Summary of Conclusions and Excerpts From:

Rocky Mountain States Boom and Bust Energy Development Patterns, 1970-2000
Final Draft

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Prepared for:

The William and Flora Hewlett Foundation
Hewlett Energy Initiative

May 1, 2003

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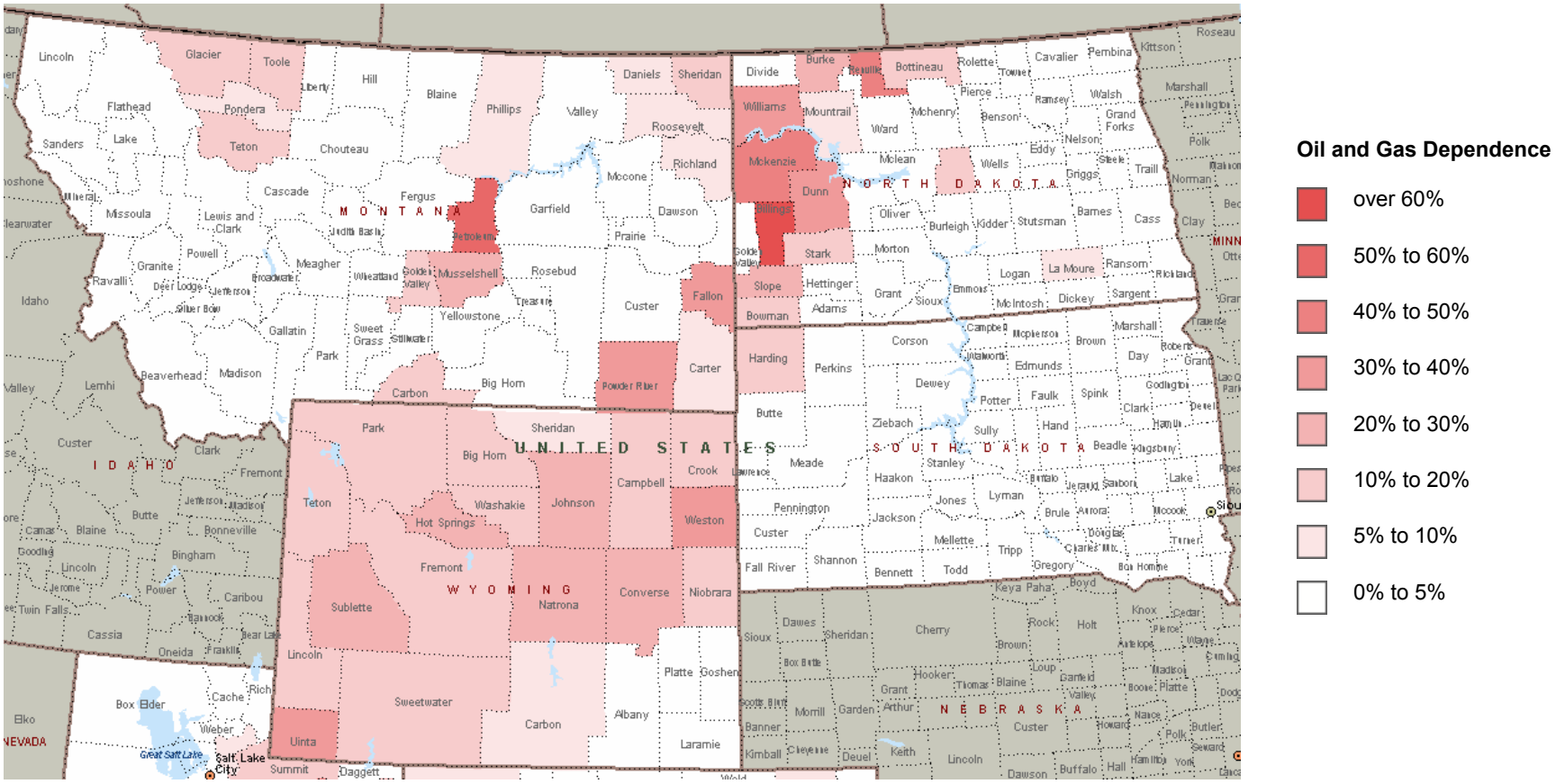
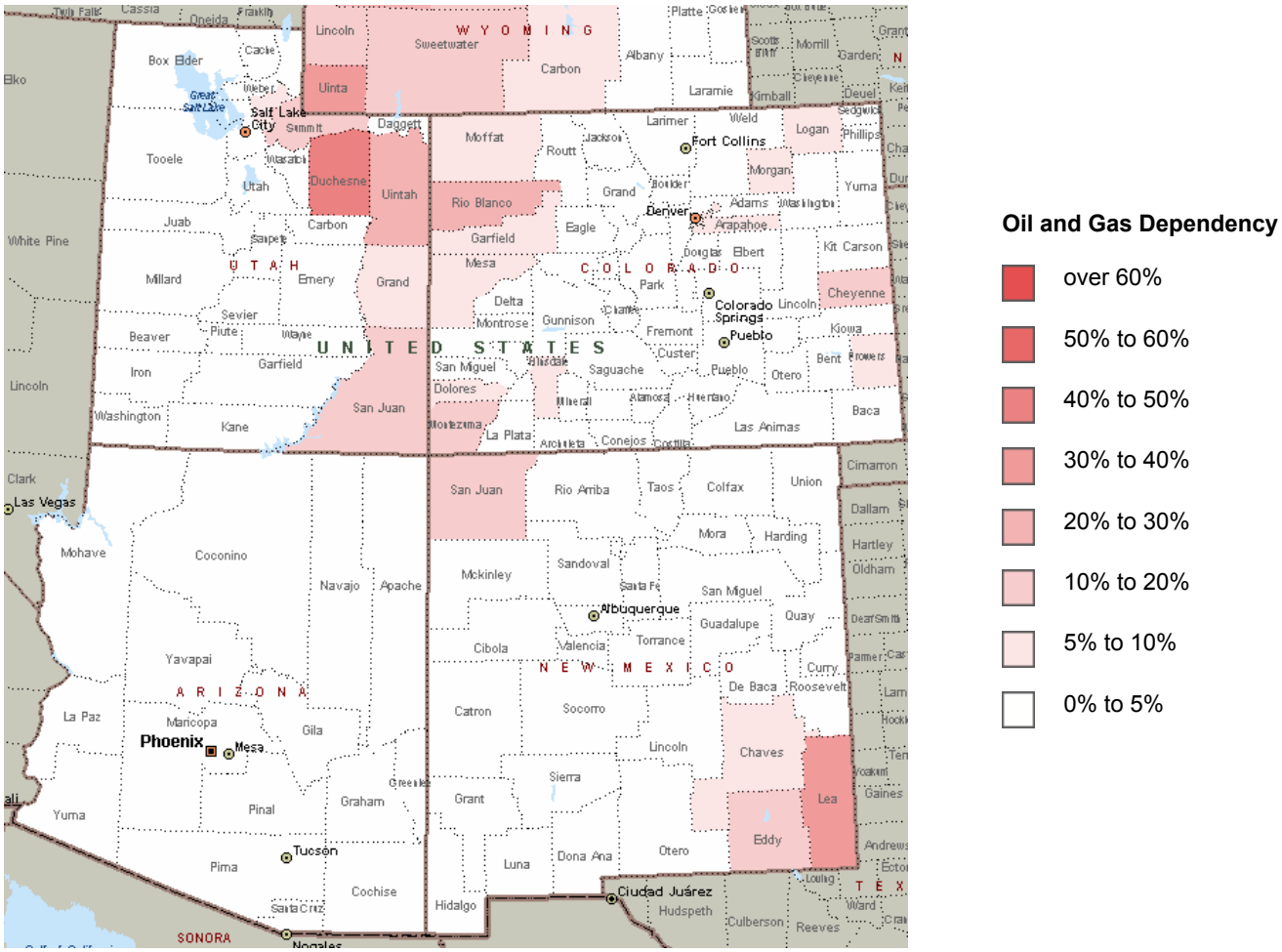
Figure 14N (Northern States) – Northern Portion of Study Area with Oil- and Gas-Dependent Counties (Largest annual county share of oil and gas earnings, 1970-1999).



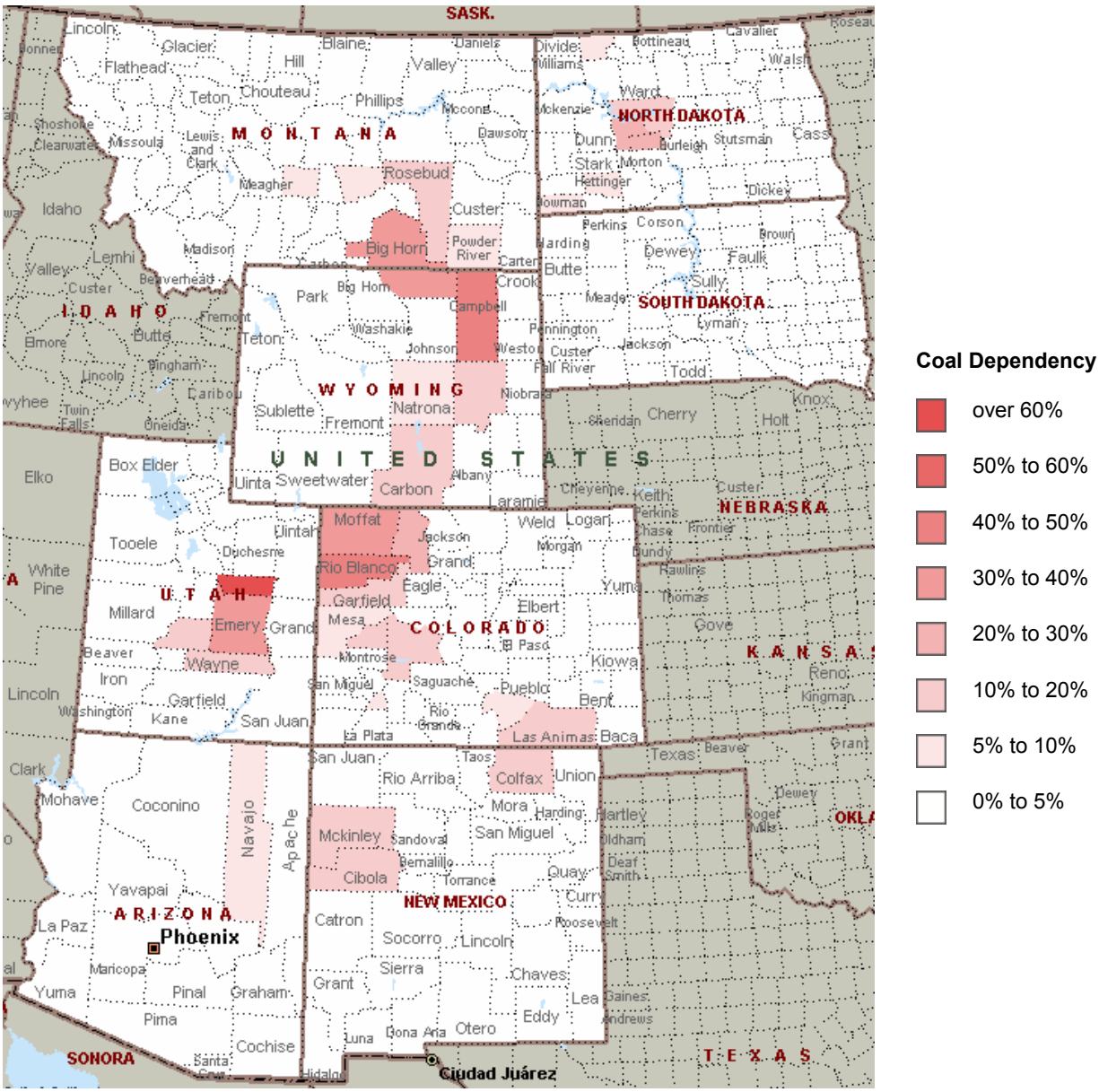
Source: U.S. Department of Commerce, Bureau of Economic Analysis (BEA), 2002, Regional Economic Information System (REIS).

Figure 14S (Southern States) – Southern Portion of Study Area with Oil- and Gas-Dependent Counties (Largest annual county share of oil and gas earnings, 1970-1999).



Source: U.S. Department of Commerce, Bureau of Economic Analysis (BEA), 2002, Regional Economic Information System (REIS).

Figure 15 – Coal-Dependent Counties in the Study Area
(Largest annual county share of coal earnings, 1970-1999)



Source: U.S. Department of Commerce, Bureau of Economic Analysis (BEA), 2002, Regional Economic Information System (REIS).

VIII. Summary of Conclusions

A. Energy Commodity Overview Conclusions

Price and production of the oil, natural gas, and coal have shown some clear trends in the region during the study period. Fossil fuel price jumps from the mid-1970s to the mid-1980s resulted in stable, or slightly increasing, oil production in the region. But, the study area has produced ever-lower quantities of oil output since the oil-price declines of the mid-1980s. Even the periodic oil price recoveries seen in various periods of the 1990s have not stemmed the gradual erosion of oil production in the region.

In contrast, natural gas production has grown significantly in the region during the study period. Natural gas prices climbed during the first and second oil price shocks of the 1970s, albeit at a somewhat more modest rate. But, gas production in the study area suffered during the mid-1980s price declines. Starting in the late 1980s and continuing to the present time, the region began a vigorous expansion in natural gas output. Gas production leaders within the region include New Mexico, Wyoming, and Colorado.

Coal production in Wyoming has shown a very dramatic three-decade-long surge in output. Coal output from the states of Montana, Utah, New Mexico, and Colorado also grew modestly during the study period.

Wyoming leads the pack by a wide margin when ranking the importance of the energy sectors to states' economies. Huge and ongoing increases in coal and natural gas production in Wyoming seem to indicate that, if anything, the state is in the midst of producing an ever-increasing share of the study area's energy commodity outputs.

Large coal and natural gas reserves and resources in Montana and New Mexico underscore the importance of energy production in those states. Of the two states, perhaps Montana has the greatest potential for significant continuing long-term growth in coal and natural gas production. But, New Mexico will likely not fade soon from the ranks of significant energy producers.

Utah and Colorado continue to be significant producers of coal and natural gas, but not on the scale of Montana, New Mexico, and North Dakota. The states of Arizona and South Dakota did not have significant energy sector production during the study period.

B. State/Regional-Level Analysis Conclusions

Energy Dependence

Wyoming has no peer within this report's studied states when analyzing the importance of energy commodity production to the state's economy. Distantly trailing Wyoming, but still having a very significant economic reliance on energy products are the states of New Mexico, North Dakota, and Montana. Having a much more modest, but still noteworthy reliance on energy production are states of Utah and Colorado. The states of Arizona and

South Dakota have seen relatively small contributions to GSP by energy products during the study period.

Population

Throughout the study period Wyoming has had the greatest energy dependence and the greatest population volatility of any of the analyzed states--by a large margin. Conversely, South Dakota has exhibited the lowest energy dependence and the lowest population volatility. The only states associated with net population losses during any one of the studied decades are those that had a high degree of energy dependence (Wyoming, North Dakota).

Income

States with the highest degree of energy dependence tended to have income fluctuations coincident with energy market variations. This relationship is most prominently displayed by the income behavior of Wyoming and North Dakota.

Absolute measures of income showed that Wyoming, the region's most energy-dependent state, claimed the second highest income in 1999. But, most of the other states in the study region showed a negative correlation of income with energy dependence. In 1999 Colorado had the highest income per capita, but it was the sixth most energy dependent state (of eight studied states). Arizona, claiming the third-ranking income in the region during 1999, ranked seventh in energy dependence. South Dakota, the state with the lowest energy dependence, had the fourth highest income. Completing the relationship, the state with the second-highest energy dependence, New Mexico, ranked last in per capita income.

Unemployment

Wyoming, the state with the greatest energy dependence and income volatility, also showed the greatest volatility in unemployment rates. The historical record for Wyoming employment is consistent with a boom/bust relationship. This is manifested by plummeting unemployment rates during energy booms and a sky-rocketing jobless rate during energy busts. But Wyoming has not been alone in the states exhibiting signs of boom and bust behavior. Other states that showed in relatively poor unemployment performances during the study period were Montana, North Dakota, and South Dakota. The Dakotas' unemployment rates did not significantly improve over the study period because they were very low to start with and therefore left little room for improvement.

Economic Diversification

As of 1999, the two most energy-dependent states of Wyoming and New Mexico contained the least diversified economies, using the relative size of government earnings as a yardstick. Conversely, the three least energy-dependent states of South Dakota, Arizona, and Colorado contained the smallest government share of earnings in that

year—implying more diversified economies. Analysis of the services sector share of earnings showed similar results. Less energy-dependent states had a strong tendency to have more developed services sectors, and more energy-dependent states usually contained more poorly developed services sectors.

Regional trends identified in the study are that a higher degree of economic diversification tended to be associated with (1) higher per capita income, (2) smaller government sector, (3) larger service sector, and (4) a relatively lower degree of energy dependence.

C. County-Level Analysis Conclusions

Wyoming, with more than 90 percent of its counties relying on energy for 10 percent or more of earnings, stands well above other study-area states in this category. North Dakota and Utah, with about one-quarter of their counties either oil- and gas- or coal-dependent make up the next tier of energy dependence. Slightly lower in energy dependence are the states of New Mexico and Montana, with about one-fifth of their counties tied to energy commodities. Lower yet, Colorado claims energy dependence for about 16 percent of its counties. At the bottom of the energy-dependence list are the states of Arizona (0 percent) and South Dakota (1.5 percent).

Oil- and gas- and coal-dependent counties tended to have much smaller populations during the study period than non-energy producers. On average, counties with significant energy output had populations about one-third the size of non-energy-dependent counties. Also, the rate of growth of both petroleum- and coal-dependent counties has shown a much greater variance than that seen in non-energy-dependent counties. Evidence presented in this study tends to confirm at least one of the primary characteristics of conventional wisdom about boom and bust economies. That is, energy-dependent economies tend to feature relatively large changes in population growth patterns—population increases during the booms and population drops during the busts. Population in counties with a high degree of energy dependence had a strong tendency to have very rapid population growth during high energy prices and experienced a steep decline in population growth, or even absolute population declines during relatively low energy prices.

Non-energy-dependent counties started the study period with a per capita income level significantly lower than that seen in energy-dependent counties. By virtue of a much larger growth rate from 1970 to 1999, non-energy-dependent counties equaled or exceeded income parity with energy-dependent counties by the end of the study period. Oil- and gas- and coal-dependent counties showed annual real income growth of 1.7 and 2.1 percent, respectively from 1970 to 1999. Non-petroleum- and non-coal-dependent counties showed faster annual income growth rates of 2.0 and 2.2 percent, respectively. In 1999 average per capita income for non-energy-dependent counties was about $23,300, with oil- and gas-dependent and coal-dependent counties claiming a slightly lower income. This study shows that energy production has not necessarily lead to long-term increased income for energy-dependent regions.

Unemployment rates of oil- and gas-dependent counties tended to be somewhat lower in the early half of the study period, and then became slightly higher than their non-energy counterparts over time. On the other hand, throughout the entire study period coal-dependent counties experienced considerably higher unemployment rates than that seen in non-coal-producing counties. Increasing unemployment in coal mining during the study period may be more related to higher levels of mechanization in the industry rather than responses to coal price fluctuations.

Results of the county-level analysis of economic diversification were mixed. During most of study period the relative size of government earnings in energy-dependent counties was smaller than in non-energy-dependent counties. But, data from 1999 show non-energy dependent counties with a slightly lower share of government sector share of earnings.

Services sector size analysis tells a different story. In 1970 the relative size of the services sector in both energy-dependent and non-energy-dependent counties was about 11 percent. Both categories of counties saw a growth in the relative size of the services sector, but non-energy-producing counties grew at a more rapid rate. By 1999 the size of the services sector in non-petroleum-dependent and non-coal-dependent counties was 21.2 and 23.6 percent, respectively. By comparison, the size of analogous oil- and gas-dependent and coal-dependent services sector size was 19.9 and 18.5 percent, respectively. Although the study period began with virtually no difference in their sizes, non-energy-dependent counties experienced significantly greater services sector growth than counties with considerable energy production during the study period. By 1999, non-energy-dependent counties tended to have a more diversified economy as measured by these yardsticks.

D. Case-Study Conclusions

Campbell County, Wyoming and Rio Blanco County, Colorado are not typical Wyoming or Colorado counties. These areas were chosen as subjects of case studies because the counties have tended to show an extreme degree of energy dependence compared to other counties in the area. The impacts of projected and actual energy development that occurred in these counties also may mirror what has resulted from more modest energy development in less-energy-dependent counties—although perhaps to a lesser extent. Information and analysis from these case studies constitute a valuable source of information about the response to energy development in the entire region.

Both case-study counties showed many of the classical signs of boom-and-bust impacts. These include (1) alternating periods of rapid population growth and decline; (2) domination of employment by energy-related occupations followed by extreme contraction, major changes in the technology of energy extraction resulting in the collapse of energy employment; (3) county earnings tied to energy-commodity price cycles—with energy contributing the an increasing share of county earnings during high energy-price periods and a shrinking share during low energy-price periods.

A review of projections of impacts from energy impacts that were spelled out in the environmental documents written in the 1970s and early 1980s showed some interesting trends. It is clear that there were under-estimates of expected energy-related impacts in the early years of energy booms, followed by systematic over-estimates of the population, employment, housing, schooling, and other impacts tied to energy production in these counties.

In general, as counties plunged into energy boom conditions, planners were loath to project an end to ever-increasing boom conditions. Depressed conditions found during previous energy busts were expected never to return. Once localities recognized they were in a period of high energy prices and related impacts, they projected more of the same into the future.

In what is perhaps a triumph of hope over history, planners in this report's case studies projected that the energy booms during which they were working would not be followed by the inevitable bust. They projected that the new prosperity derived from their current energy boom was a new baseline representing a level of activity that would only grow over time. And, one which might yield the stability, growth, and diversification experienced by the non energy-dependent areas in the study region. Unfortunately, history showed once again that energy-dependence may yield many short-term benefits, but that it is still closely associated with boom and bust behavior.

E. Overall Study Conclusions

This study examined the impact of energy development in the Rocky Mountain states using three different levels of detail—regional and state, county, and case study. Several relationships have emerged that were found at each level of investigation;

(1) Wyoming stood well apart from the rest of the study area as having a very energy-dependent economy;

(2) The states of North Dakota, New Mexico, and Montana also contained regions with significant energy dependence;

(3) Largely mirroring the oscillations in energy prices, significant boom and bust conditions were observed in the more energy-dependent states named above.

Boom and bust circumstances experienced in the more energy-dependent states included (a) significant shifts in population trends (including periods of actual population loss during low energy price periods), (b) a slower rate of per capita income growth compared to less energy-dependent states in the region, (c) a much greater variance in unemployment rates—high energy prices brought low levels of employment and lower energy prices ushered in times of markedly higher unemployment, and (d) a less-diversified economies, as measured by both government and services sectors shares of income and employment; and

(4) Not surprisingly, this study shows that energy-dependent regions have seen significant impacts during energy boom periods, as evidenced by sharp increases in population, income, and employment. But, periods of low energy prices have also caused dramatic decreases in population, income, and employment.

The three decades of data used in this study covered a number of energy boom and bust periods. This study of the Rocky Mountain States suggests that energy dependence has yielded some short-term benefits during peak energy price periods. But, in the long run energy-dependent regions have produced economies that have proven to be somewhat less stable and less diversified than in less energy-dependent regions.