Understanding Economic Transitions in Energy-Focused Communities

A Research Project of the Western Rural Communities Program
With Support from the William and Flora Hewlett Foundation

July 2019

Table of Contents

Executive Summary

This report, thanks to generous funding from the William and Flora Hewlett Foundation, defines the primary challenges facing energy-focused Intermountain West communities trying to create more diverse and resilient economies. Through an assessment of economic trends, review of pertinent literature, and case studies, it also explores promising ideas and practices for communities facing transition to employ.

In recent decades, the economy of the Intermountain West has shifted dramatically along with changes in the national economy. There has been a broad turn to service industries as a competitive strength in the face of pressure on basic commodity sectors from automation, globalization of trade, and low-cost competition from abroad.

Energy-focused communities—places where the local economy has an above average focus on producing and processing oil and gas, and coal—occupy a unique space in the broader economic transition. Their economies can be highly volatile as they respond to shifts in pricing, automation and new technologies, competition from renewable energy sources, the discovery of new fossil fuel resources, and changes in regulations and trade agreements.

Industry diversification is a core concept used to understand economic transitions and efforts to build economic resilience. Economic diversification is a shift from a single source to multiple sources of jobs and income covering large segments of the population.

Resilient economies absorb impacts and reorganize based on a new understanding of competitive positioning. A key is to pivot from trying to keep a community the way it is in the face of change, or even trying to control change, to shifting attention and resources to cope with and adapt to change.

This report examines efforts to diversify energy-focused economies in three case studies: Delta County, Colorado; San Juan County, New Mexico; and Campbell and Sheridan counties, Wyoming. These on-the-ground examples are works in progress, but they offer a glimpse into what it takes to diversify and create new competitive advantage in today's economy.

The case studies show a single industry does not typically replace a dominant industry, but that reorienting and rebuilding local economies in today's market is possible. They also highlight the importance of a sense of urgency and point to the essential function leadership plays in exploring and legitimizing diversification pathways. And they show the need for a clear strategy and adequate resources to sustain and implement successful transition efforts. Case study details and lessons are available in the main body of this report.

The research does not validate a single economic development method, such as support for entrepreneurs, or business recruitment or retention efforts, as the panacea to challenging economic transitions. Instead, it shows that the key to success is a context-sensitive process that follows the framework outlined below.

Once adapted to local timing and conditions, this approach offers the best chance for building the required support and implementing a strategic course of action to reimagine and rebuild local economies that have historically depended on fossil fuel extraction and processing.

Rupture - Change is happening all the time, but major change happens when there are significant ruptures to a way of life or economic foundation, such as when a coal mine abruptly shuts down. The more abrupt and significant a rupture, the more it allows for faster and more focused responses. But there is still a good chance that the response will be more reaction (a doubling down on current industries) than adaptation (an exploration of new competitive options).

Leadership - An effective response to change is led by individuals in a community who are respected and willing, through their networks, to discuss and explore new development pathways. This involves respecting the past while facing the future, and requires credibility locally and an ability to facilitate sometimes difficult discussions about change.

Vision - In order to let go of one set of commitments, it is essential to have a vision of success that points toward the future. Ideally the community as a whole crafts this vision, though it may be led by a particularly energized part of the community. The vision should express a generally desired future, but also should outline with a degree of specificity how the community can get there.

Strategy - The vision needs a strategy that reflects the culture, assets, and market opportunities available to a place, along with a set of "where to play" and "how to win" choices, in order to prevail.

Resources - All transition efforts require human and financial resources. These are crucial to initiate change (e.g., convening, planning, strategy development), build new competitive advantage (e.g., training, infrastructure, branding/marketing), sustain momentum (e.g., investor and customer relationships, scaling startups) or support new ventures. Over time, the mix of these resources should rely less on outside support and more on local investment.

Execution - Leadership, vision, strategy, and resources all set the stage for effective action. This involves coordination, adhering to choice commitments, and dedication to seeing efforts through to completion. Initiatives should seek to build momentum for future steps.

In addition to these factors, three additional observations are worth emphasizing: the importance of *culture*, *communication*, and *time* to succeed in this work. These considerations permeate the sequential change flow above.

In the Intermountain West, *economic change is cultural change*. People in this region fiercely identify with occupations and industries, especially when these jobs and sectors have defined places for decades or longer. A large part of the resistance to change comes from an unwillingness to abandon long-standing identities—the pull of "social memory" is strong. As a result, economic transition efforts should develop learning pathways for people to consider new identities alongside newer forms of economic activity.

At every stage of the change flow, *clear communication is imperative*. Initially, this might be between leaders trying to assess a downturn or brainstorm response ideas, but very quickly it needs to involve key stakeholders and perhaps even the community as a whole to allow for broader engagement and legitimize change efforts. Eventually, local actors will need to communicate clearly and consistently with outside parties to build the partnerships that can bring resources and expertise as well as access to customers, capital, and markets.

While economic ruptures can come quickly, *diversifying economies takes time*. This fact rewards early movers. It also requires deliberation about achieving short-, medium-, and long-term outcomes. Early wins show progress and build momentum. They also attract partnerships, build confidence with investors, and keep people engaged in a long-term vision of success.

Introduction

In recent decades, the economy of the Intermountain West has shifted dramatically along with changes in the national economy. Although not shared proportionately across the West, there has been a broad turn to service industries as a competitive strength in the face of pressure on basic commodity sectors from automation, globalization of trade, and low-cost competition from abroad.

This economic shift has had profound impacts on Intermountain West rural communities and small cities, many of which are facing serious economic decline. Nowhere is this more evident than in local economies that are grounded in producing and processing fossil fuels such as oil and gas, and coal.

Economic transitions are incredibly challenging. They are neither fast nor easy. Successful economic adaptation and diversification is a long-term endeavor that challenges cultural identities and may not match up well with a community's current skills, infrastructure, and aspirations. Yet rural and small urban communities across the Intermountain West are making choices about how to manage the decline of mainstay industries and exploring alternative economies. They are working to diversify their economies to create new jobs, retain residents, minimize economic volatility, and sustain or improve their standard of living and quality of life.

With support from the William and Flora Hewlett Foundation, Resources Legacy Fund (RLF) conducted research to learn from these efforts. We convened an expert academic panel from regional public land grant universities—Montana State University, University of Wyoming, and New Mexico State University—to help define the research scope, select case studies, and review findings. The resulting study explores how select rural and small urban, "energy-focused" Intermountain West communities have transitioned from a narrow focus on fossil fuel energy extraction and production to a more diverse and resilient economy. It sheds light on factors, forces, opportunities, and actions that have enabled some Intermountain West communities to navigate difficult economic transitions and reorient their economies toward the future.[1]

The report's content and conclusions have broad social and economic implications for policymakers, civic leaders, economic development professionals, funders, nonprofit organizations, and western residents who are interested in benefiting from economic change and improving community well-being.

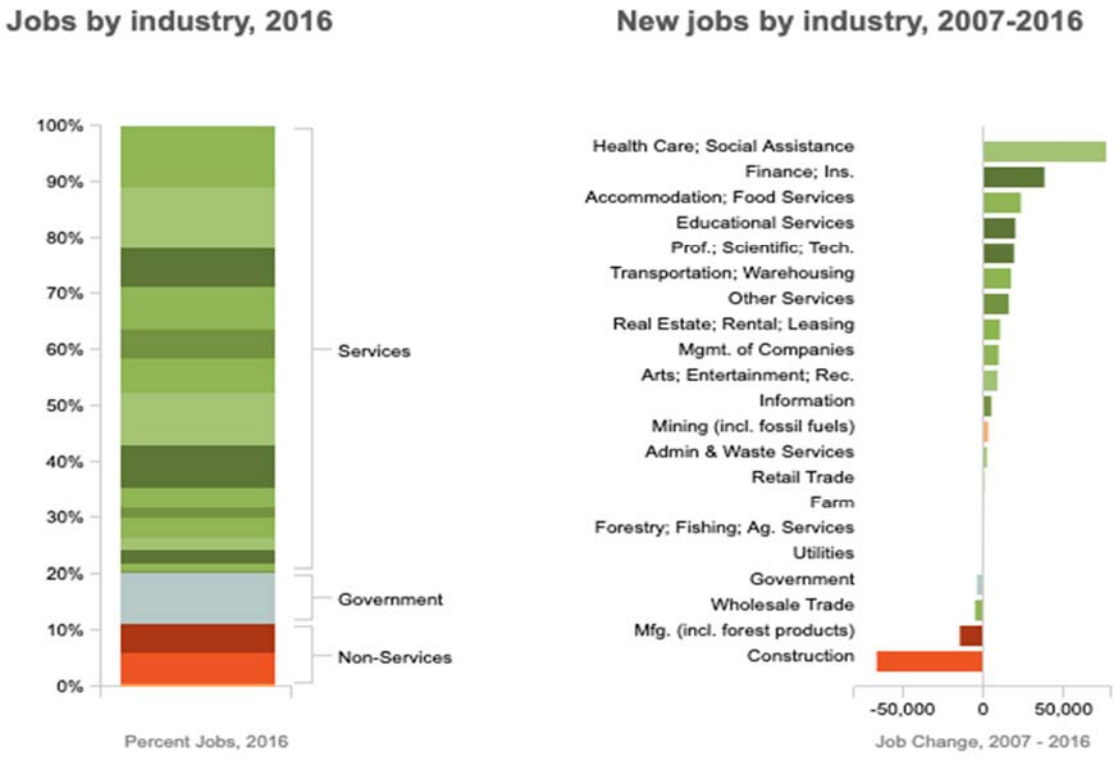
[1] For details on participating academic experts, see Appendix A. For details on what "energy-focused" signifies, see Appendix B. The term "gas" refers to "natural gas" throughout this report.

The Issue

Recent economic trends

In recent decades, the economy of the U.S. West has shifted along with the national economy. There has been a broad turn to service industries as a national competitive strength in the face of a significant decline in jobs and earnings within basic commodity sectors, construction, and manufacturing due to pressures from automation, globalization of trade, and low-cost competition from abroad.[2]

The resulting restructuring of the western economy has been dramatic. From 2007 to 2016, while services added more than four million new jobs in the region, non-services lost more than 450,000 jobs.[3] Service industries now predominate and also are the main sources of new employment and labor earnings. Services are shown in green in the graphic below.



[2] Moretti, E. The New Geography of Jobs. 2012. New York: Houghton Mifflin Harcourt.
[3] U.S. Department of Commerce. 2018. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. The "West" includes Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Washington, Wyoming, and Utah.

In the parts of the Intermountain West examined in this report, the shift to a services economy at the regional scale has coincided with strong performance. In the last decade, the region is outperforming the U.S. as a whole in the creation of new jobs, growth in real earnings per job and total personal income, and decline in unemployment.[4]

Yet the turn to a services economy has not been universally beneficial across the Intermountain West region. While major metropolitan areas (such as the Front Range in Colorado), university and emerging technology centers (such as Bozeman, Montana), retirement destinations (such as St. George, Utah), and resort communities (such as Jackson, Wyoming) are thriving in these larger economic shifts, other places are not faring so well in the transition. The negative impacts have been felt acutely in rural places (areas with population centers less than 10,000 people) and also in small cities (areas with population centers of at least 10,000 but less than 50,000 people).[5] This has often resulted in outmigration, declines in non-services jobs and earnings, falling real earnings per job, and above average unemployment. It is no coincidence that government reports and media coverage routinely point out the challenges to creating prosperity in rural towns and small cities.[6]

Energy-focused communities occupy a unique space in the broader economic transition. Their economies can be highly volatile as they respond to shifts in pricing, automation and new technologies, competition from renewable energy sources, the discovery of new fossil fuel resources, and changes in regulations and trade agreements.

In the case of coal, the downward economic trajectory had been predictable. Since 2008, coal production and consumption has been in rapid decline. This shift has been driven by low-cost gas, expansion of renewable energy sources, regulations, and the retirement of aging coal-fired power plants. From 2008 to 2018, U.S. and western coal production declined by 35 percent. And from 2011 to 2017, U.S. coal mining employment fell by 42 percent.[7]

In the case of oil and gas, the story has been more volatile. New exploration and drilling technologies have unlocked massive unconventional resources that are economically recoverable. The U.S. has become a net energy exporter, with the lower-priced gas outcompeting coal for a growing share of the electricity generation market. Changes in

---

[4] U.S. Department of Commerce. 2018. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. The "Intermountain West" includes Arizona, Colorado, Montana, New Mexico, Wyoming, and Utah.

[5] Isolation from larger market centers creates challenges for smaller western economies today. See, for example, the research by Headwaters Economics on access to markets and economic performance: https://headwaterseconomics.org/dataviz/three-wests.

[6] See, for example, U.S. Department of Agriculture. 2018. Economic Research Service, Economic Information Bulletin No. (EIB-200), Rural America at a Glance. https://www.ers.usda.gov/publications/pub-details/?pubid=90555; and The New York Times. 2018. The Hard Truths of Trying to 'Save' the Rural Economy. https://www.nytimes.com/interactive/2018/12/14/opinion/rural-america-trump-decline.html.

[7] Institute for Energy Economics and Financial Analysis. Coal Outlook 2019. http://ieefa.org/ieefa-report-coal-outlook-2019. U.S. Energy Information Administration. Annual Coal Report 2017. https://www.eia.gov/coal/annual.

global and national markets, recessions, and more efficient drilling technologies have affected production, pricing, and employment. U.S. oil and gas employment fell 19 percent from 2007 to 2010, bounced back 47 percent by 2014, and fell 26 percent by 2016 due to oversupply and falling prices.[8]

These trends—coal's downward trajectory and the volatility of oil and gas—have created significant challenges for the labor force that extracts and processes coal and oil and gas, and the communities where they do so. There are legitimately different perspectives on the future prospects for the fossil fuel economy in the U.S. and the Intermountain West. However, it appears that coal will continue to decline due to competition from other energy sources domestically and from coal producers abroad, while oil and gas will rise and fall with new discoveries (notably in the Bakken and Permian formations just outside the Intermountain West region) along with supply and demand considerations.[9]

At a local scale, these trends can have an outsized impact. This is true in part because of the "resource curse": the apparent paradox of natural resource abundance and poor economic performance. What lies behind the paradox is the reality that export-focused, commodity-led economies are vulnerable to price swings; suffer from underinvestment in other industry sectors (especially manufacturing); and are often characterized by an unequal distribution of wealth that impedes long-term economic growth.[10]

It has often been the case in communities of the Intermountain West that a highly profitable industry deters broader investment, high wages impede labor force skill development for other industries, and a local economy comes to rely on the dominant industry's revenues, resulting in a narrow and brittle economic structure that works well only as long as the dominant industry thrives. And this effect is amplified in smaller economies that underpin communities and governments with fewer resources at their disposal to address sudden economic shifts.

What is economic development?

The standard definition of economic development is usually stated in terms of objectives: "creation of jobs and wealth, and the improvement of quality of life." It also is defined as a "process that influences growth and restructuring of an economy to enhance the economic well-being of a community."[11]

In other words, economic development is a set of objectives *and* an approach to realizing those objectives. But because every place is different—with distinct challenges, assets,

8 U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C.
9 U.S. Energy Information Administration. Annual Energy Outlook 2019. https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf.
10 See, for example, Humphreys M, JD Sachs, and JE Stiglitz, eds. Escaping the Resource Curse. 2007. New York: Columbia University Press.
11 Economic Development Reference Guide. International Economic Development Council. No date. https://www.iedconline.org/clientuploads/Downloads/IEDC_ED_Reference_Guide.pdf.

market access, and ideas of what success looks like—there is no single approach to economic development. There are, however, more common ones.

These range from recruiting or retaining businesses, working with entrepreneurs to start or scale businesses, investing in the conditions that businesses in any sector might need to thrive, to becoming a great place to live and work, retraining or improving the skills of a workforce for emerging opportunities, and building on the collective strength of existing or emerging groups of industries (industry clusters).

Sometimes approaches to economic development are pursued as ends in themselves, such as when a community invests in broadband without a sense of how businesses will use it to grow or improve profitability, or retrains displaced workers with new skills but no associated job openings, or attempts to recruit businesses without considering the challenges of remoteness or the opportunity costs of tax incentives. When done well, however, economic development activities serve a broader strategy for economic growth and revitalization, as we will see below.

What is economic diversification?

Industry diversification is a core concept to understand economic transitions and efforts to build economic resilience. In essence, economic diversification is a shift from a single source to multiple sources of jobs and income covering large segments of the population. "Diversity" in this context typically applies to industries, such as farming and ranching or health care, but can also apply to income sources, such as wage labor, self-employment, investments, and government transfer payments.[12]

[12] The Concept of Economic Diversification in the Context of Response Measures. United Nations Technical Paper. See Chapter 3: The Concept of Economic Diversification. No date. https://unfccc.int/sites/default/files/resource/Technical%20paper_Economic%20diversification.pdf. There is a wide range of methods for measuring economic diversification. Most focus on one of two approaches: measures of economic specialization (e.g., Herfindahl-Hirschmann index) or measures of economic structure (e.g., Theil index). See, for example, Measuring Economic Diversification in

Diversification frames many of today's rural and small urban economic development discussions because smaller economies tend to be less diverse and resilient than larger ones. There is no single approach to achieving greater economic diversity. Some diversification efforts focus on reducing vulnerabilities and creating stability, others on growth and new competitive positioning in emerging sectors.[13]

To explore whether energy-focused counties show evidence of recent economic diversification, we created an online data visualization to examine their history, as well as growth of service sectors, industry concentration, and economic performance data and trends. A scan of the Intermountain West using the data visualization shows that most energy-focused counties are not diversifying their economies. At the county level, it is more common to see services tracking with the growth or decline of historically significant non-service sectors, including energy.

Aligning Rural Values and Competitive Assets

The Nicholas Institute for Environmental Policy Solutions is studying the attitudes of rural Americans towards conservation and the environment. A series of recent focus groups with rural Americans, including several in the West, suggest that rural Americans have a strong commitment to conservation of natural resources, water, wildlife, and open spaces. Further, they understand the value of natural resources for both the economy and quality of life of rural communities. At the same time, many environmental policies are met with skepticism in rural communities.

Our research suggests that policies and investments that protect or incentivize healthy landscapes are a promising pathway to making small places more competitive in today's market, and align with rural values. Environmental quality, in both the natural and built environment, is a competitive asset for rural communities trying to retain residents, attract newcomers, and appeal to location-neutral businesses. Many local efforts around the West, including all three case study locations examined in this report, seek to enhance natural landscapes and expand access to them because this work reinforces existing values and dovetails with community rebranding efforts.

Theory of Change

Economic transitions are difficult

We already know, to some extent, why successful community economic change is difficult: the challenges rural areas and small cities face connecting to and competing in the growing high-wage service sectors that are predominantly located in large metropolitan areas and the "resource curse" energy-focused communities face. The resilience literature, however, points to another set of challenges. These center on ties to the past that govern how change is managed. Perhaps the most powerful determinant is the "social memory" of a place—local knowledge, experience, and accumulated wisdom—that defines a community's identity, including the stories people tell themselves about who they are, what's important to them, and even what's possible for them to do. By reinforcing the past, community identity often means that key decisions and actions are at least in part determined by previous ones.

Hawaii. Research and Economic Analysis Division, Department of Business, Economic Development and Tourism, State of Hawaii. Original report 2008; updated report 2011. https://dbedt.hawaii.gov/economic/reports_studies/econdiversification.

[13] For a useful discussion of the perils of narrowly focused economies and the advantages of more diverse economies, see Economic Diversification: The Road to Sustainable Development. Booz & Company. 2008. https://www.strategyand.pwc.com/media/file/Economic_Diversification_The_Road_to_Sustainable_Development_FINAL.pdf.

By contrast, change often originates from outside of a community or place, through shifts in societal attitudes, macro-economic trends, and larger politics and policies. These shifts offer transition opportunities that can trigger a reactive response and reinforce current commitments, or allow for new pathways and ways of doing business that fundamentally alter a community's orientation.

The timing and abruptness of change can have a large impact on how communities and individuals respond. More gradual change (e.g., incremental layoffs at a coal mine) lends itself to a series of evolutionary decision points with less at stake with each decision. The difficulty here is change may not be palpable enough to address or begin the process of shifting commitments and restructuring basic identities or ways of doing business until the accumulated impact of a series of changes over time so compel. More sudden disturbance (e.g., the sudden closure of a coal mine or coal-fired power plant), brings immediate focus and attention, but with more at stake and less time to respond, and presents practical challenges to being able to adapt quickly enough to avoid major negative impacts.[14]

The essence of community resilience—in gradual change and sudden disturbance scenarios alike—is to absorb impacts and reorganize based on a new understanding of competitive positioning. A key is to pivot from trying to keep a community the way it is in the face of change, or even trying to control change, to shifting attention and resources to cope with and adapt to change. More successful places anticipate and plan for change.

This forward-facing orientation requires *leadership, capacity, and learning pathways* that are not wholly committed to the past. A crucial response resource for addressing change is often called "social capital": the glue that holds a community together and involves the networks between individuals and groups that ultimately form a community. And communities that are more adaptive typically have some balance between bonding (inward-looking) and bridging (outward-looking) forms of social capital. While bonding social capital is better at "getting by," bridging social capital is better at "getting ahead."[15]

Strong bridging forms of social capital are evident in more diverse places where there is excess capacity that can be repurposed, and more connections with interests outside the community. Smaller, more isolated, and less diverse places face greater adaptive barriers if they lack these resources and consequently are unable or unwilling to embrace new learning pathways.

[14] This discussion on resilience draws on Wilson, G. Community Resilience and Environmental Transitions. 2012. New York: Routledge.
[15] Putnam RD. Bowling Alone: The Collapse and Revival of American Community. 2000. New York: Simon & Schuster.

What is economic competitiveness?

If the goal for many energy-focused places is to reduce economic vulnerabilities and capitalize on new growth opportunities, such as emerging or promising export or service sectors, then it becomes important to develop a strategy that can make individuals, firms, and places more competitive and profitable in the market today.

Many natural resource commodity producers—including fossil fuel producers and processors—are caught in a comparative advantage trap. Their profitability is contingent on being a low-cost commodity producer, trading on the advantages of natural resource endowments, cheap labor, and geographic advantages. But in our age of global trade, low cost international labor, and competition, these advantages are easily replicated, tipping the market leverage from supplier to buyer, and relegating commodity suppliers to the role of "price takers" who become noncompetitive unless they are *the* local cost provider or operate in a protected market.[16]

This "low cost" approach is not proving to be an effective value or wealth creation strategy for an increasing number of rural places and small cities, and the firms who do business there. An alternative approach is to focus on a product or service that has specific value to customers who are willing to pay for that value. This "differentiation" strategy starts by identifying attractive industry segments where profit margins are higher, barriers exist to others entering the market, and local businesses are capable of both understanding and meeting the needs of customers with a unique product or service.

In the end there are only two competitive strategies: low cost and differentiation. If pursuing low cost, businesses must have a superior cost position in the market, and if pursuing differentiation, customer knowledge and satisfaction are the critical ingredients of success.

Many local energy-focused economies in the Intermountain West have only been competitive on a low-cost basis. Knowing the disadvantages of low-cost positioning, some communities and businesses are rethinking how they can build more diverse and resilient economies. To do this, they must be clear about their strategy and make choices that reflect these commitments.

Two key choices: "where to play" and "how to win"

"Where to play" is fundamentally about where to compete and what business you are in - the geography, product or service, customer segment, distribution channel, and pricing. "How to win" is about figuring out how to create cost leadership *or* distinctive products or services that are more valuable to customers than competitive offerings.[17]

---

[16] Fairbanks, M; S Lindsay. Plowing the Sea in the Developing World : Nurturing the Hidden Sources of Growth. 1998. Boston: Harvard Business School Press.
[17] Lafley, AG; RL Martin. Playing to Win: How Strategy Really Works. 2013. Boston: Harvard Business School Press.

As communities consider their economic future, there is a tendency to overlook the "where to play" decision and jump right into the "how to win" analysis, with a bias toward low cost strategies because they are more familiar. But at the core of successful diversification efforts is sober analysis of where local businesses can and should compete followed by research and explicit choices about how to compete.

The essence of strategy is choice (to do some things and not others) that results in timely and effective action. This puts a premium on leadership: the choices leaders make and their ability to communicate clearly the reason for these choices to community members, investors, and employees. But as we saw in the resiliency discussion, there is a tendency to defer to social memory when responding to changes in the competitive environment.

Case Studies

This section examines efforts to diversify energy-focused economies in three case studies: Delta County, Colorado; San Juan County, New Mexico; and Campbell and Sheridan counties, Wyoming. These on-the-ground examples are works in progress, but they offer a glimpse into what it takes to diversify and create new competitive advantage in today's economy. These local diversification efforts are complex, so we are focusing more on what we can learn than telling a detailed history.

To analyze success and failure, we use a framework developed through this research, which builds upon the resiliency and competitive strategy literature, and stresses the importance of key change attributes: rupture (the degree to which the initial change was abrupt and severe), leadership, vision, strategy, resources, and execution. Following the case studies, we draw out key lessons and identify approaches that can facilitate effective economic transitions.

Delta County, Colorado

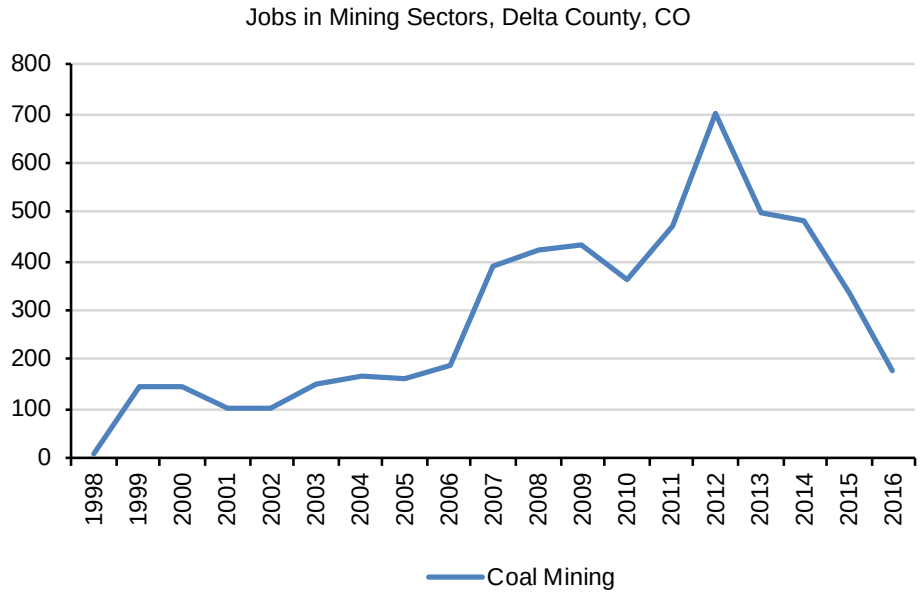
Background

Delta County, on Colorado's Western Slope, is a rural county surrounded by high mountain peaks and defined by prominent river valleys, notably the North Fork Valley along the Gunnison River. The county's name originated from the "delta" of arable land at the confluence of the Uncompahgre and Gunnison rivers, where the county seat and eponymous town of Delta is located. Delta County was established by orchardists and ranchers, and later by coal miners. Its twin industries—agriculture and mining—defined Delta County for most of its history.

The county's small population (30,568) is isolated from larger metropolitan areas, though its communities can access a regional commercial airport (Grand Junction's airport is an hour's drive from Delta and an hour and a half drive from Paonia). Delta County's river valleys are scenic and have a moderate climate. More than half of the land base is in federal (U.S. Forest Service and Bureau of Land Management) ownership, offering easy access to Gunnison Gorge National Conservation Area, Dominguez-Escalante National Conservation Area, and Grand Mesa. Over time, the county attracted a mix of footloose people who found the place attractive and modestly broadened the foundation of the economy, including value-added agriculture, health care, and a mix of professional and technical services.

In 2013, the Oxbow coal mine closed after an underground fire damaged a critical longwall that proved to be too costly to repair. This was followed in 2016 by the closure of Bowie mine, leaving only the West Elks mine in operation at reduced levels. The resulting trends in mining employment (not including proprietors) can be seen below. Mining went from a high of 701 jobs in 2012 to 107 in 2016, a 75 percent decline.[18]

[18] U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C.



The effect was catastrophic. Locals report that most miners left the county, while indirect employment tied to direct mining jobs and spending also contracted. Unlike some places that have a more gradual off ramp or predictable decline, these mine closures came suddenly and significantly, allowing for little advance planning or preparation for what would come next.

What did they do?

A small group of people stepped in after the mine closures and began discussions about what needed to be done. These conversations were private at first, then gradually more public, at venues like Delta County Economic Development (a nonprofit) and Delta Montrose Electric Association (a utility), and town and county meetings. With solid facilitation at the more formal discussions, people put differences aside and worked together to focus on common initiatives.

Because of the abruptness and severity of the change, residents realized something needed to be done and that the coal mines were not coming back, though there was hope that the West Elk mine would continue, which it has. A cadre of people with vision who knew the economy had to become more diverse and had enough social capital to bring others into the conversation. From the start, leaders recognized the importance of a new vision for the county, especially in the upper North Fork Valley hardest hit by the closures. These local leaders dared to think broadly about bold possible futures, and resisted the temptation to narrow their thinking too early.

Delta County Economic Development reached out to the U.S. Department of Commerce's Economic Development Association, Colorado's Department of Local Affairs and Office of Economic Development and International Trade, and others to secure adjustment and assistance grants that initially brought planning dollars and eventually project dollars to the

table. These resources were essential to hiring a consultant, Better City, to develop an economic development strategy for the region that focused attention and effort, and offered some hope that positive change could happen.

The Better City report assessed current conditions and provided a market analysis and strategic recommendations. They focused on addressing weaknesses and capitalizing on emerging opportunities. The recommendations aimed "to create high wage jobs by focusing on differentiated export-oriented businesses, fostering entrepreneurship, developing community assets to make Delta a place where people want to visit, work, and live."

The recommendations also emphasized supporting current industry clusters—construction, agriculture, manufacturing, education, retail trade, and tourism—as promising sectors. And they identified the need to build the brand of the region to enhance outside visibility and connections, and an overall export orientation to create high-wage jobs. The report included a helpful action plan in table format, identified priorities for action, and listed funding needs and potential funding sources. It offered no clear outline, however, of partners, roles, or accountability.[19]

The Importance of Partnerships and Working Capital

In Montrose County, Colorado, just west of Delta County, the small West End communities of Nucla, Naturita, and Norwood (combined population 1,782) are facing enormous economic upheaval with the closure of the coal-fired Nucla Tri-State Power & Generation Station and the recent closure of the New Horizon coal mine. These shutdowns have led to the loss of the majority of local jobs and tax base. The survival of these communities is dependent on diversifying the local economy.

In response, local residents created the West End Economic Development Corporation (WEEDC), which is housed in a co-working space called the "Collective Mine" and is developing and implementing a community-driven economic diversification plan, including work on business/entrepreneurship, tourism/recreation, and agriculture/value-added products. With the severe contraction of the local tax base, these efforts needed to secure alternative funding for staff capacity and program related investments to get the work done.

In a promising sign of regional cooperation, the Telluride Foundation along with the federal Economic Development Administration have helped WEEDC raise $1.6 million for economic transition staff and programs under the three-year "Advance West End Initiative." In addition to the EDA grant funding, the Foundation funds a Capital Advisor position and a Skillful Coach position. The Skillful Coach works on workforce redevelopment. The Capital Advisor launched the Foundation's $2 million working capital loan fund to help unbankable businesses and entrepreneurs obtain funding. The Capital Advisor also is targeting potential investors who can benefit from the federal Opportunity Zone program, which provides a tax incentive to reinvest unrealized capital gains into low-income and distressed communities.

These financial resources are making a difference. Recently, Family Market, the sole Naturita grocery store, received a loan for upgrades from the loan fund. WEEDC's co-working space is full, the towns are implementing Main Street beautification, the real estate market has steadied, a trails group is planning 100 miles of new recreational trails, and a local committee is pursuing a new affordable housing project. Perhaps most importantly, these communities have embraced the transition challenge and are starting to think positively about the future.

[19] Delta County Economic Development Strategy. Better City. No date. https://deltacountyed.org/resources/Documents/Delta%20Phase%203%20-%20Final.pdf.

County and town efforts focus on putting Delta County on the map in more visible ways. A push for tourism and outdoor recreation identified a potential new hotel and riverfront access and enhancement at the confluence of the Gunnison and Uncompahgre rivers and a new county trails master plan, including a 70-mile trail connecting Delta with Grand Junction. The town of Hotchkiss created a downtown revitalization plan, the state designated the town of Paonia a "Creative District" and then Paonia launched a "Safe to Create," initiative focused on creative industries and affordable housing and workspace. The county also is revising its land use framework, which relied on a special use permit process that is expensive and lacks the predictability that business needs.

These examples of laying the groundwork find their boldest expression in Delta Montrose Electric Association's (DMEA) "Elevate" initiative. The idea behind Elevate is to deliver fiber and gigabyte broadband to every household and business in the region. DMEA and others see this infrastructure and service as a foundational competitive advantage for startups, established businesses, location neutral businesses working remotely, telemedicine, and more. Companies like Lightworks are hiring and retraining laid off miners to install the new network. Solar Energy International, a local technical training renewable energy company working all over the world, has capitalized on the new service to expand their curriculum and offer online courses.

At the same time, DMEA in its more traditional energy utility role decided to move beyond coal altogether and shift to wholesale energy production from renewable energy sources, mainly solar and hydropower. They saw this as a way to offer cheaper and more sustainable energy to customers. It is a response to declining electricity load demand (after coal mine closures) and increasingly uncompetitive coal-based energy pricing, and has the advantage of creating jobs locally, building greater energy self-reliance, and reducing the cost of business in the region.

To take next steps, various partners realized there needed to be a hub for ongoing convenings and technical assistance. Born of the original Economic Development Administration (EDA) planning grant and guided by the Better City reports, Entrepreneurial Growth Agriculture Energy (ENGAGE) aims to "foster economic activity, diversify the local economy, and enhance the existing agriculture, education, and energy clusters."[20] ENGAGE is administered by the local Technical College of the Rockies. It has a number of specific initiatives: creating a rural entrepreneur ecosystem through training and convening; supporting business innovation, incubation and acceleration efforts; and offering co-working space. While this hub concept hits the mark, the college is unable to supply actual space to meet or host activities, and the hub is struggling to sustain funding and operations.

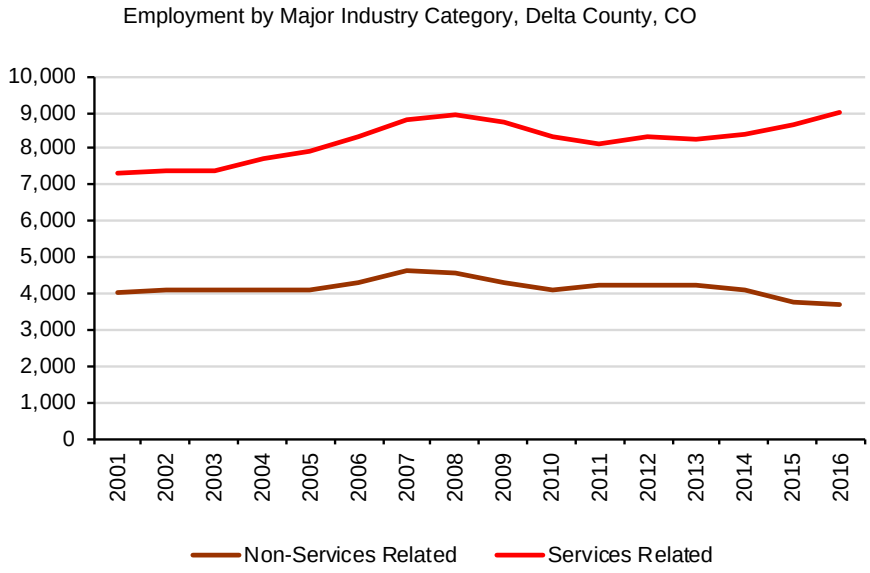
A promising area for ENGAGE is assisting agricultural businesses to diversify and grow. The agricultural community is split between traditional orchard agriculture and livestock operations, and more niche and organic producers of a wide range of products. ENGAGE is working to expand the agricultural sector and its profitability through training and standards

[20] https://engagedeltacounty.org.

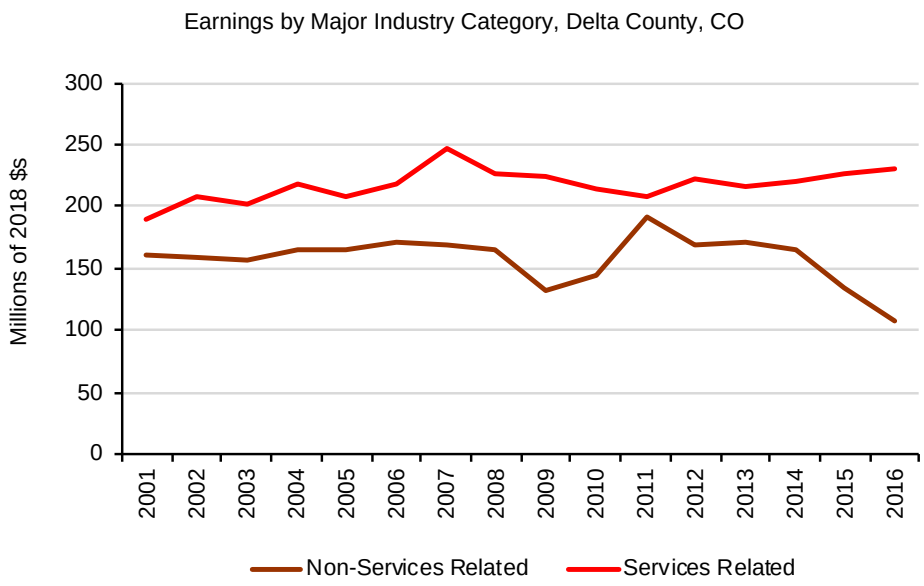
development, support for business incubation and supply chain expansion, and marketing value-added products.

Is it working?

In 2011, the key inflection point for Delta County came when the broader recovery from the Great Recession took hold, seen in the ensuing stabilization and modest growth in overall employment and earnings. By 2013, even as the Oxbow and Bowie mine closures sent mining employment and earnings sharply down, the recovery continued. From 2011 to 2016, Delta County added 344 new jobs and $3.6 million in new personal income, in real terms. The unemployment rate fell from 10 to five percent. However, average wages fell by 12 percent, reflecting the loss of high-paying mining jobs.[21]



[21] U.S. Department of Commerce. 2018. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. U.S. Department of Labor. 2019. Bureau of Labor Statistics, Local Area Unemployment Statistics, Washington, D.C.



The divergence of services and non-services shows the independence of the broader economy from mining per se. From 2011 to 2016, while mining employment shrank by more than half (from 807 to 355 jobs, a loss of 452 jobs) and mining personal income fell more than 80 percent (from $103 million to $19 million, a loss of $84 million), service sector employment grew by 10 percent (from 8,158 to 8,975 jobs, a gain of 817 jobs) and service sector personal income rose 12 percent (from $207 million to $231 million, a gain of $24 million), in real terms. The leading growth industries were health care, real estate, and accommodation and food services. Despite efforts to spur agriculture, this sector had mixed performance, losing 47 jobs but adding $3.4 million in new earnings, in real terms.[22]

Analysis

Below we examine Delta County's track record using key change attributes adapted from the resilience and competitive strategy literature: rupture, leadership, vision, strategy, resources, and execution.

Rupture = yes
The abruptness and severity of change triggered a clear and focused response.

Leadership = yes
Leaders emerged to address the economic rupture. They came from the private and public sectors, and were able to work with each other. Crucially, they decided early on that they could not influence the macroeconomics of coal and focused their rebuilding efforts elsewhere. It is also important to note that there are strong cultural divisions within the county—for example, between old timers and newcomers, and from down valley in Delta to up valley in Paonia—that were never resolved.

[22] U.S. Department of Commerce. 2018. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Additional performance measures can be seen on the data visualization developed for this research and available online.

Vision = yes
Through leadership, planning, and outside assistance, a new vision for the county emerged. It was expressed in the Better City report and various town and county plans. The vision is compelling and aligns well with potential economic opportunities. However, these plans are not universally well understood in the community, pointing to an ongoing communication challenge with the public. In fact, the main vision and strategy document is still referred to locally as the "Better City report," not the Delta county vision and strategy.

Strategy = mixed
The Better City report and a still-in-draft EDA Comprehensive Economic Development Strategy do a good job of answering the "where to play" question—recommendations focus on productive business conditions and industries to develop.[23] However, these documents do not offer a clear "how to win" set of activities or outline tough choices about where to focus limited resources. And although the Elevate initiative is visionary regarding strategic infrastructure, the deeper thinking about how to help businesses adopt and use this new high-speed connectivity to compete is missing.

Resources = mixed
The parties in Delta County successfully obtained outside resources to support initial diversification efforts. There are numerous examples of this, especially for planning, but also for projects such as Elevate and ENGAGE, among others. The largest hurdle is sustaining resources over time, shifting from adjustment to ongoing support, and developing local revenue streams. The lack of financial sustainability has hamstrung a number of efforts, most notably ENGAGE, which remains a tenuously situated initiative rather than the institutionalized hub it needs to be to achieve its mission.

Execution = mixed
The initial execution of tasks and project launches was superb. Delta County Economic Development and DMEA (locally) and EDA and DOLA (outside) have been critical implementers. ENGAGE is more promise than result at present. Some high priority goals encountered problems, such as the difficulty of finding the right hotel partner for the riverfront redevelopment project. Others—such as an organic center of excellence, downtown redevelopment, and recreation assets development—are more plans than activities, and await funding and advocacy to gain traction.

Lessons Learned

Efforts to diversify an economy hard hit by fossil fuel declines can work. Focused attention, strong leadership, visionary ideas, and effective partnerships have all contributed to successes. While some of the groundwork for other industries to succeed was in place prior to the rupture, these have been reconsidered and activated in an intentional and productive manner.

[23] U.S. Department of Commerce. 2019. Economic Development Administration. Region 10 Comprehensive Economic Development Strategy 2019-2024 Draft. https://www.region10.net/ceds.

No single industry can replace a dominant industry. Smaller enterprises across a range of sectors that are still trying to develop their competitiveness and scale up cannot replace a dominant and high-paying industry and employer overnight.

Economic transitions are cultural transitions. In thinking about future options that made sense for Delta County, the exploration of agricultural alternatives and new energy horizons was a constructive way to build on the region's long history in these sectors and labor force skills while pivoting to entirely new products and services.

Efforts to think broadly and ambitiously about the future are invaluable. The Elevate initiative alone may give the region a digital access competitive advantage that will pay off many times over. It would not have happened without strong leaders willing to think big.

A strategy has to be informed by more than competitive possibilities. It needs to identify the right playing field *and* how to win on it. While the conditions side of new competitiveness (infrastructure, services, brand) got a lot of attention, more attention needs to be paid to how to capitalize on these assets, and how to provide distinctive value to customer segments willing to pay for what local communities and businesses offer.

Sustaining resources is a huge challenge. Whether from the tax base, government programs, philanthropy, banks, or private investors, sourcing financial capital to scale and sustain efforts has held back implementation of plans, services, and improvements that enable diversification. This is especially evident in the hub functions that ENGAGE seeks to provide.

San Juan County, New Mexico

Background

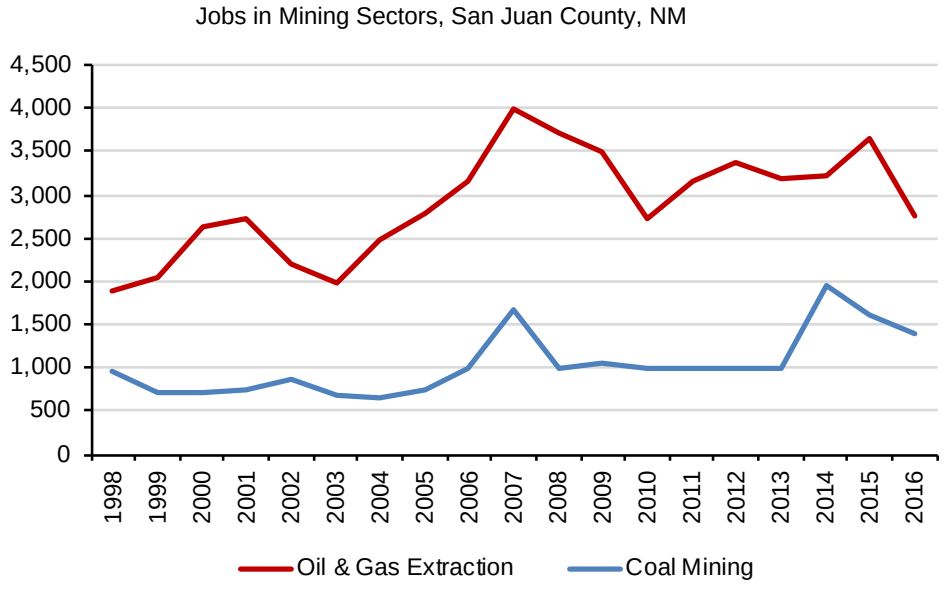
San Juan County (population 126,926) covers northwest New Mexico on the Colorado Plateau. The county seat is Aztec, but the main population center is Farmington (population 44,788), which lies at the confluence of the San Juan, Animas, and La Plata rivers. The region has a long Pueblo history and is home to the Navajo Nation, whose lands occupy the western half of San Juan County. The discovery of fossil fuel reserves—oil and gas, coal—and construction of connecting highways and gas pipelines in the 1940s and 1950s led to rapid growth and development. As the area evolved into a regional trade center, Farmington expanded into a range of services such as retail trade, health care, and education.

Despite Farmington's role as an energy hub and regional service center, there is no reliable commercial air service from the local Four Corners Regional Airport. Instead, people drive an hour to Durango's airport or three hours to Albuquerque's airport for airline service. The county's land based is largely tribal (64 percent native held) and federal (24 percent managed by the Bureau of Land Management), with the remainder private (eight percent) and state owned (three percent). Significant protected areas and historic sites in the area

include Aztec Ruins National Monument, Salmon Ruins, Chaco Culture National Historical Park, and Mesa Verde National Park.

The economy of the region has centered around oil and gas development, and coal-fired power plants (Four Corners Power Plant and San Juan Generating Station) and related coal mining (Navajo and San Juan mines). In 2007, the Great Recession hurt this twin energy economy, beginning a decline that continues today. The recession resulted in an oversupply of gas at significantly lower pricing, which in turn reduced drilling activity in the county. At the same time, low-cost gas undercut coal in the broader energy market, making coal-fired electricity less economical. Combined with aging power plants, new regulations, and a growing desire to shift to renewable energy production by utilities and customers, this led to a series of coal-fired power plant and coal mine closures.[24] In 2019, these trends culminated in the New Mexico Public Regulation Commission's decision to require the Public Service Company of New Mexico to examine retiring the final two San Juan Generating Station coal-fired units by 2022.

This contraction resulted in the decline of energy-related employment, outmigration of workers, net population loss, and decrease in fiscal revenue. Oil and gas jobs fell from a high of 3,698 in 2007 to 2,764 in 2016 (not including proprietors), a 25 percent decline. Employment by utilities fell from 1,301 jobs in 2007 to 850 jobs in 2016, a 35 percent decline. And coal mining jobs fell from 1,679 in 2007 to 1,384 in 2016 (not including proprietors), an 18 percent decline. These losses negatively affected other sectors of the



[24] For details on coal-fired plant and coal mine closures and impacts on employment, income, and government revenue, see Regional Economic Assessment & Strategy for the Coal-Impacted Four Corners Region. 2017. Highland Economics.

economy, particularly construction and manufacturing, but also wholesale trade, and administrative and waste services.[25]

In 2019, the New Mexico Legislature passed and the governor signed the Energy Transition Act, which decisively moves the state away from coal and toward clean energy by the middle of this century. The bill provides funds to assist mineworkers and plant employees with severance pay and job training, with specific funds allocated to impacts on tribal workers. In the case of the San Juan Generating Station, $22 million in transition funds will be available, along with additional funds for workforce retraining. Program specifics will be developed through a public process.[26]

What did they do?

In San Juan County and Farmington, oil and gas volatility is not new, and final coal-fired power plant closures (and related coal mine closures) have been foreshadowed but with timelines that have not been definitive until very recently. As compared to the Delta County experience, Farmington had a slow onset of decline. As a result, leaders were slow to react. It is not surprising that regional interests began a set of planning exercises. We explore two of the more consequential plans below.

In 2012, a regional Transition Steering Committee and E > P Think Tank published the *E > P Report: Catalyzing Change and Success in a New Economic Future for San Juan County*. This report is refreshingly direct and action-oriented. It begins with a call to action—"grim new economic realities call for urgent, decisive action"—and clearly defines a strategy, especially "where to play" considerations. However, it pays less attention to "how to win" issues.

The *E > P Report* outlined a targeted sector approach with a focus on business recruitment, expansion, and startups in six sectors: energy and related manufacturing, tourism, location neutral work, health care, agriculture, and education. It also outlined a set of capacities and activities that will be necessary for success: data, plans, and marketing; infrastructure, facilities, and land; workforce development; and capital, tax, and regulatory changes.[27] One concrete development from this report was the formal establishment of Four Corners Economic Development (4CED) as an entity to oversee the strengthening of the regional economy.

In 2017, the Northwest New Mexico Council of Governments published the *Regional Economic Assessment and Strategy for the Coal Impacted Four Corners Region* with funding from the Economic Development Administration. The report addresses the challenge of coal-

[25] U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C; U.S. Department of Commerce. 2018. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C.
[26] See Energy Transition Act final text: https://nmlegis.gov/Sessions/19%20Regular/final/SB0489.pdf.
[27] The E > P Report: Catalyzing Change and Success in a New Economic Future. 2012. E > P Think Tank.

related contractions and offers a comprehensive assessment and diversification strategy for the Four Corners region.

The report outlines five basic action areas: workforce and business development, quality of life, regional networks and partnerships, branding and marketing, and a shared vision for the future. For San Juan County, the report identified four targeted growth sectors: tourism, petrochemicals, food processing, and crop production.[28] This report largely builds on the recommendations of the *E > P Report*, though it has more of an orientation toward impact mitigation.

These planning efforts helped framed possible action steps. Various entities in the Farmington area stepped up to address different aspects of the diversification challenge. At the regional level, 4CED used the reports to convene people, create buy-in, and establish priorities. In two well-attended public forums, surveys identified priority action areas: broadband, marketing, and local food initiatives. 4CED is focusing on regional relationship-building and fostering better coordination among regional interests.

City of Farmington leadership saw the need to invest in the community before it can attract new outside investment, and began by passing a quarter-cent sales tax increase to fund a full-time economic development officer and initial programming. Farmington has been a leader in addressing transportation challenges (no interstate, rail line, or viable commercial airport exists), securing FAA approval and funding to expand the landing strip at Four Corners Regional Airport and Sky West commercial air service to regional hubs.

Farmington adopted a downtown revitalization and trails plan, built a new civic center and water park, created an outdoor recreation office, developed outdoor programs, and redeveloped Farmington Lake as a recreational amenity. The city hopes to capitalize on outdoor recreation as a way to make the community more attractive to retirees and location neutral workers, boost travel and tourism activity, and attract outdoor manufacturers to the region. Because business location services look closely at workforce skills, the city also has partnered with New Mexico's Job Training Incentive Program to underwrite workforce upskilling.

These activities have been complemented by the Farmington Convention & Visitors Bureau's efforts to re-brand Farmington. The new "Jolt Your Journey" slogan moves beyond the previous nicknames—"Industrial town south of Durango" and "Shoppington"—that conveyed less flattering associations, and capitalizes on nearby cultural and recreational assets. An analysis examining the gap between the brand promise and on-the-ground realities is guiding investment. New partnerships with the Bureau of Land Management and efforts to create adventure guiding businesses and train guides are underway.

In a disappointment to the city and visitors bureau, San Juan College in Farmington recently dropped its Outdoor Leadership, Education, and Recreation Program. In almost every other

[28] Regional Economic Assessment & Strategy for the Coal-Impacted Four Corners Region. 2017. Highland Economics and Catalyst Environmental Solutions.

aspect, however, the college is a crucial hub for efforts to sustain and expand the regional economy. A number of programs focus on the needs of the fossil fuel energy industry, but there now is a center of excellence for renewable energy, and the college offers signature programs in veterinary technology, physical therapy, occupational safety, and the training of automotive technicians. Its health science programs address shortages in the delivery of healthcare and train providers for one of the fastest growing industries in the region.

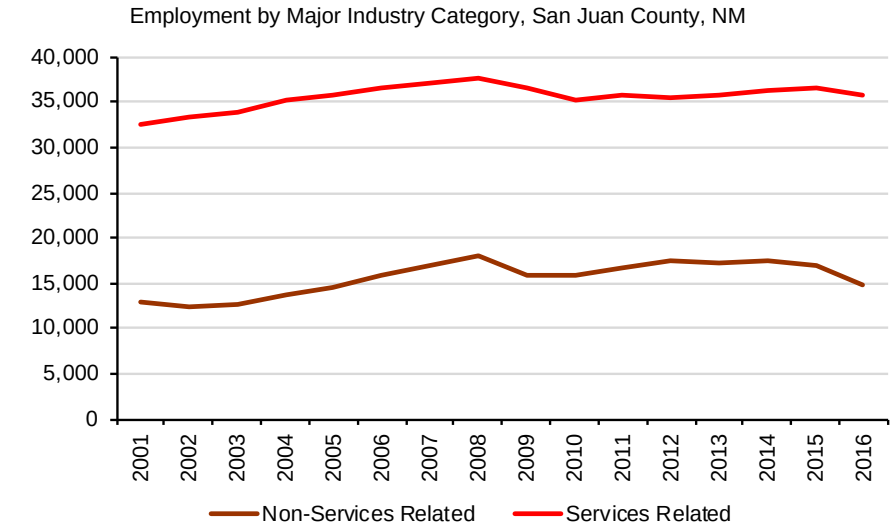
In addition, the college's Center for Workforce Development provides vocational training and certifications for people with a job but looking for advancement, offers longer-term academies for training in IT and medicine, and works with companies that have specific onsite retraining needs. San Juan College administers a large EDA grant to retrain displaced coal workers, with an emphasis on "stackable credentials" that build a ladder for career transitions, allowing sequential training followed by on-the-job experience and mentoring. Finally, the college operates an Enterprise Center that houses a makerspace for developing products, small business development center to help start businesses, and incubator where businesses can work on site to develop products and services.

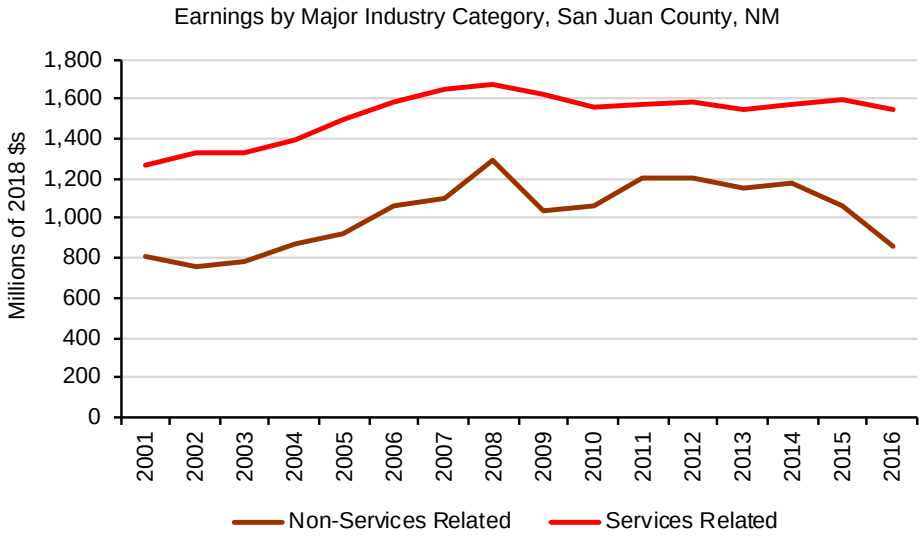
There is broad interest in expanding the agricultural sector in the region to become more diversified and include food processing. The Navajo Agricultural Products Industry (a Navajo corporation) recently expanded into organic production and is examining how it can develop a range of value-added products to create new jobs and higher returns. Farmington is working with the Navajo Nation and others to create markets locally for diversified produce and potentially to site a processing facility. Finally, San Juan College has announced it will create a food hub and maker market to help producers create shelf-stable products from local produce.

Is it working?

Progress in San Juan County is mixed. Overall, the economy contracted from 2008 to 2016, losing 4,840 jobs and $546 million in personal income, in real terms. However, the decrease in the energy as well as the non-services portion of the economy is greater than for the services portion of the economy as well as the broader economy as a whole.[29]

[29] U.S. Department of Commerce. 2018. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. We use the start date of 2008 here, as opposed to 2007 above, because the broader economy peaked in 2008, whereas the energy economy peaked in 2007.





This trend suggests that non-energy sectors are finding ways to sustain themselves in the midst of the energy economy's decline. In other words, the overall economy is not exclusively tied to energy-related activities and trends, which has resulted in a more diverse economy by default.

Bright spots exist at the industry level, indicating effective diversification. From 2008 to 2016, health care added 1,560 jobs; farming, 716 jobs; and accommodation and food services, 567 jobs. On the earnings front, health care led all industries with $119 million in new personal income, followed by retail trade with $16 million, and accommodation and food services with $11 million in new personal income, in real terms. These shifts in the economy have resulted in lower overall earnings per job, which fell from a recent peak of

$54,119 in 2012 to $50,013 in 2016, in real terms, as higher-paying energy occupations were replaced with lower-paying jobs in service occupations.[30]

Analysis

Below we examine San Juan County's track record using key change attributes adapted from the resilience and competitive strategy literature: rupture, leadership, vision, strategy, resources, and execution.

Rupture = mixed
In San Juan County and Farmington, change has not seemed real or permanent until very recently. Oil and gas industry volatility is not new. It's always possible that oil and gas may rebound with new discoveries, the application of new drilling technologies, or changes in prices. Coal-fired power plant and mine closures were anticipated and more gradual than in Delta County. It has taken a recent New Mexico Public Regulation Commission decision to recommend the shutdown of the remaining San Juan Generating Station units in 2022 and the passage of the Energy Transition Act to definitively mark the end game for coal in the region.

Leadership = mixed
Local leadership's response to the decline of fossil fuel sectors has been strong on planning and gets good marks for convening to educate and begin to determine a course of action. And while there are good examples of leaders pushing for specific activities that can move the economy ahead, there also is noticeable hesitation or lack of confidence in the ability of these efforts to succeed. (One interviewee characterized the pattern as "On your mark, get set, hold on.") As a result, effort has been split between defending past advantage and cautiously looking forward.

Vision = mixed
The Four Corners region is complex with different histories and cultures—tribal, Hispanic, Anglo—that result in dissimilar worldviews and priorities. As a result, it has been challenging to create and communicate a widely-shared economic vision for the region, which has led to frustration among the various players. In this context, 4CED's bridge-building and common-ground efforts are critical to developing a more collective sense of purpose. Farmington and the Visitors Bureau have articulated a new brand that is forward looking. Yet there is such a wide gulf between current conditions and the brand promise that these efforts can seem unrealistic to residents or evident to visitors.

Strategy = mixed
The E > P and Highland Economics reports outline solid approaches to rebuilding San Juan County's economy. In general, they articulate better "where to play" considerations but are weaker on "how to win" questions. The lack of coordinated leadership often has resulted in

[30] U.S. Department of Commerce. 2018. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C.

unilateral actions as well as a bigger disconnect between the two strategy reports' recommendations and a lack of subsequent implementation.

Resources = mixed
The parties in the region have created new local resources and secured outside support. Farmington's new tax for economic development looks promising and sends the right message to outside investors about the city's willingness to invest in itself. The Northwest New Mexico Council of Governments, San Juan College, and 4CED have secured industry and government funding for planning and convening, redevelopment and transportation projects, workforce training, and incubators and makerspaces. Despite the range of these activities, one outside investor manifested significant frustration about the lack of local initiative, saying "If they could actually implement, we'd fund it! I am not getting calls, I am making calls."

Execution - mixed
A review of the strategic recommendation reports highlights the gap between ideas and results—whether in the new brand promise; buildout of more attractive infrastructure and outdoor recreation opportunities; or success starting, scaling, and attracting businesses in targeted industry clusters of the future—but also points to the difficulty of the work itself. Better coordination along with clearer priorities for action would help deliver results.

Lessons learned

Real change requires a sense of urgency and a well-coordinated response. The combination of a hesitant response to the economic rupture, mixed views toward adaptive change, and uncoordinated actors and actions within the region has hampered implementation. This is not due to the absence of good ideas or even resources, but because of the lack of a sense of urgency and leaders without the social and political capital to coordinate change efforts in the region.

Effective strategy involves making choices. There is some excellent work happening on the ground: new taxes, branding, workforce training, transportation upgrades, investments in downtown and recreational amenities, and more. However, the breadth and lack of coordination among these various efforts risks falling into the do-it-all strategy trap: failing to make choices and making everything a priority. This drains limited energy and resources, making it more difficult for Farmington, or a worker or business in Farmington, to focus on priority steps.

Mitigation should be balanced with forward-facing investments. The Highland report and the Energy Transition Act emphasize mitigating the impacts of economic loss. This weighting is helpful from an adjustment standpoint, but it does not build new competitive positioning or a winning strategy. Some efforts try to thread the needle. New Mexico's Job Training Incentive Program offers income assistance and specific retraining support. San Juan College's "stackable credentials" approach to career transitions balances the need for immediate employment and training with a sequential model that builds skills and certifications while continuing to work and advance in a new career.

Wage differentials are a significant deterrent to change. The transition challenges facing individuals and families are real barriers. One example is the wage gap between energy and other sector employment. In 2017, average earnings in San Juan County for jobs in oil and gas extraction were $105,662, mining $101,397, and all other jobs, a meager $39,917.[31] Many workers are unwilling or unable to accept lower wages, even when they can find alternative work or access skills training. Instead, they choose to drop out of the labor force, commute long-distance to other energy locations, or simply leave.

Workforce training and job opportunities must be aligned. A related workforce reskilling challenge is finding new employment. San Juan College does a good job providing a range of workforce development offerings, but in many cases there is a disconnect between newly acquired skills and regional job openings. Workforce training in this mismatched labor supply-demand context incentivizes people to leave for new careers in other places with stronger labor markets. This dynamic points to the importance of understanding the regional labor market, and aligning training with emerging sectors and business startup, scaling, and recruitment efforts. Healthcare is a good example of where this is working in San Juan County.

Economic diversification takes time—starting early is an advantage. The time it takes to build new competitive positioning and diversify economies—at least a decade or more—is another major challenge. A key timing takeaway is the importance of starting early and creating stepped outcomes—short-, medium-, and long-term—that show progress and sustain momentum toward more ambitious and transformational change. Strategy development, coordination, and public education are good short-term activities; workforce retraining and placement along with entrepreneur and small business support are good mid-term activities; and investments in physical infrastructure and community quality are good long-term activities. Leadership must stay engaged and adaptive throughout this staged process to ensure there is a common and winnable aspiration and the capacity and competency to execute.

[31] U.S. Department of Labor. 2018. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Washington, D.C.

Campbell and Sheridan Counties, Wyoming

These adjacent counties have responded in distinct ways to the economic transition challenge. Although connected to the same fossil fuel reserves, they have different economic ties to these resources, levels of risk associated with those relationships, and resources at their disposal. This case study explores some important resulting differences in the two counties' economic transitions.

Background

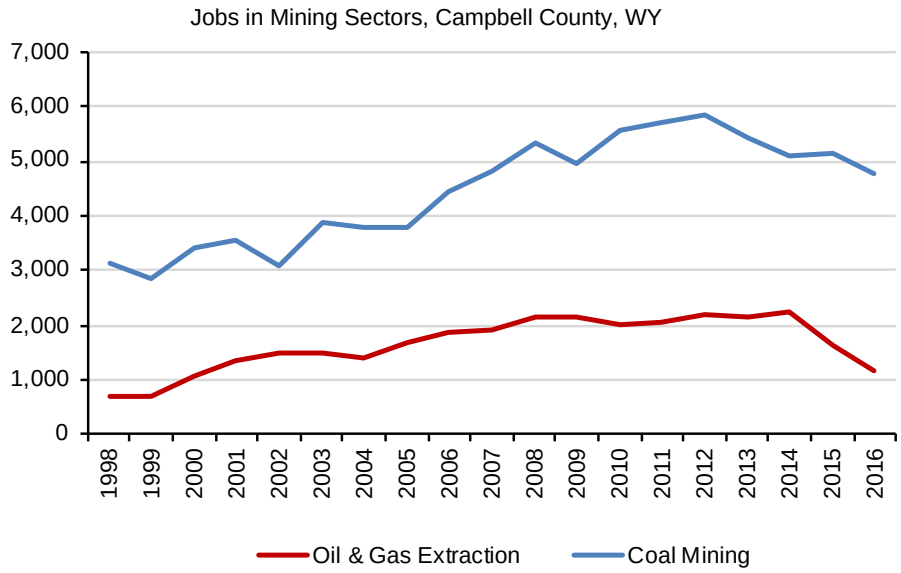
Campbell and Sheridan counties, Wyoming, are located in the Powder River Basin, which stretches from northern Wyoming into southern Montana. The Basin contains one of the largest coal deposits in the world and more coal is extracted here than anywhere else in the United States. The region is also rich in oil and gas as well as coal bed methane reserves. Gillette (population 30,560) and Sheridan (population 17,860) are the main population centers and county seats, each with railroad and interstate highway access and limited commercial airline service. (Most people drive two hours to the airports in either Casper or Billings.)

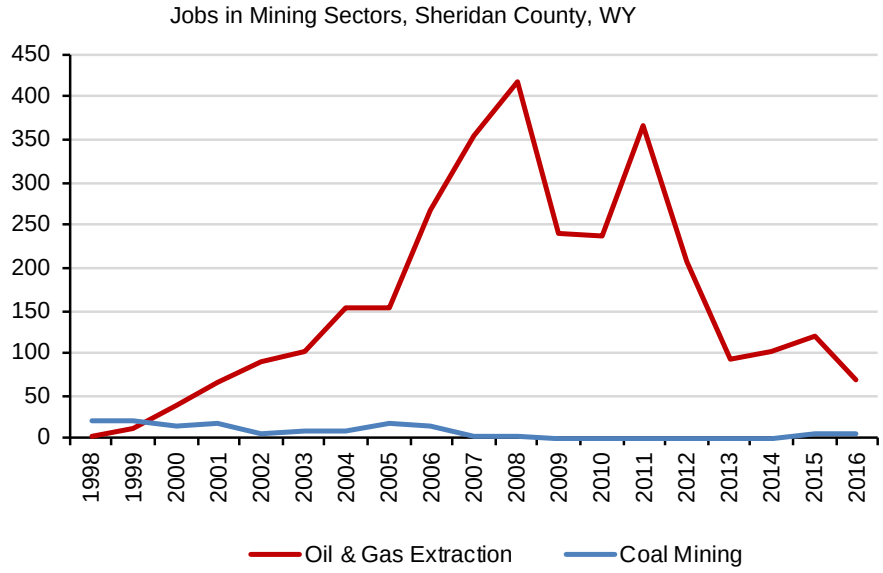
In the 1890s, with the arrival of the railroads, the region developed an economy based on underground coal mining, agriculture, and logging. These sectors fueled growth, but also extreme volatility, as whole industries came and went with technological shifts, market changes, and new regulations. In the 1950s, underground coal mining declined when diesel engines replaced coal-powered steam locomotives; in the 1960s, oil drilling exploded and then collapsed; in the 1970s, after passage of the Clean Air Act and subsequent amendments, today's low sulphur strip-mine coal industry sprang up; in the 2000s, coal bed methane and unconventional oil and gas surged and then contracted.

Out on the plains and closer to the major coal reserves, Gillette developed a narrower, energy-focused economy, with a major tie to coal. Closer to the Big Horn mountains and attractive natural amenities, Sheridan developed a broader economy, including ranching, tourism, and a mix of services, alongside oil and gas extraction.

In recent years, the region's energy economy has faced a number of challenges. For coal, these include competition from cheaper energy alternatives, regulations, and difficulties growing the export market. In the case of oil and gas, oversupply and low pricing have led to declines in production, employment, and associated personal income. For example, in Campbell County, oil and gas jobs (not including proprietors) fell from a high of 2,225 in 2014 to 1,154 in 2016, a 48 percent decline; and coal jobs (not including proprietors) fell from a high of 5,858 in 2012 to 4,748 in 2016, a 19 percent decline. In Sheridan County, oil and gas jobs (not including proprietors) fell from a high of 417 in 2008 to 68 in 2016, an 84 percent decline.[32]

[32] U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C.





In both places, recent declines were large and swift. However, in Campbell County—where direct energy jobs accounted for 25 percent of total private employment in 2016—the oil and gas, and coal downturn is much more significant in both relative and absolute terms.[33] The pressures on the coal industry are intense, resulting in a recent string of company bankruptcy filings, consolidations, and employment cutbacks.

[33] Ibid.

What did they do?

Gillette has fought hard and with focus to sustain its energy economy. Gillette's first instinct is to defend current competitive positioning, in which it is strongly aligned with the state of Wyoming, which relies on coal as its single largest source of revenue. But people in Gillette are pragmatic and eager to understand and explore alternative economic pursuits. Engagement on these issues is high.

Leaders work well together in Gillette. In the 1970s, the city became known for the Gillette Syndrome: a range of social dysfunctions associated with rapid growth (from the booming 1960s). Gillette's leaders knew the city had problems and started planning for new development and investing in needed infrastructure. Over time this grew to include an excellent hospital, state-of-the-art recreation center, downtown revitalization, convention center, public art, and community trails. For the last 40 years, Gillette has assessed a one percent sales tax to fund improvements, and has placed "one cent" signs in front of projects to validate public investment in the community.

Although locals lament a "war on coal" as coal's economic prospects look increasingly grim and the impacts on people, jobs, and revenue become more serious, local leaders recognize that Gillette needs to diversify. This view is best expressed through the work of Energy Capital, the local economic development organization, with a guiding vision of an "environment that sustains and generates employment and a healthy, growing and diverse economy." Energy Capital's strategy starts from a foundation of leadership and civic development; layers on quality of life, workforce, and infrastructure investments; focuses on scaling existing businesses and entrepreneur development; and, finally, seeks to recruit new business.[34]

There are strong partnerships between local and state government, especially the Wyoming Business Council and Wyoming Technology Business Center, along with Gillette College, Energy Capital, and others. Together, they are making the community attractive, creating multiple tracks at Gillette College for skills development and retraining, hosting a maker space and business incubator, and building road, sewer, and business park infrastructure in anticipation of future development. In the 2019 Wyoming legislative session, Gillette and Campbell County secured state revenue guarantees for local commercial airline service and the ability of Gillette College to offer four-year degrees, but failed to pass a lodging tax to help alleviate declining local government revenue.

The biggest challenges facing Gillette are its narrow economic foundation, reliance on resource extraction for revenue, and lack of competitive positioning in a post-coal world. As a result, Energy Capital is on the lookout for potentially higher risk, but higher impact "carbon plus" projects, looking for new ways to use, process, and sell coal-derived products in carbon capture, filtration, and manufacturing applications. These higher-risk, high-impact ideas are often untested and their pathway to market unclear.

[34] http://www.energycapitaled.com.

To address such challenges, Energy Capital, with state and federal support, has launched public-private partnerships such as the Advanced Carbon Products Innovation Center, to foster new manufacturing and technologies, and the Wyoming Integrated Test Center, to develop carbon capture technology. Companies working to create new "carbon plus" products include Atlas Carbon, which uses finely ground coal dust to create filters that could be used to scrub coal-fired power plant emissions, and Ramaco Carbon, which is turning coal into carbon fiber and resins.

Just an hour's drive to the west, Sheridan has taken a different path. It is less reliant on direct energy jobs, but has captured a range of oil and gas, and coal services. Sheridan's broader sector mix can be explained in part because it is a more desirable place to live, with an attractive downtown and mix of amenities, and significant local philanthropy. Despite these advantages, Sheridan has struggled with economic volatility, which has deterred private investment as well as public planning and infrastructure projects.

When the coal bed methane boom hit in the early 2000s, the community was unprepared for the demands of rapid growth. New municipal leadership stepped forward and marshalled the political capital to get things done. This started with meeting the growth challenge: commissioning studies to inform planning and new industry development, building new partnerships with landowners and the local college, and creating accountability to attract funding and implement targeted initiatives. Sheridan's leaders were not afraid to "break some eggs" and learned the value of working early with investors on projects and spending significant time and energy communicating with the public about the benefits of proposed changes.

Many locals now refer to the accomplishments of the new municipal leadership as "setting the table" for the successes that followed. There are many examples. The City of Sheridan adopted new budgeting controls, reached out to landowners to extend infrastructure and allow for new development, and raised taxes and fees to keep pace with growth. The local Whitney Foundation examined its grantmaking and decided to create a robust partnership with Sheridan College by investing in student scholarships and loans for all area residents and developing training programs to prepare young adults for diverse careers.

The Center for Community Vitality created a civic leadership program that builds skills and working relationships across interest groups in the Sheridan area. Downtown Sheridan focused on redeveloping Sheridan's downtown as the heart of the community and a destination for visitors. Sheridan Travel and Tourism began aggressively promoting the community, hosting year-round events, and showcasing local resources and itineraries to visitors.

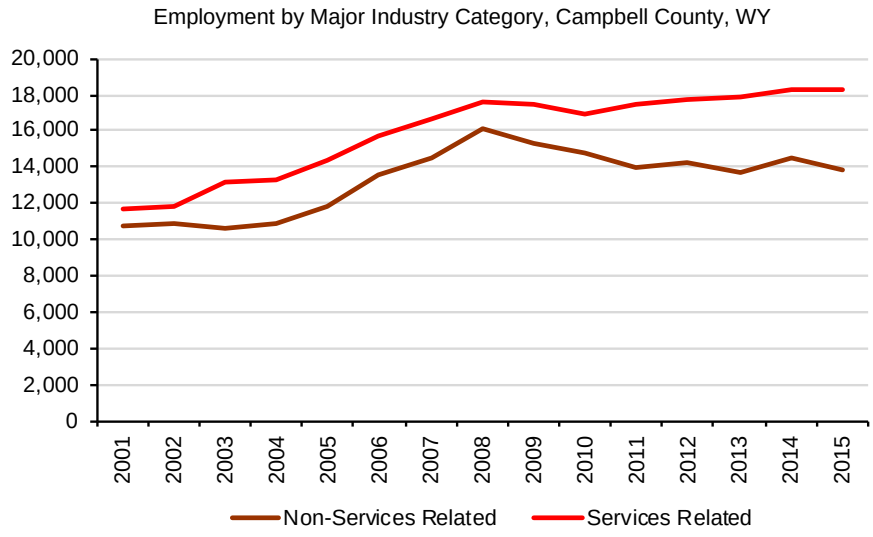
Forward Sheridan, the local economic development authority, and Sheridan Economic and Educational Development Authority, a joint authority of the city and college, worked on a mix of recruitment and scaling efforts. They commissioned targeted industry studies in 2007 and 2014 and identified data centers, professional services, light manufacturing, healthcare, creative arts, and tourism and recreation as promising sectors. Together, they led an effort to build and manage the Sheridan High Tech Park. With help from the state of Wyoming and

EDA, this industrial park now houses recruited and homegrown light manufacturing businesses such as Weatherby (firearms), Kennon Products (engineered coverings), and VacuTech (vacuum systems).

In 2018, Wyoming's Department of Workforce Services created the Next Generation Sector Partnership as a venue for manufacturing companies to discuss and solve common challenges. This effort has engaged younger business owners and helped local companies, like Surf Wyoming (a lifestyle apparel company), expand in downtown Sheridan while working with other regional enterprises to resolve mutual business challenges, such as poor UPS and FedEx shipping schedules.

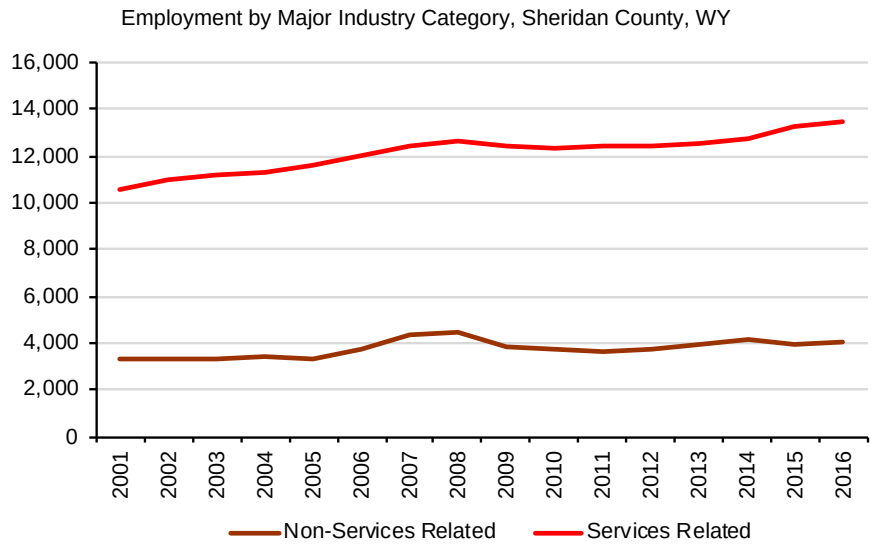
Is it working?

In Campbell County, 2008 represented a high-water mark for non-services and mining employment. From 2008 to 2015, non-services lost 2,245 jobs, a 14 percent decrease. During the same time period, services added 676 jobs, a four percent increase. In 2016, more significant layoffs in mining, from bankruptcies and scaled-back production, challenged this trend. From 2015 to 2016, mining alone lost 1,546 jobs while services as a whole lost 863 jobs. These recent trends show that the broader economy is diversifying, but is unable to make up for lost mining jobs and struggles in the face of an abrupt downturn in the energy economy. Since 2008, the service industries adding the majority of new jobs are accommodation and food services, real estate, and finance and insurance. Despite efforts to boost manufacturing, this sector lost 123 jobs from 2008 to 2016. These same results are borne out in the earnings data.



In Sheridan County, the picture is rosier. In 2008, non-services employment peaked and then declined in the aftermath of the Great Recession, before stabilizing. From 2008 to 2016, non-services lost 418 jobs, a nine percent decrease. Services also declined after the

recession, but then recovered. From 2008 to 2016, services added 826 jobs, a seven percent increase. These recent trends show the local economy diversifying, with services accounting for most new private sector jobs. Since 2008, the service industries adding the majority of new jobs are accommodation and food services, real estate, and finance and insurance—similar to Campbell County. Manufacturing added 151 new jobs from 2008 to 2016. These same results are borne out in the earnings data.



As these local economies shifted, there were associated changes in average earnings. In Campbell County, average earnings peaked at $81,945 in 2011 before falling in real terms to $63,518 in 2017, a 22 percent decline. In Sheridan County, average earnings peaked at $46,367 in 2009 and were $43,913 in 2017, a five percent decline. The loss of high-paying mining jobs in Campbell County resulted in a larger earnings decline and contrasts with the lower but more stable average wage rate in Sheridan County where fewer energy jobs were lost and relatively high-paying manufacturing employment grew.[35]

Analysis

Below we examine the track record in Campbell and Sheridan counties using key change attributes adapted from the resilience and competitive strategy literature: rupture, leadership, vision, strategy, resources, and execution.

Rupture = yes; mixed
These two communities have a long-term energy history. In Gillette's case, the booming 1960s led to positive efforts in the 1970s to build community. Recent declines in coal were significant and abrupt enough to galvanize action on building alternative economies. In

[35] U.S. Department of Commerce. 2018. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C.

Sheridan's case, the coal bed methane boom of the early 2000s led to effective efforts to manage growth. The recent oil and gas downswing has not by itself brought a reconsideration of basic competitiveness so much as validated long-standing work to diversify the economy.

Leadership - yes; yes
Gillette's leadership is balancing defending past advantage with recognizing that coal has a limited future and the local economy desperately needs alternative industries. Since the consequences of inaction are dire, there is a high level of engagement on economic diversification. Sheridan faces less urgency, partly because the city has already invested in a broader set of economic activities. Initially strong Sheridan leadership in the early 2000s has lost some steam and disagreements are common.

Vision = mixed; mixed
In Gillette, the "carbon plus" vision unambiguously seeks to diversify the economy but also represents the practical challenge of determining what else might sustain livelihoods. In Sheridan, no single vision guides the community or economic development, and instead multiple groups are pursuing organizational interests, such as downtown revitalization, health care, and specific industry needs.

Strategy = mixed; mixed
Gillette's economic diversification strategy does a good job of reflecting local culture and assets and is creative about emerging markets. It is hard to fault their carbon-focused "where to play" choice, even when the "how to win" steps are so risky and unproven. The focus on leadership, capacity, community quality, and business-ready infrastructure are all forward looking moves. Sheridan does not have a single economic diversification strategy. This may reflect existing affluence and diversity in the community, but translates into a lack of agreed upon priorities and clarity on roles to ensure accountability.

Resources = mixed; yes
Gillette has been successful in aligning human resources in the community and attracting outside public monies, such as from Wyoming Business Council and EDA. Yet for an area that generates massive fiscal revenue for Wyoming but faces declining assessed valuations and budgets, the needs are far greater than the transfers it receives. Sheridan has an abundance of human and financial resources and, like Gillette, has been able to capitalize on state and federal resources to underwrite business and infrastructure projects. Sheridan also has local philanthropic resources that will likely keep investing in the area, giving the community greater autonomy of action and sustaining momentum.

Execution = yes; mixed
Gillette's sense of urgency has resulted in united and focused action. Within this narrow scope, there is competent implementation. Sheridan's "setting the table" for success focus has become more diffused in recent years because of leadership changes and the lack of an overall strategy and accountability on coordinated outcomes.

Lessons Learned

There are not always good diversification options. Gillette reminds us that there are not always good options to diversify local economies. The nation's "energy capital" never created much economic diversity because it was a small place before fossil fuels and, even in downturns, independent sectors could not compete against the financial returns and wages of oil and gas, and coal.

Investing in quality of life improvements is a winner. Gillette and Sheridan show that making quality of life investments matters. Gillette would have lost more workers and families in downturns, and would not be in a position to compete for a "carbon plus" future without being able to attract new residents and businesses. Sheridan appeals to newcomers (including young families and retirees), attracts visitors, and is succeeding in its light manufacturing recruitment efforts in part because of long-term investments in community quality.

Political capital is a key ingredient to securing resources. Gillette demonstrates that economic development takes financial resources and political capital. The loss of energy revenue comes at exactly the time when Gillette needs to spend more to create new competitive positioning. Although Gillette is a huge net contributor to state coffers, it still has to fight for airline service revenue guarantees, and business innovation and expansion project funds with the rest of the state.

Leadership needs to communicate its strategy. Sheridan shows how leadership can capitalize on crisis to make long-term change. It also demonstrates the perils of pushing for change while not spending adequate effort to develop a broadly shared vision of success that can be tied to a strategy and sustained over time.

Lessons from the last boom and bust are valuable for the next one. Sheridan demonstrates the value of foresight. The city raised taxes in the coal bed methane boom and as a result had revenue available in the following bust to invest in downtown revitalization. Economic development partners identified light manufacturing as a promising "where to play" sector that could benefit from skills in the energy labor force. They then built the Sheridan High Tech Park that has been key to attracting several companies and allowing smaller local businesses to expand and hire workers laid off from energy occupations.

Partnerships are crucial to getting the work done. Sheridan shows the value of healthy private-public partnerships to build institutions and infrastructure that can catalyze economic diversification. The Center for Community Vitality, Sheridan College, Forward Sheridan, Sheridan Economic and Educational Development Authority, and others have built both the culture and capacity to attract and grow business in a range of sectors. The state's Next Generation program also stands out as a constructive approach to engaging younger business owners and enlisting them in solving collective problems.

Conclusion

This report has defined the primary challenges facing energy-focused Intermountain West communities trying to create more diverse and resilient economies. Through an assessment of economic trends, review of pertinent literature, and case studies, it also has explored promising ideas and practices, implicitly suggesting some directions not to go.

The research does not validate a single economic development method, such as support for entrepreneurs, or business recruitment or retention efforts, as the panacea to challenging economic transitions. Instead, it shows that the key to success is a context-sensitive process that follows the change flow outlined below. This process begins with a rupture and moves clockwise around the circle to execution.

This framework is not a simple plug-and-play approach. It must be adapted to local timing and conditions. We believe, nonetheless, that such a flexible approach offers the best chance for building the required support and implementing a strategic course of action to reimagine and rebuild local economies that have historically depended on fossil fuel extraction and processing.

Building on concepts in the community resiliency and competitive strategy literature, and buttressed by our case study analyses, we define below the essential change factors:

Rupture - Change is happening all the time, but major change happens when there are significant ruptures to a way of life or economic foundation. More abrupt and significant ruptures allow for faster and more focused responses. But there is still a good chance that the response will be more reaction (a doubling down on current industries) than adaptation (an exploration of new competitive options).

Leadership - An effective response to change must be led by individuals in a community who are respected and willing, through their networks, to discuss and explore new development pathways. This involves respecting the past while facing the future, and

requires credibility locally and an ability to facilitate sometimes difficult discussions about change.

Vision - In order to let go of one set of commitments, it is essential to have a vision of success that points toward the future. Ideally the community as a whole crafts this vision, though it may be led by a particularly energized part of the community. The vision should express a generally desired future, but also must at least begin to outline with a degree of specificity how the community can get there.

Strategy - The vision needs a strategy that reflects the culture, assets, and market opportunities available to a place, along with a set of "where to play" and "how to win" choices, in order to prevail.

Resources - All transition efforts require human and financial resources. These are crucial to initiate change (e.g., convening, planning, strategy development), build new competitive advantage (e.g., training, infrastructure, branding/marketing), and sustain momentum (e.g., investor and customer relationships, scaling startups). Over time, the mix of these resources should rely less on outside support and more on local investment.

Execution - Leadership, vision, strategy, and resources all set the stage for effective action. This involves coordination, adhering to choice commitments, and dedication to seeing efforts through to completion. Initiatives should seek to build momentum for future steps.

In addition to these factors, three additional observations are worth emphasizing: the importance of *culture*, *communication*, and *time* to succeed in this work. These considerations permeate the sequential change flow above.

In the Intermountain West, *economic change is cultural change*. People in this region fiercely identify with occupations and industries, especially when these jobs and sectors have defined places for decades or longer. A large part of the resistance to change comes from an unwillingness to abandon long-standing identities—the pull of "social memory" is strong. As a result, economic transition efforts should develop learning pathways for people to consider new identities alongside newer forms of economic activity.

At every stage of the change flow, *clear communication is imperative*. Initially, this might be between leaders trying to assess a downturn or brainstorm response ideas, but very quickly it needs to involve key stakeholders and perhaps even the community as a whole to allow for broader engagement and legitimize change efforts. Eventually, local actors will need to communicate clearly and consistently with outside parties to build the partnerships that can bring resources and expertise as well as access to customers and markets.

While economic ruptures can come quickly, *diversifying economies takes time*. This fact rewards early movers. It also requires deliberation about achieving short-, medium-, and long-term outcomes. Early wins show progress and build momentum. They also attract partnerships, build confidence with investors, and keep people engaged in a long-term vision of success.

Appendix A - Expert Academic Panel

Resources Legacy Fund convened an expert academic panel from regional public land grant universities—Montana State University, University of Wyoming, and New Mexico State University—to help define the research scope, select case studies, and review findings. RLF is grateful to these academic professionals for their contributions to this research effort.

Julia Haggerty, PhD, *Montana State University*

Dr. Julia Haggerty is Associate Professor of Geography in the Earth Sciences Department at Montana State University where she teaches courses on Human Geography, Energy Resources, and Rural Economic Geography. Her Resources & Communities Research Group has a diverse portfolio of externally-funded research projects focused on governance and the experiences of communities with natural resource economies. Julia co-directs the Energy Impacts Research Coordination Network, an international forum for cross-disciplinary social science coordination and exchange.

Robert Godby, PhD, *University of Wyoming*

Dr. Robert Godby is Associate Professor of Economics and Director of the Center for Energy Economics and Public Policy at the University of Wyoming. His research areas include natural resources, energy, and environmental economics and policy, industrial organization and macroeconomic policy. Robert has authored or co-authored books, many professional journal articles, and several studies for agencies of the Wyoming government on energy, economic development, labor market, and education policy.

Chris Erickson, PhD, *New Mexico State University*

Dr. Chris Erickson is Professor of Economics at New Mexico State University, where he has been on the faculty since 1987. He serves currently as interim department head of the Department of Economics, Applied Statistics and International Business. Chris's research includes U.S.-Mexico border issues, the New Mexico economy, and the role of finance in economic development. His published research includes a monograph on the coordination of environmental policy on the U.S.-Mexico border, an article on the impact of China's WTO assertion on Maquila employment, and an article on foreign direct investment in Latin America.

Appendix B - Case Study Selection

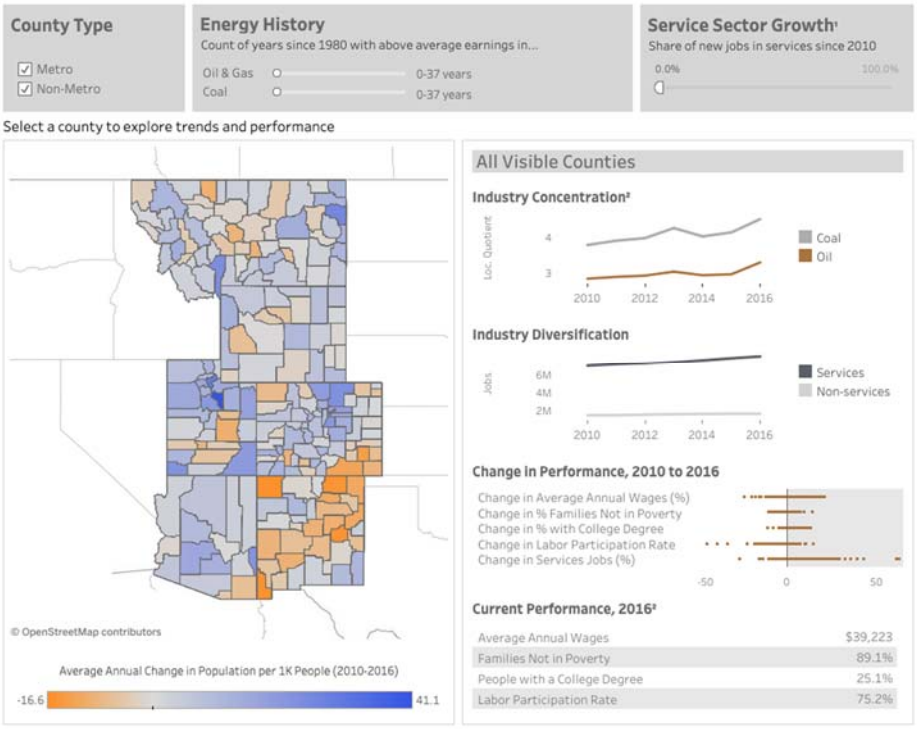
This research project seeks to identify long-term energy-focused economies in the Intermountain West and explore efforts to diversify these local economies. In order to do this, we needed to define the region, what it means to be "energy-focused," and what it means to diversify the industry mix of these local economies.

Geography
The Intermountain West examined in this report includes six states with fossil fuel energy producing and processing counties: Arizona, New Mexico, Utah, Colorado, Wyoming, and Montana. Idaho and Nevada do not have significant local fossil fuel economies and as a result are not considered in this report.

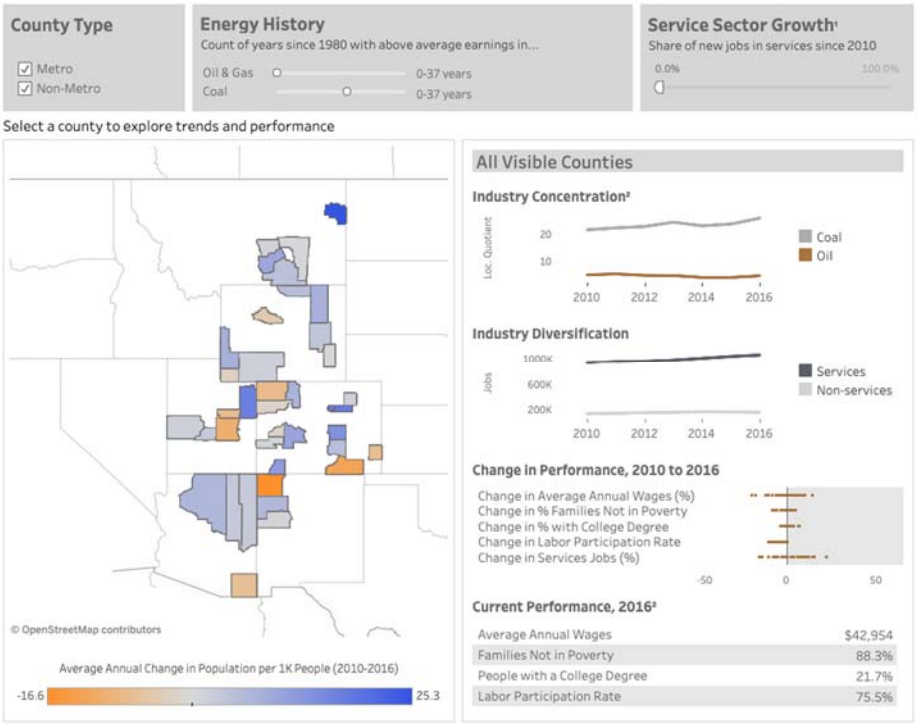
The most robust and long-term economic data comes from the U.S. Department of Commerce and is reported down to the county level, so we use counties as the primary geography for reviewing economic data and trends. The six states collectively have 206 counties.

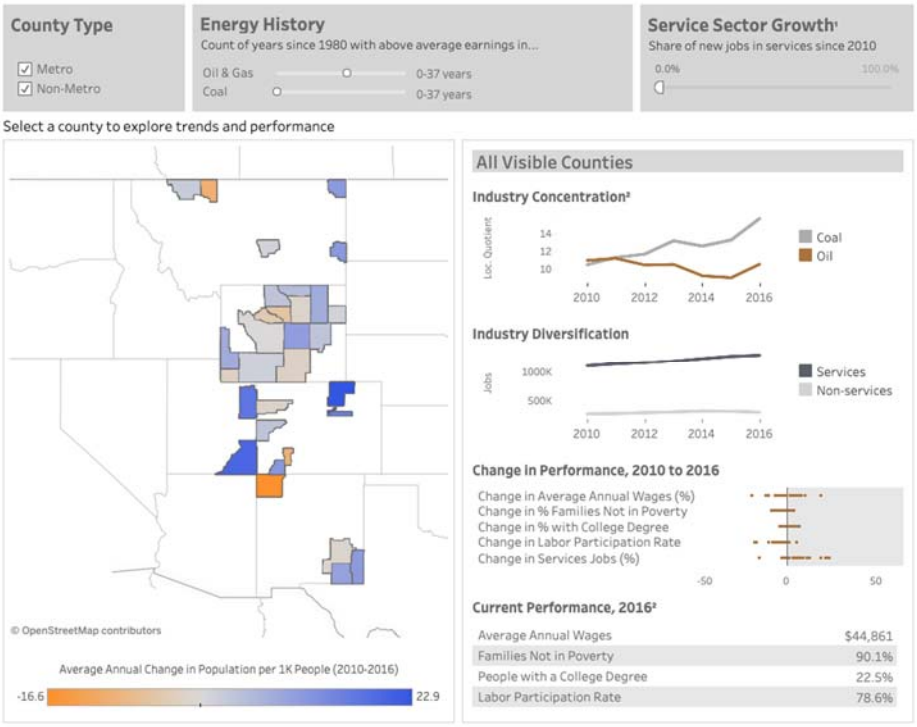
"Energy-Focused"
We defined fossil fuel energy sectors using the specific industry sectors that are directly related to coal and oil and gas industries according to the U.S. Department of Commerce's North American Industry Classification System (NAICS). We used earnings, as opposed to employment, data because these sources provide more refined industry level information for coal and oil and gas. For more details on data sources and methods used to define and evaluate "energy-focused" counties, see Appendix C - Data Visualization Methods.

To identify the location of long-term energy-focused counties and explore whether they show evidence of recent economic diversification, we created a data visualization to examine the history of energy-focused economies, growth of service sectors, industry concentration and diversification, and economic performance data and trends. The data visualization is available online.



To identify counties with a significant long-term reliance on energy producing and processing, we selected all counties that had at least 20 years of above average earnings from coal, oil and gas sectors from 1980 to 2016 (latest data available). We identified coal counties separately from oil and gas counties. These sets of counties are shown below.





Using this definition, there are 38 coal counties (18 percent of total) and 32 oil and gas counties (16 percent of total). There are 12 counties (six percent of total) that have long-term above average earnings from coal *and* oil and gas.

Diversification

To identify energy-focused counties that recently have diversified their industry mix, we examined historically energy-focused counties where service industries accounted for at least 75 percent of all new jobs created from 2010 to 2016 (latest data available).

The U.S. Department of Commerce defines services using the North American Industry Classification System (NAICS).[36] Services comprise 15 service-related sectors at the NAICS 2-digit level: Utilities, Wholesale trade, Retail trade, Transportation and warehousing, Information, Finance and insurance, Real estate and rental and leasing, Professional and technical services, Management of companies, Administrative and waste services, Educational services, Health care and social assistance, Arts, entertainment, and recreation, Accommodation and food services, and Other services, except public administration. Most, but not all, services are unrelated to coal, and oil and gas industries.

Non-services comprise all industries that are not classified by the U.S. Department of Commerce as services. These are: Mining (including oil and gas), Construction, Manufacturing, Agriculture, Forestry, Fishing, and Hunting.

[36] U.S. Department of Commerce. 2017. Census Bureau, North American Industry Classification System, Washington, D.C. https://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2017.

We compared the trends in services and non-services, from 2010 to 2016, to see whether employment in services tracked with, or were independent of, employment in non-services. Using the data visualization (see Service Sector Growth and Industry Diversification panels), we identified three scenarios:

1. Counties that added new services jobs *and* new energy jobs
2. Counties that added new services jobs *but* lost energy jobs
3. Counties that lost services jobs *and* energy jobs

We then looked more closely at categories 1 and 2 above to determine if new service industry job gains could be largely attributed to growth on non-service industries or were growing independently. We examined category 3 places to determine whether service industry job losses were less than non-service job losses. In all three cases, we were looking for recent evidence of economic diversification in county economies that were historically focused on fossil fuel production and processing.

Selection
We made phone calls to a range of potential candidate counties and relied on expert advice from the academic panel assisting with this research to ensure that we selected locations where there have been intentional efforts to diversify local economies.

The final selection approach sought to ensure diversity in the study sample and placed a high emphasis on locations where we can learn from efforts to diversify the local economy.

We selected three case study locations: Delta County, Colorado; San Juan County, New Mexico; and a comparative case study examining neighboring Campbell and Sheridan counties, Wyoming.

These counties encompass places with a long-term energy economic history that includes coal and oil and gas; represent three different states with unique policy environments; offer a mix of population size and degree of isolation from larger markets and major metropolitan centers; and have made intentional efforts to diversify local economies.

Appendix C - Data Visualization Methods

The data visualization draws from five federal data sources.

- U.S. Department of Commerce. 2016. Bureau of Economic Analysis, Regional Economic Accounts, Washington, D.C. Table CA30.
- U.S. Department of Commerce. 2017. Census Bureau, American Community Survey Office, Washington, D.C.
- U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C.
- U.S. Department of Commerce. 2018. Census Bureau, Population Division, Washington, D.C.
- U.S. Department of Labor. 2017. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Washington, D.C.

Below are details on variables and calculations used for each section of the data visualization.

Base Map

We use U.S. Census Bureau's Population Estimates to shade the 220 counties in the six-state region (Arizona, Colorado, Idaho, Montana, New Mexico, and Wyoming) in terms of population change per one thousand people from 2010-2016. The shading shows counties that are gaining (blue) and losing (orange) population in this time period. Population gain and loss is a useful at-a-glance proxy for economies that are growing or shrinking.

County Type

We allow dataviz users to view and interact with all 220 counties in the six-state region or just with the metropolitan or non-metropolitan (and more rural) areas of the region. The U.S. Census Bureau divides counties into Metropolitan Statistical Areas and Micropolitan Statistical Areas. We define Metropolitan Statistical Areas as "Metro" and all other counties as "Non-Metro." These definitions reflect the February 2013 vintage of the Census Bureau Metropolitan Statistical Area classification.

Metropolitan Statistical Areas are counties that have at least one urbanized area of 50,000 or more people, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.

Energy History

We allow dataviz users to select counties, using a slider bar, that historically have had an above average reliance on oil and gas or coal earnings for longer or shorter periods of time. To be "above average" in any year, earnings in a county from oil and gas or coal had to be above the average, as a share of total earnings, compared to the earnings, as a share of total earnings, from oil and gas or coal for all 220 counties combined in the six-state region.

We use earnings data from Bureau of Economic Analysis, Regional Economic Accounts, Local Area Personal Income to identify counties that had above average earnings in oil and gas

and coal sectors from 1980 to 2016 (latest year available). These data are reported by place of work. The U.S. Department of Commerce used two different industry classification systems (the older Standard Industrial Classification [SIC] and the current North American Industry Classification System [NAICS]) during the analysis period.

The table below shows the specific data sources and line codes used to calculate oil and gas, coal, and total labor earnings.

Table	Line Code	Earnings Description	For
CA05	230	Oil & gas extraction	Oil & Gas
CA05N	201	Oil & gas extraction	Oil & Gas
CA05	200	Mining (incl. fossil fuels)	Coal
CA05	500	Transportation and Public Utilities	Coal
CA05N	200	Mining (incl. fossil fuels)	Coal
CA05N	300	Utilities	Coal
CA05 & CA05N	35	Labor Earnings	Both

Service Sector Growth

We examine the share of new private sector jobs in services to explore whether local economies have diversified beyond employment in fossil fuel energy extraction and processing. We use employment data from the Bureau of Economic Analysis, Regional Economic Accounts, Local Area Personal Income. We calculate the change in the percentage of jobs that are in service sectors from 2010-2016 (latest year available). These data are reported by place of work. We use total private sector employment (total employment minus government employment) as the denominator for the calculation of percent of jobs in service sectors.

Data sources and specific industry sectors that are counted as services according to the North American Industry Classification System (NAICS) are: Utilities; Wholesale trade; Retail trade; Transportation and warehousing; Information; Finance and insurance; Real estate and rental and leasing; Professional and technical services; Management of companies; Administrative and waste services; Educational services; Health care and social assistance; Arts, entertainment, and recreation; Accommodation and food services; and Other services, except public administration.

Industry Concentration

We use a location quotient to determine the intensity of local oil and gas or coal industry concentration. A location quotient is a ratio that compares an industry's share of total employment in a place to a larger benchmark area. More precisely, it is the percent of local employment in a sector divided by the percent of employment in the same sector in a benchmark area.

We use data from County Business Patterns to calculate the location quotient for oil and gas and coal sectors from 2010-2016. We use all 220 counties in the six-state region as the benchmark. A location quotient of more than 1.0 means the local area is more specialized in that sector relative to the benchmark area. A location quotient of less than 1.0 means it is less specialized relative to the benchmark area.

Some County Business Patterns data are withheld by the federal government to avoid the disclosure of potentially confidential information. As a result, a location quotient is not available for all counties for all years.

Industry Diversification

We use employment data from the Bureau of Economic Analysis, Regional Economic Accounts, Local Area Personal Income to examine the degree to which service sectors have changed relative to the non-service sectors. We graph employment data for service and non-service sectors for each county from 2010-2016. These data are reported by place of work.

Change in Performance/Current Performance

In these sections we show the change from 2010-2016 and the most recent data for select socioeconomic variables that are indicators of well-being and economic performance. The horizontal clusters of data points for each change-in-performance variable show individual counties and the full distribution of data for all selected counties, making it easy to see where an individual county sits among user-selected groupings of counties.

These performance variables are: average annual wages, share of families not in poverty, the share of adults with a college degree, labor force participation rate, and change in services job. These data come from three different sources: U.S. Census Bureau, American Community Survey; Bureau of Labor Statistics, Quarterly Census of Employment and Wages; and Bureau of Economic Analysis, Regional Economic Accounts, Local Area Personal Income.