Social and Economic Context for the Federal Coal Program

July 2016

Introduction

The Department of Interior has imposed a three-year pause on new federal coal leases while it reviews the existing federal coal-leasing program. During the pause, the Bureau of Land Management (BLM) will prepare a Programmatic Environmental Impact Statement (PEIS) that considers a range of issues related to where, when, and how federal coal is leased and extracted.

The PEIS will include a socioeconomic impact assessment. Understanding the outcomes of the federal coal program for coal-dependent communities is important so that decision-makers understand the results of their choices and the public can participate in an informed way as part of the process.

Headwaters Economics has compiled economic and fiscal data that provide context for the socioeconomic assessment in the PEIS, including coal production, employment, and revenues. This report provides background information and methods, and documents the data sources used, and is accompanied by a web post with data visualizations and maps:
http://headwaterseconomics.org/energy/coal/federal-coal-program-context/

Summary Findings

- Federal coal, which is mined predominantly in the West, made up more than 43 percent of total U.S. coal production in 2015.
- The value of federal coal made up 20 percent of the total value of coal mined nationally in 2014. The low value of federal coal relative to production volume is explained by a wide range of factors including low heat content, remoteness, and lower mining costs that allow producers to gain market share by selling coal at lower prices.
- Federal coal is produced largely from efficient surface mines and employs relatively few people compared to the volume of production. Coal mines with federal leases employed 19 percent of total coal mine workers in the U.S. in 2015.
- Federal coal production is concentrated in a few places. Changes to the federal coal program will be felt acutely in rural communities dependent on coal mining for employment and tax revenue. However, these impacts will be limited in scale from a state and national perspective.
- Royalty and tax revenues from coal are relatively more important to states and local governments when compared to the employment benefits. Recent

modeling of leasing and royalty reform options suggests new revenues will outweigh the costs associated with reform.[1]

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Background on the Federal Coal Review Process

In January 2016 the Secretary of the Interior announced a pause on leasing federal coal.[2] No new leases will be offered until the Department of Interior completes a full review of the federal coal-leasing program.[3]

Several recent reports from the Government Accountability Office and the Inspector General of the Interior Department raised concerns about the leasing process, including the social and environmental impacts of the federal coal program, and whether the program was receiving a fair return for taxpayers.[4] Importantly, the federal coal leasing and royalty program has not been reviewed for 30 years.[5]

During the pause on new leasing, the Department will complete a Programmatic Environmental Impact Statement (PEIS). The Secretary charged the BLM to consider how, when, and where the federal government should lease federal coal, how to account for environmental and public health effects of mining and coal-fired power generation, and if and how coal sales and royalties provide a fair return to taxpayers.

The Secretarial Order stated that the PEIS should at a minimum address six topics, including socioeconomic considerations. Specifically, the Order states: "Beyond the issue of fair market value, the PEIS should assess whether the current Federal coal leasing program adequately accounts for externalities related to Federal coal production, including environmental and social impacts. It should more broadly examine how the administration, availability, and pricing of Federal coal affect regional and national economies (including job impacts)."[6]

Background on Socioeconomic Impact Assessment

The National Environmental Policy Act of 1972 (NEPA) requires socioeconomic impact assessment as part of a project-level Environmental Impact Statement and for programmatic reviews such as the current PEIS of the federal coal program.

Socioeconomic impact assessment is important because the Department of the Interior should understand the impacts of its decisions on communities and workers. Additionally, the public deserves the opportunity to understand how government decisions will affect them and the opportunity to participate in the decision-making process.[7]

In practice today, declining budgets and capacity within the BLM means that much of the work involved in completing socioeconomic impact assessments is contracted out by the BLM to private parties.[8]

Recent history and experience has shown that socioeconomic impact assessment too often is formulaic and lacks important context.[9] A comprehensive socioeconomic impact assessment should do more than compile easily obtainable baseline information such as population statistics, employment trends, and wages in affected sectors, or rely solely on an input/output model such as IMPLAN or REMI to describe the likely impacts of a federal decision on the economy.

In addition to describing baseline data, socioeconomic impact assessments should include plans and support for adaptive management and monitoring, and identify mitigation strategies that may resolve or limit some of the impacts related to proposed actions.[10]

Headwaters Economics developed the Economic Profile System (EPS) in partnership with Bureau of Land Management (BLM) and U.S. Forest Service in order to make public data available to these federal agencies and to the public, and to help provide context to socioeconomic impact assessments.[11] For example, EPS can be used to assess the size of the projected changes relative to the rest of the economy (*Is the expected change big or small?*) and to understand the role of federal lands and natural resources in the broader economy.

Headwaters Economics also worked with academic experts to provide suggestions for how make socioeconomic monitoring effective and efficient. We produced two case studies (one on Sublette County, WY, and one on Garfield County, CO)[12] in addition to a review of social impact assessment and recommended best practices for monitoring the social and economic impacts related to energy development.

This report draws on these resources to provide context for the PEIS—including data on federal coal production, employment, and revenues for all federal coal-producing regions. It also describes trends and broader context including total coal

production from all lands, employment in other economic sectors, and coal revenue as a share of total revenue for state and local governments.

The Federal Coal Program in Context: Coal Production

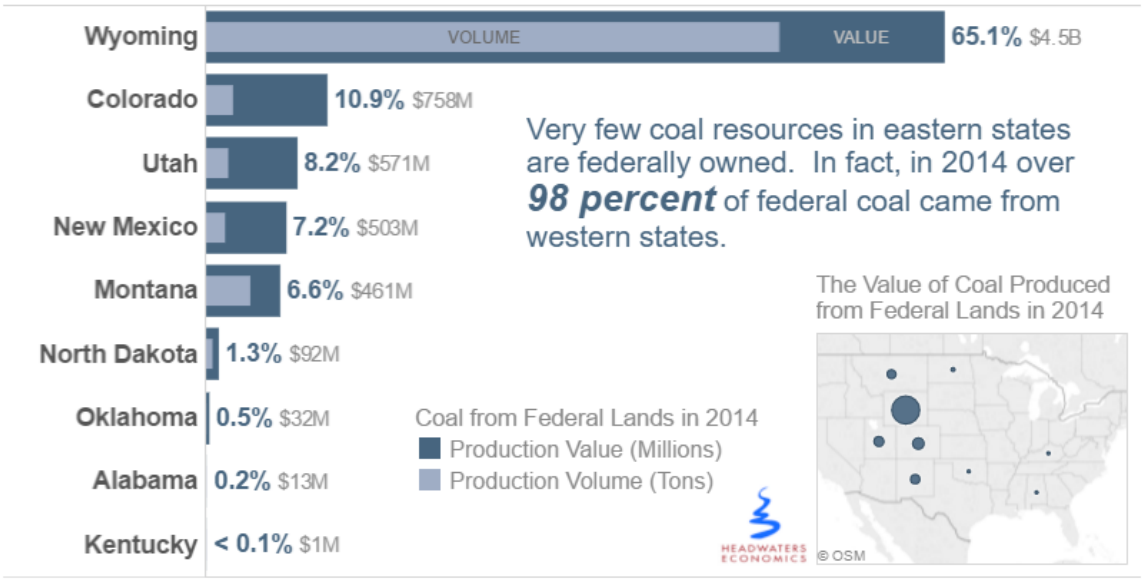
Federal Coal Production in Context

Federal coal is a large share of total U.S. coal production. In 2015, 409 million tons of coal was extracted from federal coal leases,[13] more than 43 percent of total coal production nationally (943 million tons).[14]

Federal coal extraction is located predominantly in the West. In 2014, Wyoming hosted 80 percent of total federal coal extraction, and combined with Colorado, Utah, New Mexico, and Montana, the West hosts more than 98 percent of all federal coal extraction.[15]

Coal extraction is highly concentrated geographically. Nationally, the BLM administers 306 coal leases.[16] As of February 2015, active BLM coal leases were located in 47 individual mines located in 28 counties, including seven counties in Colorado, five counties in Wyoming, and four counties in Montana.[17]

Figure 1: Federal Coal Production and Production Value by State in 2014



Source: U.S. Office of Natural Resources Revenue, Mine Safety and Health Administration, and U.S. Energy Information Administration.

The Value of Federal Coal Production in Context

Federal coal is lower value on average compared to non-federal coal. Federal coal makes up more than 43 percent of total U.S. production, but only 20 percent of total coal production value nationally in 2014. The average price of all U.S. coal valued at the mine was $34.83 per ton in 2014.[18] The average price of federal coal at the mine was only $17.40 in the same year.[19] Federal coal production value is a relatively smaller share of total U.S. coal production value for several reasons:

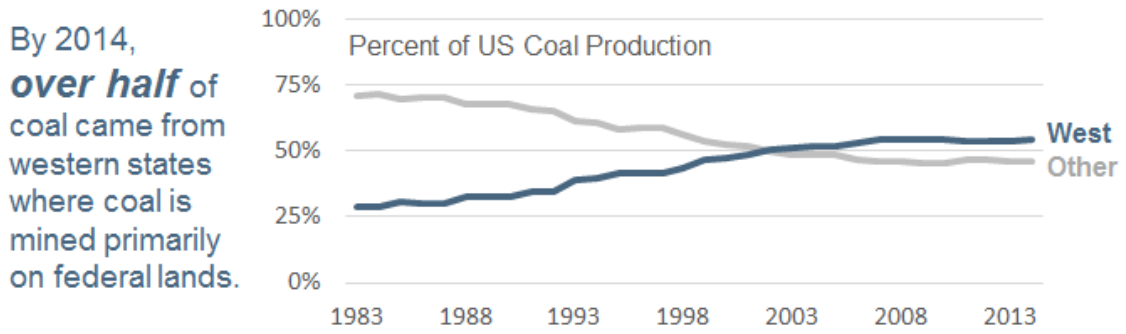
- Federal coal on average is of relatively low value (in terms of heat content), sub-bituminous coal, resulting in a lower average price per ton.
- Because of its relatively low heat content, federal coal is disproportionately utilized in domestic electricity generation markets where delivered prices are lower compared to other markets. Of total U.S. coal production, 81 percent is utilized for domestic electricity generation, about 12 percent is exported, and the rest, about 8 percent, is used in a variety of commercial and industrial uses, including steel production. About 98 percent of coal produced in Wyoming, which accounts for the large majority of federal coal, is used in the domestic electricity generation sector.[20]
- The large majority of federal coal mined in the Powder River Basin in Wyoming and Montana is more remote from markets and has higher transportation costs resulting in a discount at the mine and restricted access to higher value markets. For example, international exports of coal used for electricity generation declined between 2002 and 2012 in Wyoming, but increased for the U.S. as a whole from about 10 million tons to more than 50 million tons annually.[21]
- Federal coal mining is relatively efficient compared to non-federal coal resulting in lower mining costs. Lower mining costs have allowed Western coal producers to gain market share by selling coal at lower costs. Montana and Wyoming rank second and first, respectively, in average coal production per employee hour (17 and 28 tons per employee per hour, respectively, compared to fewer than 3 tons per hour in Kentucky and West Virginia).[22]
- Federal leasing and royalty policy are also responsible for lower production value. Federal lease sales are uncompetitive, potentially limiting bonus bids received for federal coal and allowing companies to sell coal at lower prices. Through captive transactions at the mine and through "take-or-pay" contracts, companies may be able to further lower the gross value of coal upon which they pay royalties.[23]

Trends in Federal Coal Production

Federal coal production has grown significantly in the last 40 years. Federal coal increased from 130 million tons in 1982 (15% of total U.S. production) to a high of 507 million tons in 2002 (46% of total U.S. production).[24]

Productivity advantages and declining rail shipment costs in the Powder River Basin led to a shift in coal extraction from the East to the West.[25]

Figure 2: Coal Production in the West versus the Non-Western States, 1983-2014



Source: Office of Natural Resources Revenue and Mine Safety and Health Administration.

Less coal will be produced in the future. More recently, federal coal production is down from a high of 507 million tons in 2002 to 409 million tons in 2015. Production is expected to remain at lower levels for several reasons:

- Hundreds of coal-fired power plants have retired since 2010. Retirements tended to be older and smaller plants and account for only a small share of total coal generating capacity. Coal-fired retirements in 2015 totaled 4.6 percent of total coal-fired generating capacity.[26]
- New capacity is being added in natural gas and renewable energy.
- Competition with natural gas has resulted in decreased utilization of existing coal-fired power generation capacity. The average capacity factor (the rate at which coal-fired power plants are operated) for coal plants declined from nearly 70 percent in 2010 to 55 percent in 2015.[27] The reduction in utilization reflects increased competition with natural gas which is displacing coal generation.

Federal coal production and prices will be more volatile in the future. Demand for coal in domestic electricity generation markets depends on the relative price of coal, natural gas, and renewable energy sources and changes in capacity to generate electricity from these various sources over time. With increased price competition from these other sources, coal utilization has become less predictable from year to year. For example, coal accounted for 33 percent of total generation in 2015, but EIA projects coal could supply between 28 and 40 percent of electricity generation in 2040.[28] Uncertainty about how much coal will be burned in the future—whether more or less than current levels—stems from price competition between coal and natural gas, and the relative volatility of natural gas prices compared to coal.

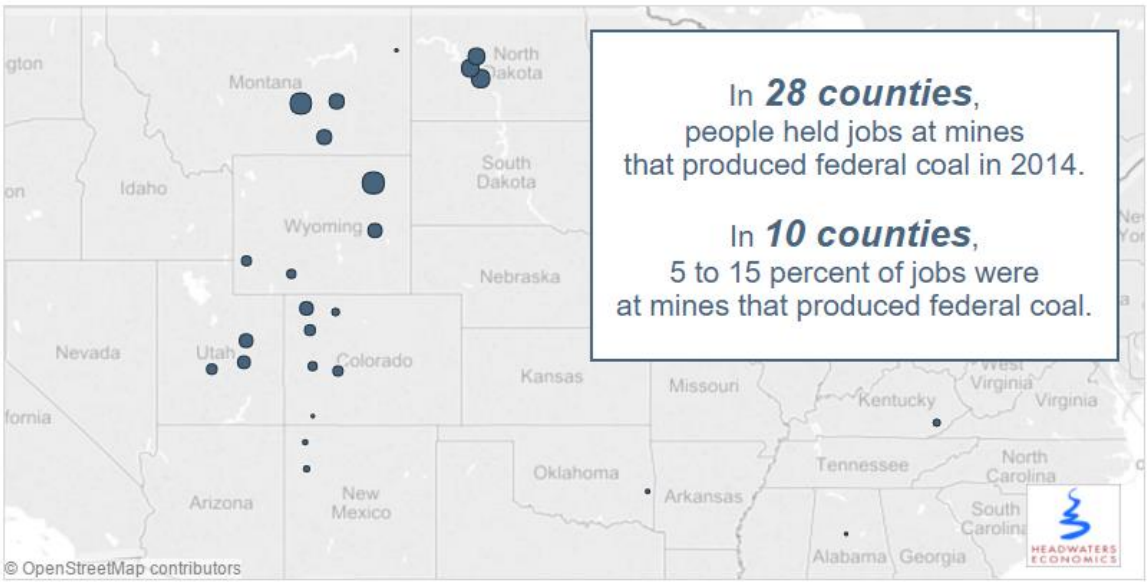
The Federal Coal Program in Context: Coal Jobs

Federal Coal Mining Jobs in Context

In 2015, mines that had federal local leases employed 13,098 workers. Roughly half of these jobs were in Wyoming.[29]

> Throughout this report "federal coal mining jobs" are defined as all jobs in coal mines that had active or inactive federal coal leases as of February 3, 2015.

Figure 3: Percent of Direct Jobs from Federal Coal Mining in 2014



Source: Mine Safety and Health Administration and Bureau of Economic Analysis.

Federal coal mining generates relatively few jobs when compared to production volume. In 2015, federal coal made up 43 percent of total U.S. coal production, but was responsible for only 19 percent of direct coal mining jobs.[30]

Direct coal mining jobs are concentrated in relatively few Western counties. Of the 224 counties that had coal mines nationally in 2014, 28 counties had coal mines with federal leases. These counties represent less than one percent of 3,114 counties (and county equivalents such as Parishes and Boroughs in Louisiana and Alaska, respectively) nationally.

In ten counties, direct employment in coal mining is a significant portion of total employment. In 2014, direct coal mining jobs in mines with federal leases made up five to fifteen percent of total private and government employment in ten counties.

In all other counties, direct coal mining jobs make up less than five percent of total employment.

Table 1: Direct Federal and Non-Federal Coal Mining Jobs in 2015

State	Coal Mining Jobs in Mines with Federal Leases	Coal Mining Jobs in Mines Without Federal Leases	Total Coal Mining Jobs	Federal share of total
U.S.	13,098	55,315	68,413	19%
Wyoming	6,502	152	6,654	98%
Colorado	1,605	65	1,670	96%
North Dakota	1,261	52	1,313	96%
Utah	1,166	142	1,308	89%
Montana	1,148	181	1,329	86%
New Mexico	801	332	1,133	71%
Alabama	455	2,838	3,293	14%
Oklahoma	109	55	164	66%
Kentucky	16	10,279	10,295	< 1%
Other States	-	41,219	41,219	-

Source: Mine Safety and Health Administration.

Direct coal mining jobs are a small share of total employment at a national and a state scale. In the nine states that have federal coal leases, coal mining jobs associated with these mines made up 1.6 percent of total employment (private and government) in Wyoming and less than 0.3 percent of total employment in all other states in 2015.[31]

Table 2: Direct Coal Mining Jobs as a Percent of Total State Employment in 2015

State	Coal Mining Jobs as a Percent of Total Employment	Federal Coal Mining Jobs as a Percent of Total Employment
Wyoming	1.6%	1.6%
North Dakota	0.2%	0.2%
Montana	0.2%	0.2%
New Mexico	0.1%	0.1%
Utah	0.1%	0.1%
Colorado	0.1%	0.1%
Alabama	0.2%	< 0.1%
Oklahoma	< 0.1%	< 0.1%
Kentucky	0.5%	< 0.1%

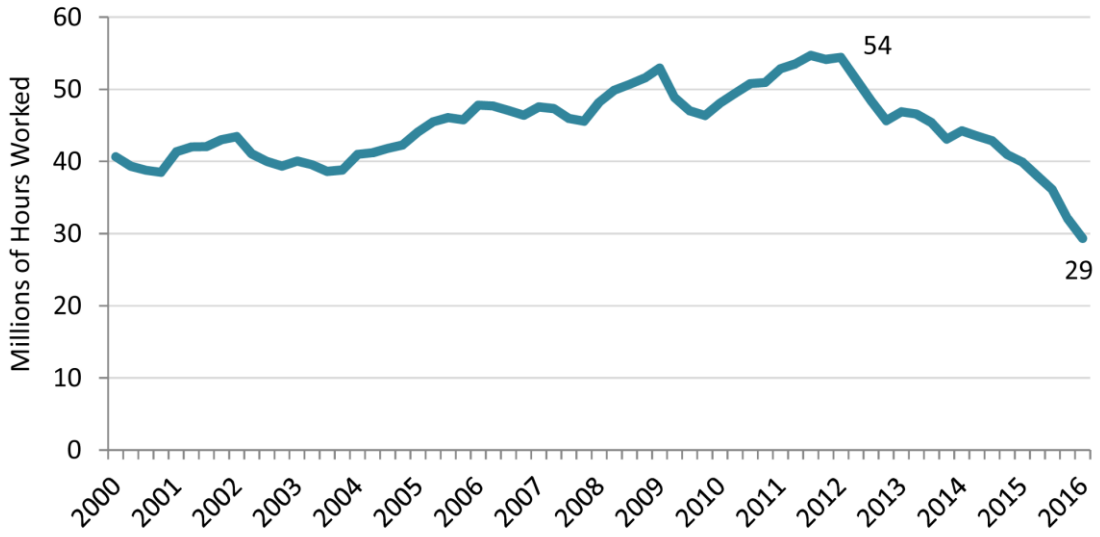
Source: Mine Safety and Health Administration and Bureau of Economic Analysis.

Trends in Coal Mining Employment

Increased efficiency in federal coal production resulted in significant job losses nationally. Coal employment was down by about 120,000 jobs from 1985 to 2015 despite large increases in total production volume.[32] Most of these jobs have been lost in Appalachia as coal mining shifted to more efficient Western surface mines where fewer people are required to extract an equivalent amount of coal. These mines are located primarily in the Powder River Basin in Wyoming and Montana.

T*he current downturn in production is resulting in job losses in coal mining in the West*. Increased competition with natural gas and renewable energy sources is resulting in additional job losses in the coal sector. From the second quarter of 2015 to the second quarter of 2016, hours worked by employees at U.S. coal mines decreased by 10 million, and a total of 16,746 coal mining jobs were lost.[33] These declines come on the heels of 22,549 coal mining jobs already lost between the first quarter of 2012 and the first quarter of 2015. The West has seen fewer coal mining job losses over time, but the recent downturn is starting to affect the region. Wyoming lost 858 coal mining jobs between the second quarter of 2012 and the second quarter of 2016, with 343 of these job losses coming in the last year.

Figure 4: Hours Worked by U.S. Coal Miners per Quarter, 2000-2016



Source: U.S. Department of Labor and Mine Safety and Health Administration.

Coal Mining Employment will be more uncertain in the future. Future employment in coal mining will depend on the relative price of natural gas, renewable energy, and coal. Because natural gas prices have historically been more volatile compared to coal prices, coal producers can be less certain going forward about how much coal will be demanded from year to year, or even month to month. This uncertainty in electricity markets creates uncertainty for coal workers.

Coal fired electricity generation provides additional employment opportunities.[34] Thirteen counties have coal-fired power generators that receive coal deliveries directly from mines with federal leases. In 2014, these coal-fired plants (see Table 3) contributed 3,782 direct jobs in electricity generation, transmission, and distribution,[35] adding to 13,098 federal coal mining jobs.

Table 3: Electric Power Generation Jobs in Federal Coal Mining Counties in 2014

County	State	Coal Fired Power Plant	Coal Mine	Electricity Generation Jobs
Moffat County	Colorado	Craig (CO)	Colowyo Mine	368
Routt County	Colorado	Hayden	Foidel Creek Mine	113
Rosebud County	Montana	Colstrip	Rosebud Mine&crusher/Conveyor	389
McKinley County	New Mexico	Escalante	El Segundo	151
San Juan County	New Mexico	San Juan	San Juan Mine 1	343
McLean County	North Dakota	Coal Creek	Falkirk Mine	250
Mercer County	North Dakota	Leland Olds	Freedom Mine	500
		Antelope Valley	Freedom Mine	
		Coyote	Beulah Mine	
Oliver County	North Dakota	Milton R Young	Center Mine	163
Le Flore County	Oklahoma	AES Shady Point LLC	P8 North	85
Emery County	Utah	Hunter	Deer Creek Mine	450
		Huntington	Castle Valley Mine #4	
Campbell County	Wyoming	Wyodak	Wyodak Mine	379
		Wygen 2	Wyodak Mine	
		Dry Fork Station	Dry Fork Mine	
Lincoln County	Wyoming	Naughton	Kemmerer Mine	198
Sweetwater County	Wyoming	Jim Bridger	Bridger Underground Coal Mine	393

Source: Energy Information Administration and U.S. Census, County Business Patterns.

The Role of Coal Mining in Rural Western Counties

Direct coal mining jobs create jobs in other local economic sectors. "Multiplier" effects of coal mining are an important contribution of the mining sector. Estimates of the indirect and induced benefits range from between 0.2 and 2, meaning every ten jobs in the mining sector create between two[36] and twenty[37] additional jobs in the local economy. Because of the wide differences in estimates of the additional employment benefits associated with mining, this report does not describe secondary and tertiary jobs associated with coal mining activities. Direct employment in coal mining and in coal-fired power generation are presented in order to identify communities most dependent on coal mining.

Coal mining communities have different challenges associated with declining coal production. For all coal mining communities, continued dependence on natural resources may become increasingly problematic as coal production and prices decline and are likely to become more volatile in the future. Declining coal production will disproportionately impact rural counties that do not have easy

access to major population centers via air or road travel or that lack an educated labor force necessary to compete in the non-resource extraction portions of the U.S. economy. Rural counties will have more difficulty diversifying economically and replacing lost coal mining jobs with jobs in other sectors.[38]

Headwaters Economics developed several new tools, utilizing the latest data (through 2014) that can be used to understand economic conditions in coal mining regions and to compare coal-dependent counties to other western counties with similar characteristics.[39]

The Federal Coal Program in Context: Coal Tax and Royalty Revenue

Coal extracted from federal land is an important source of revenue for some states and local governments. Coal production in states with federal leases generated $1.1 billion in government revenue in 2014. The largest source of revenue is federal royalties, followed by a host of state production taxes levied directly on coal extraction, and royalties from coal extracted from state-owned lands.[40]

Federal coal revenue is a relatively larger contribution to state economies compared to employment. Coal revenue made up 12.5 percent of total state and local government budgets in Wyoming in 2012 (the latest year for which accurate, national data on total state and local government budgets is available). By comparison, coal mining jobs made up only 1.8 percent of total employment in 2012. This same relationship holds in the other states, although the relative importance of federal coal revenues is significantly lower. In Montana, the state where federal coal mining is second most important in terms of its fiscal contributions, federal royalty and state taxes on federal coal production constituted 1.1 percent of total state and local government revenue and coal mining jobs were 0.2 percent of total employment in 2012.

There are two primary reasons that federal coal revenue is a relatively larger contribution to state economies compared to employment:

1. Gains in productivity have resulted in fewer jobs, limiting the employment benefits of coal mining in the West.
2. The federal owner shares royalty revenue directly with states, increasing the share of value that is available to support government services in mining states.

Policy decisions made by states can increase or decrease dependence on coal tax and royalty revenue. State and local governments often utilize fossil fuel revenue, including from coal, to offset (or lower) taxes on individuals and other economic sectors, which has the effect of increasing dependence on fossil fuel revenues. Different policy choices, including investing fossil fuel revenue in permanent funds

and limiting the use of volatile fossil fuel revenue on annual governmental operating budgets, can create greater resilience to changes in coal revenue streams.[41]

Federal royalties are deductible from state production taxes. Some states allow coal producers to deduct from their state severance taxes the royalties they pay to the federal government. As a result, higher royalties to the federal government results in lower taxes paid to states. These tax interactions have several outcomes:

- Higher royalty payments are partially offset by lower state tax payments, limiting the cost to industry of federal royalty reform if reform raises royalty payments.
- States will receive greater total compensation from coal production as larger distributions from the federal government through federal royalty distributions outweigh reductions in direct state tax collections.
- State spending on government infrastructure and services may change because states spend their share of federal royalties in a way that is different from the way they spend state severance taxes.

Why Is Revenue Policy Context Important?

Fiscal policy can help mitigate the acute impacts associated with mining activity and related population growth, manage revenue volatility over time, and make long-term investments in economic development.

Communities facing declining coal production and employment are also faced with significant revenue losses. How states and local governments tax coal mining and spend the resulting revenue can lead to greater or less risks of fiscal crisis. In some cases, coal revenue is largely spent on annual general government expenses and is utilized to lower taxes on individuals and other economic sectors. These policy decisions create greater exposure to revenue volatility. By comparison, states that save coal revenue and make long-term investments in education and infrastructure (limiting annual expenditures and tax switching) are resilient to changes in the coal markets.

Methods: Employment Statistics

This report uses several data sources to measure the employment contributions of coal mining, electricity generation, and total employment at the county and state level.

- The Mine Safety and Health Administration (MSHA) reports average coal mining jobs for each individual coal mining operation based on a survey of mine operators. Employment numbers include mine workers and office workers. MSHA data is available quarterly from the first quarter of 2000 to the first quarter of 2016. MSHA mining employment is compared to total jobs at the county and state level as reported by the Bureau of Economic Analysis. This report uses MSHA data to measure total direct jobs in coal mining because these data provide the most accurate, industry-reported count of workers at coal mines. MSHA reports a greater number of coal mining jobs when compared to County Business Patterns, which is described below.

- The U.S. Census County Business Patterns (CBP) is used in this report to estimate jobs at coal-fired power plants. Although CBP describes employment in industries at a high level of detail, it tends to undercount jobs since it does not include employment data for government, agriculture, railroads, or proprietors (in most cases self-employed individuals). In order to approximate jobs at coal-fired power plants, we report CBP data for NAICS code 2211 (electric power generation, transmission, and distribution) which includes coal-fired power generation and power generation from natural gas, wind, and other sources and jobs in transmission and distribution of electricity. Some CBP data are withheld by the federal government to avoid the disclosure of potentially confidential information. Headwaters Economics uses a documented method for estimating these data gaps (see http://headwaterseconomics.org/wphw/wp-content/uploads/CBP_Documentation.pdf).

- The Bureau of Economic Analysis reports all government and private sector wage and salary jobs and proprietors, and provides the most accurate count of total jobs in a county or state economy. In this report we compare mining employment reported by MSHA to total employment reported by BEA in order to provide an accurate picture of the relative contributions of mining in the context of total jobs.

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Endnotes

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[3] The order does not apply to existing leases and production. BLM estimates it has already leased enough coal to provide a 20-year supply at current rates of consumption. The Order allows for pending applications to proceed and emergency leasing criteria will allow for new leases under certain economic conditions. The pause on new leasing does not apply to metallurgical coal and also does not apply to Indian coal.

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