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

HEADWATERS ECONOMICS

Fossil Fuel Extraction as a County Economic Development Strategy

Are Energy-focusing Counties Benefiting?

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ABOUT HEADWATERS ECONOMICS

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

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ABOUT THE *ENERGY AND THE WEST* SERIES

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

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

Titles in the *Energy and the West* series:

- Energy Development and the Changing Economy of the West
- U.S. Energy Needs and the Role of Western Public Lands
- Fossil Fuel Extraction as a County Economic Development Strategy: Are Energy-focusing Counties Benefiting?
- Energy Revenue in the Intermountain West: State and Local Taxes and Royalties from Oil, Natural Gas, and Coal
- Impacts of Energy Development in Colorado, with a Case Study of Mesa and Garfield Counties
- Impacts of Energy Development in Wyoming, with a Case Study of Sweetwater County
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- Potential Impacts of Energy Development in New Mexico, with a Case Study of Otero County

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INTRODUCTION

A rapid rise in the price for oil, natural gas, and coal, and a political climate that has favored energy development on public lands has made it possible for some counties in the West to use energy development as a strategy for economic development.

In this report in our *Energy and the West* series, we examine the consequences of focusing on fossil fuel extraction as an economic development strategy. Has it benefited counties in the long run?

The recent rise in fossil fuel development in the West is happening in the context of an economy that has already made a significant shift, away from a historic dependence on resource extraction, to an economy that today is driven primarily by service industries and knowledge-based occupations, and retirement and investment dollars. As a consequence, the economic role of public lands, where much of today's energy development is taking place, has also shifted.

In the past, the principal economic contribution from Bureau of Land Management (BLM), Forest Service, and state lands in the West came from the raw materials that were extracted and exported from the region. Today, there is an additional economic role for public lands. For many communities, the recreational opportunities and scenery provided by public lands are essential components of the quality of life that attracts and retains people and business, as well as retirees and investment income. The scenery, wildlife, and recreation-oriented lifestyle, in which public lands play a critical role, are now economic assets, and a key component of the West's competitive advantage.

The information provided in this report can help those entrusted with the management of the lands in the West to understand the consequences, and potential tradeoffs, of energy development.

Questions Answered in this Report:

1. Has an economic focus on energy development benefited counties of the West?
2. Is today's energy surge any different from the energy boom of the 1970s?
3. Why do energy-focusing counties underperform relative to their peers?

SUMMARY FINDINGS

Key Term: Energy-focusing

We use the term "energy-focusing," abbreviated "EF" in this report, to refer to the 26 rural counties in the West that concentrate their economic development on the extraction of fossil fuels. These counties have a relatively high proportion of total jobs (7% or more) in the county that are involved in the extraction of fossil fuels (natural gas, oil, and coal). We use the term "peers" to describe the remaining 254 western counties of similar size (57,000 people or less). For a full definition of "energy-focusing" (EF) counties and their "peers" see the Methods section on page 4.

Counties that have focused on energy development are underperforming economically compared to peer counties that have little or no energy development.

It is well documented that counties focused on energy extraction as an economic development strategy have historically gone through periods of boom and bust—that their economies are volatile. What is less well understood is how these counties fare economically in the long term.

In the long run, the economies of energy-focusing (EF) counties grow more slowly than the economies of their peers that are not pursuing energy extraction as an economic development strategy.

From 1990 to 2005, for example, the average rate of growth of real personal income in EF counties was 2.3 percent per year, compared to 2.9 percent in the peers. In terms of employment, the average annual growth of EF counties over the same time period was 1.8 percent, compared to 2.3 percent for their peers.

An energy development surge no longer guarantees strong economic performance.

In the energy boom that began in the 1970s and ended in the early 1980s, counties that were focused on energy development, with a high portion of jobs in fossil fuel development, were some of the top economic performers in the West. In today's energy surge, this is no longer the case.

As measured by average annual job growth, only one of 26 EF counties ranks among the top 30 economic performers in the West, while during the last energy boom half were top performers. In addition, more than half of EF counties are losing population in the midst of today's energy surge.

In EF counties, the share of total jobs in energy-related fields has declined, from 23 percent in 1982 (past energy boom) to 14 percent in 2005 (current energy surge). In recent years, jobs unrelated to energy extraction are growing rapidly and the western economy is much larger than in the past.

A heavy reliance on fossil fuel extraction may point to diminished future competitiveness.

As the West develops its fossil fuel energy resources, an ongoing challenge is increasing the competiveness of local economies, especially in sectors unrelated to energy development.

Compared to their peers in the West that have not pursued energy development as an economic strategy, EF counties over the long term are characterized by:

- Less economic diversity and resilience
- Lower levels of education in the workforce
- A greater gap between high and low income households
- A growing wage disparity between energy-related workers and all other workers
- Less ability to attract investment and retirement dollars

These long-term indicators suggest that relying on fossil fuel extraction may not be an effective economic development strategy for competing in today's growing and more diverse western economy.

METHODS: THE DEFINITION OF ENERGY-FOCUSING (EF) COUNTIES

We define those counties that concentrate their economic strategy on the development of fossil fuels as "energy-focusing" (EF) counties. These are counties where a relatively high proportion of total jobs in the county are involved in the extraction of fossil fuels (natural gas, oil, and coal). Fossil fuel extraction includes the following codes from the North American Industrial Classification System (NAICS): drilling and extracting oil and gas reserves, extracting coal reserves, and support activities related to these. These NAICS codes are shown in Table 1 and are defined in more detail in the Appendix.[1]

Table 1.Description of Data Used to Show Employment and Personal Income Related to Energy Development, by North American Industrial Classification System (NAICS) Code

Description	NAICS Code
Oil and Gas	
Oil and gas extraction	211
Drilling oil and gas wells	213111
Support activities for oil and gas operations (e.g., contract drilling, surveying, mapping, operating oil and gas fields on a contract basis)	213112
Coal	
Coal mining	2121
Support activities for coal mining (e.g., geophysical surveying, mapping)	213113

We define a county as energy-focusing (EF) if more than 7 percent of total private-sector employment in the county was engaged in energy development—natural gas, oil, and coal—in 2005. The 7 percent cut-off was selected for two reasons: (1) below this threshold, the percent of employment in fossil fuel energy sectors in counties across the West falls off rapidly, and (2) any less energy activity as a share of total employment does not reflect a significant concentration on this single industry.

There are 26 EF counties in the West. Table 2 shows the list of EF counties, and their relative concentration in oil and natural gas versus coal extraction. They are all counties with small populations—fewer than 57,000 people. There is one exception: San Juan County, New Mexico. We eliminated San Juan County, New Mexico from the list because it is more than twice as large as the next largest EF county, and we wanted to compare EF counties, which are overwhelmingly rural, with their rural counterparts in the West.

There are 254 "peer" counties in the West. These are western counties of similar size (57,000 people or less) that do not have significant employment devoted to the extraction of oil, natural gas, and coal (less than 7% of total private employment). EF counties (yellow), along with their non-energy "peers" (blue), are shown in Map 1 (page 6).

Of the 26 EF counties in the West, 12 had between 10 percent and 15 percent of all employment engaged in fossil fuel extraction (light green in Table 2), and another eight had more than 15

percent involved in energy development (dark green in Table 2). Four counties had more than 20 percent of all employment in energy development, and one, Campbell County, Wyoming, had a third of its workforce employed directly in energy development.[2]

We used County Business Patterns data, from the Bureau of the Census, to define EF counties. This data does not include individual proprietors (the self-employed), so the actual number of energy workers in a given county will be larger. The ratio of wage and salary workers to proprietors is fairly consistent across industries, so using wage and salary employment numbers does not significantly alter the overall employment share for each industry.[3]

Definition of Mining

When we use the term "mining" in our *Energy and the West* series, we refer primarily to jobs and income associated with the development and extraction of oil, natural gas, and coal (the fossil fuels). Because of restrictions placed on the level of detail available from the U.S. Department of Commerce and the Bureau of the Census, it is sometimes not possible to separate minerals mining from fossil fuels mining. In the energy-focusing counties analyzed in this report, the bulk (over 80%) of "mining" is in energy development.

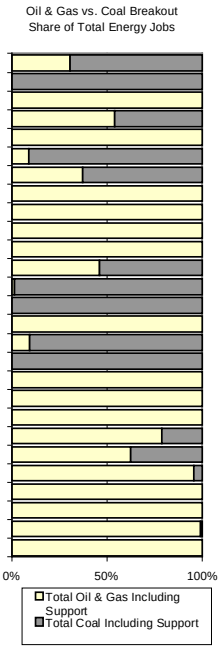
Table 2. Energy-focusing Counties in the West, 2005

			Oil and Gas Jobs:				Coal Jobs:			
	Energy Jobs in 2005	**Energy Jobs Share of Total Jobs in 2005**	Total Oil & Gas Including Support	Oil and Gas Extraction	Drilling Oil and Gas Wells	Support Activities for Oil and Gas Operations	Total Coal Including Support	Coal Mining	Support Activities for Coal Mining	Population in 2005
Campbell, Wyoming	5,436	**30.0%**	1,656	455	211	990	3,780	3,709	71	37,420
Emery, Utah	668	**24.5%**	2	-	-	2	667	660	7	10,711
Cheyenne, Colorado	99	**21.5%**	99	13	70	15	-	-	-	1,952
Rio Blanco, Colorado	343	**20.9%**	185	49	29	107	158	158	-	6,000
Uinta, Wyoming	1,163	**17.5%**	1,163	247	-	916	-	-	-	19,873
Big Horn, Montana	354	**16.7%**	32	2	-	31	322	322	-	13,076
Converse, Wyoming	610	**16.4%**	227	71	14	142	384	384	-	12,743
Hot Springs, Wyoming	233	**15.4%**	233	36	1	196	-	-	-	4,568
Fallon, Montana	124	**14.9%**	124	72	-	52	-	-	-	2,709
Blaine, Montana	133	**14.1%**	133	-	70	63	-	-	-	6,634
Sublette, Wyoming	309	**14.0%**	309	108	4	197	-	-	-	6,965
Lincoln, Wyoming	639	**13.6%**	294	37	7	250	345	345	-	15,940
Moffat, Colorado	507	**13.5%**	8	2	-	6	499	499	-	13,397
Rosebud, Montana	359	**13.4%**	-	-	-	-	359	359	-	9,279
Lea, New Mexico	2,065	**12.3%**	2,065	447	699	919	-	-	-	56,650
Carbon, Utah	807	**11.5%**	75	44	15	15	733	731	2	19,459
Gunnison, Colorado	689	**11.4%**	-	-	-	-	689	689	-	14,182
Weston, Wyoming	179	**11.2%**	179	87	14	78	-	-	-	6,642
Uintah, Utah	824	**10.9%**	824	195	60	569	-	-	-	27,129
Eddy, New Mexico	1,835	**10.5%**	1,835	798	210	827	-	-	-	51,269
San Juan, New Mexico	3,534	9.5%	2,786	671	500	1,615	748	748	-	125,820
Sweetwater, Wyoming	1,344	**9.0%**	841	217	32	592	502	502	-	38,019
Richland, Montana	317	**8.8%**	303	47	7	249	14	14	-	9,163
Yuma, Colorado	204	**8.4%**	204	17	152	35	-	-	-	9,785
Toole, Montana	124	**7.8%**	124	72	35	17	-	-	-	5,174
Big Horn, Wyoming	175	**7.3%**	174	23	-	150	1	1	-	11,325
Duchesne, Utah	293	**7.0%**	293	99	19	175	-	-	-	15,328

Energy Jobs over 15% of Total
Energy Jobs over 10% of Total

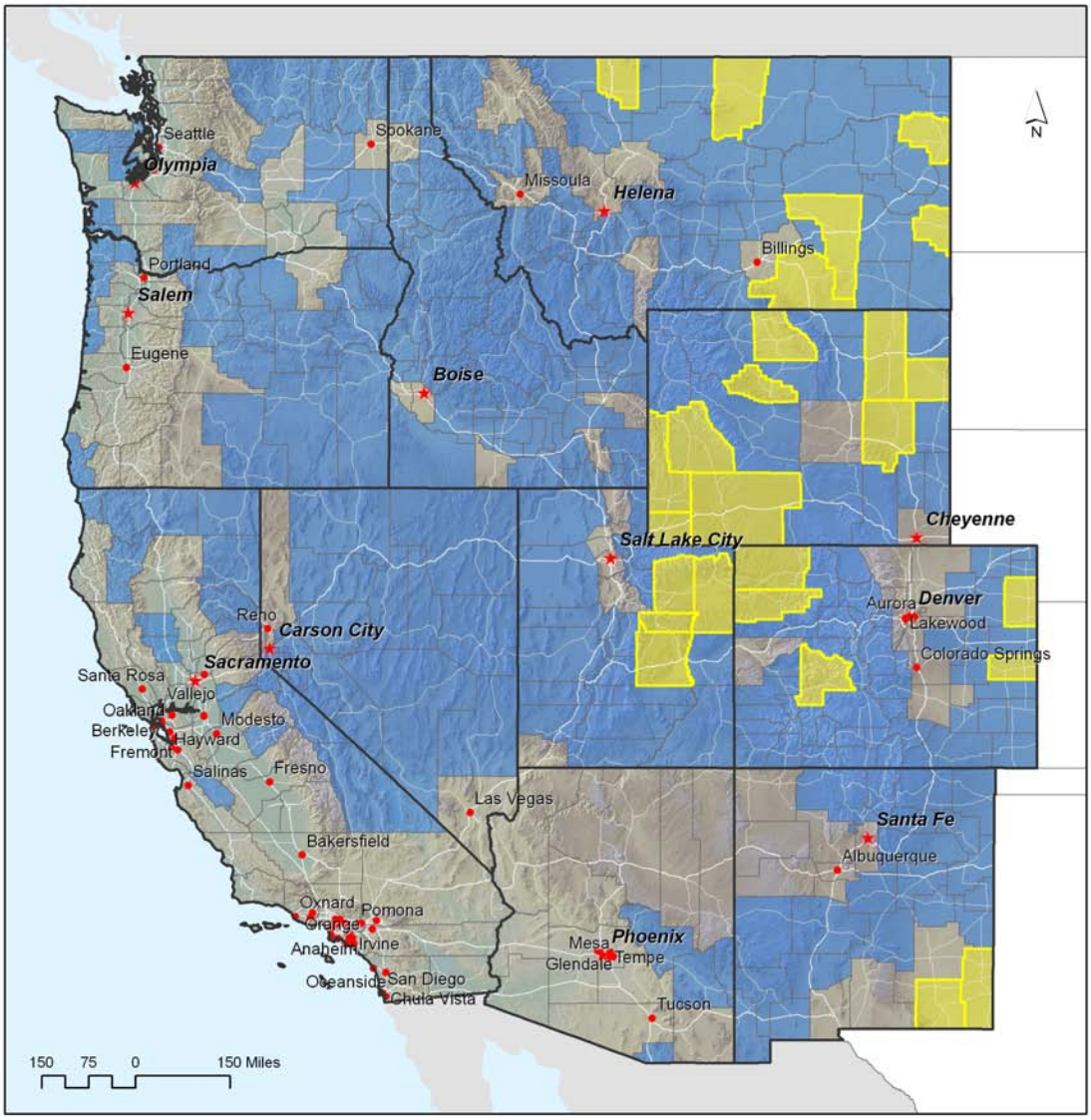
Maximum Population (excl. San Juan) 56,650

San Juan, NM was excluded because population is much larger and we want to focus on small rural communities that are heavily dependent on energy.



EF counties and their peers are shown in Map 1.

Map 1. Energy-focusing Counties and their Rural Peers



HAS AN ECONOMIC FOCUS ON ENERGY DEVELOPMENT BENEFITED COUNTIES OF THE WEST?

In order to answer this question, we compared the economic performance of energy-focusing (EF) counties, measured in a variety of ways, to their rural peers.

We use three time periods for analysis:

1970–1982 A period of economic growth, culminating in a national recession. This period also captures an energy development "boom" period in the West.

1982–1990 A period of recovery in the national economy, but decline, or energy "bust" period, for EF counties in the West.

1990–2005 The beginning of a new period of growth in the national economy, dominated by a shift to a service and knowledge-based economy, an increasingly mobile workforce, and the advent of new technology (personal computers, the Internet, telecommunications). This period also captures the most recent energy surge for parts of the West, which began approximately in 2000.

We use these periods for comparison because they frame starkly different economic stages, and highlight differences as well as emerging similarities between EF counties and their peers.

The measures of performance we used to compare EF counties to their rural peers are:

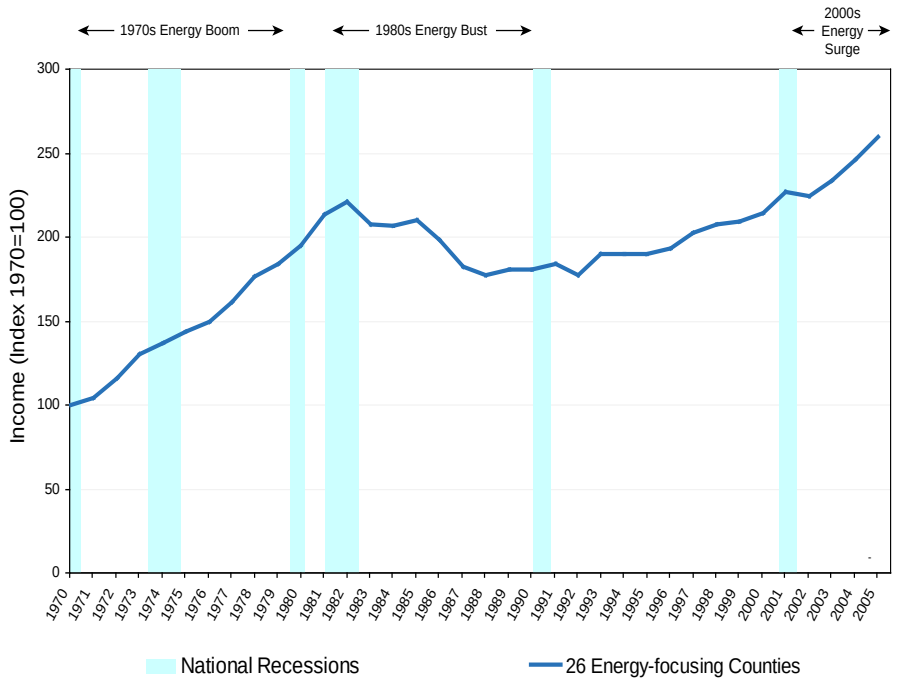
- Total personal income
- Average earnings per job
- Population
- Per capita income
- Employment

Throughout this report all dollars figures are in real terms, i.e., adjusted for inflation.

We begin by looking at the long-term economic history of EF counties. Figure 1 shows the growth and decline of real personal income from 1970 to 2005 in EF counties (in aggregate). Light blue vertical bars illustrate periods of national recession.

The economic history of EF counties is characterized by tremendous volatility. The boom in the 1970s was followed by a bust that lasted a decade in the 1980s. In the 1990s, EF counties recovered. This recovery was fueled by sectors unrelated to energy development, and represents a significant departure from the experience of the 1980s. The steady growth in the 1990s was extended and accelerated in the 2000s, when the current energy surge took root.

Figure 1. Total Personal Income in Energy-focusing (EF) Counties in the West, 1970–2005 (Indexed 1970=100)



Next we examine EF counties as compared to their peers from a historical perspective. Figure 2 shows the trends in personal income, by source (industry and non-labor income sources) from 1970 to 2000, for the aggregate of the 26 EF counties in the West. Figure 3 shows the same information for the aggregate of the 254 rural peer counties in the West.

The differences between the economic experience of EF counties and their peers are starkly evident. While EF counties went through a discernable boom/bust cycle, their peer counties saw a much steadier growth.

From 1970 to 1982, total personal income in EF counties, driven by mining, which includes energy development, grew rapidly. For the rest of the 1980s, mining and energy development contracted severely and brought the rest of the economy down with it. By the 1990s, however, with mining and energy development still declining though beginning to stabilize, the rest of the economy grew—this time independent of the fortunes of mining and energy extraction. Growth in the 1990s was driven by the rise in personal income from people employed in service and professional industries, and the even-faster increase of non-labor income (retirement, investments, government transfer payments, etc.).

For EF counties, the 1990s represented a period of economic diversification. The fact that the economies of EF counties began to diversify, even in the face of rapid declines in the mining (mostly energy development), is an important point. It underscores the economic shift that took place in the rural West between the 1980s and the 1990s, and shows that the context for today's energy surge is an economy that is both larger and more diverse that in the past.

Figure 2. Historical Trends in Personal Income by Source, Energy-focusing (EF) Counties in the West, 1970–2000 [4]

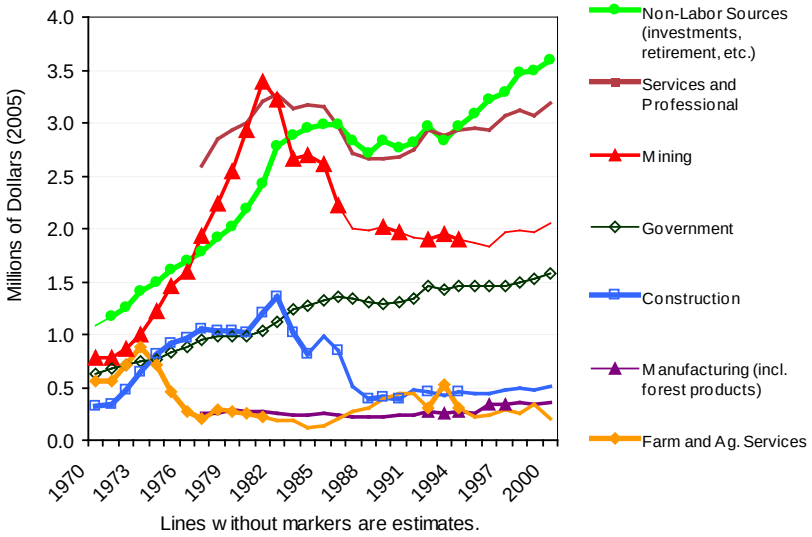
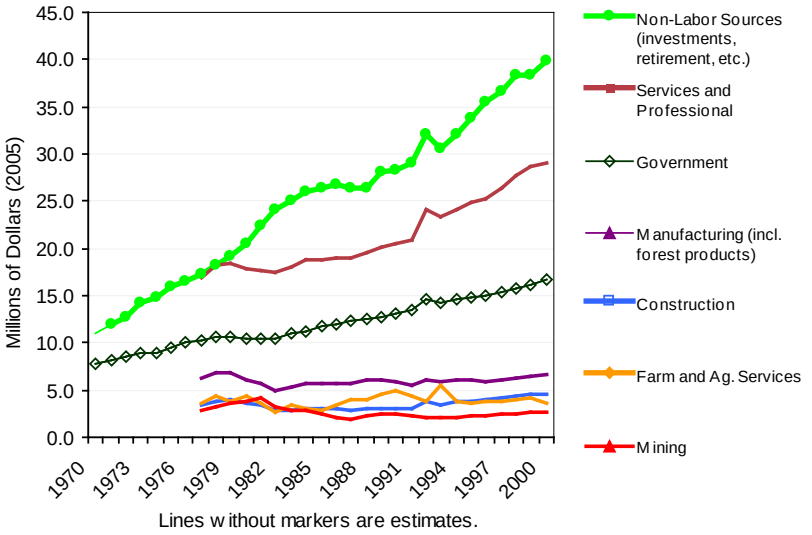


Figure 3: Historical Trends in Personal Income by Source, Peer Counties in the West, 1970– 2000 [5]

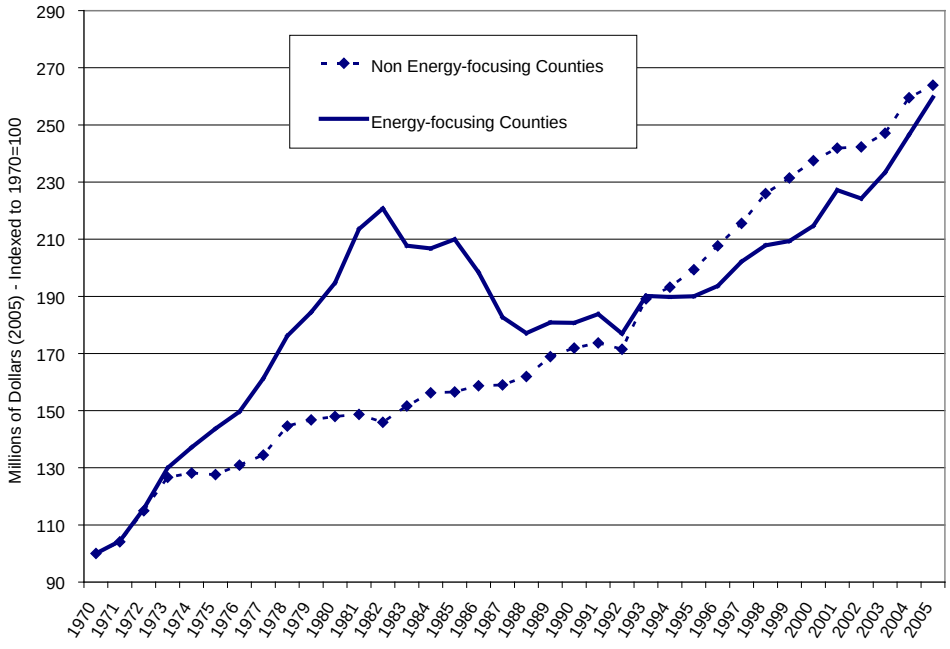


In contrast to EF counties, the non-energy peer counties saw a long and continued growth in real personal income, with no slowdown following the 1982 recession. Traditional industries, ranging from agriculture to manufacturing and construction, were all flat, while service and professional industries, non-labor income, and government enterprises accounted for the growth in personal income.

This tortoise-versus-the-hare comparison shows that it is not necessarily the case that rural counties in the West need to develop energy resources (if they have them) in order to succeed. Both sets of counties—EF counties and their peers—grew their economies at the same rate over the long term. This point is illustrated by Figure 4, which shows the long-term trend in personal income, comparing EF counties to their peer counties. The figure is indexed to 1970 in order to show relative rates of growth.

While the rate of growth in EF counties is characterized by fast acceleration and fast deceleration, the peer counties pursued a steadier expansion, with higher rates of income growth since the early 1990s. From 1990 to 2005, the average rate of real personal income growth in EF counties was 2.3 percent per year, compared to 2.9 percent in the peer counties. For the same time period, the average annual employment growth of EF counties was 1.8 percent, compared to 2.3 percent for the peer counties.[6]

Figure 4. Growth of Total Personal Income, Energy-focusing (EF) Counties versus Peer Counties in the West, Indexed, 1970–2005



These findings show that EF counties have historically gone through periods of boom and bust, outperforming their non-energy peers during the boom, and underperforming during the subsequent bust. They also show that EF counties began to grow and diversify their economies in the 1990s independent of mining and energy development. And, finally, over the last 15 years, EF counties have been falling behind in economic performance compared to their peers.

IS TODAY'S ENERGY SURGE ANY DIFFERENT FROM THE ENERGY BOOM OF THE 1970S?

Figure 5 (page 13) shows measures of economic performance (change in personal income, employment, average earnings per job, population, and per capita income), comparing EF counties to their peers. The vertical bar charts show the difference in growth rates for each measure between the two county types. In the chart, bars above 0.0% (the x-axis) indicate a period when EF counties outperformed the non-EF counties. Bar charts below 0.0% refer to episodes when EF counties underperformed compared to their peers.[7]

During the past energy boom period (1970–1982) EF counties showed fast rates of growth in personal income, employment, average earnings per job, population, and per capita income. This is consistent with Figure 4 that showed a much higher growth rate for EF counties during the 1970s. During the ensuing bust (1982–1990), the reverse occurred, and EF counties saw significant declines in all economic performance indicators relative to their peers.

The most interesting finding of Figure 5 is what occurred from 1990 to 2005, after the last energy bust and before and during the current energy surge, and how different the comparative performance is between the two sets of counties when contrasted with the earlier boom period of the 1970s. Compared to their peer counties in the West, EF counties saw a decline in personal income, employment, and population, and a rise in average earnings per job and per capita income from 1990 to 2005. This means that relative to their peers, EF counties underperformed in terms of the growth of real personal income, employment, and population, and outperformed in terms of the growth in earnings per job and per capita income. In other words, in today's economy there is no guarantee that counties that develop fossil fuel reserves have any significant advantage over those counties without those resources.

What Figure 5 also shows is that economically today's energy surge is different from those of the past. Until 1990, the pattern for EF counties was to do very well during a boom and very poorly during a bust. After 1990, this pattern changed, and it is no longer the case that an energy surge causes those counties with a higher share of economic activity devoted to energy development to outperform their rural peers. In three of the five economic indicators, the EF counties did worse than their peers. For the measures where they outperformed—average earnings per job and per capita income—there was only a modest performance difference (0.6% per year from 1990 to 2005).

The reasons for the difference in relative performance are explored in the next section. In brief, one reason is that the economy of the rural West has grown substantially in the last few decades, and as a result new energy jobs now make up a much smaller percent of total employment than in the past. Figure 6 shows that in EF counties at the peak of the last boom, in 1982, energy-related jobs were 23 percent of total employment (the green line, and right axis in the figure), whereas, in 2005, energy-related jobs in EF counties were 14 percent of total employment.[8] In other words, the relative share of energy jobs in EF counties has declined.

In addition, today's energy surge, driven in part by ready access to public lands, is occurring in a different context. Over the last three decades the economic role of public lands has changed significantly, from a repository of raw materials, to a haven for recreationists, tourists, retirees, and mobile businesses whose owners choose to locate in areas with a high quality of life. The economic transition, from a resource-based economy, to one focused on services, knowledge-based occupations, retirement, and investment dollars, has already taken place.

To put this in perspective, for the West as a whole, service-based occupations and non-labor income constitute 86 percent of the growth in the economy during the last three decades. And today, 45 percent of total personal income comes from wages earned by people employed in service-related occupations, while another 27 percent is from non-labor sources, such as retirement and investments.[9]

Of particular note, given that a new energy development surge started around the beginning of this decade, is the fact that mining, which includes oil, natural gas, and coal development, is still a relatively small component of the economy of the West, providing 1 percent of total personal income in 2005.[10]

The West is the most urbanized part of the U.S., with 90 percent of people living in metropolitan areas. [11] As a result, these trends largely represent urban phenomena. A closer look at the rest of the West—the rural West without metropolitan areas—reveals similar findings.

In the non-metropolitan West, a third of personal income in 2005 was generated by service-related industries. Non-labor income was relatively larger than in the rural West, making up more than 40 percent of total personal income. [12] Mining, including oil and natural gas, constituted less than 5 percent of total personal income and 2 percent of employment.[13]

For a thorough discussion of the economy of the West and the relative role of energy development, please consult another report in our *Energy and the West* series, *Energy Development and the Changing Economy of the West*.

Figure 5. Annual Rates of Growth of Key Economic Indicators, Shown as the Difference in Growth Rates Between Energy-focusing (EF) Counties and their Peers in the Rural West

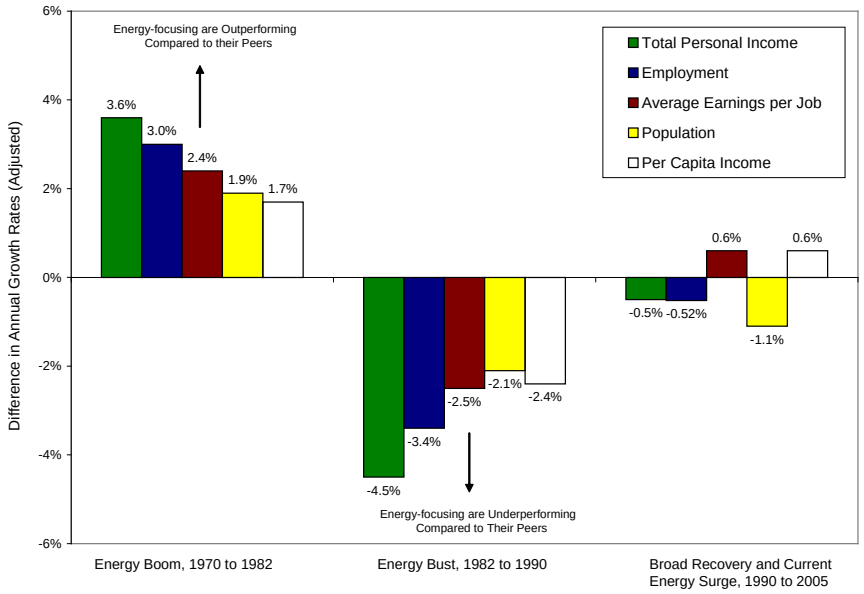
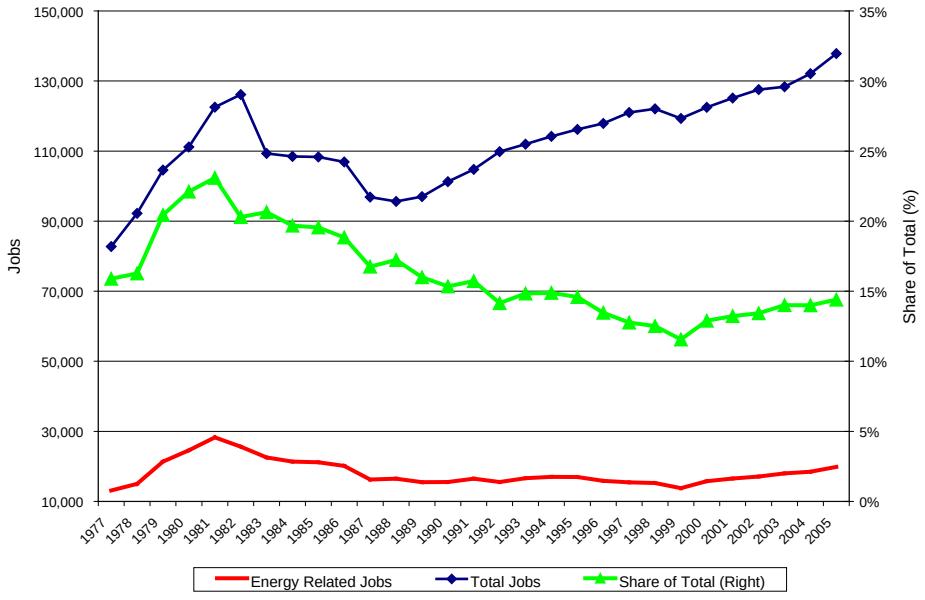


Figure 6. Energy-related Jobs in the Energy-focusing (EF) Counties in the West, as Share of Total, 1977–2005



The scale of the recent economic transition means that it is more difficult today for energy development, by itself, to turn county economies into top economic performers. This is illustrated in Table 3, which ranks EF counties among all counties in the West according to the annual growth of jobs during three time periods. In the energy boom that took place from 1970 to 1982, 10 of the 26 EF counties were in the top 30 counties in the West in terms of job growth (light green). Only one, Toole County, Montana, was among the bottom 30 counties (orange).[14]

During the ensuing bust, from 1982 to 1990, 12 of 26 EF counties ranked among the bottom 30 counties in the West in terms of job growth, and none were top performers. This is consistent with previous figures that showed significant economic decline for EF counties during this period.

The current energy surge has not created a rising tide lifting all EF boats as in the past. Only one county, Sublette County, Wyoming, ranks among the top economic performers in the West, in terms of job growth. Campbell County, Wyoming, the most energy-focusing county in the West, had the third highest rate of growth in the past energy boom, but ranks 85th in overall job growth in the current surge. Emery County, Utah ranked fifth in the past boom, and is 331st in the current surge. Even Sweetwater County, Wyoming, which is in the midst of a boom in natural gas development, ranks 254 out of 411 in terms of job growth during the current energy surge, as compared to fourth in the last boom.

Table 3. Ranking of Energy-focusing Counties Among all Counties in the West, in Terms of Average Annual Job Growth

Sorted by Energy Dependence:	Energy Jobs in 2005	Energy Share of Total (2005)	Rank among 411 western counties, based on average annual job growth during: Old Boom: 1970-1982	Bust: 1982-1990	Recent Boom: 2000-2005
Campbell, Wyoming	5,436	30.0%	3	402	85
Emery, Utah	668	24.5%	5	385	331
Cheyenne, Colorado	99	21.5%	240	327	384
Rio Blanco, Colorado	343	20.9%	31	411	237
Uinta, Wyoming	1,163	17.5%	6	370	139
Big Horn, Montana	354	16.7%	296	348	202
Converse, Wyoming	610	16.4%	14	391	112
Hot Springs, Wyoming	233	15.4%	161	380	304
Fallon, Montana	124	14.9%	280	399	301
Blaine, Montana	133	14.1%	367	270	366
Sublette, Wyoming	309	14.0%	157	326	28
Lincoln, Wyoming	639	13.6%	149	353	110
Moffat, Colorado	507	13.5%	23	358	221
Rosebud, Montana	359	13.4%	7	390	375
Lea, New Mexico	2,065	12.3%	87	403	228
Carbon, Utah	807	11.5%	29	405	327
Gunnison, Colorado	689	11.4%	54	274	36
Weston, Wyoming	179	11.2%	116	382	215
Uintah, Utah	824	10.9%	28	393	88
Eddy, New Mexico	1,835	10.5%	136	351	224
Sweetwater, Wyoming	1,344	9.0%	4	386	254
Richland, Montana	317	8.8%	104	408	321
Yuma, Colorado	204	8.4%	289	131	398
Toole, Montana	124	7.8%	386	299	372
Big Horn, Wyoming	175	7.3%	205	374	278
Duchesne, Utah	293	7.0%	22	375	102

Top 30 (out of 411 Western Counties)
Bottom 30 (out of 411 Western Counties)

In spite of the recent rise in energy development activity, most EF counties are experiencing population losses. Table 4 (page 16) shows that of the 26 EF counties, 10 (38%) have seen an increase in population from 2000 to 2007 (highlighted in green). This includes some of the most heavily energy-focusing counties in Wyoming, Utah, and Colorado. Surprisingly, 16 (62%) of the energy-focusing counties lost population during the same period.[15]

Strangely, six of the counties that lost population at the same time added over 100 new jobs (not counting proprietors), from 2000 to 2005, in energy-related fields. These are: Blaine, Richland, and Rosebud counties, Montana; Eddy and Lea counties, New Mexico; and Uinta County, Wyoming.

Why are these counties losing population in the midst of an energy surge? One possible explanation may be the rising cost of living, which we discuss in more detail in the case study reports. As new jobs are created in the fields of oil, natural gas, and coal mining, workers move in, the cost of labor rises, and with a limited supply of housing, the cost of housing rises along with it. Non-energy workers, unable to compete for housing and a higher cost of living, leave. For example, rental prices in Rock Springs, Wyoming, in Sweetwater County, an EF county that is growing rapidly because of energy development, increased by 100% between 2000 and 2007.[16]

Further Reading

For more detail on the impacts of rapid energy development, see the two reports in the *Energy and the West* series listed below. They are available at: www.headwaterseconomics.org/energy.

Impacts of Energy Development in Colorado, with a Case Study of Mesa and Garfield Counties

Impacts of Energy Development in Wyoming, with a Case Study of Sweetwater County

Another possible explanation is that communities in the midst of an energy surge may displace other residents, retirees for example, who do not wish to live in what is becoming for many former rural towns a fast-paced industrial landscape. There may be other reasons for the loss of population that have nothing to do with energy development, and more to do with the plight of rural communities in general. Regardless of the reasons, there appears to be no guarantee that making a choice to focus economic activity on energy development will stem the loss of population that is so common in the rural West.

Table 4 . Net Migration per Thousand People per Year in Energy-focusing (EF) Counties, 2000–2007

	Migration 2000 to 2007 (People per 1000 per year)
Sublette, Wyoming	36.9
Campbell, Wyoming	14.8
Lincoln, Wyoming	8.0
Uintah, Utah	7.1
Converse, Wyoming	4.6
Duchesne, Utah	4.6
Weston, Wyoming	4.5
Gunnison, Colorado	2.7
Rio Blanco, Colorado	0.5
Lea, New Mexico	-1.8
Moffat, Colorado	-2.0
Sweetwater, Wyoming	-2.2
Big Horn, Wyoming	-2.9
Hot Springs, Wyoming	-4.4
Eddy, New Mexico	-4.7
Yuma, Colorado	-5.6
Uinta, Wyoming	-5.9
Richland, Montana	-6.0
Fallon, Montana	-8.2
Toole, Montana	-9.2
Carbon, Utah	-10.6
Big Horn, Montana	-10.9
Rosebud, Montana	-13.0
Emery, Utah	-15.9
Blaine, Montana	-16.5
Cheyenne, Colorado	-32.6
Unweighted Average	-2.6

These findings show that rural economies focusing on energy development today are very different than in the past. Unlike the past, EF counties are underperforming compared to their rural peers. EF counties are not the West's top economic performers they used to be. Today, only one EF county ranks among the top 30 economic performers in the West, while during the last energy boom half were top performers. Energy development also plays a smaller relative role in EF counties than in the past. The share of total jobs in energy-related fields in EF counties has declined, from a high of 23 percent in 1982 (peak of last energy boom) to 14 percent in 2005 (in the midst of today's energy surge). At the same time, 62 percent of EF counties are losing population in the midst of today's energy surge.

WHY DO ENERGY-FOCUSING COUNTIES UNDERPERFORM RELATIVE TO THEIR PEERS?

In this section, we explore answers to the question of why EF counties underperform economically.

Energy-focusing Counties are Less Economically Diverse

The more diverse the economy of a county, the better it is able to adapt to the constantly changing conditions of the global and national economy.[17]

There are indications that EF counties are diversifying. Figure 2 (page 9), for example, shows a rise in certain sectors of the economy, such as services and non-labor income, despite declines in mining, including energy development. Figure 2 shows that the relative contribution of mining is declining, in part, because the overall non-energy related portion of the economy is growing. In spite of this diversification, by 2000 (the beginning of the current surge) EF counties were still much less diverse economically than their non-EF peers.

To measure economic diversity we developed a specialization index for the aggregate economy of all 26 EF counties and compared that to one developed for the 254 peer counties in the West.[18] This index is commonly used as a measure of industrial specialization in the economy. Counties with a high specialization index are less economically diverse, more susceptible to volatility, and less innovative.[19] The most diverse score possible would be one that exactly emulated the U.S. economy, and would have a score of 0.0.[20]

Our findings show that in 2000, the specialization index for EF counties was 280, compared to a score of 106 for their peer counties. The principal ways EF counties are different from the U.S. are: a heavy reliance on mining and energy development (11.8% of total compared to 0.4% for the U.S.); under-reliance on manufacturing (4.3% compared to 14.1% for the U.S.); and under-reliance on professional scientific and technical services (2.4% compared to 5.9% for the U.S.). The main ways the peer counties in the West differ from the U.S. are: under-reliance on manufacturing (7.9%); over-reliance on agriculture, forestry and fishing (7.2% compared to 1.5% for the U.S.), and over-reliance on accommodation and food services (8.6% compared to 6.1% for the U.S.).[21]

Another way to represent economic diversity is to assess those industries that are growing, and those that are in decline. Table 5 shows the growth of jobs during the current energy surge (2000 to 2005), comparing EF counties to their peers in the West.[22]

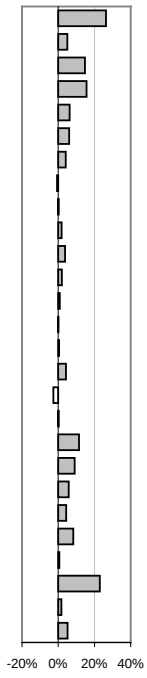
In EF counties, the principal growth (indicated in light green when over 5% of new jobs) was in direct energy-related occupations (energy, mining, support activities for oil and natural gas operations) and largely in occupations indirectly associated with energy development (manufacturing, construction, transportation, warehousing, and professional and scientific services). Other sectors, such as retail trade, health care and social assistance, and accommodation and food services also grew.

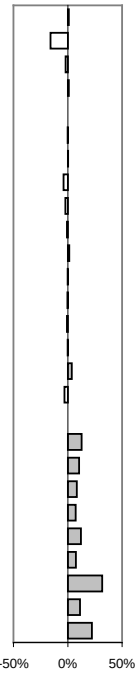
In the peer counties, the bulk of the job growth came from service-related occupations, with the largest growth in health and social assistance, and accommodation and food services. Other areas in which the peer counties grew include construction, transportation and warehousing, retail trade, real estate, and other services. In addition, other data, detailed below, show that peer counties are more successfully attracting investment and retirement dollars, and diversifying their economies with these income streams.[23]

The difference in types of growth can be seen in the column at the far right of Table 5. EF counties are specializing, adding those sectors that are necessary for the exploration, development, extraction, and transportation of fossil fuels. They do not create many new jobs that characterize the broader economic shift in the western economy over the last several decades, namely the development of a service-based and knowledge-based economy.

Table 5. New Jobs by Industrial Sector Comparing Energy-focusing Counties to Peer Counties in the West, 2000–2005

	26 Energy-Focusing Counties			254 Non Energy-Focusing Counties		
Industry	New Jobs 2000-2005	New Jobs Share of Total	New Jobs Share of Total	New Jobs 2000-2005	New Jobs Share of Total	New Jobs Share of Total
	15,312	100.0%		62,320	100.0%	
Energy	4,043	26.4%		643	1.0%	
Manufacturing	775	5.1%		(9,873)	-15.8%	
Mining	2,249	14.7%		(1,234)	-2.0%	
Support Activities for Oil and Gas Operations	2,387	15.6%		599	1.0%	
Management of Companies and Enterprises	969	6.3%		103	0.2%	
Drilling Oil and Gas Wells	922	6.0%		(7)	0.0%	
Oil and Gas Extraction	632	4.1%		170	0.3%	
Unclassified	(108)	-0.7%		(2,392)	-3.8%	
Forestry, Fishing, Hunting, and Agriculture Support	38	0.3%		(1,440)	-2.3%	
Information	284	1.9%		(416)	-0.7%	
Other Services (except Public Administration)	567	3.7%		830	1.3%	
Utilities	293	1.9%		(60)	-0.1%	
Educational Services	131	0.9%		(187)	-0.3%	
Wholesale Trade	12	0.1%		(523)	-0.8%	
Support Activities for Coal Mining	76	0.5%		(125)	-0.2%	
Finance and Insurance	652	4.3%		2,360	3.8%	
Auxiliaries, except Corporate, Subsidiary, and Regional M	(412)	-2.7%		(1,930)	-3.1%	
Coal Mining	25	0.2%		6	0.0%	
Construction	1,756	11.5%		7,969	12.8%	
Transportation and Warehousing	1,382	9.0%		6,466	10.4%	
Retail Trade	892	5.8%		5,187	8.3%	
Administrative and Support and Waste Management and	669	4.4%		4,533	7.3%	
Professional, Scientific, and Technical Services	1,261	8.2%		7,484	12.0%	
Real Estate and Rental and Leasing	100	0.7%		4,660	7.5%	
Health Care and Social Assistance	3,510	22.9%		19,682	31.6%	
Arts, Entertainment, and Recreation	262	1.7%		7,026	11.3%	
Accommodation and Food Services	789	5.2%		13,778	22.1%	





Green if over 5%, Brown if under -5%.

Overall Wages Have Not Increased at the Same Rate as Energy Industry Wages

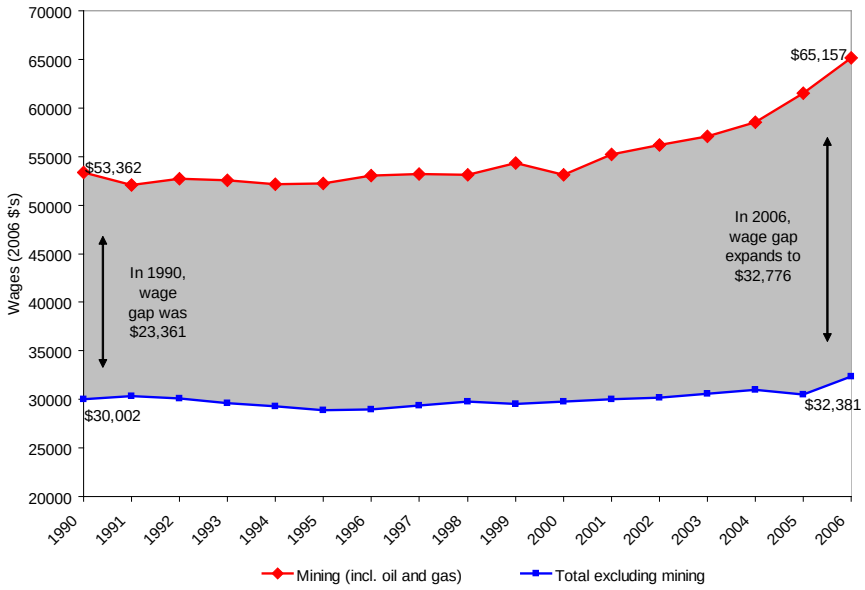
Another possible reason for the relatively lower performance of EF counties is a growing gap between what mine workers earn ("mine" includes energy-related fields in this report) compared to those working in other sectors of the economy.

Figure 7 shows average annual wages of mine workers (primarily oil and natural gas workers) in EF counties, compared to wages in the rest of the economy. In 1990, the wage gap was $23,361; mine workers earned $53,362 per year, on average, while those in other sectors earned, on average, a little over $30,000 per year. Wages in non-mining sectors have not changed much since then. From 1990 to 2006, they grew (in real terms) by 7.9 percent, to $32,381 in 2006. During that time, average annual wages for the mining sector grew by 22 percent, to over $65,000 per year in 2006. The wage gap grew to a difference of $32,776, which is $9,414 more than it was in 1990.[24]

It is possible that the 7.9 percent growth in non-mining wages would not have happened if there weren't any mining activity. From 1990 to 2006, average annual wages in the peer counties grew more slowly, by 6 percent. In 2006, average annual wages in non-mining sectors in the peer counties was $30,555, lower than that of the EF counties, at $32,381.[25]

The growing wage gap in EF counties between mine and all other workers—from $23,361 in 1990 to $32,776 in 2006—is not a healthy sign. The danger is that more people, including teachers, nurses, and farm workers, will be left behind if renewed energy development increases the general cost of living, especially the cost of housing, in a place. We explore this issue in more depth in the case study reports in the *Energy and the West* series.

Figure 7. Average Annual Wages in Mining, including Energy Development, Compared to the Rest of the Economy, in Energy-focusing Counties in the West, 1990-2006



Energy-focusing Counties Have Less Equitable Wealth Distribution

A community where everyone is doing comparatively well stands a higher chance of being able to adapt to change and grow.[26] We measured the gap between "high income" and "low income" by counting the number of households earning more than $150,000 per year ("high income") divided by the number of households earning less than $30,000 per year ("low income") .[27]

At the end of the last energy bust cycle and before EF counties started their economic recovery, in 1990, EF counties had a large gap between high income and low income households: for every household earning over $150,000 per year, there were 108 household earning less than $30,000 per year. By comparison, that same year in the peer counties, for every household earning more than $150,000 per year, there 87 households earning less than $30,000. This means that at the beginning of the recovery period that started in the 1990s, EF counties had a relatively less equitable distribution of wealth; i.e., there were many more "low income" relative to "high income."

Fortunately, by 2000 (at the beginning of the current energy surge, and at the end of the recovery that took place during the 1990s) the high income-low income ratio declined significantly for both county types.[28] In EF counties, for every high income household, there were 27 low income households (a ratio of 1:27; for the peer counties in 2000 the ratio was 1:17).

That EF counties had a larger gap between high income and low income than their peers at the end of a bust period and before embarking on economic recovery (i.e., 1990) is related to the fact that EF counties have not diversified their economies and developed a more mixed suite of service-related industries. By 2000, after a decade of more balanced economic growth, EF counties had improved their earnings distribution, but still lagged behind their peers.

In the current energy surge, EF counties are once again developing an earnings gap among residents. This is attributable to the widening gap between earnings of mine workers and the rest of the economy, a gap that is growing and was over $32,000 in 2006. If cost-of-living factors are considered, it is likely that people on fixed income or earning lower average wages are falling even further behind.

It is premature to estimate what income distribution will look like in EF counties after the current surge, but it is plausible that the gap between the high income and low income households will continue to widen for counties that focus on energy development as a rural development strategy.

Energy-focusing Counties Have Less Educated Workforces

An important condition for economic success in today's U.S. economy is an educated workforce.[29] We look at the percent of the adult population with and without a high school and college education.

At the end of the last energy bust cycle and before EF counties started their economic recovery, in 1990, EF counties had somewhat less educated workforces compared to their peers. In 1990, 24 percent of the adult population in EF counties did not have a high school diploma, which is slightly higher than their peer counties (23%). By 2000, 19 percent of the adult population in the EF counties did not have a high school diploma, an improvement from the previous decade, but still higher than their peers (17%).[30]

In terms of college education, in 1990 the percent of the adult population with a college degree was about equal among the two county types, although slightly less (14% compared to 16%) for EF counties. By 2000, at the end of the 1990s recovery, the percent of the population with a college degree increased slightly for EF counties (to 16%), but remained lower than in the non-EF peers (20%).

These statistics show that counties focused on energy development lag behind their peers in terms of workforce education levels. Even though all counties are experiencing increases in workforce education levels, the proportion of college-educated workers in EF counties at the beginning of this century had been reached by their non-energy peers a decade earlier.

Energy-focusing Counties Attract Fewer Retirement and Investment Dollars

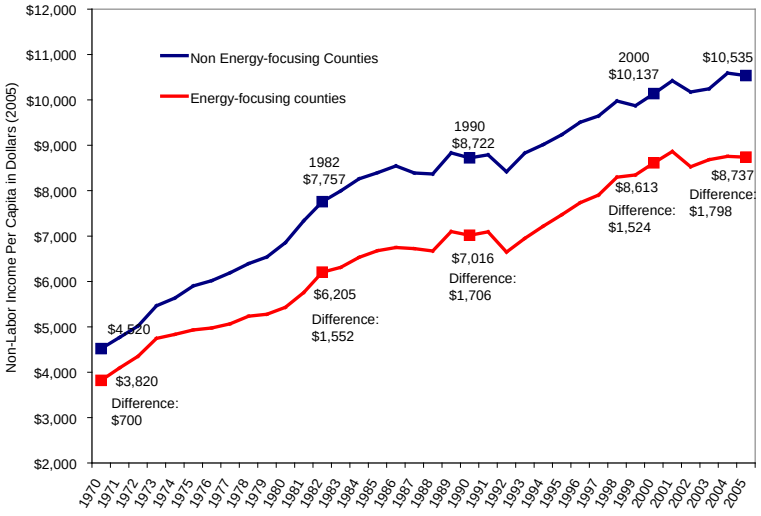
The importance of non-labor sources of income shows no signs of diminishing in the near future. As Americans generate more wealth and our population ages, more people will use their savings, investments, and programs like Social Security to sustain their livelihoods, whether they are still working or retired. By 2005, more than 40 percent of total personal income in the rural West was from non-labor sources, including transfer payments, dividends, interest, and rent.

Non-labor income, when measured on a per capita basis, is a measure of a community's ability to attract and retain this fast-growing segment of the economy.

Figure 8 shows the growth of per capita non-labor income, comparing EF counties to their peers in the West. In 1970, per capita non-labor income was similar between the two county types, with only a $700 difference. By 2005, the difference was $1,798.

These figures show that in the midst of today's energy development surge, counties focusing on energy extraction are less able to attract retirement and investment dollars than their peers.[31]

Figure 8. Growth of Per Capita Non-Labor Income, Energy-focusing Counties Compared to Peers, 1970–2005



These findings show that today's energy surge is different than in the past, and in several important ways EF counties today are less well positioned to compete economically. EF counties are less diverse economically, which makes them less resilient but also means they are less successful at competing for new jobs and income in growing service sectors where most of the West's economic growth has taken place in recent decades. EF counties are also characterized by a greater gap between high and low income households, and between the earnings of mine and energy workers and all other workers. And EF counties are less well educated and attract less investment and retirement income, both important areas for future competiveness.

CONCLUSIONS

In the West today, it is less certain that energy development will bring the prosperity it once did, and reason to be concerned that a concentration on fossil fuel extraction may impair a local economy's ability to grow and compete successfully in today's more diverse economy.

In the past, the pattern of development for counties with fossil fuel reserves was to grow quickly, reach a peak, and then decline sharply—the so-called boom and bust cycle. Beginning in the 1990s, it became clear that the economy in the West was diversifying, with especially rapid job growth occurring in service- and knowledge-based sectors, and that much of the real growth in personal income was associated with this service economy, and an aging population and the influx of retirement and investment dollars.

The implications of these changes—the growth and diversification of the western economy as a whole, including rural areas—is that energy development today does not have the same impact it had in the past. In the 1970s and early 1980s, there were few economic alternatives in rural communities. The discovery and development of oil and natural gas, or coal, created new high-wage jobs where in many cases there had been few or none. By the early 2000s, the West had, with a few exceptions, decoupled from its reliance on resource extraction, and enjoyed a wider range of economic choices than ever before.

The current surge in energy development takes place in this changed economic context. In counties that have pursued energy extraction as an economic development strategy—places we call energy-focusing (EF) in this report—the long-term indicators suggest that relying on fossil fuel extraction is not an effective economic development strategy for competing in today's growing and more diverse western economy.

When compared to their rural peer counties, EF counties suggest an analogy to the fable of the tortoise and the hare. While EF counties race forward and then falter, the non-energy peer counties grow steadily. At the finish line, counties that have focused on broader development choices are better off, with higher rates of growth, more diverse economies, better-educated populations, a smaller gap between high and low income households, and more retirement and investment income.

Economics is the study of how people make choices in a constrained environment. The findings in this report show state and rural leaders, as well as managers of public lands (where much of the energy development is taking place in the West today), that a concentration on fossil fuel development can undercut the competitive position of a regional or local economy.

Further Reading in our Energy and the West *Series*

Learn how energy development impacts:

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To access our *Energy and the West* series, visit: www.headwaterseconomics.org/energy.

APPENDIX

NORTH AMERICAN INDUSTRIAL CLASSIFICATION SYSTEM (NAICS) DEFINITIONS

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

211 Oil and Gas Extraction

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

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

213111 Drilling Oil and Gas Wells

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

213112 Support Activities for Oil and Gas Operations

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

2121 Coal Mining

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

213113 Support Activities for Coal Mining

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

ENDNOTES

[1] U.S. Bureau of the Census, North American Industrial Classification System (NAICS): http://www.census.gov/epcd/www/naics.html.

[2] U.S. Bureau of the Census, *County Business Patterns (CBP), 2008*. Washington, D.C.

[3] The data were derived from statistics published by the Bureau of the Census, in their publication *County Business Patterns* (CBP). We used this data sources primarily because it is devoid of disclosure restrictions. Disclosure restrictions are data gaps, where a government agency will not release information to protect the confidentiality of individual firms, and occur most frequently with data in the Regional Economic Information System (REIS) of the U.S. Department of Commerce. The disadvantage of CBP is that, unlike REIS data, it does not include the self-employed or government employment. If a relative measure is used (i.e., percent of total), as we did, the exclusion of the self-employed or proprietors does not make a significant difference. Some mining sectors employ very few single-owner proprietors, so the inclusion of proprietor's data, if it were available, would actually lower the size of mining relative to other sectors. "Coal mining" and "support activities for mining" are both examples of this, where only 8 percent of the industry is made up of proprietors. Other sectors employ more proprietors than average so the inclusion of proprietors would raise their shares. "Oil and gas extraction" is an example of this, where 12 to 14 percent of employment is in proprietors. Our definition of energy includes all three sectors. Together the differences offset each other and the resultant values for energy's share of total are not affected by the exclusion of proprietors. By using a data set that does not count government employment as part of total, our energy share of total calculations are higher than they would otherwise be, especially in some communities that have a lot of government. If we were to calculate energy shares using both proprietors and government, we expect the results would report shares that were the same or lower.

[4] U.S. Department of Commerce, *Regional Economic Information System (REIS)*, *2008*. Bureau of Economic Analysis. Washington, D.C.

[5] Ibid.

[6] CBP 2008.

[7] Data for figure derived from REIS 2008.

[8] Data for figure derived from CBP 2008.

[9] Ibid, REIS 2008. Mining personal income based on estimates. Employment based on non-disclosed data from Bureau of Labor Statistics, *Quarterly Census of Employment and Wages* (QCEW).

[10] Ibid, REIS 2008.

[11] Bureau of the Census 2008. Calculations based on dividing the total number of people living in metropolitan statistical areas (MSAs) by the total population of the West.

[12] Ibid, REIS 2008.

[13] Ibid, REIS 2008. Mining personal income based on estimates. Employment based on non-disclosed data from Bureau of Labor Statistics, QCEW.

[14] Employment data in table from REIS 2008 and CBP 2008.

[15] Figures in table derived from U.S. Bureau of the Census, 2008.

[16] Housing Data, State of WY Dept of Economic Analysis and Info. http://eadiv.state.wy.us/housing.

[17] For a useful review of the academic literature on economic diversity, see Sterling, Andrew. 1998. "On the Economics and Analysis of Diversity." Electronic Working Papers Series, University of Sussex. http://www.sussex.ac.uk/Units/spru/publications/imprint/sewps/sewp28/sewp28.pdf. More narrowly, consult Malizia, E. E. and K. Shanzai. 2006. "The Influence of Economic Diversity on Unemployment and Stability." Journal of Regional Science. 33(2): 221-235.

[18] The specialization index was calculated by summing the squares of the difference between the aggregate (i.e., 26 EF counties, 254 peer counties) and the U.S. economy:

SPECIALit = ∑ ((EMPijt/EMPit)-(EMPusjt/EMPust)) 2 where,
SPECIALit = specialization of economy in county i in year t
EMPijt = employment in industry j in county i in year t
EMPit = total employment in county i in year t
EMPusjt = employment in industry j in U.S. in year t
EMPust = total employment in U.S. in year t
n = number of industries

[19] For an example of the application of a similar specialization index by the Federal Reserve, see Ozcan-Kalemlt S., B.E. Sorensen and O. Yosha. 2000. "Risk-sharing and Industrial Specialization: Regional and International Evidence." RWP 00-06. Kansas City: Federal Reserve Bank of Kansas City.

[20] The data and calculations for the specialization indices can be found on page 23 of the EF and peer profiles, located on: www.headwaterseconomics/energy.

[21] Data from U.S. Bureau of the Census, 2000, File SF#, Table P48.

[22] Data for the table derived from CBP 2008.

[23] REIS 2008.

[24] Data for figure from Bureau of Labor Statistics (BLS). *Quarterly Census of Employment and Wages (QCEW), 2008.* Washington, D.C. The category "mining" consists primarily of workers involved in the development and extraction of oil, natural gas and coal.

[25] Ibid, BLS 2008.

[26] For a review of the academic literature on the relationship between income distribution and economic growth, see: http://micro5.mscc.huji.ac.il/~melchior/html/Income%20Distribution.htm. More narrowly, consult Henry, C.W. 1998. "Income Inequality, Human Capital Accumulation and Economic Performance." *The Economic Journal.* 108 (Jan): 44-59.

[27] Data from the Bureau of the Census, 1990 and 2000 Decennial Census of Population, and Housing.

[28] The improved ratios were not because there were significantly fewer low-income families in 2000. Rather, the number of high-income families, in both sets of counties, increased. In 1990, 0.9% of household in the EF counties were high-income. By 2000, 2.3% were "rich." By comparison, in 1990 1.1% of the households in the peer counties were high-income. By 2000, 5.4% were high-income.

[29] According to the Bureau of Labor Statistics, earnings are higher and the unemployment rate is lower for people who have high levels of education: http://www.bls.gov/opub/ted/2003/oct/wk3/art04.htm. See also Ray, M. and M. Tucker. 1992. *Thinking for a Living: Education and the Wealth of Nations*. Basic Books, New York, New York.

[30] Data from the Bureau of the Census, 1990 and 2000 Decennial Census of Population, and Housing.

[31] REIS 2008.

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