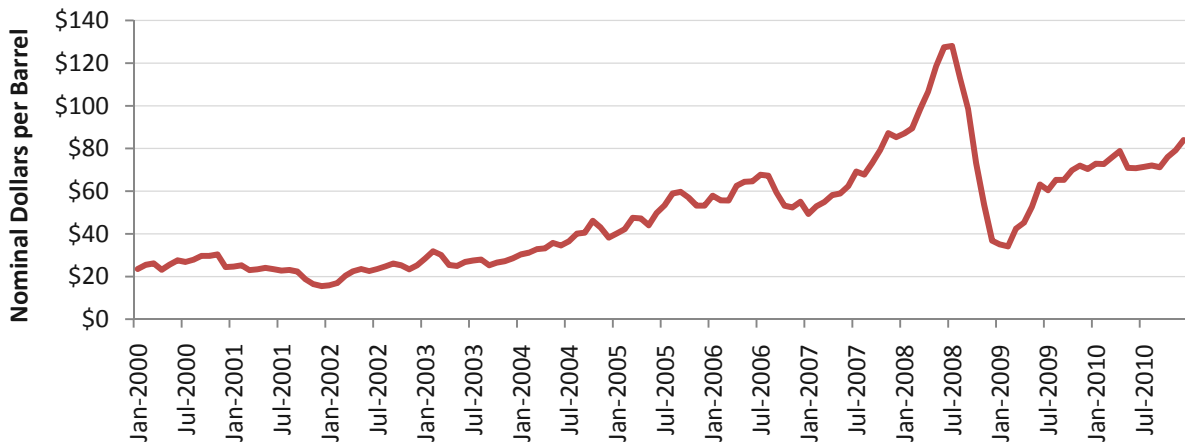
The volatility in oil and gas prices, along with the dramatic effect of the 2007-2009 recession on both oil and gas prices are visible in Figures 1-9 and 1-10, below.

Figure 1-9. U.S. Monthly Natural Gas Wellhead Price, January 2000 through January 2011



Source: U.S. Energy Information Administration, U.S. Natural Gas Wellhead Price, Accessed 4/2/11.

Figure 1-10. U.S. Monthly Crude Oil First Purchase Price, January 2000 to December 2010



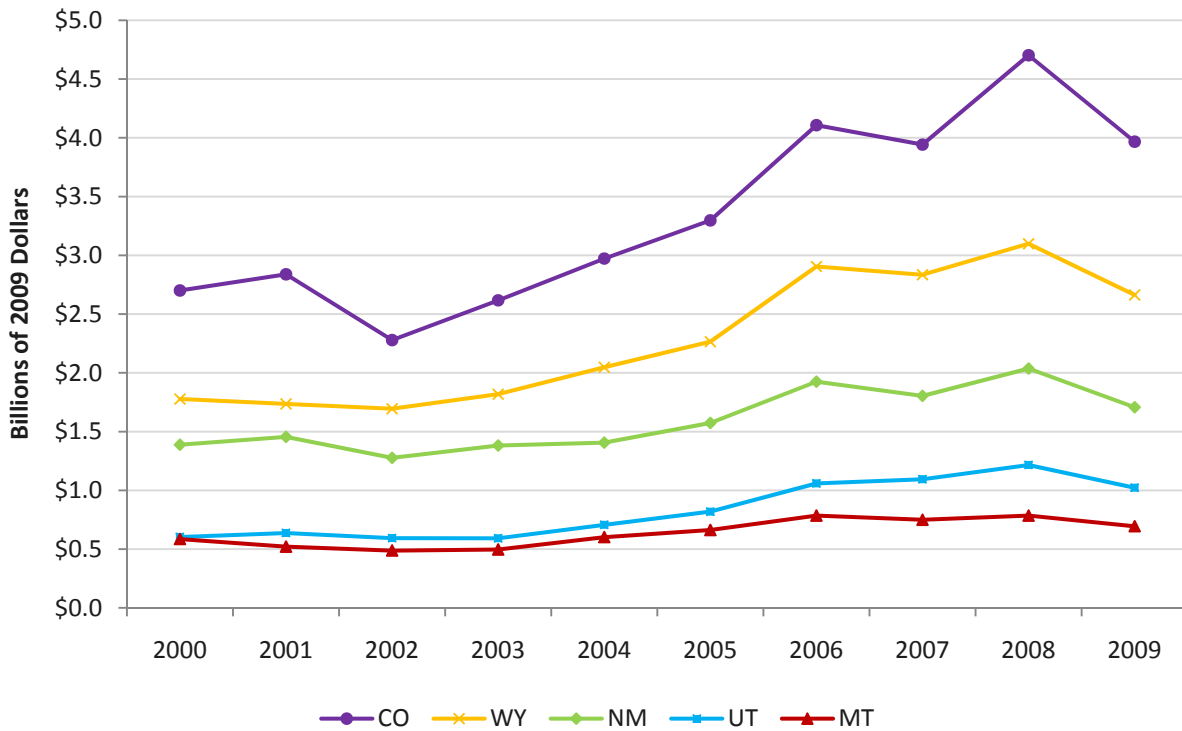
Source: U.S. Energy Information Administration, U.S. Crude Oil First Purchase Price, Accessed 4/1/2011.

Although the recession began officially in December of 2007, the price of natural gas continued to climb until July of 2008 when it reached a high of \$10.78 per thousand cubic feet. Strongly affected by the level of industrial activity in the nation, gas prices dropped steeply as the recession set in, falling to a low of \$2.98 in September of 2009. Despite some recovery, prices are not projected to reach previous highs due to major changes in natural gas supply in recent years. (See Sidebar below, page 12.)

A similar pattern is apparent in oil prices: continued growth up until July of 2008, when oil was priced at \$128/barrel, followed by a sharp decline. By February 2009 oil had dropped to \$34/barrel. A price rebound to \$73/barrel transpired in January of 2010. Recently, political unrest in North Africa has contributed to another spike in oil prices to more than \$100/barrel.¹⁰

Figure 1-11 shows the total personal income earned by people employed in oil and natural gas extraction, from 2000 to 2009.¹¹ The recent declines in personal income from employment in these industries correspond with recent declines in prices shown in Figures 1-9 and 1-11.

Figure 1-11. Real Personal Income from Employment in Oil and Natural Gas Extraction, 2000–2009



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Tables CA05 & CA05N.

¹⁰ “Top Oil Market News: Oil Rises; Hedge Funds’ Bets Soar on Libya.” Bloomberg News. February 28, 2011. <http://www.bloomberg.com/news/2011-02-28/top-oil-market-news-oil-rises-hedge-funds-bets-soar-on-libya.html>. Accessed 2/28/11.

¹¹ U.S. Department of Commerce, 2010. REIS, Table CA30.

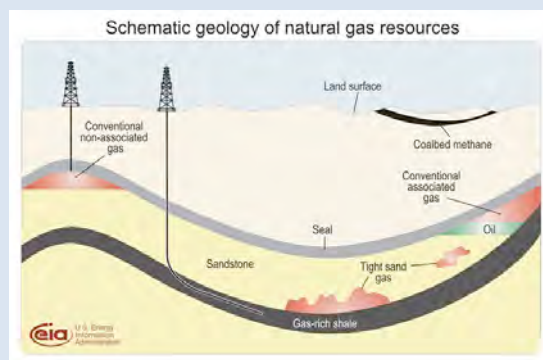
Rocky Mountain Natural Gas Less Competitive Today than Pre-Recession

Advantages that Rocky Mountain natural gas producers had during the 2003–2008 surge, strong demand and high prices, evaporated after the recession. The U.S. faces an oversupply of natural gas and prices are predicted to remain well below 2008 peak levels for the near future. This is in large part due to the success that oil and gas development companies have had with using advanced drilling and hydraulic fracturing technologies that have opened up new reserves.¹²

Predictions about what happens next with demand for natural gas are uncertain at best, but market analysts are focused on growth in demand driven by the substitution of natural gas for conventional fuels in several areas:¹³

- Electricity generation. The decommissioning of the nation’s aging fleet of coal-fired power plants offers the largest source of future demand. Colorado’s widely-watched “Clean Air Clean Jobs” Act of 2010 involved retiring four coal-fired power plants in order to combat air pollution and replacing them with natural-gas based electricity. Xcel Energy, one of two utilities affected by the act, recently signed a long-term purchase agreement for natural gas with Anadarko, potentially signaling a new trend in the way natural gas is marketed.
- Industrial power sources.
- Residential heating. Weaning the Northeast off of their dependence on heating oil will become easier as long as oil prices stay high.
- Transportation. The Pickens Plan.

Figure 1-12. Natural Gas Resource Diagram



Source: U.S. Energy Information Administration, *Today in Energy*, February 14, 2011.

¹² The U.S. Energy Information Administration notes that even under poor market conditions, the volume of proved natural gas reserves in the United States increased by 11% in 2009. Shale gas, including that found in Texas and Louisiana as well as in the middle Atlantic states, accounted for 90 percent of the growth of the nation’s proved reserves. The definition of proved reserves is “those volumes of oil and natural gas that geologic and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under existing economic and operating conditions.” U.S. Energy Information Administration (EIA), U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Proved Reserves, 2009. Released Nov. 30, 2010.

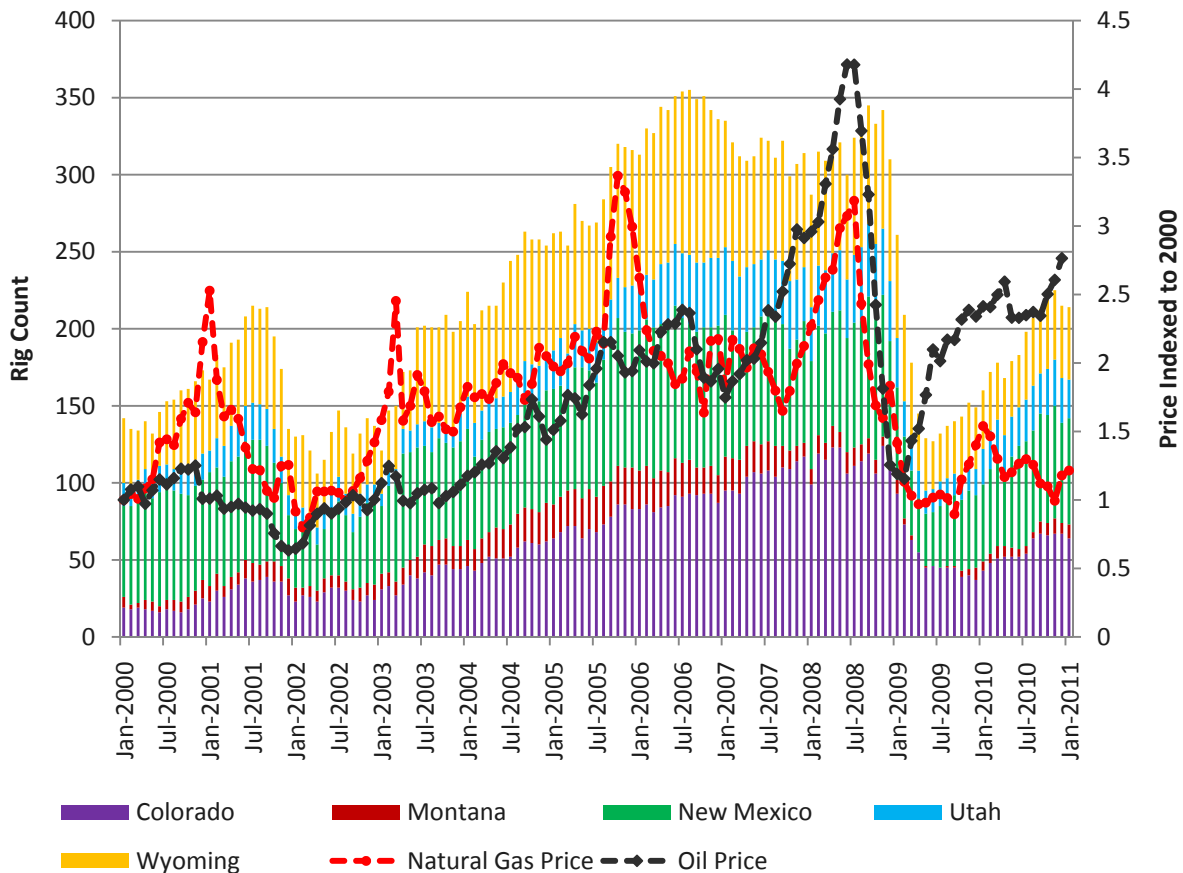
http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/crude_oil_natural_gas_reserves/cr.html#fnote1.

¹³ Braziel, E. R., 2011. “Rockies in 2011—Linkage of Natural Gas and Crude Oil.” Presentation at Platts Rockies Gas and Oil Conference, April 14, 2011, Denver, CO.

Drilling Rig Counts

Another indicator of the volatility in the fossil fuel economy is the Baker Hughes North American Rotary Rig Count. The rig count is a weekly census of the number of drilling rigs actively exploring for or developing oil and natural gas. In Figure 1-13, the monthly rig count for Colorado, Montana, New Mexico, Utah, and Wyoming is shown as stacked bars, with oil and gas price trend lines shown in front. The figure indicates that price is a primary driver of drilling activity.

Figure 1-13. Monthly Drilling Rig Count, with Monthly Natural Gas and Oil Prices, January 2000 to February 2011



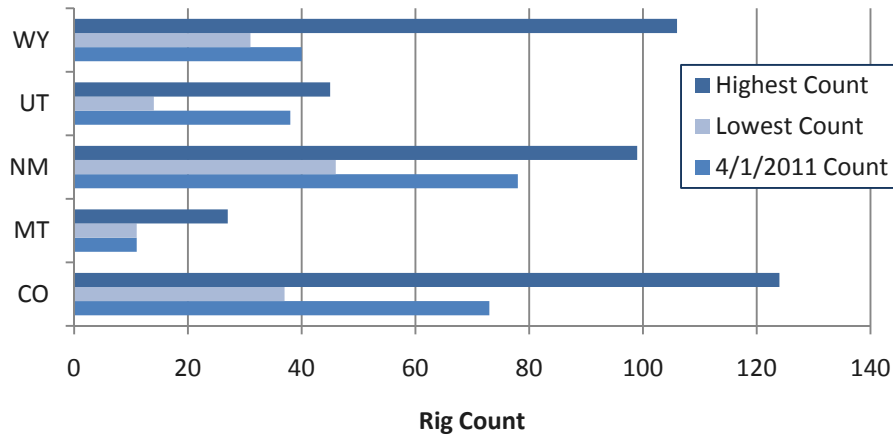
Source: Baker Hughes Rig Counts, Accessed 2/28/2011. U.S. EIA Oil and Natural Gas Price Monthly. Prices shown are in 2010 dollars, then indexed to 2000.

Corresponding with a rapid decline in prices for natural gas and oil in the summer of 2008, the number of rigs actively exploring for or producing natural gas and oil also declined sharply. In the five-state region, the number of active rigs dropped by 191 percent from June of 2008 to May 2009. Recovery is visible from late 2009 onward, and reflects among other things, the rising price of oil.¹⁴

¹⁴ See Map ES-1. The same advances in horizontal drilling and hydraulic fracturing that made tight sands natural gas extraction viable are now benefiting the development of shale oil in the Williston and Denver Basins, located in

Figure 1-14 provides a glance at how far drilling activity fell from surge highs in each state, and how it has since recovered. Oil drilling in the Permian Basin has put New Mexico in the front among the five states in rig activity in spring 2011.¹⁵ The chart counters claims that Colorado has attracted fewer drilling rigs than neighboring states since updated rules for oil and gas drilling activity went into effect in May 2009. The variances in when states reached highs, as well as variable performance since the recession, suggests that drilling activity and location is responsive to a window of opportunity affected primarily by price, but also by technological developments and other opportunities.

Figure 1-14. Rig Counts at Three Points: Surge High, Recession Low, and Most Recent (4/2/2011)



| Rig Counts: at Height of Surge, Low During Recession, and Most Recent | | | | | |
|---|-----------|-----------|------------|----------|-----------|
| | Colorado | Montana | New Mexico | Utah | Wyoming |
| High | 124 | 27 | 99 | 45 | 106 |
| (date of high) | (11/2008) | (12/2005) | (7/2006) | (2/2007) | (10/2006) |
| Low | 37 | 0 | 34 | 14 | 31 |
| (date of low) | (12/2009) | (7/2009) | (5/2009) | (9/2009) | (6/2009) |
| 4/1/2011 | 73 | 11 | 78 | 38 | 40 |

Source: Baker Hughes, Accessed 2/28/2011. Counts are taken from first week of month.

Coal

Coal is an important fossil fuel sector in several of the Rocky Mountain States, most notably Wyoming. Due to the close link between long-term power purchase agreements and the use of coal in electricity

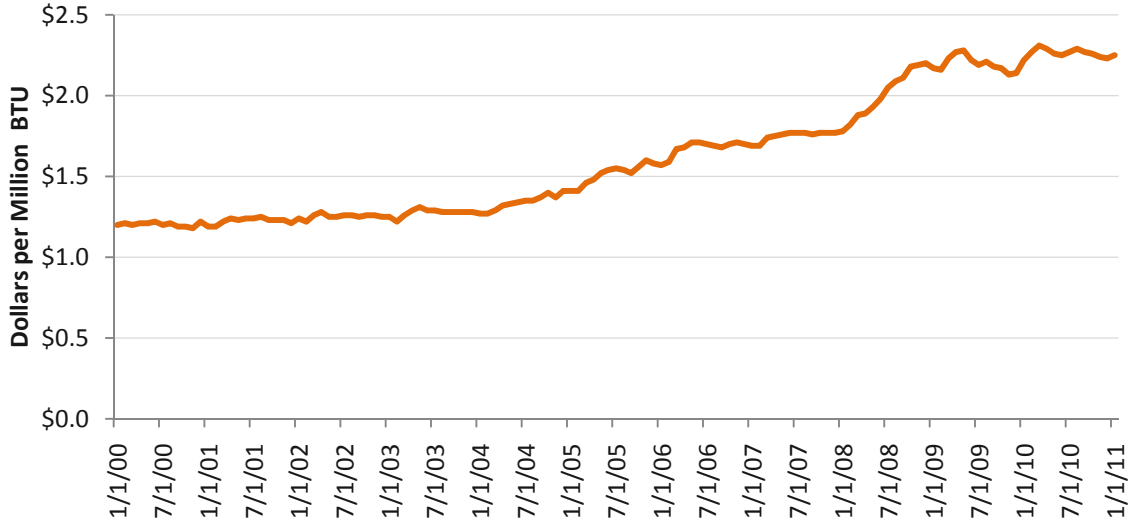
Montana and North Dakota and Colorado, Wyoming, and Kansas respectively. There were 159 oil rigs in the North Dakota Williston Basin as of April 1, 2011. Baker Hughes Interactive Well Counts, 4/2/2011.

¹⁵ 70 of New Mexico’s 78 active rigs as of 4/1/2011 were drilling for oil in the Permian Basin. Baker Hughes Interactive Well Counts, 4/2/2011. The Permian Basin is located in western Texas and southeastern New Mexico and is the largest proved reserve of crude oil in the United States. U.S.EIA, U.S. Crude Oil, Natural Gas, and Natural Gas Liquids, Nov. 2010 Release. See Figure 1-13.

http://www.eia.doe.gov/oil_gas/natural_gas/data_publications/crude_oil_natural_gas_reserves/cr.html . Accessed 4/7/2011.

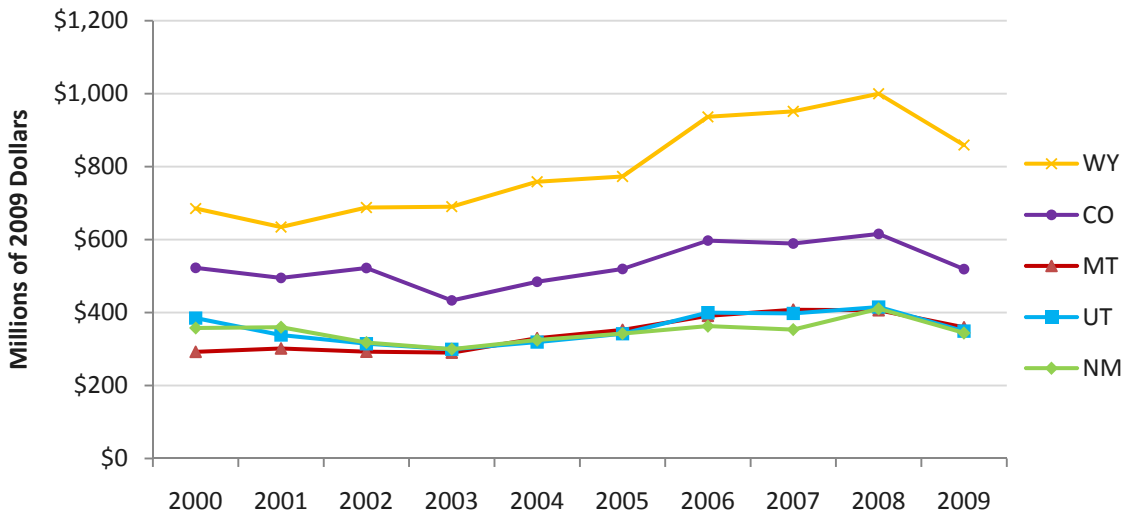
generation, coal prices tend to perform with less volatility than other fuel sources. Still, employment tracks closely with price, as with other natural fuels, as shown in the Figures 1-15 and 1-16 below.

Figure 1-15. Average Cost of Coal Delivered to Electric Generating Plants in the U.S., 2000–2011



Source: U.S. Energy Information Administration Monthly Energy Review, Accessed 2/28/2011.

Figure 1-16. Personal Income from Employment in Non Oil and Natural Gas Mining in CO, MT, NM, UT, and WY, 2000–2009



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Table CA05N.

Figure 1-15 charts the price of coal paid by electric generating plants (this measure was used because more than 90 percent of coal mined in this country is purchased by coal-fired power plants to generate

electricity).¹⁶ In contrast to the erratic prices of natural gas and oil, coal prices have climbed much more steadily: from \$1.2 per million Btu in 2000 to \$2.27 by April of 2009. Prices declined briefly to \$2.13 in November of 2009 and then rebounded to \$2.31 by March of 2010.¹⁷

Figure 1-16 shows the personal income earned from people employed in non-oil and natural gas sectors of the mining industry, which includes coal. As shown in Figure 1-8, coal employment ranges among the study states in its share of jobs in the mining sector, (from 9% in Colorado to 24% in Wyoming in 2007).

The linkage between long-term power purchase agreements by electricity generators and the relative stability of coal prices has also resulted in stability for coal mining communities over the past three decades. However, as policy forces work to shift energy production toward a variety of fuel sources and away from coal, the future stability and growth of coal prices may be in question. An example is the trend toward fuel-shifting of power plants, which represents a strategy by some large utilities to address air quality issues (see Sidebar, page 12).

¹⁶ EIA: http://tonto.eia.doe.gov/energyexplained/index.cfm?page=coal_prices. Accessed 2/28/11.

¹⁷ EIA Monthly Energy Review: http://tonto.eia.doe.gov/cfapps/STEO_TableBuilder/index.cfm. Accessed 2/28/11.

Pros and Cons of Employment Statistics Sources:

In this report, we relied primarily on published government statistics to report long-term trends in employment and personal income in the fossil fuel sectors. The advantage of using published government statistics is that they are publicly available and can therefore be verified by anyone; official government data is considered to be a credible source; and the data are reported in a consistent manner, year after year, using the same methods, which makes the data particularly useful for displaying trends. Finally, government statistics are also easy to obtain.

The disadvantage of published government statistics is that they can undercount the size of the industry in terms of employment, in particular given the transient nature of oil and gas workers. For example, the dataset called the Quarterly Census of Employment and Wages (QCEW), of the Bureau of Labor Statistics, reports workers by location of employer. There may be some undercounting when official business locations are different from place of work, as is often the case in the early days of an energy development boom. We used this dataset to report county-level trends because it contains the most recent (2009) employment estimates, which are necessary to track recession impacts.

As much as possible, we used a number of datasets, each with their own strengths and weaknesses. In much of the report, we used County Business Patterns (CBP) of the Census Bureau, and the Regional Economic Information System (REIS) of the U.S. Department of Commerce, which both report employment by place of work, avoiding the problem of failing to tally those who live far from where they work. However, even these datasets also have their pros and cons. A disadvantage of the CBP data is that measurements are taken in mid-March, which, depending on the operation and the seasonal nature of employment for some companies, may not be the busiest time of the year. In addition, CBP counts only the “wage and salary” workers, and may therefore undercount by not including the self-employed (REIS does include self-proprietors). Finally, a challenge that exists for all datasets is that some workers in the oil and gas industry may not be counted if they are counted by government statistics such as “construction,” “utilities,” or similar sectors that in some instances may be 100 percent related to oil and gas production.

How significant are these shortcomings? If the goal is an accurate count of the exact number of oil and gas workers in a small geography at a particular point in time, then the use of statistics from government sources can be problematic and supplemental estimates are needed.¹⁸ If the goal is to show long-term aggregated trends, as we do in this report (for example, showing the fluctuation of oil and gas employment and tax revenues that coincides with the rise of commodity prices), then the advantages of using published government data outweigh the cost of having to gather primary data.

¹⁸ For example, one approach is to calculate the number of full-time equivalents per rig, based on interviews with industry representatives. The most recent workforce estimates using this methodology are available here: Marcellus Shale Education and Training Center, 2009. Marcellus Shale Workforce Needs Assessment. <http://www.msetc.org/docs/NeedsAssessmentwithcover.pdf#zoom=75>. In Colorado, a useful resource is the state’s Employee Residence Reports, which are discussed in more detail in Chapter 3, at page 57.

Energy Market Volatility and State Economic Performance

The volatility of fossil fuel industries can negatively affect economies that are highly dependent on these sectors. Levels of dependence on the mining sector can be evaluated in terms of personal income from people employed in these industries, their contribution to Gross State Product by State (GDP by State) and in terms of state tax revenues collected from energy development. The economic relationship is explored below, while state revenue and budget issues are covered in full in the following chapter.

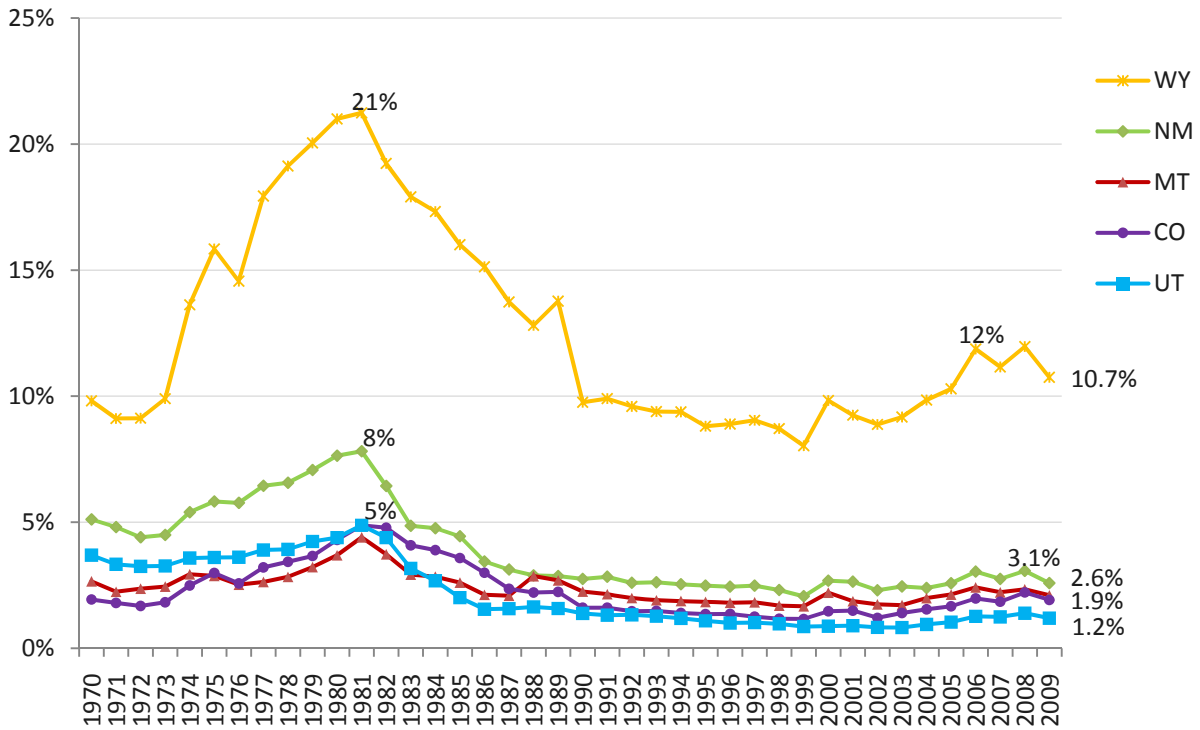
It is important to note that even in states where the proportion of total personal income from direct employment in mining is relatively small, and where its contribution to GDP by State is small, the tax revenues they provide for state budgets can be relatively substantial. The fiscal implications of energy volatility are discussed in chapters 2 and 3 of this report.

Ongoing Decline in Dependence on Mining as a Source of Personal Income

Figure 1-17 shows personal income from mining by state as a percent of total personal income from 1970 to 2009. Personal income in all of the states depends significantly less on mining than in the late 1970s and early 1990s. In recent years, Wyoming remains the most mining-dependent state by a large measure, with 12 percent of total personal income attributed to mining in 2006 and 10.7 percent in 2009.¹⁹ In Colorado, Montana, New Mexico, and Utah personal income from mining constituted less than 2.6 percent of total personal income in 2009. At the height of the recent energy development surge in 2008, mining constituted 3.1 percent of total personal income in New Mexico.

¹⁹ U.S. Department of Commerce, 2010. REIS.

Figure 1-17. Personal Income in Mining as Percent of Total Personal Income in CO, MT, NM, UT, and WY, 1970–2009



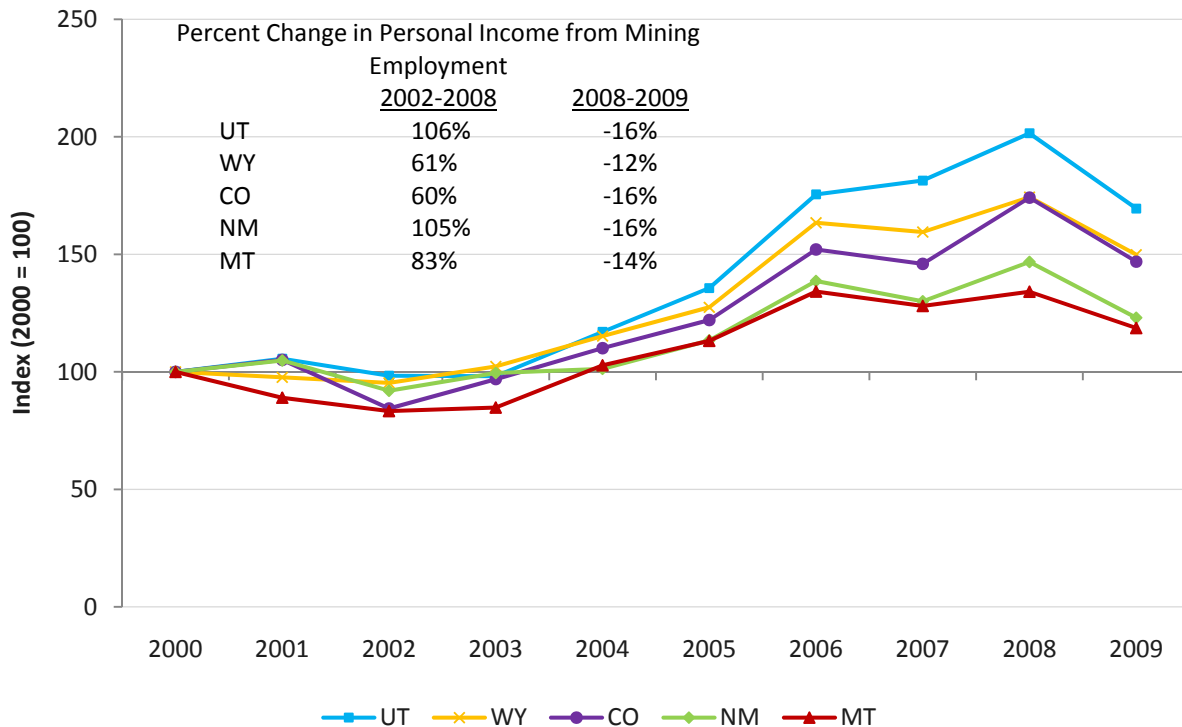
Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Tables SA05 & SA05N.

While some counties within each of these states were much more dependent on mining (see case studies in Chapter 3), from a state-wide perspective the economies of four of the five states (Colorado, Montana, New Mexico, and Utah) have grown and diversified so that the volatility in mining does not necessarily represent a volatility in state-wide personal income. Wyoming remains the exception. (See sidebar at page 23.)

From the perspective of state tax revenue, however, the story is different (see Chapter 2). Because of the profitability of mining, in particular fossil fuels development, states have developed a number of different ways to tax production, and some states are more dependent on these revenues than others. Also, some are better able to protect their budgets from volatilities in the marketplace.

Figure 1-18 shows the change in real personal income from people employed in mining, indexed relative to 2000. Colored lines below the center line indicate an absolute decline, while those above the dotted line indicate an absolute increase. Real personal income in mining, while sluggish at the start of the decade grew substantially from 2002 to 2008, particularly in Utah and New Mexico, where it more than doubled. During that period of time, personal income from mining employment also grew rapidly in other states; by 83 percent in Montana, 61 percent in Wyoming, and 60 percent in Colorado. Soon after the recession hit the mining industry in 2008 (a year later than most other sectors), personal income from mining employment began to drop quickly.²⁰

Figure 1-18. Change in Real Personal Income from Employment in Mining, 2000-2009



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Tables SA05 & SA05N.

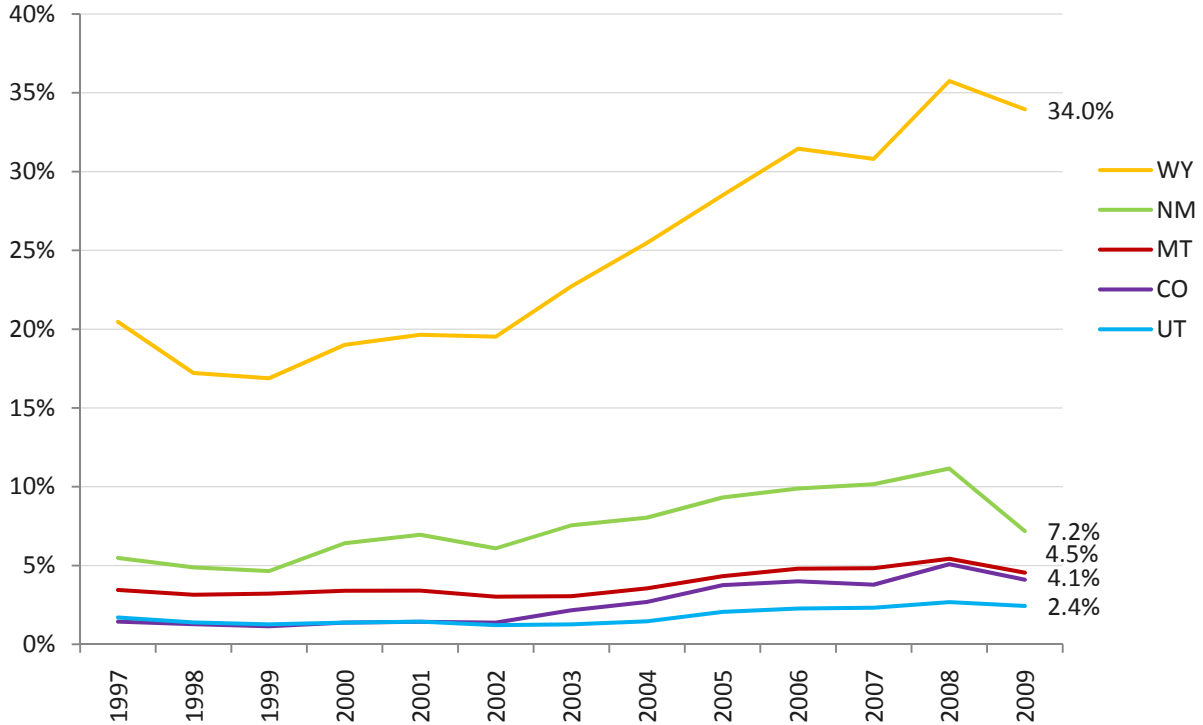
Mining Small Feature in State GDP Portfolios, Except in Wyoming

Another measure of a state’s relative dependence on mining can be measured in terms of its contribution to GDP by State (Figure 1-19). GDP by State is the state equivalent of the national Gross Domestic Product. It measures the value added from all industries in the state. Figure 1-19 shows the percent of GDP by State that comes from mining (which in these states consists primarily of the development of coal, oil, and natural gas).

²⁰ U.S. Department of Commerce, 2010. REIS.

As is the case with employment and personal income, Wyoming is the most dependent on mining, with 37 percent of GDP by State from mining in 2009. New Mexico has the second highest (9% of GDP by State from mining), followed by Colorado (5%), Montana (4%), and Utah (2%). As New Mexico’s economy has grown, mining has diminished in importance to GDP by state. In Colorado, Montana, and Utah, the contribution to GDP by State from mining has been relatively constant over time, in sharp contrast to the volatility fluctuations in prices, employment, and personal income.²¹

Figure 1-19. Mining as Percent of Gross Domestic Product by State 1997 to 2009 in 2009 Dollars



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Nov. 18, 2010 release.

Taken together, the data on personal income and GDP by State show personal income from mining to be a very small part of total personal income in every state, except Wyoming, and mining to be a small contributor to total GDP by State in each state, except Wyoming. Personal income from mining does reflect volatility in the industry—and the larger market forces behind that volatility—but while mining employment may track with larger economic patterns such as the 2007-2009 recession, volatility in the industry does not drive volatility in state economic performance with regards to personal income or GDP.

²¹ Ibid, REIS. The figure begins in 1997 because prior to that time a different industrial classification system was in use, and backward compatibility between the two systems is not possible. According to the Bureau of Economic Analysis, “An industry’s contribution is measured by its value added, which is equal to its gross output minus its intermediate purchases from domestic industries or from foreign sources.” For definitions, see: <http://www.bea.gov/glossary/glossary.cfm> Accessed 5/10/10.

Economic Specialization in Mining: A High Risk Strategy

One way to understand the relative differences in dependence on mining in the five states is to look at measures of industrial specialization. Table 1-2 shows the amount of personal income from mining *before* the recession began (3rd quarter of 2007) and as the post-recession period began (3rd quarter of 2009). It also shows Industrial Specialization Index (ISI) values for each state for the same points in time. The higher the ISI number, the more specialized a state is in mining relative to the nation.²²

Table 1-2. Personal Income from Mining and Specialization Indices for 5 States

| | Personal Income from Mining (Millions 2009 \$s) | | | | Specialization Index (ISI) | |
|-------------------|---|-----|------------------------|-----|----------------------------|------------------------|
| | 3 rd Q 2007 | % | 3 rd Q 2009 | % | 3 rd Q 2007 | 3 rd Q 2009 |
| Utah | 1,081 | 2% | 975 | 2% | 145 | 131 |
| Colorado | 3,965 | 3% | 3,723 | 3% | 219 | 206 |
| Montana | 738 | 4% | 673 | 4% | 318 | 285 |
| New Mexico | 1,814 | 5% | 1,662 | 5% | 411 | 396 |
| Wyoming | 2,797 | 21% | 2,612 | 20% | 1,610 | 1,463 |

Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C.

As Table 1-2 shows, Wyoming was very specialized in mining at the beginning of the recession, with an ISI score of 1,610, almost four times higher than the nearest most specialized state, New Mexico. Even in the midst of the recession, the ISI score for Wyoming stayed high, at 1,463. In fact, the only time Wyoming's economy becomes more diverse is during economic slowdowns when mining and energy development typically shrink faster than the broader economic contraction thereby reducing the state's reliance on energy sectors as a share of overall economic activity.

²² The "Industry specialization index" (ISI) is a measure of the degree to which states are more or less specialized in an industry. The more specialized a state is in an industry, the higher the ISI will be. The ISI is computed as the share that an industry is of a state divided by the share that the industry is of the nation, and the resulting quotient multiplied by 100. If an industry is a greater share of a state than it is of the nation, its ISI will be greater than 100; if an industry is a smaller share of the state than it is of the nation, its ISI will be less than 100. The industry specialization index is sometimes called a "location quotient" or "LQ." The ISI method is described in <http://www.bea.gov/regional/gdpmap/> Accessed 4/27/10. Data was obtained REIS: <http://www.bea.gov/regional/sqpi/> Accessed 4/27/10.

Wyoming, the Recession, and Industry Diversification

Wyoming is a special case. As the specialization data above show, no other state in the region has an economy so dependent on mining and energy production. As a result, Wyoming's economy is a useful window on the advantages and perils of narrowly focusing on energy production during a national recession.

The state's population and economy was wildly buffeted in the early 1980s recession, losing more than 10 percent of its jobs before the recovery took hold in the later 1980s. Significantly, this recovery occurred without growth in the energy sectors, suggesting that Wyoming was developing a more diverse economy. However, the energy surge of the early 2000s quickly became dominant in the state and higher paying energy jobs attracted workers from other lower-paying sectors and reinforced the state's dependence on energy production.

The results of this narrow specialization are mixed. The delayed decline in energy prices in turn delayed the impacts of the 2007–2009 recession in the state. When energy prices did fall, job losses were less than in neighboring states and the unemployment rate is lower than all but Utah for states we examine in this report. According to Buck McVeigh at the Economic Analysis Division of Wyoming's Department of Administration and Information, this may be because the state had an extreme labor shortage going into the recession and job losses in effect balanced out the mismatch between the labor force and job openings.²³

Wyoming has had difficulty attracting and retaining people. It lost nearly 100,000 people in the aftermath of the early 1980s recession. In the subsequent energy surge of the early 2000s Wyoming grew but experienced net outmigration from resident working-age adults. Nonresidents, who typically leave after the boom, take the majority of new jobs in the energy fields.²⁴ After years of overall net in-migration, the U.S. Census Bureau reports that net in-migration from 2009 to 2010 was negative.²⁵ These demographic patterns also may account for the state's relatively low unemployment rate again. The unemployment rate is the number unemployed as a percent of the labor force.

For the duration of the recession, Wyoming experienced the largest percentage decline in personal income of the five states. This is likely the case because of Wyoming's focus on energy production and the fact that mining as a whole lost a higher share of compensation than any other industry in the five-state region.

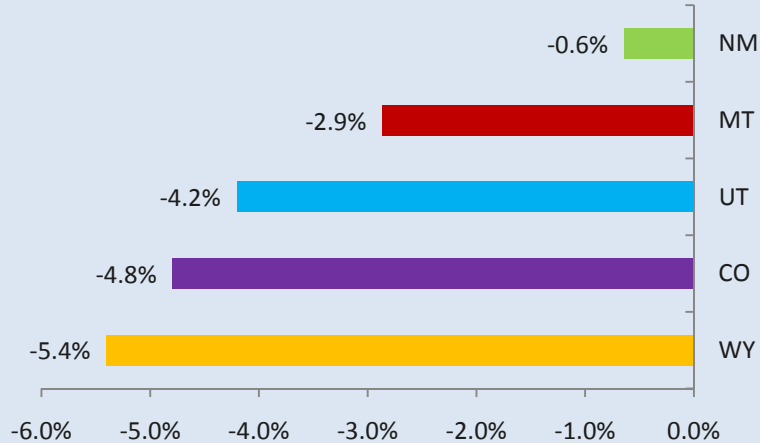
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²³ Personal Communication, Buck McVeigh, Wyoming E.A.D. 2/24/ 2011.

²⁴ Headwaters Economics. 2009. *Impacts of Energy Development in Wyoming*. See pages 8-10. <http://headwaterseconomics.org/energy/western/energy-development-wyoming-sweetwater/>.

²⁵ See: <http://www.census.gov/popest/eval-estimates/eval-est2010.html>. Accessed 3/3/2011.

Figure 1-20. Percent Change in Real Personal Income, Q4 2007 to Q4 2009



Source: U.S. Department of Commerce. 2010. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Table SA06N.

It is possible to think of economic diversification in Wyoming as taking place mainly within the energy production sector. Gains in coal employment, for example, helped offset some of the losses in oil and natural gas jobs over the last several years. Similarly, the sharp decline in natural gas prices have been mirrored recently by rising oil prices which has resulted in new exploration in areas like the Niobrara Formation. And the prospects for wind development may create new opportunities as well.

Despite this intra-sector diversity, it is clear that Wyoming's economy remains narrowly focused, and that this specialization represents a high risk strategy. The gamble is that America's and maybe the world's thirst for fossil fuel energy will outweigh factors—such as a tax on carbon or the listing of sage grouse as a threatened or endangered species—that could put the brakes on fossil fuel development. In the meantime, there are signs that the state's economy, led by energy, is emerging from the recession and also that other sectors are having a difficult time competing for people and resources as this recovery takes shape.²⁶

²⁶ Buck McVeigh reports that in the last quarter oil and gas jobs, mainly related to exploration, have jumped in the state while the higher wages in this sector are making it difficult for other industries to hire the labor force they need. Personal Communication, Buck McVeigh, Wyoming E.A.D., 2/24/2011.

Conclusions

Fossil fuel markets, with the exception of coal, show high volatility over the past three decades. This has translated into rapid and dramatic shifts in demand for oil and natural gas produced in Colorado, Montana, New Mexico, Utah, and Wyoming.

The trend data presented in this chapter point to a limited role for fossil fuel at the state level on economic indicators such as GDP by State, personal income, and employment. This means that while small groups of employees and certain mining areas within the five states are heavily exposed to volatility in the oil and natural gas prices, the performance of state economies overall is tied to the broader economy. In the recent recession, construction, manufacturing, and real estate represented the bulk of compensation loss in the five states. However, mining, including energy development, compensation shrank by the largest percent (16.1% decline from 2008 to 2009) of any sector, demonstrating the continued volatility of this industry.

The exception is Wyoming, with its heavy specialization in mining. The recession appeared to arrive late in Wyoming and also produced less steep employment losses—possibly due to the extreme labor shortage in the state going into the recession. However, for the duration of the recession, Wyoming experienced the largest percentage decline in personal income of the five states. This is likely the case because of Wyoming’s focus on energy production and the fact that mining as a whole lost a higher share of compensation than any other industry in the five-state region.

In Chapter 2, we explore state-level fiscal issues, rounding out the economic linkages between energy production and state economic performance. Chapter 3 takes on the economic and fiscal performance of energy-producing counties in Colorado and Wyoming to better understand the local dynamics of the natural gas surge and slump.

Chapter 2: Fossil Fuel Revenue and State Fiscal Health in Colorado, Montana, New Mexico, Utah, and Wyoming

Introduction

Federal, state, and local taxes on fossil fuel extraction provide a unique and valuable source of revenue for energy-producing states. This chapter discusses the volume of fossil fuel revenues in the five study states, and their relevance to overall state budgets during and after the 2007-2009 recession. Specifically, the chapter considers:

1. What share of total revenue comes from fossil fuel taxes in Colorado, Montana, New Mexico, Utah, and Wyoming?
2. How do different resources—oil, natural gas, and coal—perform as revenue sources?
3. What are the impacts of fiscal policy (how states tax fossil fuels and how tax revenues are distributed and spent) on employment and state budget performance?

Key Findings

- Prices for oil, natural gas, and coal remained high for nearly a year after the onset of the recession in 2007. Combined with a lag between production and tax collection, production tax revenues continued to grow well into FY 2009, buffering state budgets in energy-producing regions from the early declines in tax revenue felt elsewhere.
- Energy-producing states were not immune to the impact of the recession on state budgets. In FY 2010, severance taxes declined at a faster rate than other sources of revenue and many energy-producing states subsequently faced significant revenue shortfalls and/or budget gaps.
- State fiscal policy including tax rates, state distribution and spending decisions, and long-term savings strategies played a minor role in buffering states from the impacts of the recession. Each state made policy decisions that in various ways deepened their exposure to the economic downturn. States taxed too little, saved too little, or failed to mitigate the immediate impacts created during the boom. States also increased their dependence on energy revenue by reducing taxes elsewhere and increasing spending from severance taxes on general government and education, linking basic government services to a highly volatile revenue source.
- States can raise effective tax rates on fossil fuels with little fear of reduced production or job losses. 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).
- States with greater oil production relative to natural gas or coal will experience a rebound in production tax revenue more quickly. Persistent low prices for natural gas combined with significant new reserves and a national surplus of supply will continue to hold down production

tax revenue from this fossil fuel. Coal prices are less volatile in the short-term, but the long-term prospects for coal are less certain and will be shaped by future climate-related legislation and international trade agreements.

Energy-Producing States Not Immune to Budget Crisis

The recession that began in 2007 resulted in the largest decline in state tax revenue since the Great Depression.²⁷ State tax collections at the start of FY 2011 are 11 percent lower than at the start of the 2007–2009 recession²⁸ and states have made significant spending cuts in each of the last three years. Many states were bolstered by federal stimulus dollars, but as these monies dry up, states find themselves facing deeper budget deficits even as tax revenue slowly begins to grow. Budget shortfalls across all states nation-wide are projected to be \$112 billion in FY 2012.²⁹

The relatively strong performance of energy-producing states including Montana, North Dakota, Texas, and Wyoming in avoiding significant budget deficits at the beginning of the recession led some analysts to conclude that oil and natural gas production lent these states immunity to the effects of the recession.³⁰

Now, however, Montana and Texas (Texas is the nation's leading energy producer³¹) are facing budget gaps of \$400 million and \$4.3 billion respectively.³² Montana's tax revenue was down 16 percent between FY 2009 and FY 2010, and severance taxes declined by 30 percent. Wyoming continues to avoid budget shortfalls, but only after cutting the state's budget by 10 percent across the board in FY 2009 and instituting a hiring freeze.³³

Energy prices stayed high for a full year after the onset of the recession, buffering energy-producing states from early revenue declines (See Figure 2-1). Since then, fossil fuels have not necessarily buffered states from the recession. In some cases, fossil fuels exposed state budgets to increased volatility and revenue declines.

²⁷ The National Bureau of Economic Research (NBER) officially designates the start and end dates of economic cycles. See <http://www.nber.org/cycles.html>.

²⁸ McNichol, E. P. Oliff, and N. Johnson. 2011. *States Continue to Feel Recession's Impact*. Center on Budget and Policy Priorities. <http://www.cbpp.org/cms/index.cfm?fa=view&id=711>. Accessed on Feb. 15, 2011; Lucy Dadayan and Donald J. Boyd. 2011. *State Tax Revenues Gained New Strength in Fourth Quarter*. Rockefeller Institute of Government, Albany, New York.

²⁹ McNichol, E. P. Oliff, and N. Johnson. 2011. *States Continue to Feel Recession's Impact*. Center on Budget and Policy Priorities.

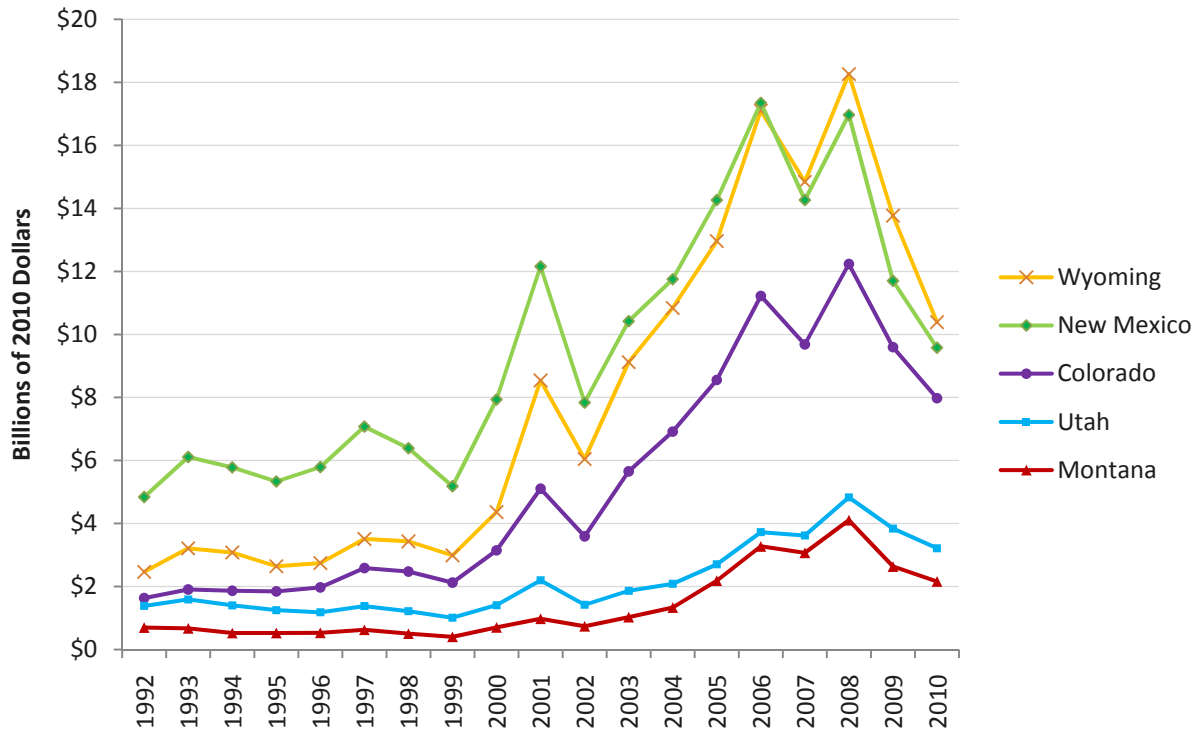
³⁰ See for example Weisenthal, J and G. Lubin. Jan. 3, 2011. *There's One Huge State Budget Crisis That Everyone is Refusing to Talk About*. Business Insider online <http://www.businessinsider.com/texas-state-budget-crisis-2011-1>. Accessed on 2/15/2011.

³¹ U.S. EIA. U.S. States Overview: Top 10 Energy Producers, 2008 (Total Energy Production, trillion Btu). <http://www.eia.doe.gov/state/>.

³² Johnson, T.W. 2010. *Montana Legislative Fiscal Division General Fund Revenue Update, Fiscal Year 2010*. http://leg.mt.gov/content/Publications/fiscal/2010-Revenues/Gen_Fund_Update_May.pdf; Montana Budget and Policy Center. 2010. *Montana's Revenue Challenges and Why it Matters*. Helena, MT.

³³ Bill McCarthy. May 28, 2009. *Here come the budget cuts*. Wyoming Tribune Eagle. Cheyenne, Wyoming. http://www.wyomingnews.com/articles/2009/05/28/news/19local_05-28-09.txt.

Figure 2-1. Production Value of Oil and Natural Gas, 1992–2010



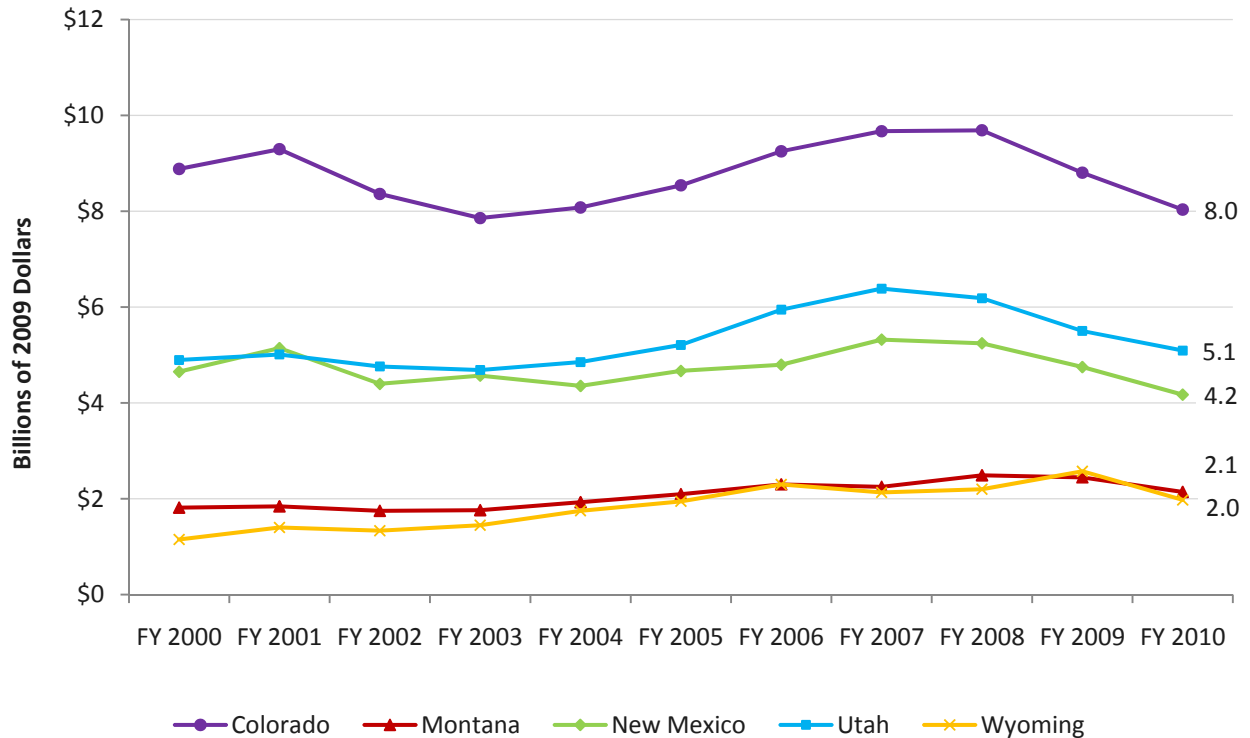
Sources: U.S. Energy Information Administration, Natural Gas Withdrawals, Crude Oil Production, Natural Gas Wellhead Prices by Area, Crude Oil Wellhead Acquisition Price by First Purchasers by Area.

Fossil Fuel Revenue's Importance to State Budgets Varies Dramatically

The size and makeup of each state's fossil fuel resource (oil, natural gas, and coal) largely determines how dependent each state is on continued production to fund state government. Fiscal policy related to fossil fuels—how the resource is taxed and how the revenue is used—also plays an important role.

Figure 2-2 shows the decline in revenue across the five energy-producing states that began in FY 2008, concurrent with the onset of the recession. Wyoming enjoyed higher tax revenue through FY 2009, but has experienced the greatest rate of decline in revenue from FY 2009 to FY 2010 among the five states (Wyoming lost 23% compared to the next fastest decline in Montana and New Mexico, at -12% each).

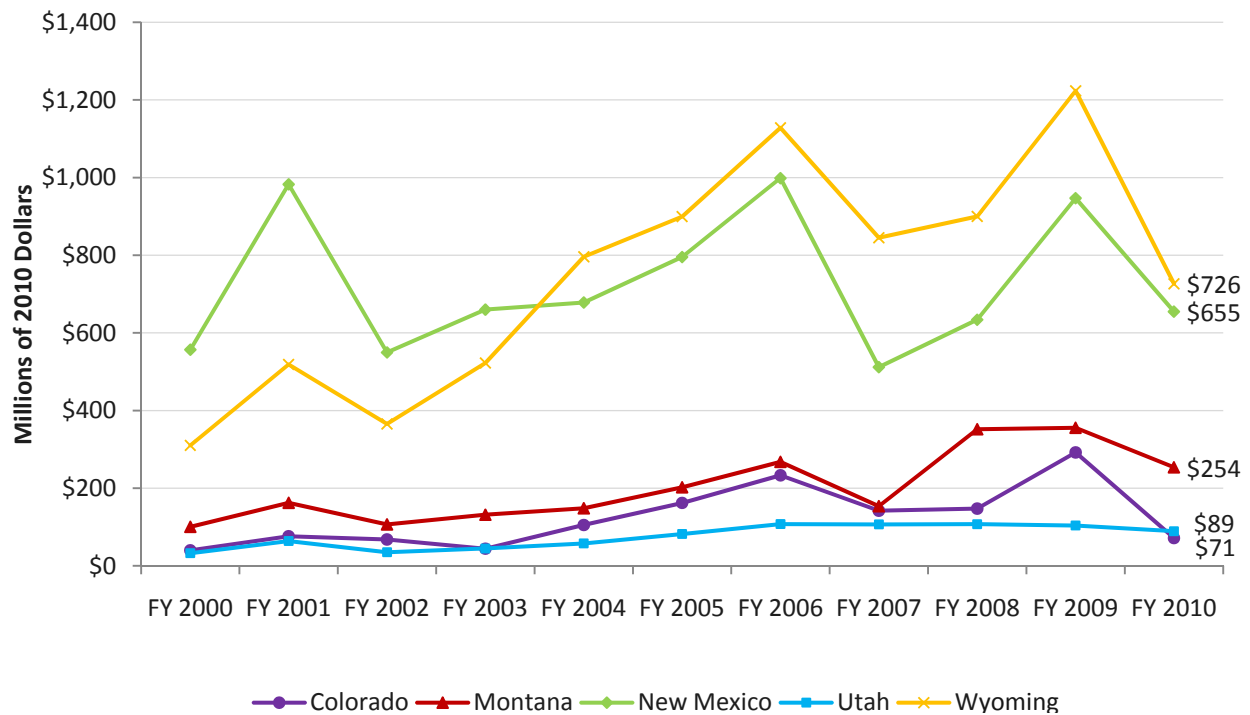
Figure 2-2: Total Tax Revenue in CO, MT, NM, UT, and WY, FY2000–2010.



Source: U.S. Department of Commerce, Census Bureau. Federal, State, and Local Governments, Quarterly Summary of State and Local Government Tax Revenue, 3rd Quarter 1999 to 2nd Quarter 2010. Quarterly data were converted to fiscal year by Headwaters Economics.

Figure 2-3 shows that severance tax receipts were at or near record levels for FY 2009, then declined significantly in FY 2010.³⁴ FY 2009's receipts were a product of high prices that continued to rise until July of 2008—nearly a year after the onset of the recession. The sharp drop in oil and natural gas prices during calendar year 2009 resulted in much lower severance tax collections in FY 2010.

Figure 2-3: Severance Tax Revenue in CO, MT, NM, UT, and WY, FY2000–2010.

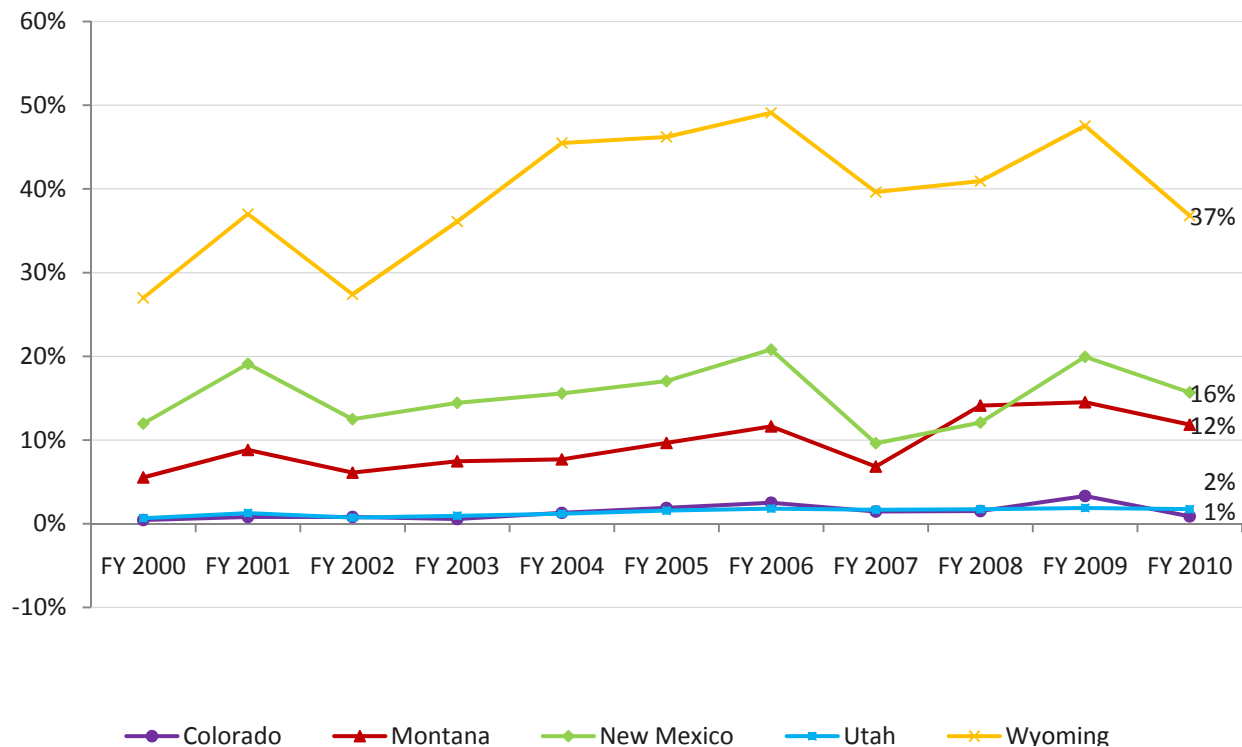


Source: U.S. Department of Commerce, 1999-2010. Census Bureau. Quarterly Summary of State and Local Government Tax Revenue.

³⁴ Severance taxes are taxes on fossil fuels and other minerals extracted, or severed, from the earth, and are tied to the production value of these resources (sometimes called a “production tax”).

Figure 2-4 shows that severance tax collections declined at a faster rate than did all other tax collections in FY 2010, indicated by the fact that severance tax revenue declined as a percent of all state tax collections. Severance taxes were down 39 percent in all five states combined from FY 2009 to FY 2010, compared to a drop of 11 percent for all other taxes.

Figure 2-4: Severance Tax Revenue as a Percent of Total Tax Revenue in CO, MT, NM, UT, and WY, FY2000–2010.



Source: U.S. Department of Commerce, 1999–2010. Census Bureau, Quarterly Summary of State and Local Government Tax Revenue.

In Wyoming, severance taxes made up 48 percent of total general government revenue in FY 2009, but only 37 percent a year later. The importance of severance taxes in Wyoming delayed its decline in tax collections relative to other states, but did not insulate the state from the effects of recession. In FY 2009, former Governor Dave Freudenthal pushed through a 10 percent across the board spending cut and imposed a hiring freeze.³⁵ At the time, oil and natural gas prices plummeted from more than \$100 to \$40 a barrel, and the Wyoming-based Equality State Policy Center projected that maintaining existing spending levels could exhaust the state's reserves—built up over the previous decade of high fossil fuel prices and tax revenue—in just two years.³⁶

³⁵ Bill McCarthy, Here come the budget cuts. *Wyoming Tribune Eagle*. 5/28/2009.

³⁶ Equality State Policy Center, June 16, 2009. *Bring severance tax rates into state budget discussions*. http://www.equalitystate.org/PDFs/Op-Ed_Bring_severance_tax_into_budget_discussion.pdf. Casper, WY.

Montana's experience was similar to Wyoming's. The state had a \$1 billion surplus in 2007, about half the state's entire budget, and tax revenue increased through FY 2008. The state enjoyed a budget surplus going into the 2009 biennium budget cycle despite the onset of tax revenue declines thanks to the federal stimulus (state revenue was down 7.5 percent but stimulus money allowed the state to increase spending in the 2009 biennium).³⁷

The economic downturn, the end of federal stimulus funding, and a sharp decline in severance taxes have hurt Montana's budget. The current 2011 legislature is looking to close a budget gap (difference between current spending levels and projected revenue) of more than \$400 million. According to the Montana Legislative Fiscal Division, revenue was projected to be down 12 percent in FY 2011 and will not reach FY 2008 levels (nominal dollars) until 2015.³⁸ Current spending on services is 10 percent higher than projected revenue.

New Mexico, the state second most dependent on state severance taxes of the five we profile (severance taxes made up 16% of total tax revenue in FY 2010), is also facing significant budget woes. Revenue began to decline in FY 2008, and the state faced budget gaps for each of the last three years. In FY 2011, the state is facing a \$333 million dollar budget gap, and is projecting an even larger deficit next year of \$450 million.

Colorado and Utah did not benefit from the buffering effect of fossil fuels, largely because fossil fuels are not sufficiently important to their state budgets (3% and 2% respectively in CO and UT in FY 2009 when severance taxes peaked).

Budget Crisis Not Limited to Recession's Impacts Alone

The largest cause of all states' fiscal problems is the deep decline in all revenue associated with the recession, including severance taxes. The national and global economic downturn cost jobs and economic activity, leading to lower sales taxes, income taxes, and other sources of state revenue. The downturn also strictly cut demand for fossil fuels and prices plummeted in the middle of 2008, reducing severance taxes collected by states.

Lower revenue is paired with increased demand for some state services, including unemployment benefits, Medicaid, and food stamps—programs that experience increased demand during recessions.³⁹

³⁷ See Montana Budget and Policy Center, 2010. Montana's Revenue Challenges and Why It Matters: Moving Towards a Balanced Approach in 2011. Helena, MT.

<http://www.montanabudget.org/sites/default/files/reports/Full%20Report%20-%20A%20Balanced%20Approach%20to%20the%20State%20Budget.pdf>.

³⁸ Preliminary Budget Outlook for the 2013 Biennium, A Report Prepared for the 61st Legislature by the Montana Legislative Fiscal Division, February 24, 2010.

³⁹ Medicaid spending for FY 2009 was up 7.8 percent from FY 2008. Enrollment increased 5.4 percent over the same period. Enrollment for FY 2010 will grow 6.6 percent, meaning spending will continue to increase. Fiscal Survey of the States, Fall 2010. National Governors Association and the National Association of State Budget Officers.

The recession also exposed a deep imbalance between some state's savings intended to cover employee pension obligations (retirement and health care costs) and actual liabilities.⁴⁰

Another factor in energy-producing states (although not limited to them) is that strong revenue leading up to the recession urged some states to increase spending, borrowing, and tax cuts—meaning many were woefully unprepared to absorb revenue declines that were to come. New Mexico financed significant income tax cuts with increasing severance tax revenue from FY 2003 to FY 2008, increasing the state's exposure to the extreme volatility associated with oil and natural gas tax revenue.⁴¹ Dependence on a single revenue source or a single economic sector was signaled out by the Pew Center on the States as one of the contributing factors that deepened the impact of the recession on states.⁴²

State restrictions on revenue and spending increases have also contributed to fiscal stress, and will slow the ability of some states to recover. Colorado's TABOR law (Taxpayers Bill of Rights) is perhaps the most aggressive revenue limitation on state finances in the nation. TABOR restricts government's ability to raise taxes, or to raise revenue from existing taxes, at a rate faster than the rate of inflation and population growth without voter approval. In many respects, Colorado's budget woes are structural, with TABOR playing a leading role.⁴³ In 2005 voters approved a five-year moratorium on TABOR, and made permanent changes that give some fiscal tools back to the state. Even after some restrictions were lifted, the state's structural problems persist.

Oil, Natural Gas, and Coal Will Have Different Future Budget Impacts

The relative importance of oil, natural gas, and coal to a state's revenues may play a significant role in how quickly these revenues recover, and ultimately to how strongly fossil fuels can support broader fiscal recovery at the state level.

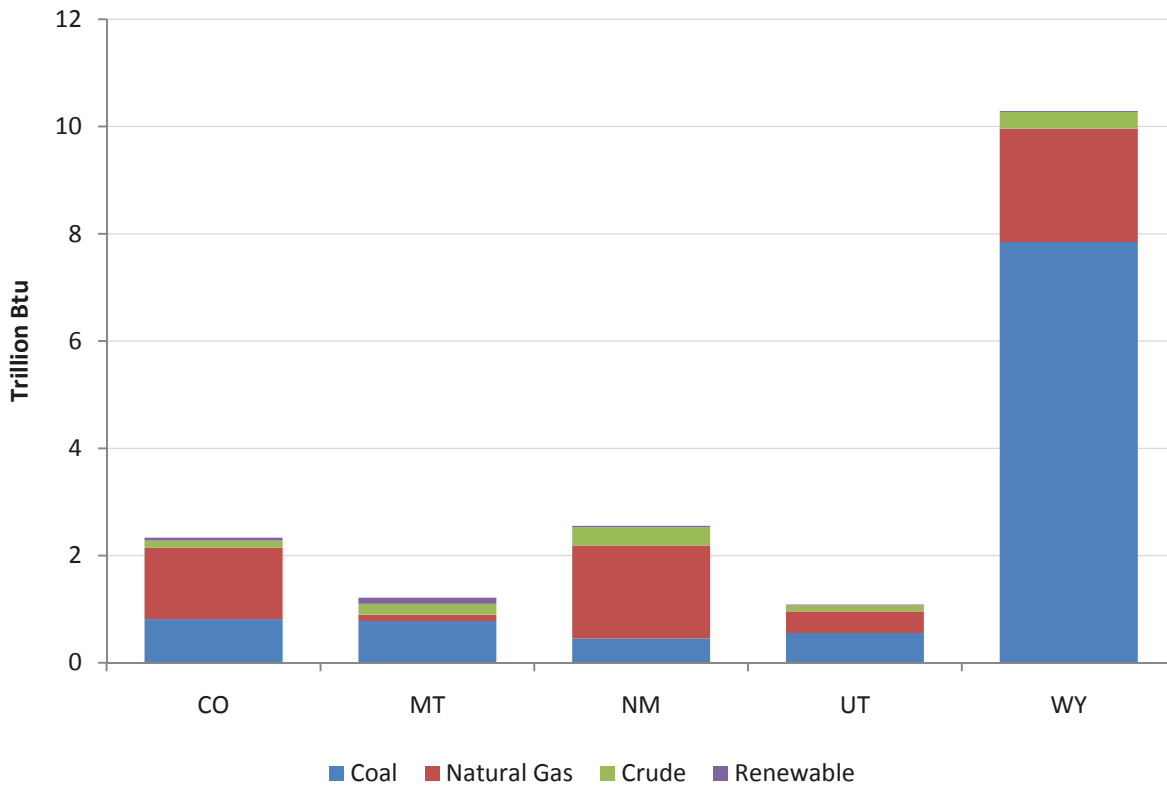
Figure 2-5 provides a snapshot of the contribution by different types of energy to total production in each state (as well as indicating the relative size of each state's energy industries). The important role of coal in Wyoming is clear in this figure, as well as the significance of the natural gas sectors in Colorado and New Mexico.

⁴⁰ States are required to account for the long-term value of pension plans they offer current and retired employees. The funds states set aside to pay for these obligations nearly always fall short, and the stock market decline means that money that states have set aside is declining, even as pension benefits increase. See the report from The Pew Center on the States, *Promises with a Price: Public Sector Retirement Benefits*. 2008; and also Iris J. Lava and Elizabeth McNichol, 2011, *Misunderstandings Regarding State Debt, Pensions, and Retiree Health Care Costs Create Unnecessary Alarm*. Center on Budget and Policy Priorities.

⁴¹ Thomas Clifford, New Mexico Tax Research Institute presentation at the Energy and Economic Development Conference, New Mexico State University. *Managing Volatility of State and Local Oil and Gas Revenues*. <http://www.nmtri.org/associations/3740/files/NMSU%20Volatility%20March%202009.pdf>. Accessed on Feb 16, 2011.

⁴² The PEW Center on the States. 2009. *Beyond California: States in Fiscal Peril*. Washington, D.C.

⁴³ Colorado's State Budget Tsunami. 2009 Issue Brief, University of Denver Center for Colorado's Economic Future. http://www.du.edu/economicfuture/documents/BudgetTsunami_001.pdf. Accessed on Feb 16, 2011; Governing Magazine, *Measuring Performance: The State Management Report Card for 2008*.

Figure 2-5. Energy Source as Share of Total State Production, 2009

Source: U.S. Energy Information Administration, State Energy Data System, June 30, 2010 Release.

The following discussion summarizes recent information from the Energy Information Administration and other energy analysts about future trends in various energy sectors and the implications of these projections for state revenue.

Oil

The Energy Information Administration projects that oil prices and production will recover more quickly from the dramatic drop in FY 2009 than other fuel prices. Prices have rebounded, growing by 29 percent between 2009 and 2010, 18 percent this year, with further increases projected for 2012. The current turmoil in the Middle East has spiked oil prices above \$100 per barrel at the time of this writing.⁴⁴ Compared to natural gas and coal, oil is the only fossil fuel the EIA projects will exceed production levels and prices that existed before the bust in 2009. For Montana, New Mexico, and Wyoming, rising oil prices will boost production value and lead to increased severance tax receipts.

Natural Gas

EIA projects lower natural gas prices than in past years resulting from the large new shale gas plays in the South and Central U.S. Prices continued to fall through 2010, and are projected to rise at a marginal rate

⁴⁴ Libya Supply Disruption Could Push Oil to \$130. March 2, 2011. Reuters and CNBC.com. http://www.cnbc.com/id/41865499/Libya_Supply_Disruption_Could_Push_Oil_to_130_Official.

through 2012. Natural gas prices are not projected to exceed peak 2008 prices until 2025, and possibly much later. There are warning signs that natural gas production and price may not recover in the West anytime soon (See page 12).

In the short term, states more dependent on natural gas for severance tax revenue, including Colorado and New Mexico, will be less able to rely on fossil fuels to boost the state's efforts at recovery.

Coal

The EIA reports that coal prices have been relatively stable over the last ten years, and are not expected to change significantly in the next several years. Coal is typically sold in longer-term contracts for power generation, so price is generally less volatile and supply more predictable. Looking beyond the next few years, coal prices may weaken if policies are adopted that favor natural gas over coal for power generation or if air quality regulations dampen the demand for poor quality (high-sulphur, high-sodium) coal. In some regions, prices for delivered power from natural gas have reached parity with coal in 2011.⁴⁵ States with significant coal production (Wyoming) have benefited substantially from the relatively stable production and value of coal. The opportunity is less certain, however, for other states to benefit similarly from developing lower-quality coal resources in a shifting marketplace.

State Fiscal Policy Deepens Recessions Impact on Budgets

In addition to the market forces shaping different fuel sources, state fiscal policies are also a critical factor affecting the role of fossil fuel revenue in state budget performance. Decisions that states make about how to tax energy production can raise or lower the potential contribution of a given resource. For example, Utah has no severance tax on coal, and because of generous incentives, Colorado's severance tax on oil and natural gas is significantly lower than that of its neighbors. (Producers can deduct the value of local property taxes from severance taxes owed; in some Colorado counties, the property tax deduction is worth more than the severance tax bill, meaning oil and natural gas producers pay no property tax at all). As a result, coal in Utah and natural gas in Colorado are underachievers in supporting state fiscal health.

Wyoming consistently taxes fossil fuel resources more effectively than its peers, capturing more value from each dollar of production value. Even so, a projected budget gap of \$31.8 million for FY 2010 and fears of continuing low prices for fossil fuels prompted the governor to cut the state budget by 10 percent across the board and to freeze public employee salaries to make ends meet.⁴⁶ The state has built up significant budget reserves over the last decade but has yet to tap into them. However, Wyoming may be falling short too. The Equality State Policy Center has contended that Wyoming is not doing enough to tax and invest severance taxes to ensure the state's natural resources lead to long-term well-being. A 2009 report projected that at FY 2009 funding levels, the state's reserves would last for only two years.⁴⁷

⁴⁵ Reuters, citing Bentek, LLC. "Analysis: More U.S. utilities switch from coal to natgas." 2/10/2011.

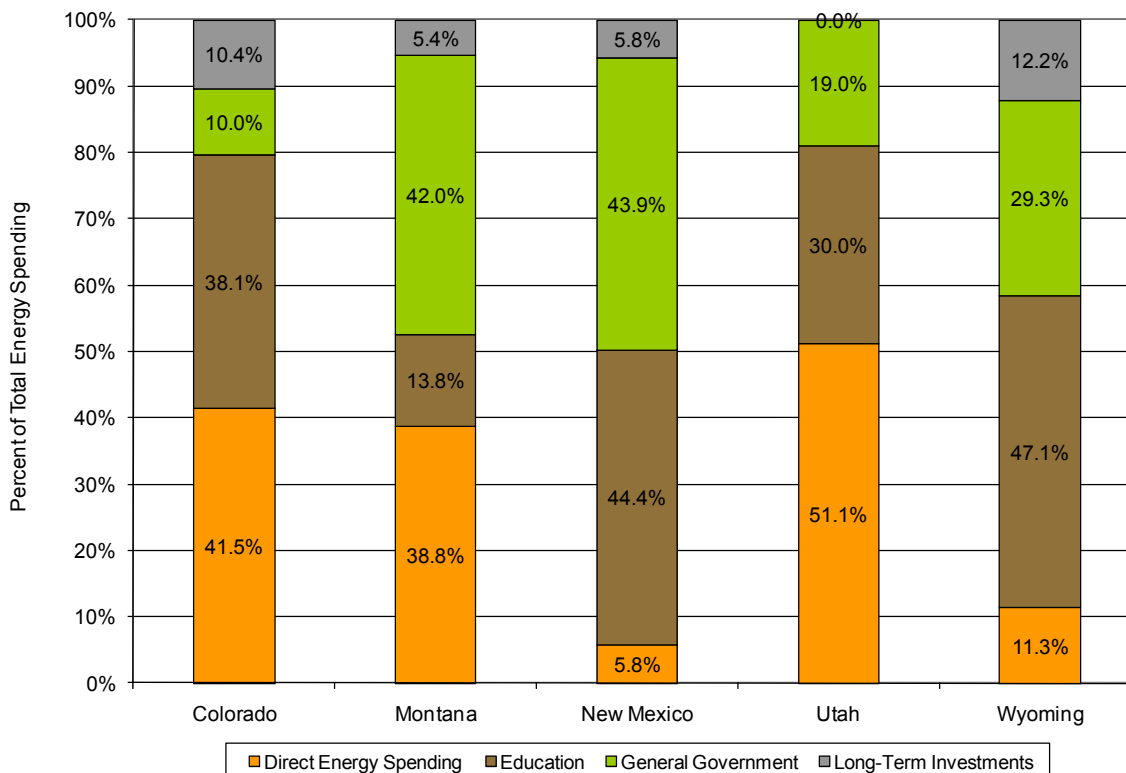
⁴⁶ Sunshine Review, 2011. Wyoming state budget. http://sunshinereview.org/index.php/Wyoming_state_budget. Accessed 4/9/2011.

⁴⁷ See for example Dan Neal and Sarah Gorin, Bring Severance Tax Rates Into State Budget Discussions, 6/22/2009 Guest Column WyoFile. <http://wyofile.com/2009/06/bring-severance-tax-rates-into-state-budget-discussions/>; and

The most important aspect of fiscal policy may not be tax rates or savings, but how revenue is distributed and spent. Severance taxes are designed to achieve two main public policy objectives: to compensate the public for the impacts of extraction activities on infrastructure, communities, and the environment; and to buildup reserves to compensate for the depletion of non-renewable resources. A review of state mineral taxation policies suggested that only Alaska has taxed its natural resources at a rate sufficient to buildup reserves that could help fund basic state services after the resources are depleted.⁴⁸

No one state has the perfect balance between tax rates, revenue distribution, and savings to help state agencies and local governments successfully weather the boom-time impacts of development. Figure 2-6, taken from our previous reports on fossil fuel energy development, shows that New Mexico and Wyoming applied the smallest share of fossil fuel revenue to what we termed “direct energy spending,” defined as all allocations and spending by agencies and governments that directly monitor and regulate the energy industry, build and maintain infrastructure used by the industry (e.g., county roads), and provide services impacted by energy development, such as local police, emergency, and health services.

Figure 2-6: Percent Distribution of Oil, Natural Gas, and Coal Revenue in Colorado, Montana, New Mexico, Utah, and Wyoming, 2006.



Source: Headwaters Economics, 2008. Energy Revenue in the Intermountain West.

The Equality State Policy Center tax and fiscal policy project
http://www.equalitystate.org/HTML/tax_and_fiscal_policy.shtml

⁴⁸ Robert Ginsburg. 2008. Mining Taxes in Ten Western States. Center on Work and Community Development.

Montana does the best job of mitigating impacts, returning 50 percent of total production taxes to local governments where production takes place, but the state saves nothing (the state's permanent fund that would receive oil and natural gas tax dollars is capped at \$100 million).

Overall, Colorado applies the greatest share of revenue to direct energy spending and to savings, but the state also levies the lowest effective tax rate of the five states, meaning the state and local communities still struggle to mitigate the impacts of drilling activity, and the state's savings from fossil fuels are meager relative to the state's overall budget, providing little buffer against the current or future economic downturns.

The next chapter discusses the impacts on four counties in Colorado and Wyoming in some detail. Flowcharts of Colorado and Wyoming state distributions of severance taxes and federal mineral royalties can be found in the Appendix .

Tax Policy and Rates of Fossil Fuel Production

Over the last several years, the federal government and a number of states including Montana, Colorado, California, Alaska, Arkansas, and Pennsylvania have considered higher taxes or eliminating tax breaks on oil and natural gas. These discussions have intensified in response to the impact of the recession in state budgets and the federal deficit.⁴⁹ Most of the debate centers on the impact that higher energy taxes or closed loopholes may have on jobs and the economy. Industry leaders consistently charge that any change to current incentives or tax rates will lead to immediate and direct job losses and expose the nation to greater dependence on foreign oil.⁵⁰

A growing body of research indicates that taxes have little to no effect on where and when industry chooses to drill for oil and natural gas.⁵¹ In the late 1990s, the Wyoming state legislature commissioned two academic studies to evaluate the likely impact of tax and/or incentive policies on the pace and scale of energy activities.⁵² Researchers at the University of Wyoming concluded that lowering severance taxes would do little to boost production or jobs, but could cost the state hundreds of millions of dollars in lost tax revenue. Likewise, raising severance taxes, at least modestly, could return significant revenue to the state without reducing production or costing jobs.

These findings are confirmed by more recent academic studies⁵³ and are consistent with our observations of industry behavior in the context of vastly different tax structures amongst states, and changing demand and price associated with the recession.⁵⁴

Continued on next page.

⁴⁹ Nick Snow, 2011, Obama keeps pledge to end oil tax incentives in 2012 budget request. Oil and Gas Journal online, 2/14/2011, http://www.ogj.com/index/article-tools-template.articles.oil-gas-journal.general-interest-2.government.20100.february-2011.obama-keeps_pledge.html. Pennsylvania is contemplating imposing a severance tax on natural gas for the first time, and bills were introduced into the Montana and Colorado legislatures to remove tax incentives for the oil and natural gas industries.

⁵⁰ See for example comments from industry leaders in: Snow, 2011, Obama keeps pledge to end oil tax incentives in 2012 budget request.

⁵¹ Ujjayant Chakravorty, University of Alberta, Shelby Gerking, University of Central Florida, and Andrew Leach, University of Alberta: “State Tax Policy and Oil Production: The Role of the Severance Tax and Credits for Drilling Expenses.” Paper presented at the American Tax Policy Institute Energy Taxes Conference organized by Gilbert E. Metcalf, Tufts University. October 2009. Papers to be published by Cambridge University Press. <http://www.americantaxpolicyinstitute.org/research.html>.

⁵² 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/mtim/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>.

⁵³ Chakravorty et. al. 2009. “State Tax Policy.”, Allaire, J and S. Brown. 2009. Eliminating Subsidies for Fossil Fuel Production: Implications for U.S. Oil and Natural Gas Markets, Resources for the Future Issue Brief 09-10; Metcalf, G.E. 2007. Federal Tax Policy Toward Energy. Tax Policy and the Economy, Vol. 21, pp. 145-184.

⁵⁴ Headwaters Economics. 2008. Energy Revenue in the Intermountain West: State and Local Government Taxes and Royalties from Oil, Natural Gas, and Coal. Bozeman, MT.

Key findings of the original 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.
- These findings suggest that states and the federal government can raise taxes, at least modestly, without risk of raising consumer prices or reducing domestic production or industry jobs

Conclusions

Fossil fuel production has not insulated energy-producing states from fiscal crisis.

Energy-producing states outperformed their peers fiscally at the start of the recession, but this leadership was short-lived. Prices for oil, natural gas, and coal remained high for nearly a year after the onset of the recession in 2007. Combined with a lag between production and tax collection, production tax revenues continued to grow well into FY 2009, buffering state budgets in energy-producing regions from the early declines in tax revenue felt elsewhere.

Ultimately the decline of fossil fuel prices and reduced revenue exposed Colorado, Montana, New Mexico, Utah, and Wyoming to the impacts of the recession. In FY 2010, severance taxes declined at a faster rate than other sources of revenue and many energy-producing states subsequently faced significant revenue shortfalls and/or budget gaps. Each state has faced budget shortfalls to some extent, and has made significant cuts to state services to make ends meet.

Several other factors, including structural and policy issues, exposed energy-producing states to deeper impacts than might be expected based on the wealth generated through fossil fuel extraction. To varying degrees, each state, in its way, made decisions that left them exposed to one or more impacts of the recession.

Policy Suggestions

The 2007–2009 recession exposed many weaknesses in state fiscal policy that were concealed by the economic bubble and high energy prices that ended in 2007 and 2008 respectively. What can states learn from their collective mistakes? What actions can they take to better prepare for the next downturn? We offer the following policy recommendations:

- Good tax policy begins with a high effective tax rate. Every state we profiled can raise taxes with little impact on production and employment. The best approach may be to maximize effective tax rates at a regional level (across states) to reduce the influence of the state-by-state lobbying efforts that promote a “race to the bottom” competition through energy companies’ warnings that they will leave states that increase taxes.
- Maintain a diverse tax base to mitigate volatility.
- States need to resist the temptation to use rising severance tax receipts for tax relief for other economic sectors.
- States should minimize the use of severance taxes to fund basic governmental services, including education, public safety, and health care.
- Severance taxes should be used for three main purposes: 1) to mitigate the direct impacts energy development can have on local communities; 2) one-time or short-term funding for economic development and diversification efforts; and 3) invest in permanent or long-term reserve funds to buffer the state against future recession and revenue volatility, and to ensure lasting fiscal resources from the one-time depletion of non-renewable natural resources.

Chapter 3: Energy Development and Economic Vitality: Lessons from the Natural Gas Boom in Colorado and Wyoming

Introduction

This chapter focuses on lessons learned from local experiences with the recent natural gas surge and slump. In particular, we highlight the opportunities and challenges related to integrating volatile fossil fuel industries within a broader program of economic development in two pairs of counties: Garfield and Mesa counties in Colorado and Sweetwater and Sublette counties in Wyoming. The two county pairs are similar in the sense that while total production by volume was less in the larger county (by population), the larger county housed workers and was often the base for businesses servicing the oil and natural gas fields distributed across county borders.

A key difference is the relative diversity of western Colorado's economy compared to that of southwestern Wyoming. In addition to supporting energy development, Garfield and Mesa counties have strong amenity-, retirement- and resort-oriented economies. While southwestern Wyoming is amenity-rich, the size of its mineral and fossil fuel industries relative to other industries is proportionally much greater than in Colorado. In addition, Colorado and Wyoming differ significantly in their approach to distributing tax revenue from energy production to local governments.

The chapter first considers the local impact of the natural gas surge and slump in three areas:

1. How did energy development affect local economies, specifically employment, population, income, and cost of living?
2. How did energy development shape county- and municipal-level fiscal performance and what explains discrepancies in the fiscal impacts of energy development among the study locations?
3. How successful have energy-producing regions been in balancing the benefits of oil and natural gas extraction with costly impacts on quality of life, public health, and environmental amenities?

Key Findings

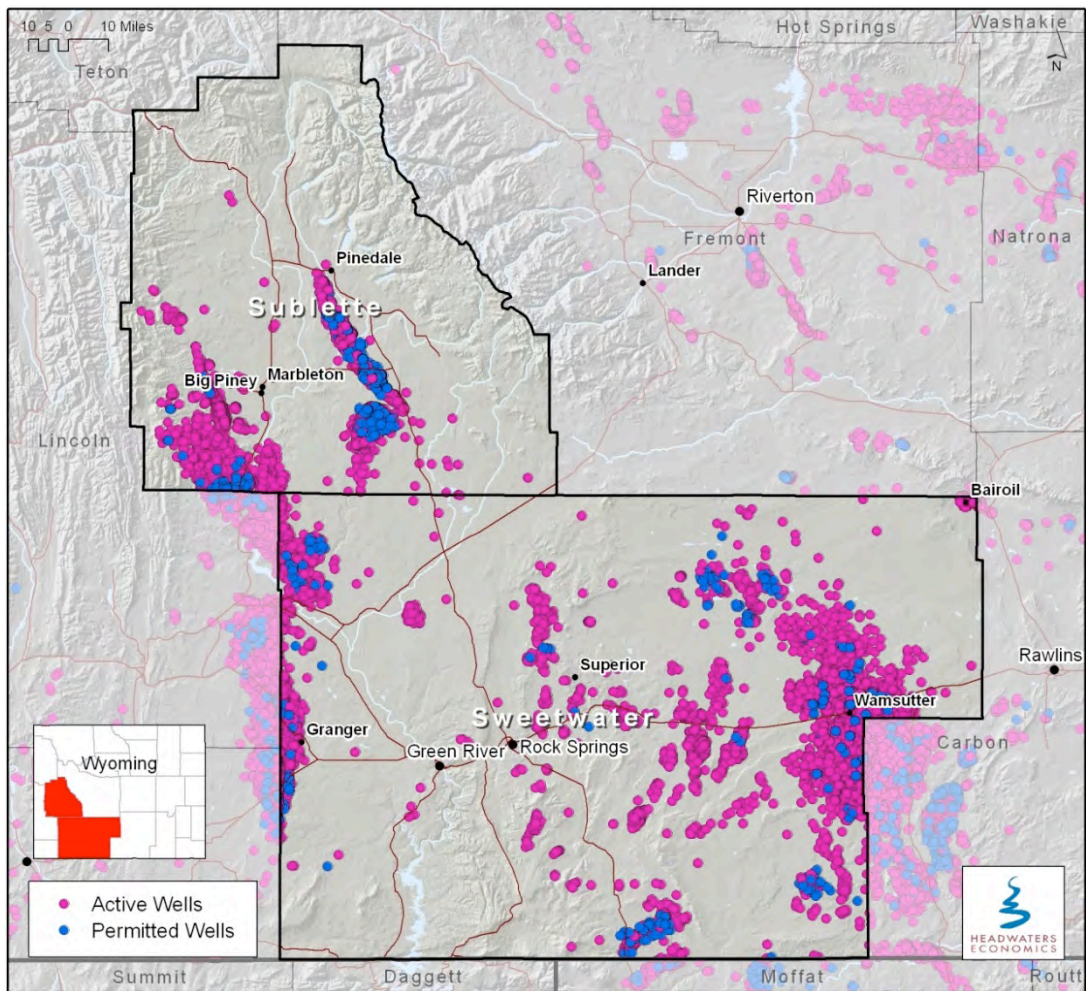
- Energy development helped to create above average employment rates for the study counties during the period 2002-2009, however, it may have also contributed to a sharper than average fall for these counties from 2008 to 2009.
- Oil and natural gas and mining employment lifted average wages in the study counties above their geographic peers, except in Mesa County. However, the majority of employees in the study areas do not earn wages on par with mining wages, indicating that high levels of employment in mining can contribute to a wage gap. Those on the “wrong” side of a wage gap, including employers and employees in non-mining related industries—often have difficulty keeping up with cost of living increases that accompany periods of rapid economic growth.

- Migration was relatively more volatile in the study area counties than in other western counties of comparable size. As drilling activity declined, the number of new people in each county fell more dramatically in the two rural counties than in the rural cohort. In contrast, in both Sweetwater and Mesa counties, migrants actually increased their share of total population from 2008 to 2009, possibly indicating a role for larger population centers as shock absorbers during periods of flux.
- In Colorado, the boom led to inflated housing prices and lower than average vacancy rates while the slump has led to a steeper than average fall in house price values.
- Both Wyoming counties have higher costs of living than the state average, and the relatively high cost of living has persisted in Sublette County since the recession.
- Fiscal benefits vary from place to place due to geographic and structural issues. Larger municipalities see the greatest population impacts on service loads, but the least amount of specifically-targeted energy revenue. This is true in both Colorado and in Wyoming.
- Garfield County, Colorado saved carefully and enjoyed a budget surplus in the midst of a severe state-wide budget crisis thanks to energy revenue, but the county's municipal governments face severe budget shortfalls.
- Wyoming examples show the impacts of a poor revenue distribution system, especially to municipalities—while Colorado distributes more than half of all energy revenue to local governments, Wyoming distributes less than five percent. This has left Wyoming counties and municipalities in the position of utilizing sales tax to fund critical infrastructure, with mixed results.
- Amenities and quality of life are cornerstones of the long-term economic viability of these rural regions. Initial results of studies about the long-term impacts of energy development on air quality, water quality, and wildlife resources suggest that energy development is taking its toll on these invaluable resources. Regulatory agencies and other national, state, and local decision-makers now face the difficult challenge of implementing adaptive management in response to these important signals. Their success or failure in adapting management to stave off costly damages will be critical in the economic success of natural gas development in the Rocky Mountain West.

Background

Spanning Wyoming's Sublette, Sweetwater, Lincoln and Uinta counties, the Greater Green River Basin comprises some of the most productive natural gas fields in the nation, including the Pinedale and Jonah fields, ranked third and seventh in the nation in size (by Estimated 2009 Proved Reserves) respectively.⁵⁵ Numerous gas fields are associated with the Piceance Basin, a large geologic formation that extends across western Colorado and eastern Utah, with a cluster of the most volumetrically significant fields located along the I-70/Grand River corridor between Rifle and Parachute, Colorado. The Grand River corridor stretches from the county seat, the resort town Glenwood Springs in eastern Garfield County, to Grand Junction, the Western Slope's largest city (population 53,000), and a regional commercial and service hub.

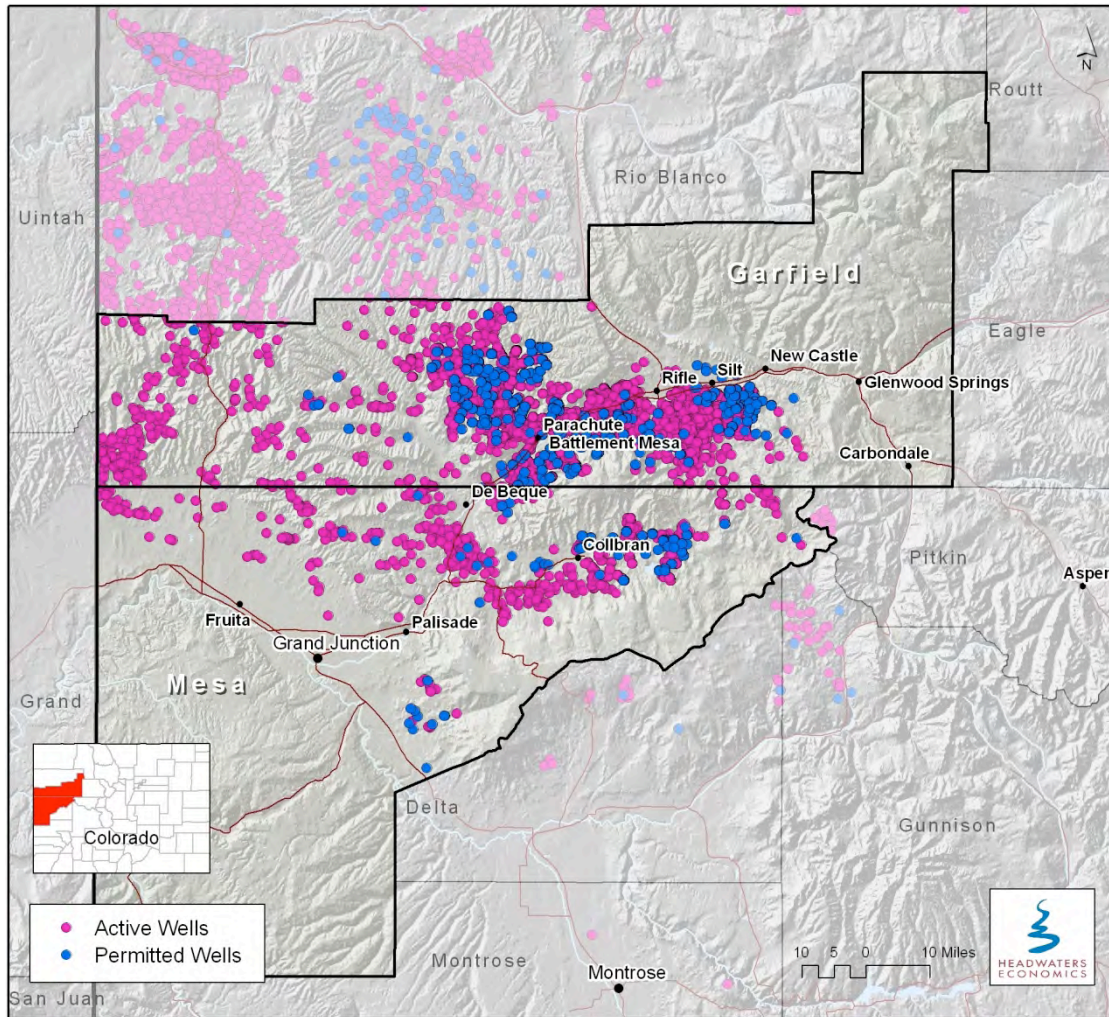
Map 3-1. Oil and Gas Well Activity in Sublette and Sweetwater Counties



There are 9,164 active wells in Sublette and Sweetwater counties, and 1,061 permitted wells.
Source: Wyoming Oil and Gas Conservation Commission, 3/31/2011.

⁵⁵ U.S. EIA, 2011. Top 100 Natural Gas Fields by Proved Reserves.
http://www.eia.gov/pub/oil_gas/natural_gas/data_publications/crude_oil_natural_gas_reserves/current/pdf/top100fields.pdf

Map 3-2. Oil and Gas Well Activity in Mesa and Garfield Counties



There are 8,723 active wells in Mesa and Garfield counties, and 2,578 permitted wells.

Source: Colorado Oil and Gas Conservation Commission, 3/31/2011.

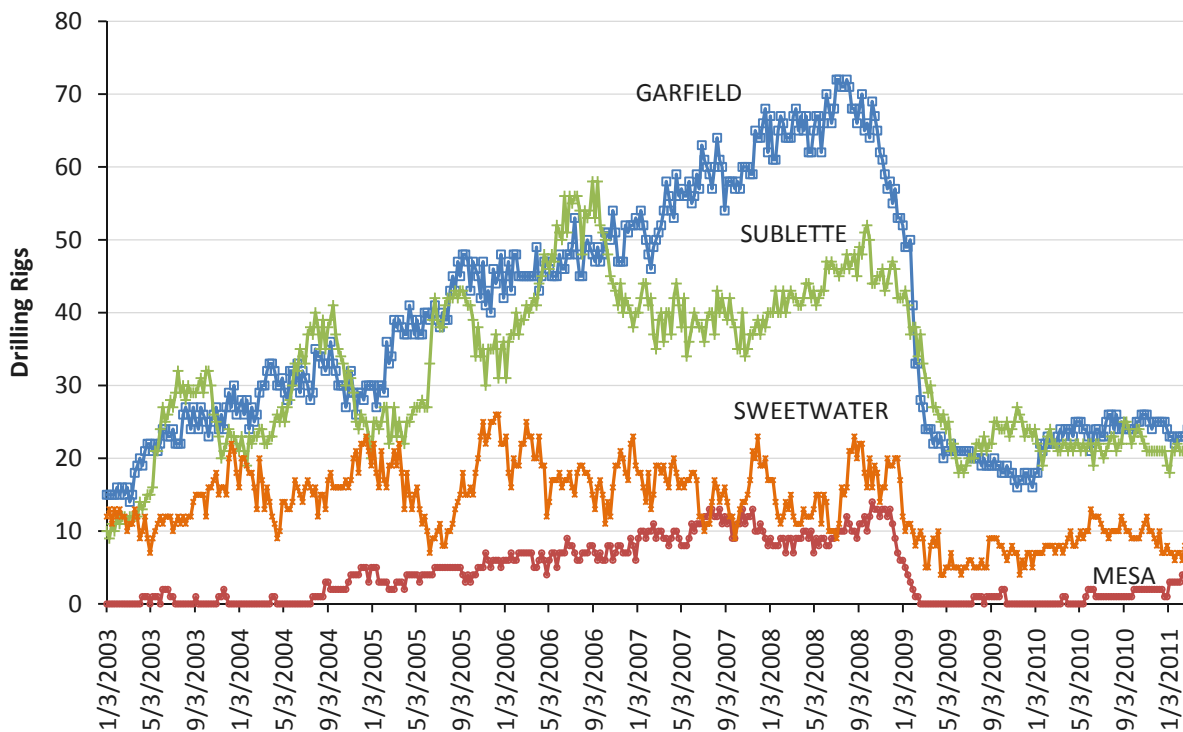
The concentration of natural gas exploration and well development in the Rulison, Parachute, Grand Valley, and Mamm Creek and Jonah, Pinedale, and Wamsutter gas fields put the relatively rural locales of Garfield and Sublette counties at the center of an energy boom in the 2000s.⁵⁶ Neighboring counties, like Sweetwater County, Wyoming and Mesa County, Colorado with more amenities and housing were also pulled into the boom by virtue of housing workers and businesses servicing remote fields. (See Maps 3-1

⁵⁶ Detailed maps of oil and gas fields are available from the EIA, http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/maps/maps.htm. On Wyoming, see Jeffrey Jacquet, 2009. "Energy Boomtowns and Natural Gas: Implications for Marcellus Shale Local Governments and Rural Communities." NERC RD Rural Development Paper No. 43, <http://nercrd.psu.edu/publications/rdppapers/rdp43.pdf>. See also, Headwaters Economics, 2009. Impacts of Energy Development in Wyoming, with a Case Study of Sweetwater County, <http://headwaterseconomics.org/energy/western/energy-development-wyoming-sweetwater/> and Headwaters Economics, 2009. Impacts of Energy Development in Colorado, with a Case Study of Mesa and Garfield Counties, <http://headwaterseconomics.org/energy/western/colorado-mesa-garfield-counties/>.

and 3-2) While the surge played out according to geographically-specific timelines, peaking in Sublette County in 2006 and in 2008, while climbing more steadily and dramatically toward a 2008 peak in Colorado, in both places the recession brought a sudden slowdown in the fall of 2009 (see Figure 3-1).

While the overall competitiveness of Rocky Mountain natural gas has shifted significantly in recent years (see Chapter 1), both the Piceance and the Greater Green River basins remain nationally significant sources of natural gas. Energy companies have made significant investments in infrastructure in the region and have continued to acquire drilling permits and to develop new wells. Although the current level of drilling activity remains slow compared to the peak of the boom, the number of active wells and permitted wells indicates that natural gas development will continue to dominate land use in these counties for many years to come.

Figure 3-1. Weekly Rig Counts, Study Counties, 2003 – March 2011



Source: Rig Data (<http://www.rigdata.com>).

The Natural Gas Surge and Slump and Local Economic Performance

This section analyzes county-level trends employment, population, and local economic trends in the context of the fossil fuel surge and slump of the 2000s. When possible, this section compares performance metrics of study counties to performance of peer areas based on the geographic characterization of the study counties by population as defined by the U.S. Office of Management and Budget (e.g. rural, micropolitan, and metropolitan). For example, levels of employment in Garfield County might be

compared to the average for a “rural cohort,” referring to all of the rural counties (as defined by the census) located in the Interior West.

Table 3-1. Study Area Profile

| | 2008 Population* | OMB Classification** | 2008 Total Oil & Gas Employment [^] | 2008 Natural Gas Production (Total, MCF) ^α |
|------------------------------|---------------------|-------------------------|--|---|
| Garfield County, CO | 54,838 | Rural | 3,389 | 548,853,373 |
| Mesa County, CO | 141,905 | Metropolitan | 4,048 | 40,806,415 |
| Sublette County, WY | 8,338 | Rural | 1,953 | 1,145,006,892 |
| Sweetwater County, WY | 39,942 | Micropolitan | 4,414 | 241,222,806 |

Sources: *U.S. Census Bureau, Population Estimates.

**U.S. Office of Management and Budget, Core Based Statistical Areas and Combined Statistical Areas, 2009.

[^] U.S. Department of Labor, Bureau of Labor Statistics, Quarterly Census of Employment and Wages. Based on mailing address of employer, not place of work. Value for Sublette County is estimated.

^α Colorado Oil and Gas Commission, Wyoming Oil and Gas Commission.

Oil and Natural Gas a Key Local Employer

In 2008, there were 2,821 (Garfield), 3,921 (Mesa), 1,769 (Sublette), and 6,028 (Sweetwater) jobs in mining in the four counties according to Bureau of Labor Statistics data. Mining jobs were particularly significant in the Wyoming counties, with 32 percent of 2008 employment in Sublette County and 24 percent in Sweetwater County in the general category of mining (NAICS 21). In Colorado, 10 percent of total employment was in mining in Garfield County and 6 percent in Mesa.

Oil and natural gas-related activities constitute the majority of mining employment in the study counties. Oil and natural gas jobs (from NAICS codes in the 21 category (mining)) were more than 95 percent of all mining jobs in three of the study counties. Sweetwater County, with trona and coal mining operations, had sixty-three percent of mining employment in oil and gas development in 2008.⁵⁷

⁵⁷ Disclosure restrictions create data gaps in reporting of oil and gas employment in total mining jobs in Sublette County. However, given that the county does not have major mining operations, a reasonable assumption is that the majority of jobs in mining are in oil and gas, as in Garfield and Mesa counties.

What is the Best Way to Count Local Oil and Gas Workers?

As discussed in Chapter 1 (see page 19), this report and this chapter in particular depend on data that may undercount oil and gas workers. We use Bureau of Labor Statistics Quarterly Census of Employees and Wages (QCEW) data because they provide the most county-level data that deal with employment across sectors. Because QCEW assigns workers to the official mailing address of the establishment by which they are employed, QCEW may miss some employees of companies reporting mailing addresses outside of the county in which oil and gas jobs are found.

Other techniques for counting oil and gas workers are available. For example, with industry cooperation it is possible to estimate the number of FTEs associated with a single well completion. These are important data points that help to indicate the intensity of the boom and are often used to estimate workforce demand. Using this technique, a researcher in Sublette County estimated that as many as 3,000 workers were working in the county's oil and gas fields in the summer of 2006 at any given time, with 2,000 to 3,000 additional workers rotating in and out as replacements.⁵⁸ BLS QCEW data reported 946 oil and gas jobs in the county that year.

The hitch is that such workforce estimates are not in any way comparable to other data, for example, the volume of total employment in a county. For this reason, this report relies on publicly available, uniform datasets, such as the QCEW, but emphasizes that in the course of well development there may be many “uncounted” workers in oil and gas fields. Whether or not they live temporarily or permanently in surrounding communities is incredibly difficult to measure. Local institutions, such as the Chamber of Commerce, may be the best situated to track the presence of non-resident workers through weekly or monthly occupancy counts of temporary housing or other more formal surveys of area employers.

It is also possible that QCEW data becomes more accurate over time, as the record keeping issues associated with unemployment insurance reporting adjusts to more accurately reflect business location trends (mandatory unemployment insurance reports are the source of QCEW data).

Non-mining Employment Demonstrates Economic Diversity in Western Colorado

Figure 3-2 describes the size of different employment sectors in each of the study counties and the average annual wage in each sector in 2009. The size of the bubble corresponds to the total number of jobs in the sector and its vertical position corresponds to the value of average annual wages in the sector, compared to combined average wages in the study county. The data shown are for 2009 and are limited to the mining sector (e.g., do not include pipeline construction jobs).⁵⁹

⁵⁸ Personal Communication, Jeffrey Jacquet, 3/29/2011. This citation references an article by Jacquet, “How Many Out of Town Workers are there in Sublette County?” *Sublette Examiner* 8/31/2006.

⁵⁹ U.S. Department of Labor, Bureau of Labor Statistics, 2010. Quarterly Census of Employment and Wages (QCEW).

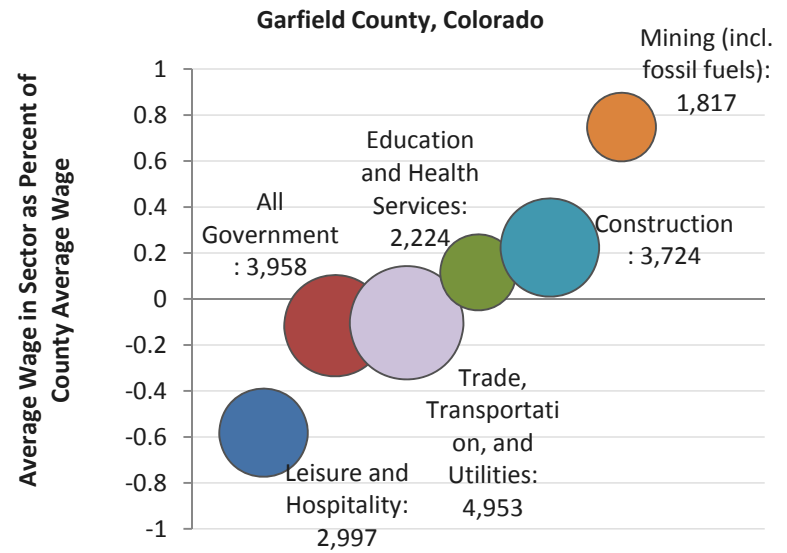
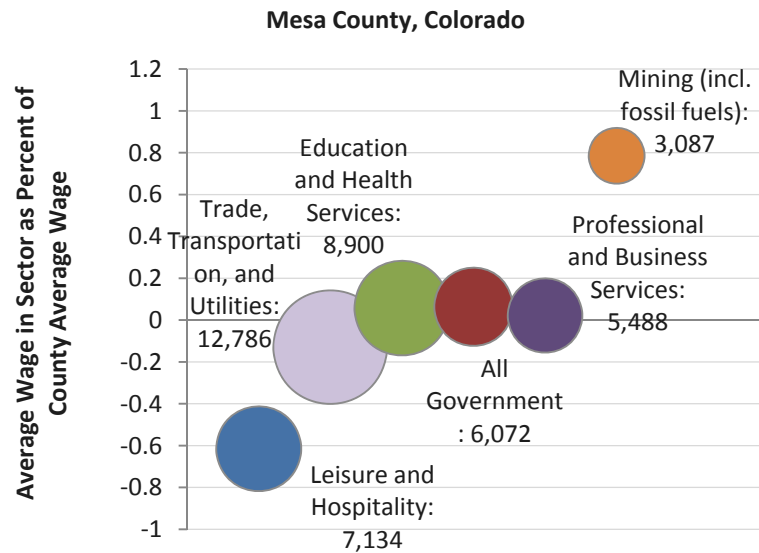
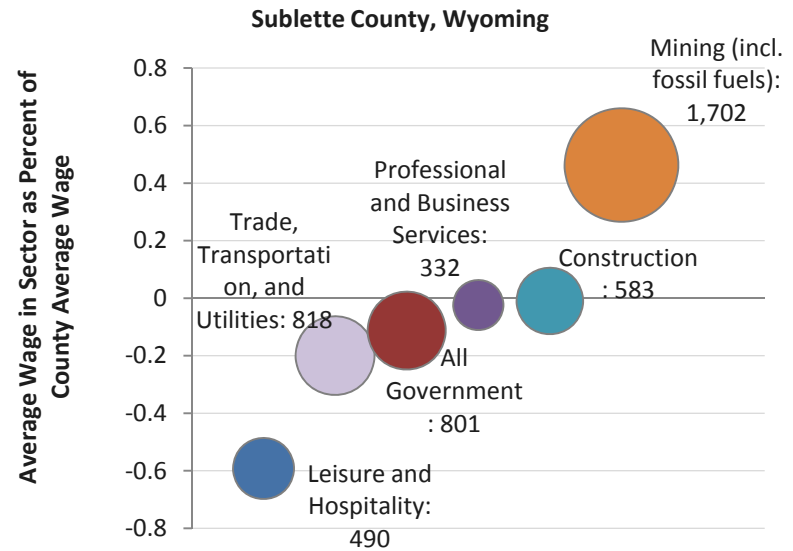
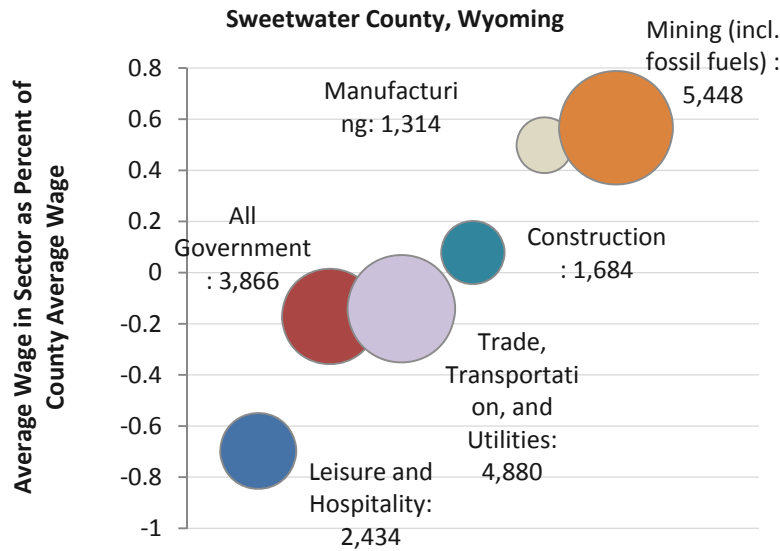
This is an important look at the differences among the counties in the study group. Mesa County has 60,020 jobs while Sublette has just 5,523. Sweetwater and Garfield counties have 23,930 and 25,094 respectively. While mining is a dominant player in terms of number of jobs in both of the Wyoming counties, it has a smaller share of total in both of the Colorado counties. Trade, Transportation and Utilities, Construction, and Government are leading sectors (Mesa County is the only county in which Construction is not among the top five employment sectors).

Education and Health Services employ many more people in the Colorado counties than in Wyoming: constituting 12 and 21 percent of total employment in Garfield and Mesa, compared to 3 and 5 percent in Sublette and Sweetwater. Government, including federal, state, and local entities, is an important employment sector in all of the counties—in declining order its share of total is 16 percent in Sweetwater, 12 percent in Garfield, 11 percent in Sublette, and 6 percent in Mesa.

In brief

- In each of the counties, one in every five jobs (one in six in Sweetwater County) in 2009 was in Trade, Transportation, and Utilities.
- In Sublette, Sweetwater, and Garfield counties, one in every six jobs was in government.
- For every job in education and health services, there were nine mining jobs in Sublette County and five mining jobs in Sweetwater County.
- The ratio of mining employment to education and health care employment was one to two in Mesa County and nearly one to one in Garfield County.

Figure 3-2. Employment and Average Annual Wages by Sector, 2009



Source: U.S. Department of Labor, 2010. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

High Pay in Oil and Natural Gas Work Not Matched in Other Sectors

Average annual wages in mining (including fossil fuels) are typically well above average wages for all jobs, and this is the case in the four study counties. Mining lifted average wages above the average for geographic peers, except in Mesa County where wages are significantly below average for metropolitan counties in the Intermountain West.

Table 3-2. Average Annual Wages in 2009

| | All Jobs | Mining | | All Jobs |
|------------------------------|----------|----------|---------------------|----------|
| Garfield County, CO | \$43,598 | \$76,204 | Rural Cohort | \$32,499 |
| Sublette County, WY | \$54,572 | \$79,837 | | |
| Sweetwater County, WY | \$49,266 | \$77,174 | Micropolitan Cohort | \$34,131 |
| Mesa County, CO | \$38,434 | \$68,630 | Metropolitan Cohort | \$43,208 |

Source: U.S. Department of Labor, 2010. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

In western Colorado, the majority of employees do not earn wages that compete with mining wages. For example, in 2009 in Mesa County 45 percent of the jobs were in sectors that pay at or below the county average wage. The two largest employment sectors in Garfield County—Trade, Transportation, and Utilities and Government—employed 39 percent of the workforce and paid 10 and 6 percent below the county average in 2009.

The wage gap is even more striking in Wyoming, where mining is more dominant (and correspondingly average wages are higher). In Sublette County in 2009, 69 percent of jobs were in sectors with average wages at or below the county average. In Sweetwater County in 2009, 63 percent of jobs were in sectors with average wages at or below the county average. In periods of rapid economic and population growth, those earning average or below average wages can suffer, as their wages fail to keep up with inflation and the cost of living.

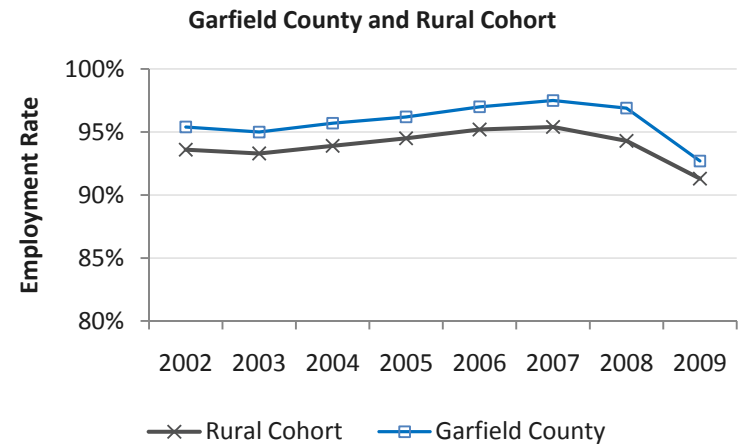
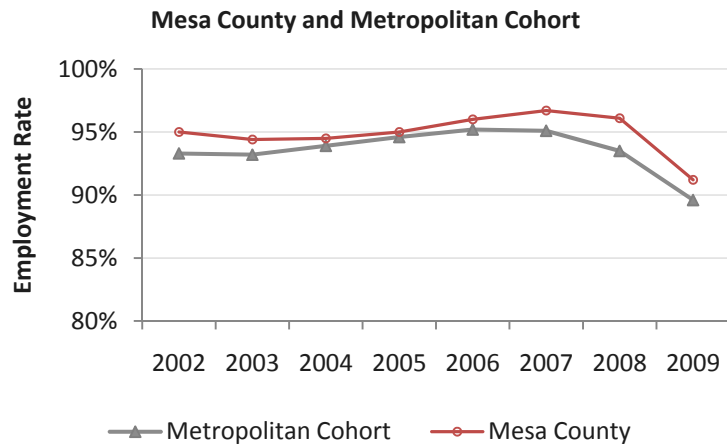
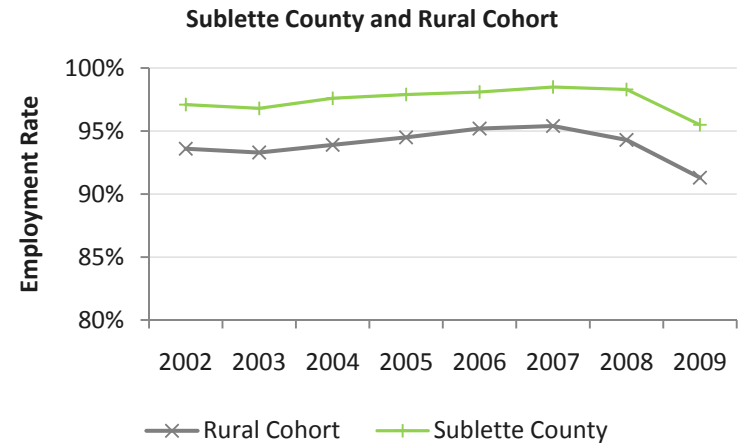
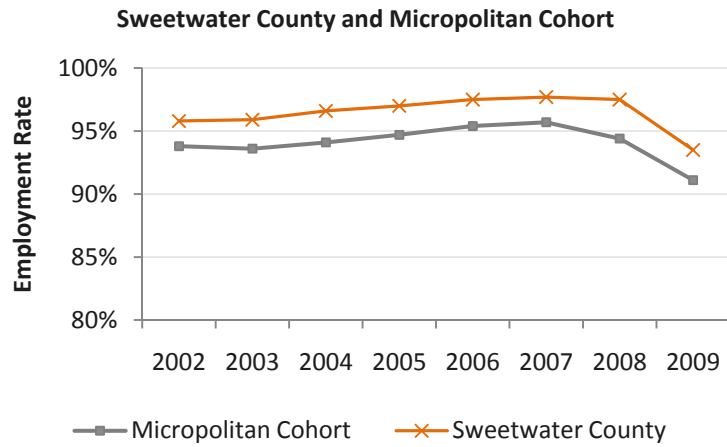
Rates of Employment Relatively High

The study counties have experienced better than average rates of employment, as shown in Figure 3-3.⁶⁰ Performance relative to geographic peer cohorts has been exceptionally high in Sweetwater and Sublette counties.

An issue during the height of the fossil fuel energy boom in some western communities was “overemployment.” Employment rates (total jobs/labor force) that approach 100 percent can create wage inflation and siphon workers from local businesses. This is especially problematic when wages in large and important employment sectors, like retail and government, cannot keep pace with wage inflation in the fast-growing mining sector.

⁶⁰ U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics.

Figure 3-3: Annual Employment Rate, 2002-2009



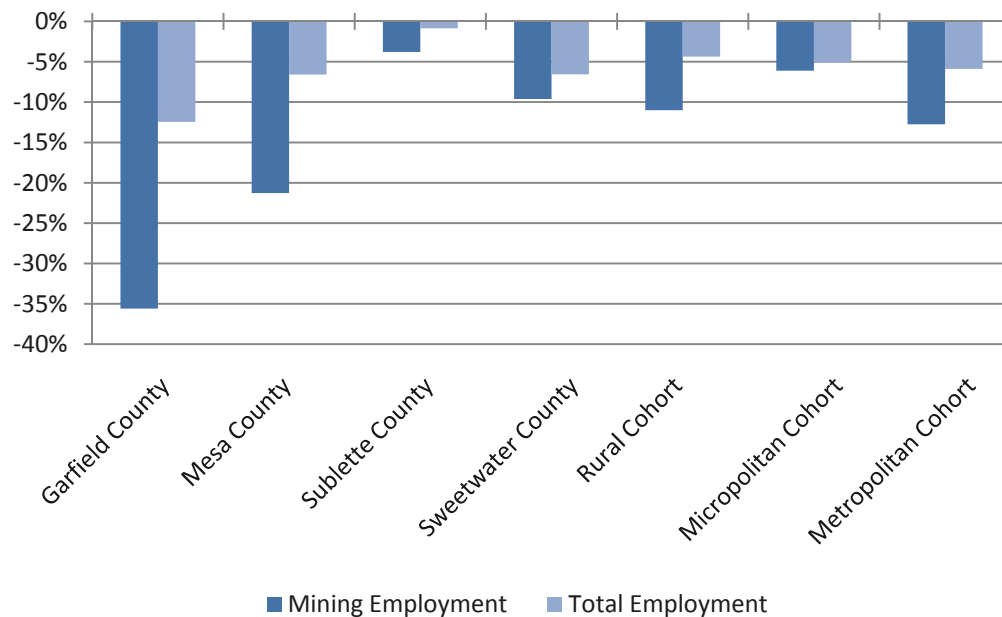
Source: U.S. Department of Labor, 2010. Bureau of Labor Statistics, Local Area Unemployment.

Mining Job Losses Outpaced Total Job Losses in Recession

As shown in Figure 3-3, the initial rate of job loss between 2007 and 2008 was less steep for the study counties than for their peers. This may indicate a link to the lag in the impact of the recession on oil and natural gas price and production trends.

However, between 2008 and 2009, job loss in mining outpaced total job loss, as shown in Figure 3-4 below.⁶¹ Measured as a percent of jobs lost from 2008 to 2009, job loss in the mining sector (including oil and natural gas, but not pipeline construction) outpaced job loss across employment sectors during the recession in each of the study counties. Garfield County suffered the most acutely, losing 1,004 jobs in 2009 from a 2008 high of 2,821, a 36 percent decline as compared to a 12 percent decline in total jobs. Sublette County appears to have suffered the least—this may be due to the fact that an earlier dip in drilling activity in 2006 created an early adjustment in the local industry, or due to the fact mining related employment demands are far greater than available workforce.

Figure 3-4: Job Loss in Mining versus Total Employment, 2008 to 2009



Source: U.S. Department of Labor, 2010. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

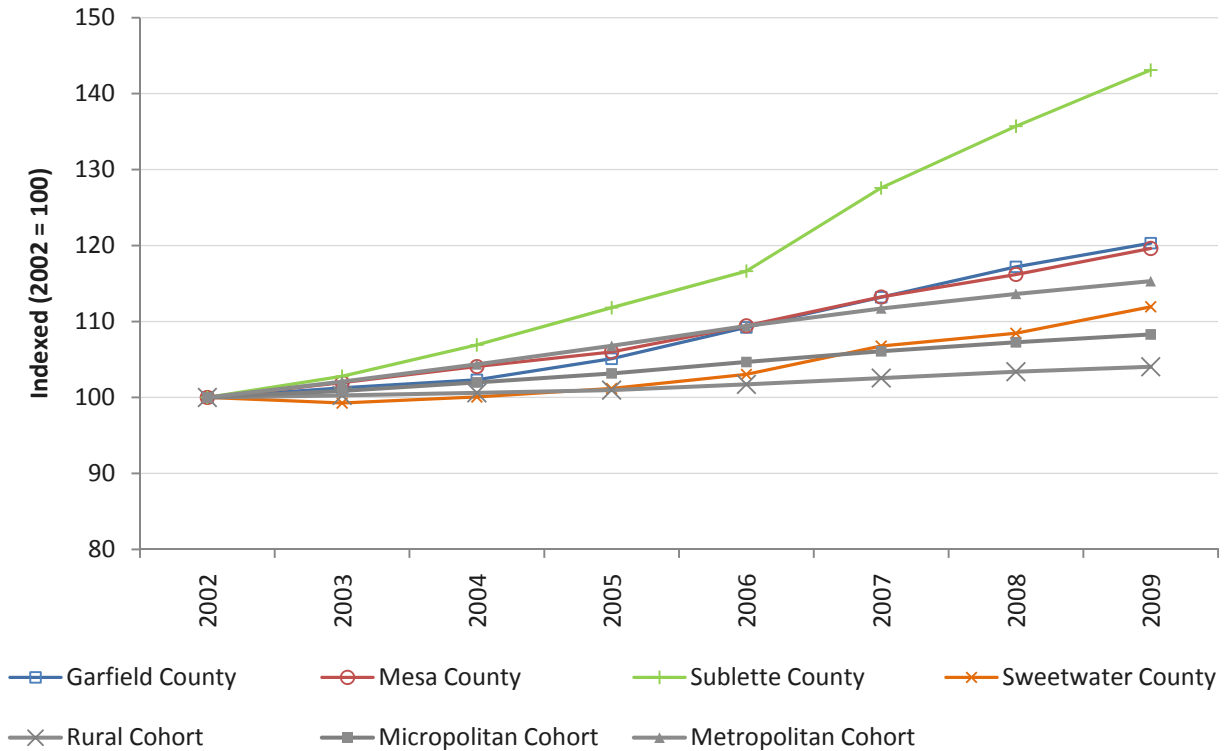
Population Growth and Turnover Present Housing Challenges

During the boom, several of the counties experienced population growth at rates above average. See Figure 3-5. From 2002 to 2009, Garfield County experienced a 17 percent increase in population and Sublette County 36 percent, as compared to an average of 3 percent for the West's rural counties.

⁶¹ Loss of jobs from Q4 2008 to Q4 2009 (or Q1 2010) for total public, total private, all oil and gas. U.S. Department of Labor, QCEW.

Sweetwater and Mesa counties experienced increases that closely mirror peer county cohorts (8% for Sweetwater versus 7% for micropolitan counties, and 16% for Mesa versus 14% for metropolitan counties).

Figure 3-5. Annual Population Change, Indexed to 2002



Source: U.S. Department of the Commerce, 2010. Census Bureau, Population Division.

Correspondingly, migration was relatively more volatile in the study area counties than in other western counties of comparable size. In 2007, on average across the rural county cohort, 4 in every 1000 people of the population were migrants, while that number was 73 per 1000 in Sublette County and 23 per 1000 in Garfield County. Migrants in Sweetwater County were also 23 per 1000, as compared to a 7 per 1000 average among micropolitan counties. Mesa County had a rate of 28 per 1000 in 2007, as compared to 10 per 1000 across metropolitan counties.

The number of new people in each county fell more dramatically in the two rural counties than in the rural cohort. In contrast, both Sweetwater and Mesa County, migrants actually relative to total population from 2008 to 2009, possibly indicating a role for larger population centers as shock absorbers during periods of flux.

Housing Shortages and Price Trends

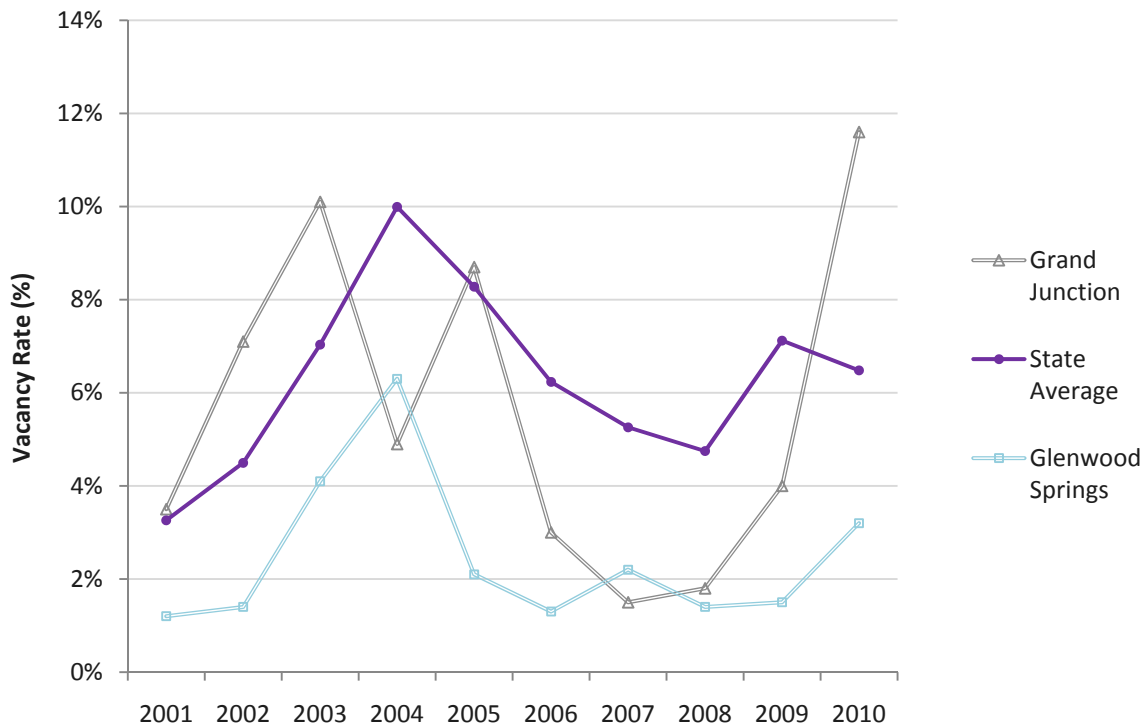
Colorado

The energy boom contributed to existing housing shortages in Garfield county (which has in the past tended to provide housing for many resort workers who commute east to the less affordable Pitkin and

Eagle counties), and appears to have prompted—or at the very least exacerbated—a very damaging episode of real estate speculation in Mesa County.

Rental vacancy rates at the height of the oil and natural gas boom were well below state averages and reached as little as 1.3 percent in Glenwood Springs in 2006 and 1.5 percent in Grand Junction in 2007. (Rental vacancy data in Colorado is available only for Glenwood Springs and Grand Junction.) As the chart below indicates, what is perhaps more striking is how dramatically the vacancy rates have swung upwards in Grand Junction, from 1.8 percent in Q1 2008 to 11.6 percent in Q1 2010.⁶² See Figure 3-6.

Figure 3-6. Vacancy Rates, Multifamily Rentals, Colorado and Glenwood Springs and Grand Junction



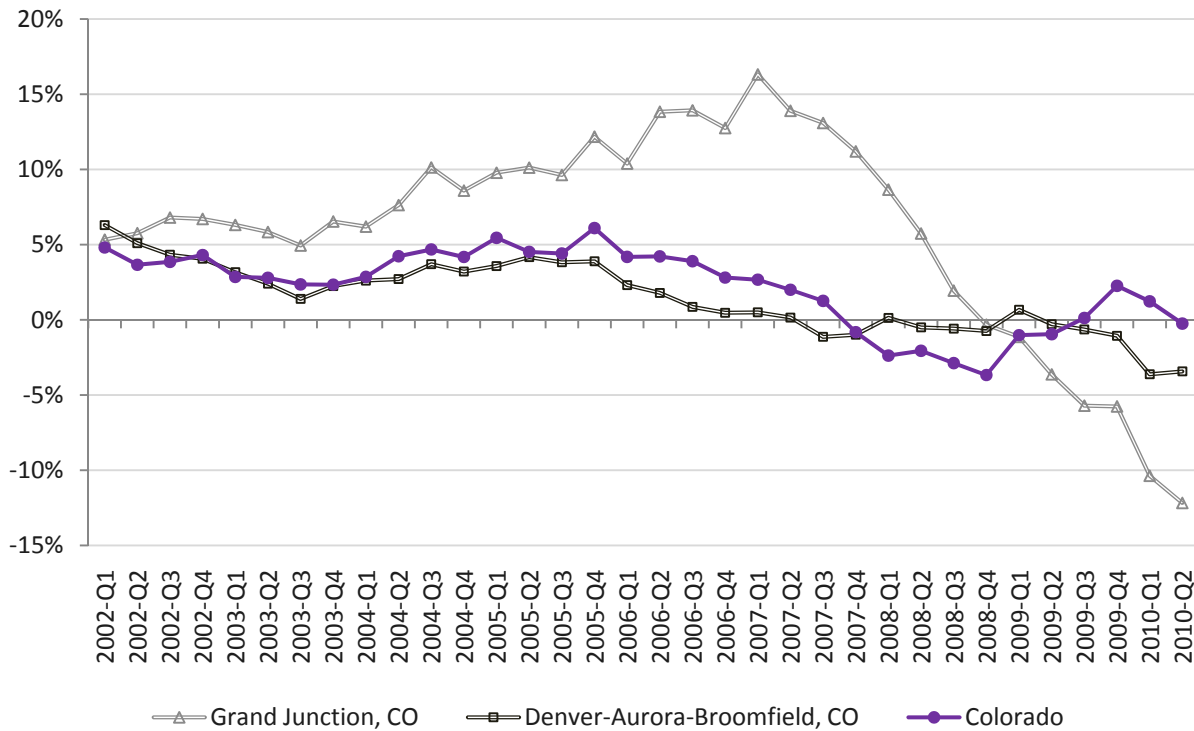
Source: Colorado Division of Housing, 2010. First Quarter 2010 Colorado Multi-Family Housing Vacancy & Rental Survey.

Grand Junction is the only community among the case study areas that is tracked by federal housing price indicators. Figure 3-7 demonstrates a significant level of volatility in housing prices, with the running 4-quarter percent change in home prices exceeding those in the Greater Denver metropolitan area for the period 2003 to early 2007. Importantly, while the recession was foreshadowed in a downward trend in value of house prices in the state and in the Denver metro area that began in the middle of 2006, prices continued to skyrocket in Grand Junction through the middle of 2007. Indeed, price increases were still positive in Grand Junction, although marginally, in the midst of the recession, despite having trended below zero elsewhere in the state. The 4-quarter percent change turned negative in the first quarter of

⁶² Colorado Division of Housing, 2010. First Quarter 2010 Colorado Multi-Family Housing Vacancy & Rental Survey.

2009 and continued to plunge into 2010. The rate of loss in home value far exceeds that of housing in the Denver Metro area.

Figure 3-7. Housing Price Trends, Grand Junction, Denver, and CO, First Quarter 2002 to Second Quarter 2010



Source: Source: Federal Housing Finance Agency, City Housing Price Index Data, data to Q2 2010.

The recession was in large part driven by multiple problems in the real estate and finance industries. What appears to have happened on the West Slope, and in Grand Junction in particular, is that the energy boom, and accompanying sense of prosperity, encouraged the kind of speculative behavior and financial overstretching that contributed to the severity of the 2007–2009 recession.

As a 2009 Mesa county publication noted:

The energy industry has been a major driving force for the economy over the last several years. Rising exploration and production activity combined with very strong prices for oil and natural gas created a significant surge in Mesa County's economy. Mesa County saw the lowest unemployment it has seen in decades, a tight housing market where assessed values increased in amounts unprecedented, a local rental market that was almost non-existent, and a surge in population growth.⁶³

⁶³ Mesa County, 2009. Mesa County Environmental Scan, page 27.
<http://www.mesacounty.us/WorkArea/DownloadAsset.aspx?id=1656>.

The same report observes of foreclosures that 50 to 60 percent of foreclosed homes in the Denver Metro area were ultimately sold, while only 30 percent were sold in Mesa County during 2007 and 2008.⁶⁴

Wyoming

The energy boom also created housing shortages in Sublette and Sweetwater counties.

According to the Wyoming Economic Analysis Division, the state's leading fossil fuel production counties, Sublette, Campbell, and Sweetwater, have ranked in the top four or five among all state counties (24) for cost of living since 2005. This is largely a function of higher than average housing costs.⁶⁵

The recession has lessened the disparity between Sweetwater County's cost of living and the state average, but not so in Sublette. In 2008, housing costs in Sublette were 25 index points above state average, and in Sweetwater housing was 15 points above the state average. The 2010 data put housing costs in each county at 21 points above state average for Sublette and 6 above for Sweetwater. This suggests that at least with regards to housing prices, Sweetwater County may have been more exposed to the impacts of the recession than Sublette.

Rental vacancy rates for rental units also swung wildly with the surge and slump. In 2007, Sublette County had a 2.5 percent vacancy rate in single families and zero percent vacancy among apartments. Similarly, in that year, Sweetwater County vacancy rates were 1.9 percent for homes, and 0.9 percent for apartments. However, in 2009, single family home vacancy rates in Sublette County had climbed to 11 percent, above the state average of 6.1 percent. Apartment vacancies had risen to 5.7 percent, below the state average of 7.3 percent. Sweetwater County's vacancy rates in 2009 also rose, to 3.3 percent for single family units and 8.7 percent for apartments.

Majority of Workers Live Near Larger Population Centers

Colorado is unique among western states in collecting data on mining employees by place of residence. This is a different set of data than is collected at a federal level about employment, such as the Quarterly Census of Employment and Wages. Data from the state of Colorado are based on mandatory surveys of employers about their employees' place of residence.

The Colorado Employee Residence Reports confirm that on Colorado's Western Slope, the majority of oil and natural gas workers have resided in Mesa County, despite the majority of drilling taking place in neighboring Garfield and Rio Blanco counties (see Figure 3-8). This suggests that energy workers gravitate toward regional population centers, like Grand Junction in Colorado and Rock Springs in Wyoming. While small by national standards, these communities offer a nexus of housing, shopping, education, health care, and other amenities that are more diverse than those in some of the very small rural communities that are closer to the gas fields themselves.

⁶⁴ Ibid, 35.

⁶⁵ Teton County, Wyoming, home to the destination resort Jackson Hole, with a limited housing stock in demand among wealthy out-of-state visitors, consistently ranks first. Wyoming Econ. Analysis Div., Wyoming Comparative Cost of Living Index. Semi-annual report, here we reference 2Q data for 2005 through 2010.

Figure 3-8 Number of Oil and Natural Gas Workers by County of Residence, Mesa and Garfield Counties

Source: Colorado Division of Local Affairs, Colorado Employee Residence Reports.

Wyoming does not collect the same data on worker residence that Colorado does. However, anecdotal evidence suggests that Rock Springs and Sweetwater County have served as the hub for energy development in Sublette and Sweetwater counties.⁶⁶ With limited housing options in rural Sublette County and even elsewhere in Sweetwater County, Rock Springs absorbed many of the workers associated with drilling and operations for the Jonah Field, the Pinedale Anticline, and the BP-Wamsutter project (eastern Sweetwater County—although Wamsutter has grown dramatically as well).

The residence of oil and natural gas workers relative to the actual site of exploration and production can be problematic if revenues accrue to areas with high levels of mining activity, but relatively few population-related service demands. This question is explored in more detail later in the chapter.

Residence patterns are also important in terms of shaping the experience of an economic downturn. Vacancy rates noted above, as well as real estate trends discussed here and in the next section, indicate that a significant exodus of oil and natural gas workers may have contributed to the severity of the recession in Mesa County, for example.

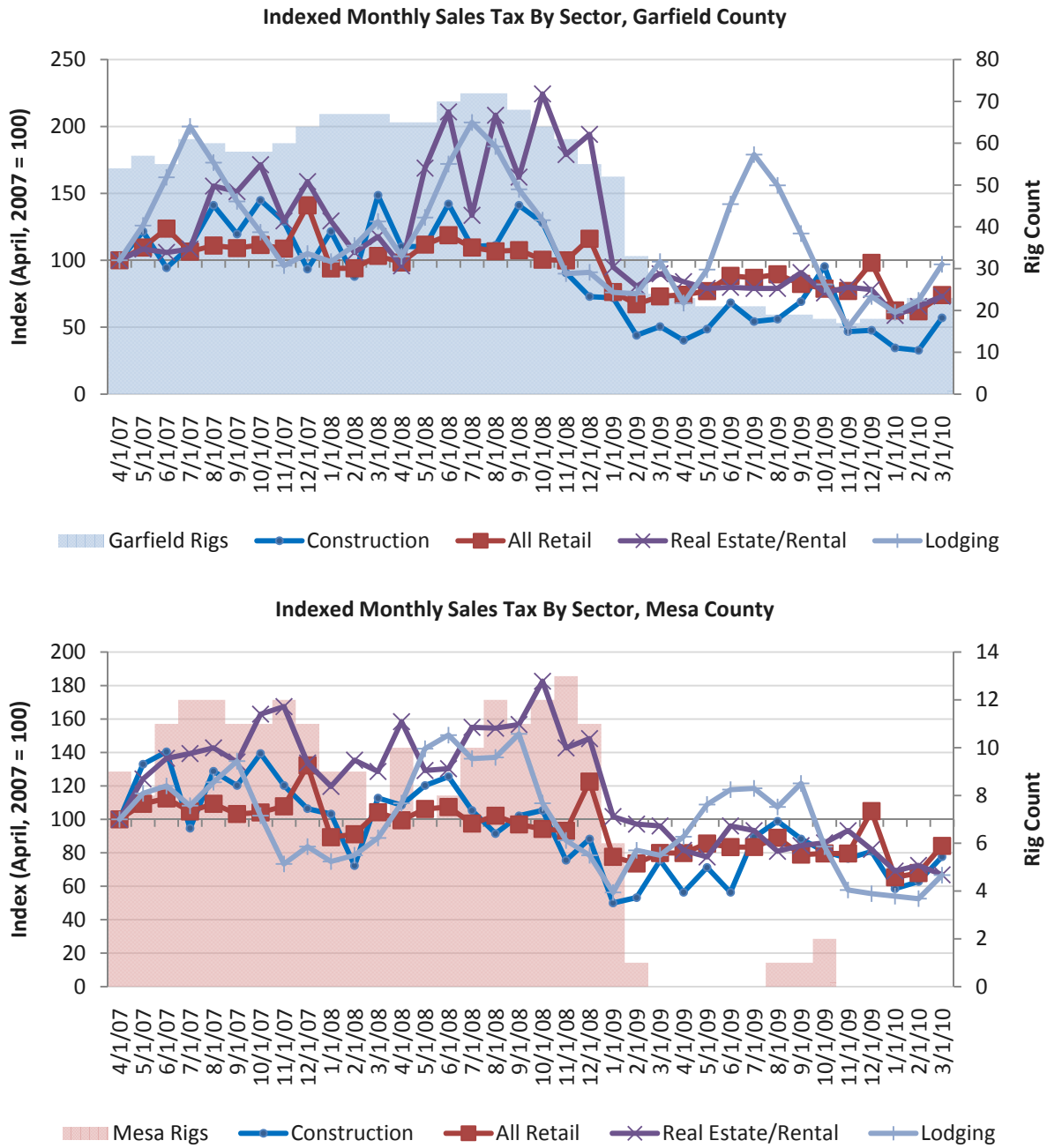
⁶⁶ Rock Springs Chamber of Commerce Director David Hanks estimates that during 2006 and 2007 there were as many as 4,000 people occupying hotels, RV campgrounds, and other temporary accommodations in Sweetwater County. Interview, David Hanks, 2/22/2011.

Linkages in the Local Economy

Interviews with local leaders in Garfield County raised concerns about the impact of volatility in the oil and natural gas industry on other sectors of the local economy. To evaluate this, we looked at county- and municipal-level sales tax activity in Colorado from second quarter of 2007 through first quarter 2010. Charts for total retail sales, construction, lodging, and real estate/rental sectors are presented, indexed to April 2007 (see Figure 3-9).

A few trends appear. For the period in question, lodging sales followed clear seasonal periodicity, with the height of sales occurring in the summer months. While the total volume for the high summer months of 2009 was off by 20 percent in Mesa County and 12 percent in Garfield County, these dips are smaller than the total changes in oil and natural gas drilling activity. A stronger link may be evident in the performance of the rental/real estate sector, which did not experience a significant seasonal boost after falling off precipitously early in 2009.

Figure 3-9. Monthly Sales Taxes by Sector in Mesa and Garfield Counties with Rig Counts, Q2 2007 to Q1 2010

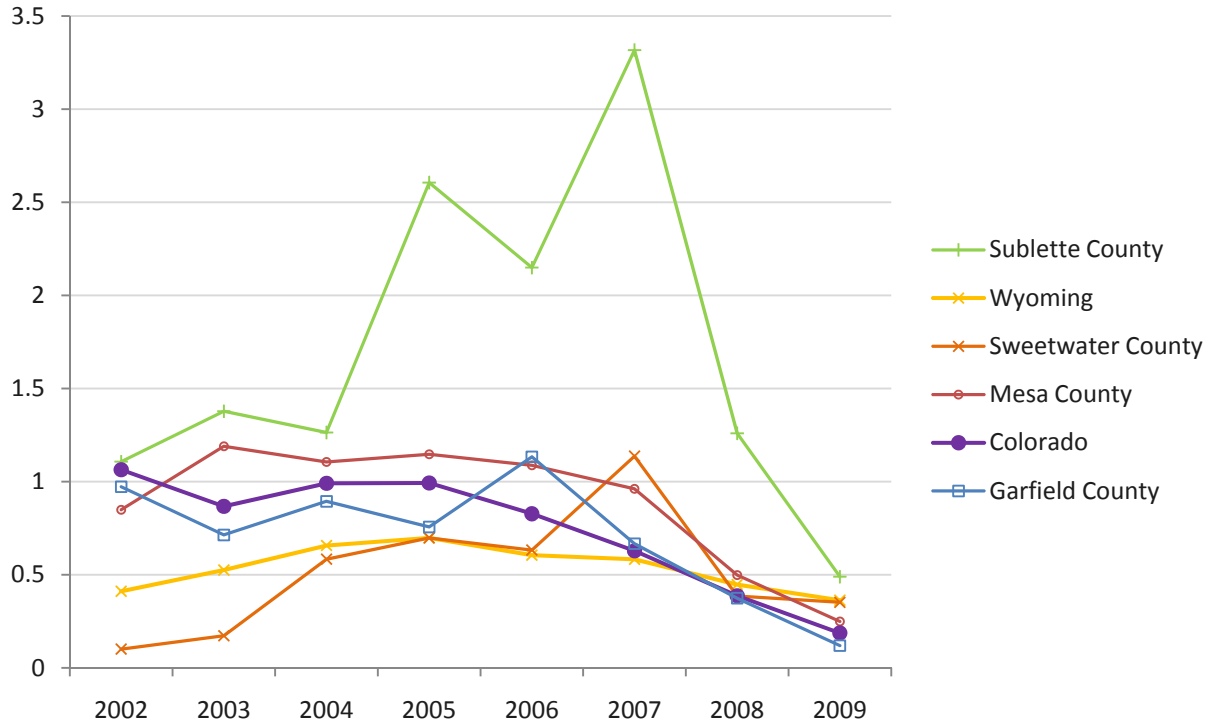


Source: Colorado Department of Revenue, Colorado Retail Sales and Sales Tax Summaries, Monthly County Summaries. Rig counts from RigData.

Construction Sector Faced Increased Exposure

Having created, and or exacerbated an existing housing boom, the natural gas surge contributed to the overexposure of local construction markets to the downturn. The direct impacts of the surge on residential construction at the county level are most visible in Wyoming, where building permits per one hundred residents increased tenfold in Sweetwater County and tripled in Sublette County between 2002 and 2007.⁶⁷

Figure 3-10. Building Permits (per 100 residents), Study Counties and State Averages, 2002-2009



Source: U.S. Department of Commerce, Bureau of the Census. Monthly New Privately-Owned Residential Building Permits.

Building permits also spiked in Garfield County in 2006 and in Mesa County in 2005. However, eastern Garfield County's sizable resort-oriented real estate market may overshadow and or amplify energy-related housing impacts at a county level.

The slowdown in residential construction as a result of the recession has been dramatic throughout the West. Statewide, residential building permits in Colorado were down by 71 percent and in Wyoming by 49 percent from the height of the boom. And in every place except Sweetwater County, permit numbers in 2009 were below 2002 levels.

⁶⁷ Source: U.S. Census, Annual New, Privately-Owned Residential Building Permits, 2002-2009. <http://censtats.census.gov/bldg/bldgprmt.shtml>.

The slowdown was more pronounced in each of the case study counties than the average for the respective states. Among the case study counties, the slowdown was most acute in Garfield County, where building activity—as measured by permits for residential buildings, was down by 90 percent. (This may again show a compound effect of the booming amenity economy and the energy economy.)

Energy Revenue and County and Municipal Fiscal Performance

Fossil fuel industry can bring significant additional tax revenue to state and local governments. Whether that revenue translates into improvement of the local economy depends on a number of factors. At the least, revenue must be sufficient in amount and arrive at the right time to enable local governments to mitigate the impacts of energy development. Energy revenue in essence should help energy development pay its own way.

To provide a real avenue for economic growth, moreover, tax revenue from energy development needs to go beyond compensating local government for its role in impact mitigation. A stable and diverse economic base, coupled with strategic financial reserves, can help to minimize the negative impacts of the volatility inherent in mining sectors. Investments in infrastructure, other capital expenditures, and new programs and services made by local and state governments should serve a larger benefit of attracting and promoting economic development. Leveraging energy development for the greater economic good is theoretically possible with the right amount of revenue—adequate to fund impact mitigation, short-term investment, and rainy day stores—and when energy development is managed to leave space in local landscapes and economies for other pursuits.

Background

At the height of the natural gas surge in the Rockies, evidence from several states, and the study area counties profiled here, suggested that tax revenue was often insufficient in amount and failed to arrive at the appropriate time to mitigate the impacts of energy development.⁶⁸ This brought a flurry of media attention to the difficulties local governments faced in meeting up-front capital expenditures to address infrastructure issues like upgrading county roads to enable them to handle heavy truck traffic or improvements to local sewer and water systems to address capacity issues brought on by rapid in-migration.⁶⁹

Moving into 2007 and 2008, the maturation of the natural gas surge revealed that impact mitigation comprised more than infrastructure and service delivery. Local governments faced additional and often more complex challenges, such as demands from local citizens that counties take an active role in helping

⁶⁸ BBC Research and Consulting, “Garfield County Socio-Economic Impact Study,” Report prepared for Garfield County, CO, January, 2007; BBC Research and Consulting, “Northwest Colorado Socioeconomic Analysis and Forecasts,” Report prepared for Associated Governments of Northwest Colorado. April, 2008.

⁶⁹ The Rocky Mountain News produced a series on energy development in Colorado in December 2007 that provided a good picture of the challenges facing local governments. Mesa and Garfield counties were profiled in a number of the stories. The report is no longer linked online, but information about it is available here: <http://www.rockymountainnews.com/news/2007/dec/07/temple-energy-series-debuts-monday/>. On Sublette County, see Alexandra Fuller, Letter from Wyoming, “Boomtown Blues,” *The New Yorker*, February 5, 2007 and “In Wyoming, the Dark Side of America’s Thirst for Energy,” *New York Times*, May 1, 2008. <http://www.nytimes.com/2008/05/01/garden/01fuller.html>.

to defend residential areas from dust, noise, odors, and light pollution as well as monitoring and oversight of the cumulative impacts of energy development on local amenities like air quality.

The 2007–2009 recession presented a new and serious set of fiscal challenges for state and local governments. To some extent, the problems associated with the energy boom evaporated as workers moved away and stresses on capital facilities abated. On the other hand, the recession affected all sectors of the economy, putting stress on state and local governments. A good measure of the contribution of energy production to long-term economic sustainability is whether energy revenue can be rolled into reserves to help smooth out the fiscal effects of the recession.

The following sections consider the fiscal performance of the four study counties during and after the natural gas surge and slump. We begin by reviewing how local governments collect, receive, and utilize energy revenue—and how that differs from place to place. We next offer a picture of fiscal trends in the study counties. Understanding the differences among the study counties points towards a set of best practices for local governments, offered at the end of this section.

How Local Governments Collect, Receive, and Use Energy Revenue

Local governments fund the provision of public goods and services through three main types of revenue: local taxation (property and sales taxes), charges for services, and intergovernmental distributions and grants from state and federal government. The share of each type of revenue for the county and municipal governments in our study area is shown in detail.

The largest source of revenue from energy development is through production taxes, including local property taxes, state severance taxes, and federal mineral royalties. Counties receive the largest portion of revenue from energy development from local property taxes on production. Municipal governments mainly generate revenue through sales taxes on the energy industry and support services. Cities and counties also receive intergovernmental support from state severance tax distributions and grant programs.⁷⁰

Increased economic activity associated with energy development surges can also affect revenue indirectly, for example by boosting sales tax revenues or increasing the base for enterprise-funded activities.

How States Return Energy Revenue to Local Governments

Local government access to state and federal revenue is through a mix of formula-based programs and one-time distributions, e.g., grant programs or other discretionary disbursements. As detailed in our 2008–2009 reports and in Chapter 2 of this report, the framework for assessment, collection, and distribution of energy revenue is detailed and complex; states vary significantly in their approach to the distribution of royalties and production taxes to local governments. Schematic diagrams providing an overview of severance and mineral royalty distribution in Colorado and Wyoming can be found in the Appendix.

⁷⁰ For more detail on revenue distribution systems, see Headwaters Economics, 2008. Energy Revenue in the Intermountain West. http://headwaterseconomics.org/pubs/energy/HeadwatersEconomics_EnergyRevenue.pdf

As a general rule, energy revenue to local governments has several characteristics:

- 1) Revenue tends to lag impacts on infrastructure and service loads, especially during periods of rapid build-up.
- 2) Revenue is highly volatile from year-to-year, because severance and property taxes are assessed based on the value of production, which rises and falls with volatile market prices.
- 3) As a rule, property tax is the most reliable form of energy revenue for local governments, because state distribution of severance taxes and federal mineral royalties is done according to formulae, which may not address local needs and by special distributions (grants or legislative appropriation) that can be politically fungible, out of local control.
- 4) The importance of property tax revenue means that counties tend to benefit more immediately than municipalities, as fossil fuel energy development (in the Rocky Mountain West) typically occurs outside of municipal boundaries.

Fiscal Performance of Case Study Counties and Municipalities

The recession that reduced tax revenue for federal, state, and local governments across the nation affected Colorado and Wyoming's energy-producing regions as well. All four counties continued to experience revenue decline resulting from reduced energy prices into FY2011. Each county was forced to take steps to reduce spending, tap into reserves, and/or forgo capital projects and defer maintenance.

That is where the similarities end. The fiscal challenges facing the four counties are very different, based on both structural and geographic differences between them, and important policy decisions at the state and local level made before and during the energy boom that ended in 2008. This section compares the recent revenue trends of the four study county governments and selected municipalities, and provides some discussion of the role fossil fuel revenue played in county budgets in the recession.

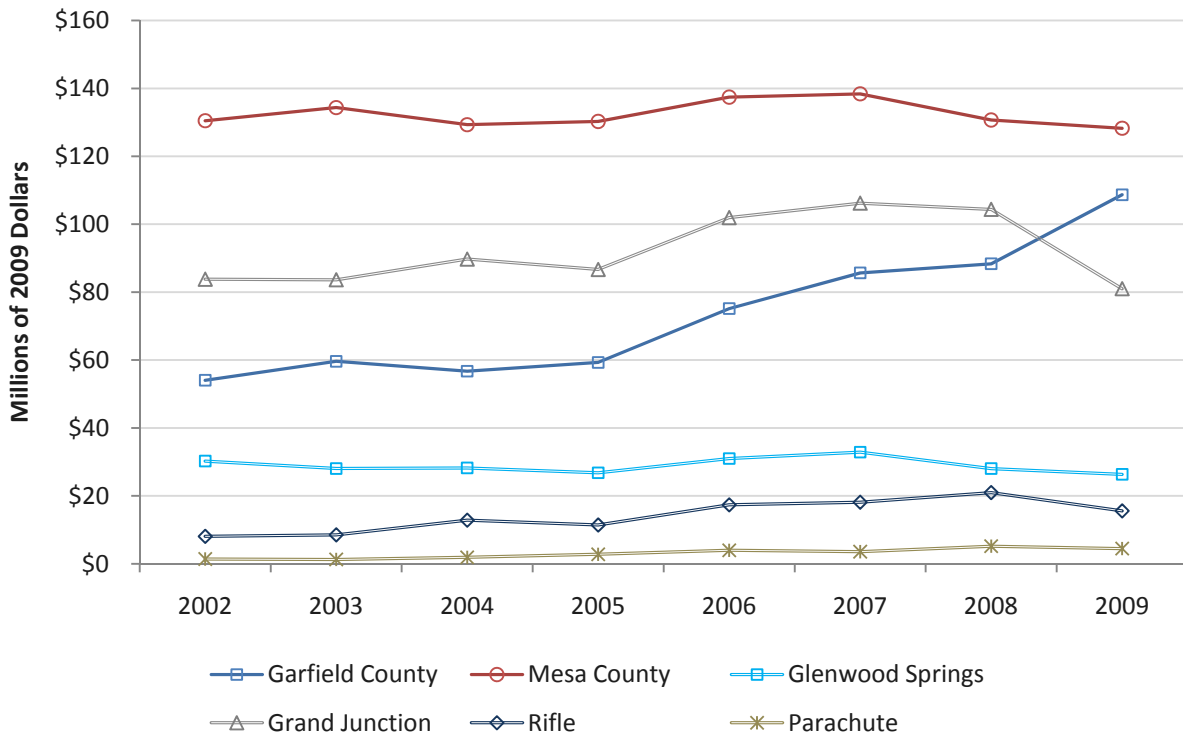
Colorado

General Revenue Trends

General revenue trends for Mesa and Garfield counties and key municipalities are shown on the following page.

Figure 3-11 shows that municipalities in Colorado experienced more rapid and steeper declines in revenue than the two counties. The cities and towns all experienced revenue declines in 2008, while Garfield County's revenue increased in 2008, and again in 2009. Mesa County's revenue declined 2 percent between 2008 and 2009, but this was modest compared to revenue losses of 6, 14, 22, and 26 percent for Glenwood Springs, Parachute, Grand Junction, and Rifle respectively over the same period.

Table 3-4 and Figure 3-12 show 2009 total government revenue and the main sources by percent, including property tax, sales tax, intergovernmental revenue, and other revenue (including investment income, licenses and permits, charges for services, and miscellaneous revenue).

Fig 3-11: Local Government Revenue Collections from All Sources, 2002-2009.⁷¹

Source: Colorado Department of Local Affairs, 2010. Local Government Finance Compendium.

Table 3-4. Colorado Local Government Revenue with Major Sources as Percent of Total Revenue, 2009.⁷²

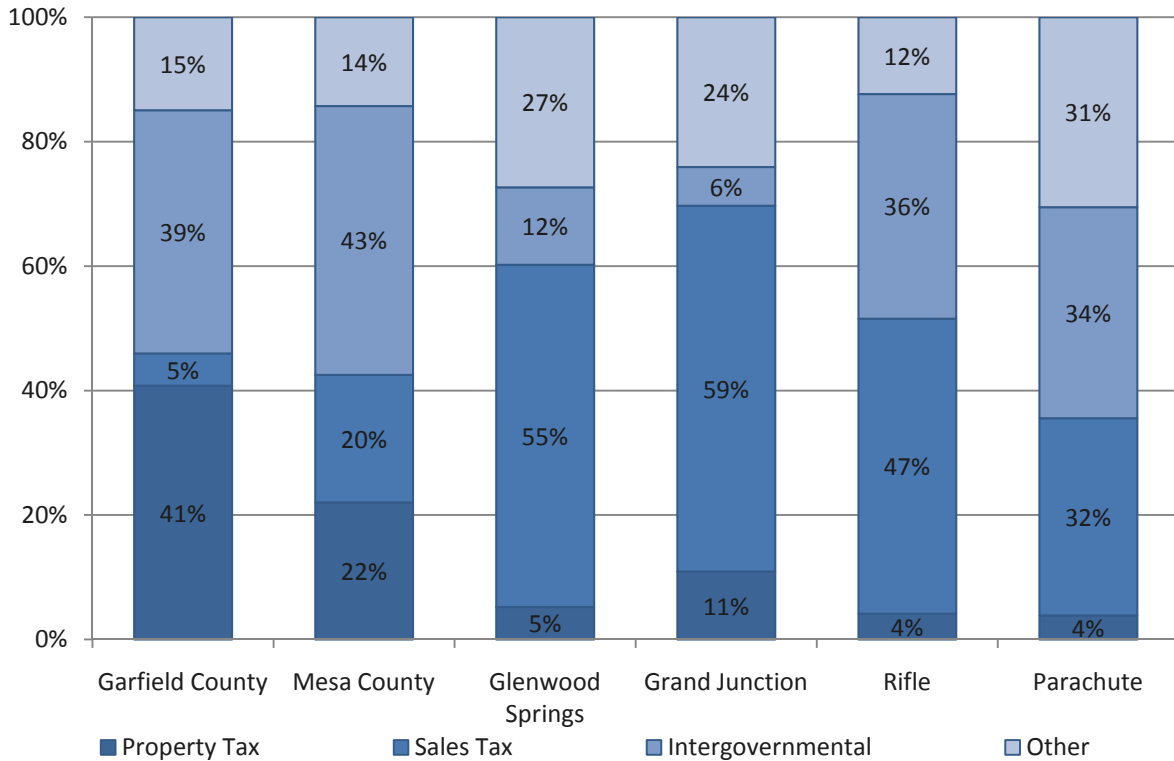
| | Total Govt. Revenue(\$) | Property Taxes | Sales Taxes | Intergovernmental |
|--------------------------|-------------------------|----------------|-------------|-------------------|
| Garfield County | \$106,928,555 | 40.79% | 5.19% | 39.09% |
| Mesa County | \$126,196,763 | 22.05% | 20.49% | 43.20% |
| City of Glenwood Springs | \$25,923,785 | 5.22% | 55.01% | 12.46% |
| City of Grand Junction | \$79,699,543 | 10.92% | 58.79% | 6.22% |
| City of Rifle | \$15,334,330 | 4.17% | 47.39% | 36.11% |
| Town of Parachute | \$4,416,923 | 3.86% | 31.70% | 33.93% |

Source: Colorado Department of Local Affairs, 2010. Local Government Finance Compendium.

⁷¹ Colorado Department of Local Affairs (DOLA), 2010. Local Government Finance Compendium. Local government finance data in this chapter were obtained for Colorado through the Local Government Finance Compendium and may reflect more uniform audit standards than in Wyoming. Wyoming data were obtained directly from local governments. See sidebar on page 66 for more information on local fiscal data sources.

⁷² Ibid.

Figure 3-12. Colorado Local Government Revenue with Major Sources as Percent of Total Revenue, 2009.⁷³



Source: Colorado Department of Local Affairs, 2010. Local Government Finance Compendium.

Tax Revenue

In Colorado, counties capture the vast majority of wealth generated by oil and natural gas production through property taxes while cities rely more on sales taxes on economic growth associated with oil and natural gas activities. The difference in tax structure puts cities at a disadvantage. (See Table 3-4 and Figure 3-11.) Most of the wealth generated through taxation is from production, meaning counties generally receive more money from energy development. Property taxes also tend to be a more stable form of revenue. Although the production value that property taxes are based on is extremely volatile (because of swings in production, price, and changes in tax policy and incentives), production (and therefore tax revenue) continues from wells even as drilling rigs, workers, and support services leave an area. Sales tax revenue is more sensitive to changes in economic activity and cities experienced revenue declines more sharply than the two counties during the recession. The lag inherent to property tax collections that caused fiscal problems at the start of a drilling boom later provided a buffer for counties at the onset of the recession.

State Distributions

Counties also receive the majority of state distributions of severance taxes and federal mineral royalties. (See Appendix.) In 2009, Garfield County received 58 percent of all state distributions, municipalities

⁷³ Ibid.

combined received 37 percent, and school districts five percent.⁷⁴ State distributions are declining, falling from \$19.6 to \$6.5 million from 2009 to 2010, a 67 percent decline. The state also eliminated the Energy Impact Assistance grants program in the summer of 2010 in order to direct these monies to the state government.

Structural and Economic Differences

Figure 3-13 shows significant differences in revenue and spending trends between Garfield and Mesa Counties during and after the energy boom.⁷⁵ There are legal as well as geographic reasons for the striking difference in revenue and expenditures in the two counties.

Using Public Data to Track Local Fiscal Information

To compile energy revenue and general financial information for local governments, we draw on different sources.

Energy-specific revenue data typically come from state sources, for example property tax assessment and revenue collection data are reported by the state revenue department. Production statistics often come from state oil and gas conservation commissions or similar state departments.

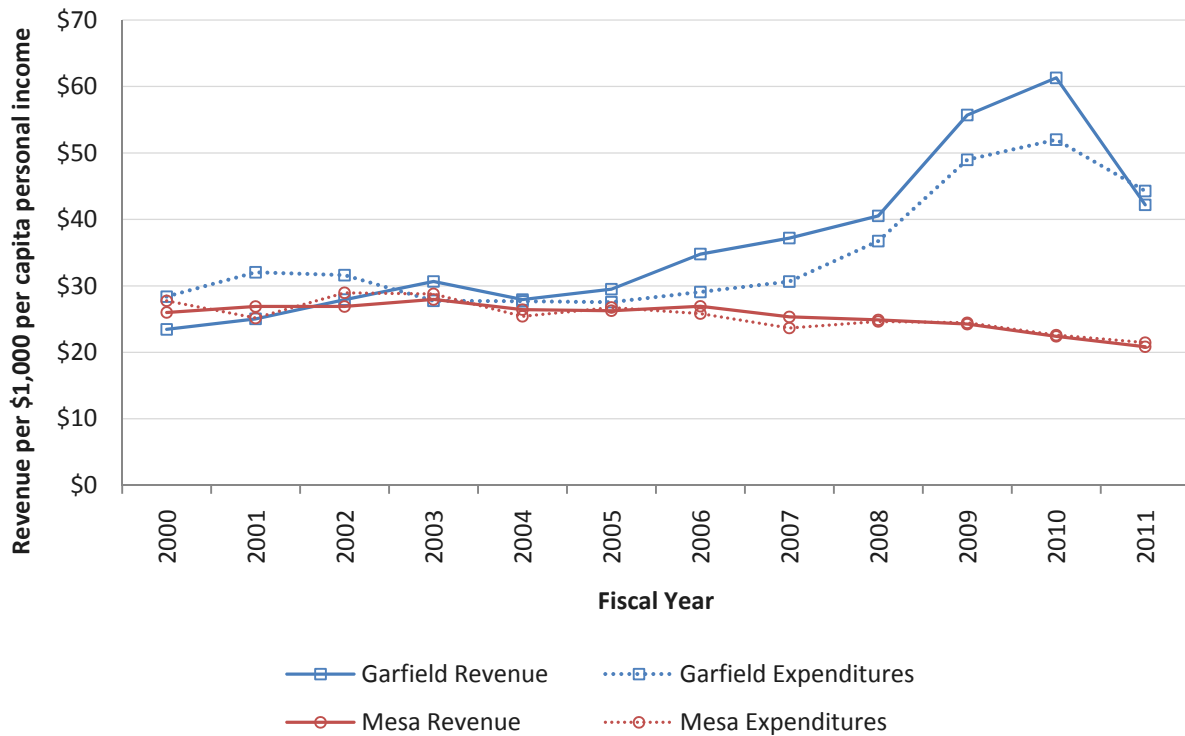
For local government financial information we rely on audited financial statements. Most states require county governments to complete annual audits of government financial reports and to report these to the state. Audited annual financial statements are the best source for local financial data because they report statistics for the entire general county government as a whole, and they are standardized, allowing for easy comparison between geographies.

Every local government relies on their own financial records, including annual budget reports, which are also helpful sources of fiscal data. Because of variations in accounting practices, it is typically difficult to utilize unaudited documents in comparisons across geographies.

⁷⁴ Colorado Department of Local Affairs (DOLA). Severance direct distribution and federal mineral lease distributions, all details by county. 2009. https://dola.colorado.gov/sdd/dist_county.jsf.

⁷⁵ Figure 3-12 above shows revenue and expenditures for both counties expressed per \$1,000 of personal income. Showing revenue and expenditure trends per \$1,000 of personal income illustrates the real change in revenue collections and spending (this method adjusts data for both inflation and changes in population). We borrow this method from Matthew Murray et. al. 2011. *Structurally Unbalanced: Cyclical and Structural Deficits in California and the Intermountain West*. Brookings Mountain West, University of Las Vegas and Morrison Institute of Public Policy, Arizona State University.

Figure 3-13. County Government Revenue and Expenditures in Garfield and Mesa Counties per \$1000 of Per Capita Personal Income.⁷⁶



Source: Garfield and Mesa counties, Audited Financial Statements.

Impact of Restrictions on County Taxing Authority

TABOR restrictions have forced down both revenue and spending in Mesa County relative to personal income even in the midst of a huge economic boom associated with energy production and related business activities (see sidebar on TABOR next page). Garfield County citizens voted to repeal TABOR restrictions locally (they “de-Bruced” in Colorado terminology in 1996), meaning from a policy standpoint, the county was able to retain new revenue from natural gas production. Garfield County’s revenue continued to climb into 2010 (up 11 percent over 2009), and the county set aside significant reserve, in the form of fund balances (up from an inflation-adjusted \$58 million to \$105 million from 2006 to 2010).

⁷⁶ Data for 2000 to 2009 are taken from each county’s Annual Audited Financial Statements (CAFR). For Garfield County, see the Finance Department resources on Financial Statements: <http://www.garfield-county.com/finance/financial-reports.aspx>. For Mesa County, see 2009 CAFR is available at <http://www.mesacounty.us/finance/2009financereport.aspx>. Adopted and projected revenue and expenditures for 2010 and 2011 are taken from the two counties’ respective budgets. Garfield County’s 2011 Budget is available at <http://www.garfield-county.com/finance/budget-reports.aspx>. Mesa County’s 2010 and 2011 Budget and Budget Summaries are available at <http://www.mesacounty.us/finance/default.aspx>.

Colorado's Taxpayers Bill of Rights Limits Prosperity from Energy Development

The Taxpayers Bill of Rights (TABOR) adopted in 1992 limits revenue and expenditure increases to the sum of population growth plus inflation. TABOR also includes a “ratchet effect” that increases the severity of the growth limitations by establishing a new, lower baseline if population plus inflation ever declines. The revenue and spending limits apply to all governments in the state, including the state government, counties, and municipalities.

TABOR has achieved its goal of reducing the size of state and local governments in Colorado. Coloradans are paying fewer taxes today than when TABOR was passed in 1992, but have also experienced a significant decline in services. Colorado’s schools receive among the lowest funding in the nation, and other services have been scaled back.

In Mesa County, TABOR has barred the county from collecting revenue from the rapid expansion in economic activity. The consequence is that the county has not been able to keep pace with growing capital facilities and service needs, let alone invest in economic diversification. Garfield County de-Bruced in 1996, the term used to describe the process of electing out of TABOR’s revenue and spending limits, named after TABOR’s main sponsor. As a result, Garfield County was able to tax the rapid increase in economic activity and use these revenues to help mitigate the impacts of drilling on county roads and other services, and ultimately to use revenue generated by the depletion of non-renewable resources to invest in economic diversification.

Garfield County projects revenue to be down 32 percent from 2010 in Fiscal Year 2011, but the county is in a much better position than Mesa County to cover these shortfalls. Garfield County is expecting to spend down fund balances, has cut non-essential capital projects spending, and will reduce staffing mainly through attrition.⁷⁷ In the end, Garfield County claims to be “in the best financial shape of any county or city in Colorado.”⁷⁸

After Surge and Slump Garfield County Emerges Ahead, Mesa County Behind

Garfield also benefited from unique geographic and structural circumstances: the county had more production than Mesa County and housed fewer workers and their families. This meant relatively more revenue relative to population size.

In many ways, Mesa County should have been in a better position to benefit from new oil and natural gas production on the West Slope. The county government was larger than Garfield’s, and could absorb more of the up-front impact of drilling activities on services. Grand Junction also served as the business hub for many of the drilling companies and support businesses. But the same structural and policy circumstances that worked for Garfield County worked against Mesa County’s capacity to generate fiscal

⁷⁷ Garfield County Finance Department, 2011 Budget Revenue Overview. <http://www.garfield-county.com/finance/documents/Revenues.pdf>. Accessed on Feb 24, 2011.

⁷⁸ Ibid.

stability and sustainable growth. TABOR constitutionally restricted Mesa County from collecting revenue on the increase in wealth moving into the county. Despite new growth, most of the production activity skipped Mesa County, meaning Mesa County and Grand Junction had to deal with many of the service demands associated with the activity with fewer resources. More reliant on sales tax revenue, the county was hit harder and more quickly in the recession as business activity plummeted. Mesa County's General Fund revenue declined 12 percent from 2009 to 2010, and is projected to be down another 7 percent in 2011.⁷⁹

Elected officials and staff in Garfield County, Colorado were determined to be smart about the natural gas surge. This “wasn't their first rodeo”—and as such, they worked hard to maximize the opportunities presented by the surge.⁸⁰ The resulting approach combined ongoing planning and monitoring of local conditions, fiscal conservatism, a focus on economic diversification, and perhaps most importantly, an aggressive strategy to capture energy-related revenue in any available form, including maximizing tax revenue as well as public- and private-sector grants.

Tax revenue increased steadily from 2006 to 2010 in Garfield County relative to personal income, at the same time that the county and municipalities actively secured millions of dollars in one-time grants. The timing of energy revenue was far from perfect and the region received a lot of media attention in 2006 and 2007 for its traffic, housing, and highway and road maintenance woes. The area did not escape the many growing pains of rapid industrialization and population growth, and continues to struggle for a balance between energy development and maintaining quality of life for local residents.

According to interviews with staff from local governments, the amount of energy revenue accrued to the county and its municipalities proved, belatedly, adequate to address the impacts of the natural gas surge on infrastructure and service delivery capacity. In fact, many of the upgrades go beyond the immediate impacts of the natural gas surge and help to build toward a vision for an economically diverse and resilient economy.

On the other hand, recent experiences in Garfield County indicate that local governments face continued impacts from oil and gas development, even when the chaos of the boom period has ended. The county has recently weighed in on several applications to drill new wells, citing concerns about both the health impacts of long-term exposure to oil and gas emissions and the efficacy of state conservation regulations in addressing light pollution (from well-pad lighting), truck traffic, and particular and Volatile Organic Compound (VOC) emissions.⁸¹ This vigilance requires financial and legal resources.

Mesa County officials were similarly motivated to ensure the local economy benefited from the energy boom, but in many respects, their hands were tied. The difference between the two counties in revenue and spending illustrates two important points: benefiting from fossil fuel development essentially stems from the ability to capture wealth through taxation, and invest these funds into mitigation and generating economic diversity. Counties and the state should do what they can to remove structural barriers to

⁷⁹ Mesa County, 2010. 2010 Budget Report.

⁸⁰ Quoting Dale Hancock, Assistant County Manager. Interview, 9/19/2010.

⁸¹ “GarCo: Gas rules not tough enough.” *Grand Junction Sentinel*, 1/17/2011.

balanced budgets, and ensure tax collections and distribution policy is generating the revenue necessary to mitigate local impacts and invest in economic diversity.

Using Energy Revenue to Grow a Clean Energy Economy

Garfield Clean Energy Initiative is a collaborative among nine local government partners in the county and a regional non-profit focused on building the clean energy economy.⁸² The project benefited from existing momentum and vision from clean energy advocates in the region, but took a quantum leap forward with a direct \$1.6m grant of severance tax revenue from the state. The grant was one of 14 projects that received a total of \$10 million in 2008.

In the two-year period from 2009 through 2010, Garfield Clean Energy completed a diverse portfolio of more than 50 projects benefiting households, businesses, schools, and local governments, ranging from facilitation of solar energy and energy efficiency technologies in government and community buildings, performing energy efficiency audits and retrofits to benefit small businesses, transportation planning, and more.

Complementing the county-wide Clean Energy Initiative are local activities, like the Rifle City Council’s adoption of an “energy village” vision and plan in 2005.⁸³ The plan recognizes Rifle’s vulnerability to boom and bust cycles in the fossil fuel energy economy and promotes a vision of Rifle as both energy efficient and (largely) energy self-sufficient as well as a bridge between the traditional fossil-fuel economy and the evolving renewable energy economy. The city has devoted money and effort to energy efficiency and local renewable energy generation. The construction of a 1.72 megawatt solar facility on a former brownfield uranium mill tailings site is, for the city, a direct manifestation of its vision of bridging the fossil fuel to clean energy transition. The brownfield rehabilitation project includes a green industrial park on city-owned land that offers incentives to alternative energy-related businesses.

Municipalities Vulnerable to Sales Tax Volatility

In general, the reliance of cities and towns in Garfield and Mesa counties on sales taxes meant they benefited less from oil and natural gas production revenue during the boom and were more exposed to the recession and the associated decline in energy development and economic activity. For most cities, revenue started to decline in late 2007 at the start of the recession.

The City of Glenwood Springs is experiencing lower revenue, and is using several strategies in the short term to cope. Adjusted for inflation, the city’s revenue has decline or remained flat every year since FY 2007. Over the period, the city has spent down its reserves by \$2 million by FY 2011, and has essentially ended the funding of capital projects (the city spent down capital reserves over the last three years ending

⁸² Garfield Clean Energy web site, <http://www.garfieldcleanenergy.org>.

⁸³ Town of Rifle, 2010. Energy Village Plan.

<http://www.riflco.org/documents/Planning/Long%20Range/Energy%20Village%20Plan%204-12-10.pdf>.

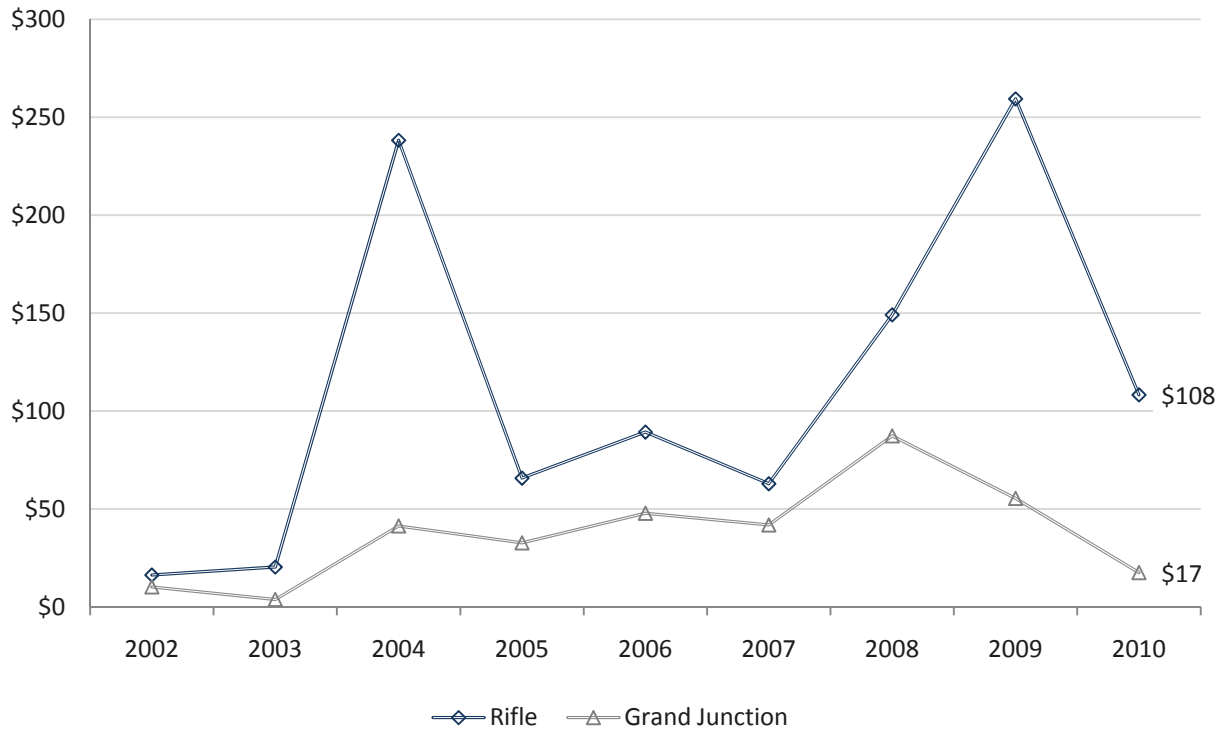
FY 2010 to finish planned projects). These actions have allowed the city to maintain critical services, with some cuts, but have not solved the long-term problem of declining revenue. The city will enter FY 2012 with fewer options to close budget gaps, and may end up with escalating capital costs as new projects and maintenance are deferred. With these measures, the city enacted a FY 2010 General Fund budget with essentially flat revenue from FY 2009 (0.002% increase). In FY 2011, the Town Council approved a 3.5 percent increase in its budget over FY 2010.

Grand Junction is also reeling from lower revenue. The city cut its staff by 82 full-time positions or 12 percent in 2010 and continues the hiring freeze imposed in 2009. Wages were reduced by 3 percent for all employees in 2010 (this wage reduction from 2009 to 2011 is larger when inflation is factored in) and benefits were cut. Sales taxes are continuing a slow recovery that began in 2010, but overall revenues are still anemic.

In addition to stressing the city in terms of basic service delivery, the loss of revenue affects the city's ability to focus on growing its economy. While Grand Junction was able to offer \$3 million to an economic development fund in 2008 and direct that money to a variety of projects—a business incubator, an economic partnership, the local land trust, Mesa State College, and a downtown business improvement district—funding for the program was down to \$775,000 in the 2011 budget request.⁸⁴

A significant difference in the ways municipalities experienced the natural gas surge may lie in the impact of the additional revenue those places generated during the boom—how much was available in real terms to help the municipalities address energy impacts, and whether any of the revenue could be directed toward budget reserves to help cover lean times. While energy revenue in the form of intergovernmental distributions is a small part of overall revenues—far smaller than sales taxes—it is often sought after by municipal governments. Municipalities look to energy revenue to tackle capital-intensive projects that either address growth issues or help to accomplish an economic development goal such as boosting local amenities such as hospital services or public facilities. Figure 3-14 below, tracks direct energy revenue distributions (state severance and federal mineral royalties) to the cities of Rifle and Grand Junction on a per capita basis. While both municipalities saw a net increase over the course of the boom, it is clear that on a per capita basis, Rifle benefited more than Grand Junction, and also experienced more volatility.

⁸⁴ City of Grand Junction, CO. "Complete budget by fund – 2008 to 2011." http://www.gjcity.org/CityDeptWebPages/Administration/LinkedFiles/PDF/Budget/Fund_Expense_Detail_08-11.pdf.

Figure 3-14. Per Capita Energy Revenue Distribution by State to Rifle and Grand Junction, 2002-2010

Source: Colorado Department of Local Affairs, Severance Tax Distribution Reports, various years.

The ability of counties and municipalities to succeed in the grant process that distributes Colorado's Energy and Mineral Impact Assistance Program differed across western Colorado. Table 3-5 below reports average annual per capita grant receipts for the period 2007 to 2009 for Rifle and Grand Junction and the two counties. Energy impact assistance funding went further for the citizens of Rifle, who received an average of \$51 per capita per year than those of Grand Junction, who earned \$17 per capita per year. While Garfield County had more wells than Mesa County, Mesa County housed the greater number of workers. Thus it would be extremely difficult to call one area more or less "energy-affected" than the other. But the funding discrepancies are striking and suggest that the benefits of energy development went disproportionately to Garfield County.

Table 3-5. Energy Impact Assistance Grants, Per Capita, Average per Year 3-Year Period 2007-2009

| | |
|-----------------------|------|
| Rifle | \$51 |
| Grand Junction | \$17 |
| Garfield County Total | \$39 |
| Mesa County Total | \$29 |

Source: Colorado Department of Local Affairs, Energy Assistance Grant Funding Announcements, Various Years.

Looking ahead, fossil fuel revenue is not likely to help cities and towns deal with budget shortfalls. Direct severance tax distributions from the state are projected to be up from \$89,000 to \$130,000 in Grand Junction in FY 2011, a 46 percent increase, but severance taxes will make up less than one percent of the General Fund budget.⁸⁵ The state has suspended its energy impact grant program, further reducing assistance for capital projects.

Wyoming

General Revenue Trends

Figure 3-15 shows that both Sweetwater and Sublette counties saw revenue declines starting in 2008. Property taxes actually peaked in 2009, but declines in sales taxes and intergovernmental revenue led to an overall drop in revenue. Sublette and Sweetwater counties generated a higher share of revenue from sales taxes than their peers in Colorado, particularly Sweetwater County that relied on local-option sales taxes to fund a significant portion of the budget (30% of total revenue). Revenue continued to decline for both counties in FY 2010 and 2011. In Sweetwater County, the basic county 12 mill level collected only \$25 million in FY 2011 compared with \$36 million the year before (a 31% decline). The county has used reserves to balance the budget every year from FY 2009, and expects to continue to rely on reserves to fund county services through FY 2012.⁸⁶

Sublette County, more so than Sweetwater, was able to tax significant natural gas production to pay for necessary capital facilities and services, as well as buildup reserves in the form of significant fund balances.⁸⁷ Revenue is down significantly, with the basic 12 mill levy generating \$42 million in FY 2011 compared to \$76 million the previous year (a 44% decline), but the county reports being in good fiscal health.⁸⁸ But the revenue still falls short of what is necessary to mitigate the impacts of intensive industrial development that ranges widely across huge expanses of public and private land. The State of Wyoming shares fewer resources on a per-value or per-capita basis than does Colorado, and Wyoming

⁸⁵ Colorado Department of Local Affairs (DOLA). Severance direct distribution and federal mineral lease distributions, all details by county. 2009. https://dola.colorado.gov/sdd/dist_county.jsf.

⁸⁶ Personal Communication with Robb Slaughter, Sweetwater County Treasurer, 3/7/2011.

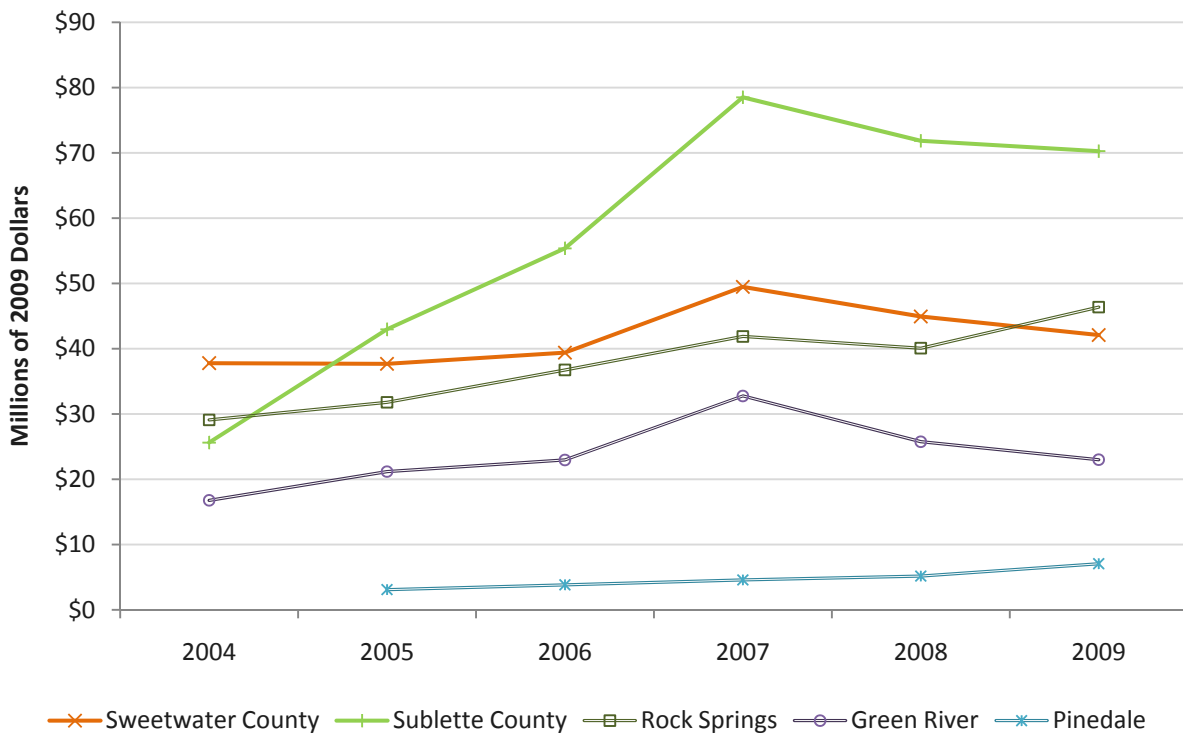
⁸⁷ Sublette County 2010-2011 State of the County Report, Sublette Board of County Commissioners, Pinedale, Wyoming. <http://www.sublettewyo.com/DocumentView.aspx?DID=388>.

⁸⁸ Ibid.

counties and cities use sales taxes, and specifically local-option sales taxes to generate revenue to meet large capital and operating needs.⁸⁹

Rock Springs bucks the trend, increasing revenue in 2009. According to the Chamber of Commerce Director, the uptick in sales tax revenue may be related to the city's position as a home to several large training and headquarter facilities for several large energy services companies, such as Halliburton. These enterprises have continued to function and do business and even may be servicing energy development elsewhere.⁹⁰

Figure 3-15. Local Government Revenue Collections from All Sources, 2002-2009.



Source: County and Municipal Audited Financial Reports.

Table 3-17 and Figure 3-16 show that, like in Colorado, Wyoming counties tend to earn more from property taxes and cities earn more from sales taxes. Even so, Wyoming counties are more dependent on sales taxes than their peers in Colorado. Sweetwater County, Wyoming has used local-option sales taxes to capture revenue from oil and natural gas activity and sales taxes made up over 30 percent of county revenue in 2009. By comparison, in Mesa County sales taxes made up 20 percent of total revenue, and Garfield County only 5 percent in the same year.

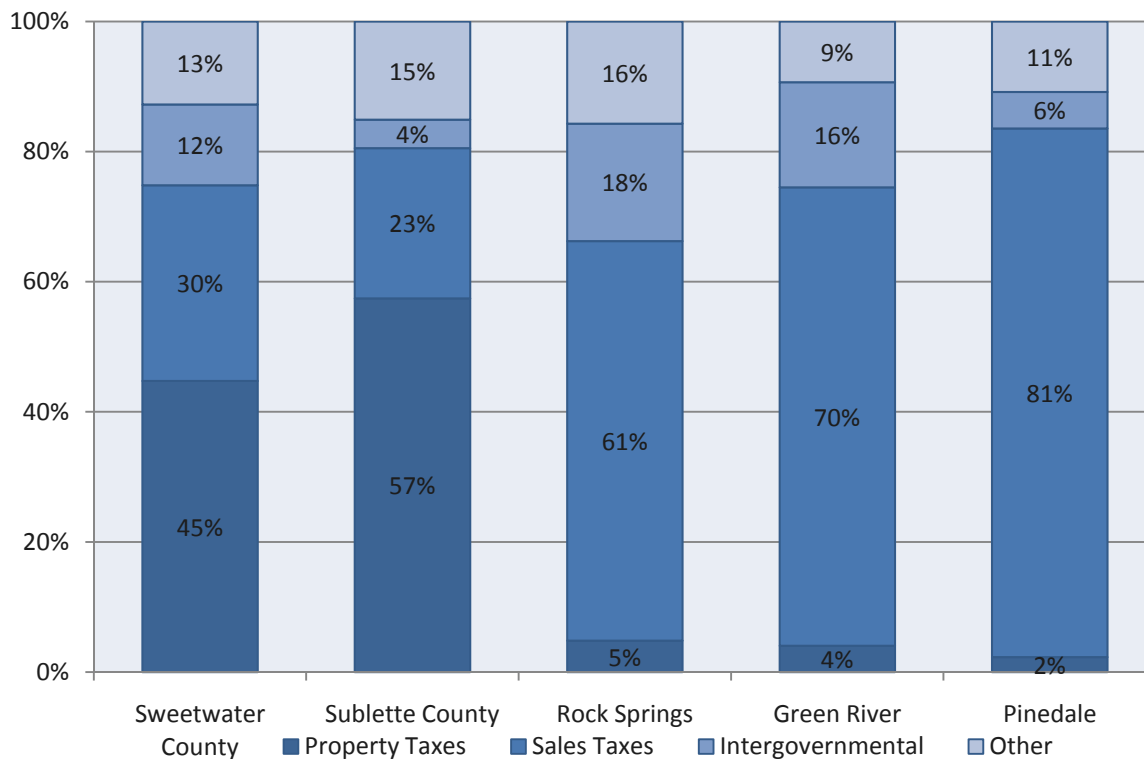
⁸⁹ See Ecosystem Research Group and Headwaters Economics 2008. Energy Revenue in the Intermountain West. http://headwaterseconomics.org/pubs/energy/HeadwatersEconomics_EnergyRevenue.pdf.

⁹⁰ Interview, David Hanks, 2/22/2011.

Table 3-6. 2009 Revenue, with Major Sources as Percent of Total Revenue

| | Total Govt. Revenue(\$) | Property Taxes | Sales Taxes | Intergovernmental |
|-------------------|-------------------------|----------------|-------------|-------------------|
| Sweetwater County | \$41,420,599 | 44.76% | 30.08% | 12.41% |
| Sublette County | \$69,130,239 | 57.45% | 23.08% | 4.37% |
| Rock Springs | \$45,624,667 | 4.83% | 61.43% | 18.03% |
| Green River | \$22,629,262 | 4.06% | 70.45% | 16.17% |
| Pinedale | \$6,958,190 | 2.31% | 81.27% | 5.59% |

Source: County and Municipal Audited Financial Reports.

Figure 3-16. 2009 Revenue, with Major Sources as Percent of Total Revenue

Source: County and Municipal Audited Financial Reports.

Taxes

In Wyoming, property taxes on oil and natural gas production are the greatest source of wealth for local governments, and this can be seen in the dramatic increase in revenue for Sublette County where most of the production was centered between 2004 and 2008. Sales taxes are also important, particularly when local governments use local-option sales taxes as a mechanism for generating revenue from oil and natural gas activities.

Wyoming does a good job at the state level of levying a high effective tax rate, but local governments often do not have resources sufficient to meet local demands and impacts associated with drilling activity.

As a result, Sweetwater County, Rock Springs, and other local governments use local-option “Specific Use” sales taxes to generate revenue for specific uses, such as infrastructure improvements. The local-option sales tax captures most of its value from economic activity directly related to oil and natural gas activity, but it is not a direct tax on production. As a result, it ends up being more volatile (sales taxes declined more quickly and more steeply than did property taxes on production at the onset of the recession). Furthermore, the sales tax option requires that elected officials take specific projects to the ballot box, so as a tool for addressing pressing service or infrastructure needs its usefulness may be limited. The Sublette County electorate, for example, has so far refused to implement a Specific Use sales tax, despite problems at the county and municipal level in meeting infrastructure and service demands.⁹¹

Intergovernmental Revenue

County and municipal governments in Wyoming tend to receive less support from the state in terms of grants and distributions than do their peers in Colorado. For Wyoming cities in particular, this has made it very difficult to facilitate growth associated with fossil fuel extraction. Despite the fact that Wyoming has superior fiscal policy at the state level relative to fossil fuels (see Chapter 2), local governments, particular municipalities, do not benefit from state assistance. Colorado distributes more than half of all energy revenue to local governments, and Wyoming less than five percent.⁹² This stems from Wyoming’s distribution system, but also reflects some inconsistencies within state policies. The state’s Industrial Siting Act could in theory offset local impacts through a direct return of a specific tax on industrial-scale projects, but oil and natural gas activities are exempt under Wyoming statute (see sidebar).

⁹¹For example, in 2010 voters in Sublette County voted down a property tax mill levy increase for the Sublette County Rural Health Care District. <http://www.pinedaleonline.com/news/2010/05/WhywesaidNOtotheRura.htm>.

⁹² See Headwaters Economics 2008. Energy Revenue in the Intermountain West. http://headwaterseconomics.org/pubs/energy/HeadwatersEconomics_EnergyRevenue.pdf.

Wyoming's Industrial Siting Act

In 1975, the Wyoming Legislature adopted the Industrial Siting Act to provide a mechanism to address environmental, social, and economic impacts of large industrial facilities. The Act helps ensure that local governments have information, technical assistance, and funding necessary to facilitate industrial development. The Act allows the state to direct any sales taxes generated during construction of industrial projects and direct them back to affected communities. But oil and natural gas drilling and production activities are exempted from the Act, meaning any sales taxes generated during the drilling boom cannot be directed back to communities through impact assistance payments.⁹³

State Rep. Matt Teeters, R-Veteran, speaking about the new oil play in the Niobrara shale in Goshen County said “from the point we start producing oil, it will be 18 months to two years before we receive any tax dollars. How will the county deal with impacts between now and the time we start collecting taxes?”⁹⁴ Without the Industrial Siting Act in play, communities are forced to negotiate directly with the oil and natural gas industry to help mitigate the impacts on local communities.

Structural and Economic Differences

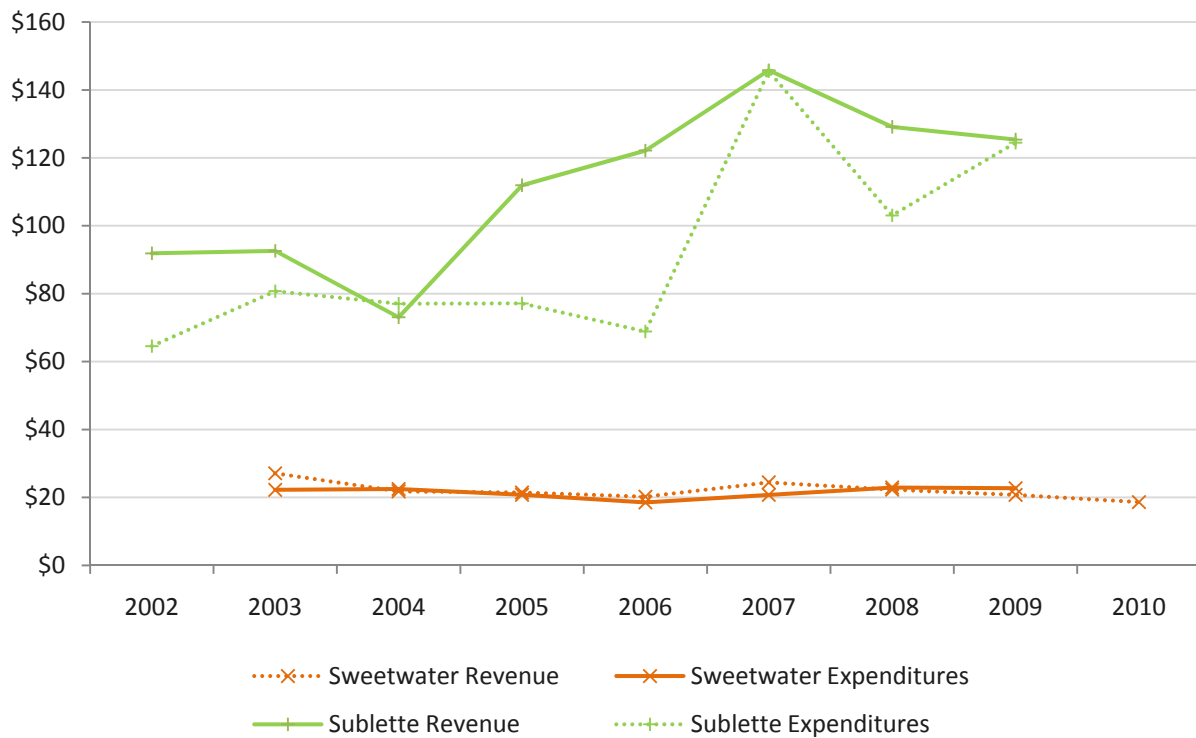
Figure 3-17 shows that while Sublette’s revenue increased relative to personal income, Sweetwater County’s remained flat, actually ending lower in 2010 than it was in 2003. This is largely due to geographic differences—Sublette County had the highest total mineral taxable valuation in the state of Wyoming (\$5.9 billion in 2008⁹⁵) because the majority of gas production occurs there. Sweetwater County, in contrast, is the population and business hub from which many gas field operations are run. What this chart indicates is the impacts of the difference in tax bases: while both areas boomed with activity from natural gas development, Sublette County’s valuation shows the importance of mineral production as compared to Sweetwater County which is far more dependent on the less valuable (in terms of taxable valuation) economic activities associated with production.

⁹³ Nicole Novotny, 2004. Wyoming Industrial Siting Act: Creation and Exemptions. Wyoming Legislative Service Office Memorandum. <http://legisweb.state.wy.us/PubResearch/2004/04tm037.pdf>

⁹⁴ Gregory Nickerson, Jan 19, 2011. Niobrara Oil Drilling Saps Wyoming’s County Road Budgets. WyoFile. http://www.newwest.net/topic/article/niobara_oil_drilling_saps_wyomings_county_road_budgets/C618/L618/

⁹⁵ State of Wyoming Department of Revenue, 2009. 2009 Annual Report. <http://revenue.state.wy.us/PortalVBVS/uploads/Department%20of%20Revenue%20%2010.29.2009.pdf>

Figure 3-17. County Government Revenue and Expenditures in Sublette and Sweetwater Counties per \$1000 of Per Capita Personal Income.



Source: County Audited Financial Reports. Data for missing years were not available to Headwaters Economics.

Wyoming Distribution Formula Shorts Counties

In an effort to bring attention to the issues facing energy-producing parts of Wyoming, the Sublette County commission, with support from Wyoming Senator Mike Enzi and former Governor Dave Freudenthal, initiated a detailed study of socioeconomic impacts from the natural gas surge. The study, executed by the Ecosystem Research Group (ERG), found that the state's existing structure for energy revenue generation and distribution had failed to provide adequate funding to the county and its municipalities to address the infrastructure impacts of energy development.

Of the \$1.1 billion in taxes on oil and natural gas production in Sublette County in 2008, only 5.86 percent of mineral revenues actually accrued to the county.⁹⁶

Specifically, the ERG report observed that as of 2009: “Although Sublette County and the towns of Pinedale, Marbleton, and Big Piney have spent approximately \$60.6 million over the past four years on capital improvements, more than \$160 million is still needed to address currently identified projects.”⁹⁷ Notable among projects identified in the study is \$55 million in county road maintenance projects that suggests the enormity of the costs of services in this remote, vast county. Also of note is the mismatch between available funds (\$400,000) and costs (\$9.2 million) for road and sewer work in the small town of Big Piney, which experienced 35 percent population growth from 2000 to 2008 and an increase in truck traffic of 240 percent during the period 2000 to 2008.⁹⁸

During the boom, population in Sublette County grew by 24 percent, affecting housing availability and price, and service loads for law enforcement, courts, county and municipal governments; and creating immediate demands for upgrades to water, sewer, and waste facilities as well as roads and bridges.

According to ERG, “The local governments of Sublette County simply were neither prepared nor financially able to address the infrastructure impacts of natural gas development in the area.”⁹⁹

In 2009, the county trimmed its spending and set aside a \$90-100 million budget reserve in anticipation of leaner times ahead.¹⁰⁰ At that time, the county also set aside \$6 million to work with its towns on development-related issues and was also instrumental in helping Marbleton secure \$3.2 in SLIB grant money to address infrastructure needs.¹⁰¹ The county contributed another \$3 million to Marbleton's water and sewer and airport upgrade projects in 2010-2011.

⁹⁶ Ecosystem Research Group (ERG), 2009. Sublette County Socioeconomic Impact Study, Phase II, ES-1.

⁹⁷ ERG, Phase. II: ES-3.

⁹⁸ Ibid, 105.

⁹⁹ Ibid, 1.

¹⁰⁰ Sublette County, State of the County Report, 2009-2010, 2.

¹⁰¹ ERG, 60.

The findings of the Ecosystem Research Group study in Sublette County were echoed by local government officials in Sweetwater County when we interviewed them in 2007.¹⁰² Since then, the county government has been able to utilize a series of Specific Use sales tax initiatives to target projects like expansion of the jail and hospital and development of public childcare facilities as well as raising \$73 million to distribute to cities and towns for water and sewer improvements.¹⁰³

Sweetwater County is also benefiting from industry commitments to the greater Green River region. Big players in the fossil fuel industry—Halliburton, BP, and EnCana have invested significantly in training facilities, community infrastructure, and other projects in Rock Springs and in Wamsutter. According to one report, the Halliburton training facility in Rock Springs is now serving as a center for workforce training and staffing throughout Halliburton’s holdings nationally. This creates an opportunity for mobile workers to base their families and homes in Rock Springs rather than moving them as rigs move. The report from Rock Springs is that “every segment of the economy is hiring” and the city is enjoying the fruits of investment in new infrastructure and amenities.

However, like Sublette County, a number of projects remain on the docket in Sweetwater County, such as expanding and creating ADA-compliance for the county courthouse.

In other municipalities, the revenue situation is reportedly less successful. Green River City Manager, Barry Cook observed that the city’s portion of the Specific Use sales tax fell short of the cost of infrastructure improvements, in part due to inflationary impacts of the energy surge on the cost of construction and labor. This forced the city to use the sales tax surplus resulting from the natural gas surge to make up the difference. Surplus sales tax dollars should have funded a rainy day fund account to address budget shortages, but were instead spent on critical infrastructure. The city is hamstrung with budget problems now.¹⁰⁴

Taken together, the fiscal situation in southwest Wyoming’s counties and municipalities shows real unevenness. Despite large increases in revenue and the successful completion of a long series of infrastructure and amenity-related capital projects, a number of ongoing infrastructure development and maintenance issues persist in the region. The state’s local-option sales tax has been the primary vehicle for addressing infrastructure development in Sweetwater County, while Sublette County has relied on federal mineral royalty and state severance tax distributions, distributions that the county has noted are out of proportion with the county’s contributions to the state’s total fossil fuel production.

While revenue in the right time and amount can in theory (although often not in practice) address those impacts of energy development that call upon familiar local government responsibilities—road maintenance, water and sewer services, and social services, there is another set of energy impacts that raise a set of challenges well outside the traditional scope of local government.

¹⁰² Headwaters Economics. 2009. Impacts of Energy Development in Wyoming.

<http://headwaterseconomics.org/energy/western/energy-development-wyoming-sweetwater/>

¹⁰³ Interview with Robb Slaughter, Sweetwater County Treasurer, 3/2/2011.

¹⁰⁴ Interview with Barry Cook, Green River City Manager, 3/4/2011.

Economic Development, the Fossil Fuel Industry, and Quality of Life

There is increasing quantitative evidence that intensive energy development is taking its toll on the livability and appeal of rural areas like the Grand River corridor or the Upper Green River Basin. Now, nearly ten years into the development of the region's natural gas fields, the issue is not only the dust, fumes, noise, and traffic of the drilling and construction phases of development, but also the more inexorable issues of cumulative impacts of development that include declining wildlife populations and severe air quality issues.

A headline in the March 9, 2011 USA Today read “Wyoming’s smog exceeds Los Angeles’ due to gas drilling.” The article reported on air monitoring results that put recent ozone levels in the Upper Green River Basin at 60 percent higher than the EPA’s maximum healthy limit. Similarly, Garfield County features heavily in a video series initiated in February 2011 by the New York Times that focuses on toxic contamination of air and water from natural gas drilling activities.¹⁰⁵ A detailed health impact study sponsored by Garfield County has also confirmed that natural gas processes “release chemicals that are known to impact health” that can jeopardize public health, particularly for residents living within a half-mile of a well pad.¹⁰⁶

These national headlines about compromised air quality in Wyoming and Colorado’s gas fields come on the heels of reports of declining wildlife populations in the zone of the Pinedale Anticline Project area.¹⁰⁷

While the broader implications of toxic impacts to wildlife and local residents are grave by any measure, they also raise clear economic concerns. In the near term, homebuilders, hunting and fishing guides, and resorts all depend heavily not only on functioning wildlife and rivers, but on public perception of Wyoming and Colorado mountain country as pristine.¹⁰⁸ Similarly, efforts to leverage the financial benefits of energy development toward broader economic growth are hindered rather than helped when communities like Pinedale and Rifle are depicted in the national media as public health hazard zones. And in the longer term, remediation of cumulative environmental impacts risks being costly and unsatisfactory as experiences with Superfund clean-ups in the United States indicate.

¹⁰⁵ “Natural Gas and Polluted Air” “ Video produced by Erik Olsen, posted 2/26/2011, <http://video.nytimes.com/video/2011/02/26/us/10000000650773/natgas.html>.

¹⁰⁶ Colorado School of Public Health, 2011. “Draft Battlement Mesa Health Impact Analysis, Revision 1, February 2011.” http://www.garfield-county.com/public-health/documents/2_HIA_2nd_draft_executive-summary.pdf.

¹⁰⁷ Mule deer populations near the Pinedale Anticline natural gas field have reportedly declined in health and number more quickly than comparable deer populations in the state. The most recent data were serious enough to trigger additional mitigation and monitoring under the terms of the BLM’s management plan for the Anticline Project Area. “Pinedale Mesa deer population drops.” Casper Star Tribune (trib.com), 10/28/2010. http://trib.com/news/state-and-regional/article_fa6d49fa-a7b6-5335-82bf-8cc7d217ea69.html10.

¹⁰⁸ Travel and tourism, which are the only easily grasped measure of the value of amenities such as clean air, water, scenic vistas, and healthy wildlife populations, are important industries in the study areas—providing 17 percent of total employment in Sublette and Sweetwater County (combined) in 2008 and 17 percent of total employment in Mesa and Garfield counties (combined) as well. U.S. Dept of Commerce. 2010. Census Bureau, County Business Patterns. Washington, D.C.

Protecting Quality of Life is an Economic Development Strategy in the West

The evidence is clear that in the modern economy, entrepreneurs and footloose employees have the opportunity to be choosy about where to locate. Surveys of business owners have consistently identified quality of life, including environmental amenities such as public land, as a key reason why entrepreneurs chose to locate in rural areas.¹⁰⁹ Similarly, amenities are well-known to be a key factor in the attraction of retirement wealth.¹¹⁰

In this trend, the West is not alone, but it is a leader. During the prosperous 1990s, the highest rates of population growth across rural America occurred in those counties with amenities such as mild winters, mountainous topography, and water—rivers, streams, and lakes. Endowed with an exceptional volume of such assets, the West was a leading region nationally in amenity migration from 1990 through 2005.

During this period, the rural counties in the West that grew the most quickly were those counties with the cluster of amenities that one team of researchers calls “New West” characteristics—recreational opportunities, proximity to public lands, and with a significant role for service and knowledge-based jobs in their economies.¹¹¹ In order to contribute to regional economic sustainability in such prime locations as the Upper Green River Basin and the Grand River Corridor, energy development must co-exist with the protection and enhancement of these amenities, rather than degrading them. Whether such a co-existence is possible remains to be seen.

Monitoring and Action

There are two important challenges to consider when it comes to the role that monitoring plays in managing extractive industries, such as natural gas development, for the long-term economic sustainability of resource-rich areas.

The first is the cost and complexity of monitoring. Monitoring for issues like public health, air and water quality, wildlife, recreational use, etc. is expensive and complex, and the timing is often out of pace with industrial activity. More specifically, the validity of monitoring depends on having substantial and credible baseline data—and it is not uncommon for resource managers to be scrambling to assemble baseline data as energy development is getting underway.

The amount of financial resources available for monitoring environmental and quality of life indicators varies from state to state and from project to project. There are examples of industry supporting

¹⁰⁹ A longer bibliography of recent research on this subject can be downloaded from the Headwaters Economics web site. http://headwaterseconomics.org/pubs/protected-lands/Protected_Lands_Reading.pdf
Johnson, J and R. Rasker, 1995. The role of economic and quality of life values in rural business location. *Journal of Rural Studies* 11(4): 405-416, Mathur, V. and S. Stein, 2005. Do amenities matter in attracting knowledge workers for regional economic development? *Papers in Regional Science* 84(2): 251-269.

¹¹⁰ Haas, W. and W Serow, 2002. The Baby Boom, Amenity Retirement Migration, and Retirement Communities: Will the Golden Age of Retirement Continue? *Research on Aging* 24(1): 150-164.

¹¹¹ Shumway, J. M. and S. Otterson, 2001. Spatial Patterns of Migration and Income Change in the Mountain West: The Dominance of Service-Based, Amenity-Rich Counties. *Professional Geographer* 53(4): 492-502.

monitoring efforts, like the Mesa mule deer survey, just as there are examples of local governments shouldering large portions of the costs of health impact studies.¹¹² One significant issue are the non-monetized costs borne by residents who serve on working groups, advisory councils, and other voluntary institutions that play a major role in advocating for and attending to monitoring efforts. When acute concerns subside, or fail to be resolved, these community efforts can flag—unfortunately just at the time when related data gathering processes might be on the verge of yielding quantitative results.¹¹³

The second challenge is acting on the findings of monitoring from both a logistical and a feasibility standpoint. Habitat degradation and air pollution typically do not respond to quick fixes, and with thousands of permits to drill already in place, it is difficult to conceive how state and federal managers can intervene in development to implement necessary mitigation measures.

Ultimately, the recent history of the actions of monitoring and the results they have yielded speak to the tremendous economic significance of an integrated, well-funded and otherwise well-resourced set of monitoring efforts—and of the importance of couching those efforts within a larger policy and regulatory framework that enables decision makers to learn of, and to act on the results of monitoring. State and federal agencies entrusted with adaptive management and oversight of social and economic impacts should be more present, provide more money and expertise to affected areas. Among state oil and gas commissions, state agencies like Colorado’s Department of Local Affairs and Wyoming’s State Land and Investment Board, not to mention federal agencies like the BLM—none currently has the capacity to help continue the momentum around critical planning and monitoring exercises that could benefit these and other counties as oil and natural gas development activity surges elsewhere.

Conclusions

Overall, the local costs and benefits of energy development are experienced unevenly: “fossil fuel prosperity” is most likely to occur in places that are the exception rather than the rule in the U.S. West. Predominantly rural areas with high levels of drilling and limited economic diversity may be the most overwhelmed by the buildup phase of an energy boom, but they are also the places that ultimately could see the greatest long-term fiscal gain from energy development.

The ability of communities and their leaders to use increased revenue to diversify and stabilize their economic future varies based on state revenue distribution systems and on local politics and decision-making. It also depends on an ability to understand and address cumulative impacts of energy

¹¹² Garfield County committed up to \$257,000 to fund the health impact study at Battlement Mesa. <http://www.garfield-county.com/public-health/battlement-mesa-health-impact-assessment-background.aspx>. The study is published here: Witter, R. et. al. 2010, “Health Impact Assessment for Battlement Mesa, Garfield County, Colorado. Sublette County air quality.” Colorado School of Public Health. <http://www.garfield-county.com/public-health/documents/1%20%20%20Complete%20HIA%20without%20Appendix%20D.pdf>.

¹¹³ For example, the socio-economic task force of the Pinedale Anticline Working Group was on the verge of disbanding in 2010, despite having generated a significant body of data about the fiscal shortfalls facing area local governments. “PAWG assesses Socioeconomic Task Group’s value” 3/4/2010, Pinedale Roundup. http://www.pinedaleroundup.com/v2_news_articles.php?heading=0&page=72&story_id=1461. The Garfield County Energy Advisory Board has gone through a related process of re-definition and self-assessment as the nature of development has changed with the slowdown. Minutes of the Garfield County Energy Advisory Board Meeting, 8/5/2010. <http://www.garfield-county.com/oil-gas/documents/8-5-10%20revised%20minutes%20jj.pdf>

development on those amenities essential to long-term economic prosperity such as scenery, water, and air quality. Experiences with air quality and groundwater impacts in the study areas to date do raise for concerns about cumulative impacts that, unmitigated, threaten to foreclose opportunities for economic diversification. Local, regional, and state governments vary in their capacity and interest in documenting and responding to such impacts.

In contrast, more urbanized areas—and the West is the most urbanized region in the United States—are less well positioned than rural counterparts especially if they have limited access to energy revenue. Cities, towns, and largely metro counties carry much of the burden of energy development by serving as a housing and service centers for energy workers, but typically cannot tap into property tax revenue that is the backbone of mineral wealth; even when property tax is available, it accrues at far lower per capita levels than rural places.

The basic distinction—that fossil fuel extraction pencils out in favor of mineral-rich, sparsely populated areas than in cities and towns, holds true for municipalities versus counties throughout the study area, and is mirrored at a broader level in the relationship on Colorado’s West Slope between Garfield County, a relatively rural, resource rich place, and Mesa County, a regional population center with few wells but many workers.

Policy Suggestions

Energy development exposes local areas to a highly volatile sector of the economy—employment, population, and the corresponding demand for services can surge and swell when prices are up and crash when prices fall. This volatility poses real challenges for private and public sector institutions at the municipal and county level. The following are several means for adapting to, and insulating local areas from the negative aspects of volatility in fossil fuel industries:

- Maximizing state revenue generation through high effective tax rates on production, distribute revenue quickly and in adequate volume to affected areas, invest revenue in economic stability, including saving for a rainy day. The most effective distribution programs are those that are most insulated from state politics—e.g., those that have an institutional home and continuity, rather than those that involve one-time appropriations from the state legislature.
- In some locations, structural barriers to taxing and spending are barriers both to benefiting from energy development and addressing local impacts. TABOR’s impact on Mesa County is a case in point.
- Federal and state agencies charged with oversight and monitoring of the immediate and cumulative impacts of energy development have limited resources. Communities and local governments that stay engaged and attentive to the outcomes of larger-scale monitoring efforts will get the best results from public agencies. Engaging effectively means staffing and supporting local positions such as Garfield County’s Oil and Gas Liaison that can help provide necessary expertise and continuity as community volunteer energy wanes.
- Coordinating governance across resource, not political boundaries, offers an important opportunity to address impacts that go beyond county or municipal boundaries, unevenness in the availability of resources for responding to impacts, as well as to leverage resources for long-term

monitoring and planning. Coordinated governance at a minimum can improve planning and analysis—as in the case of Northwest Colorado’s Council of Governments. Ideally, coordinated governance might address the need for revenue sharing across energy-impact zones.

Recommended Next Steps

This report evaluated whether the approach taken to fossil fuel development in the Rocky Mountain West in the decade of the 2000s worked to maximize benefits and minimize costs to the region's public.

Looking at the results of fossil fuel economic performance in three contexts: overall state economic metrics, state tax revenue, and local economics of energy-producing areas, we found that the answer is no. Our reasoning, policy recommendations, and conclusions are discussed in each chapter and are summarized in the Executive Summary (see pp. i-viii).

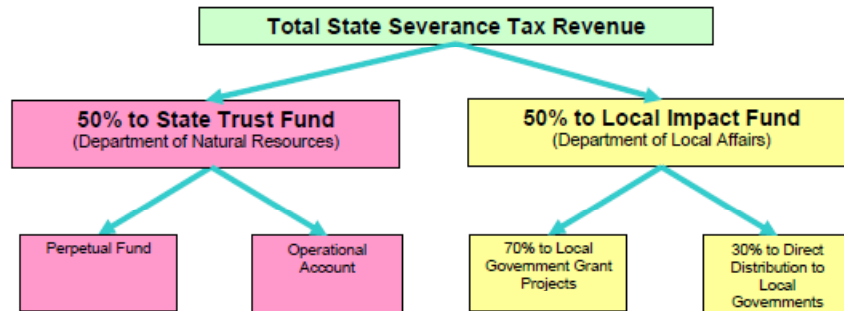
In the process of developing the analysis in this report, we identified a number of opportunities to learn more about the most balanced approach to fossil fuel extraction. We recommend more analysis in the following areas:

- A formal, structured comparison of county-level economic performance under varied approaches to energy leasing and development, such as fixed employment, “pace of development” scenarios. (Federal and state agencies would first need to designate a pilot region that actually deploys a measured approach to drilling.)
- A full accounting of the costs involved in remediating the public health risks and environmental damages that are emerging in western Colorado and southwestern Wyoming. The sum of anticipated costs could be compared to the finite local economic benefits in terms of employment, income, and tax revenue.
- Detailed employment estimates of well development, operation, and de-commissioning under various state regulations. It is likely that increased environmental and public health protections yield longer, more sustained employment.

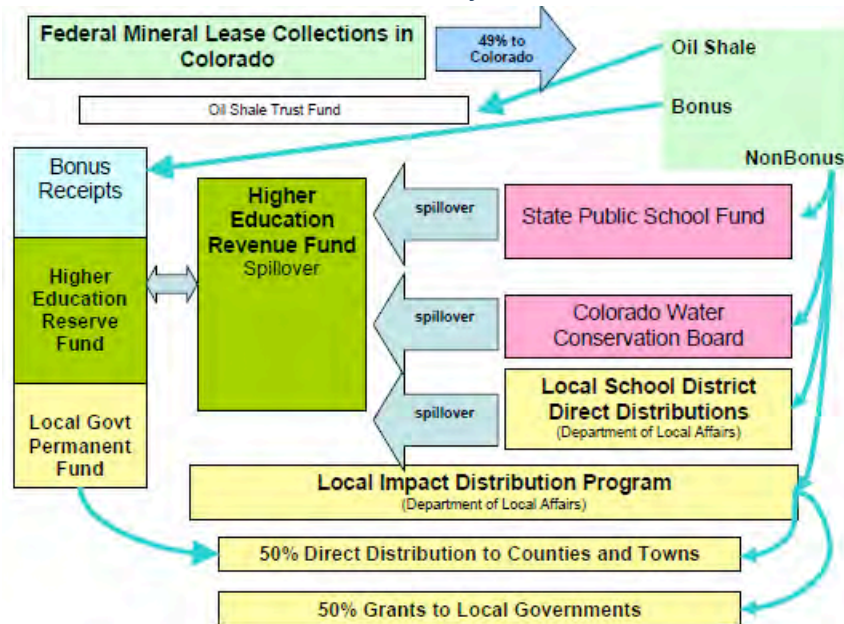
APPENDIX: ENERGY REVENUE DISTRIBUTION SYSTEMS IN CO AND WY

Severance and Mineral Royalty Distribution in Colorado

Severance Tax Distribution



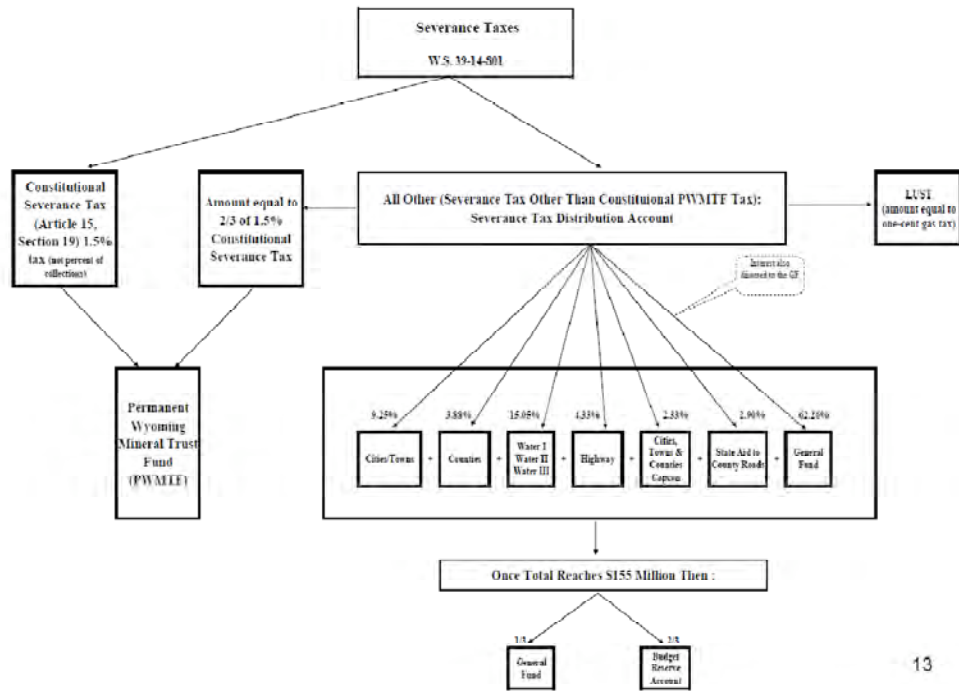
Federal Mineral Lease Payment Distribution



Source: State of Colorado, Department of Local Affairs (DOLA), "Federal Mineral Lease and State Severance Tax Direct Distribution Program Guidelines," June 2010.

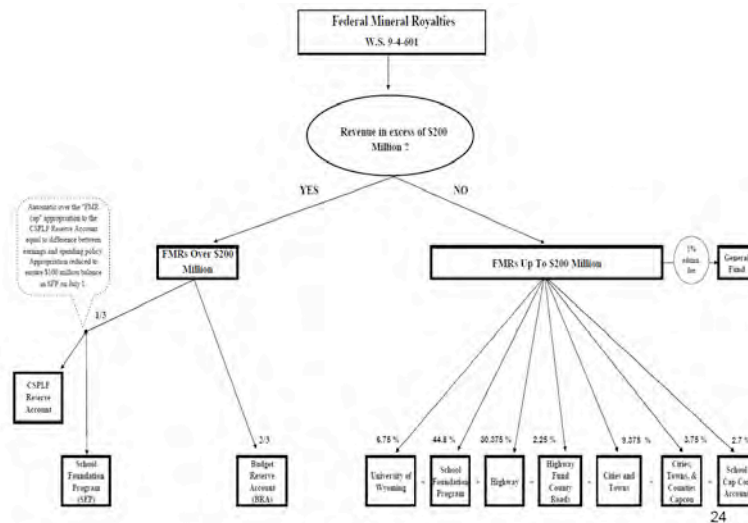
Severance and Mineral Royalty Distribution in Wyoming

Severance Tax Distribution



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Federal Mineral Royalty Distribution



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Source: Temte, D. Wyoming Legislative Services Office, "Wyoming Severance Taxes and Federal Mineral Royalties," July 2010. Accessed online: <http://legisweb.state.wy.us/budget/wyosevtaxes.pdf>

