PREPARED FOR

Virginia Coalfield Economic Development Authority

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Economic Impact of Coal and Natural Gas Industries and VCEDA in Southwest Virginia

CHMURA

1. Executive Summary

Coal mining has a long history in Virginia, and it is an important industry in Southwest Virginia.[1] In recent years, the production of natural gas from methane gas from coalbeds and coal mines has become a significant contributor to regional economic growth. The Virginia Coalfield Economic Development Authority (VCEDA) retained Chmura Economics & Analytics (Chmura) to conduct an analysis of the economic impact of the coal and natural gas industries in Virginia and Southwest Virginia.[2] This study also presents the economic impact of VCEDA in those two regions. These are the main results of the study:

1.1. Coal Impact Summary

Despite years of decline, the coal industry[3] remains a vital industry in Southwest Virginia**.**

- In 2023, the 41 active coal mines in Virginia produced a total of 10.0 million short tons of coal. In 2024, total coal production in Virginia declined to 8.6 million short tons.

- Total employment in Virginia's coal industry was 2,511 in 2024. Almost all of Virginia's coal industry employment (98.7%) was located in Southwest Virginia. **The coal industry employed 2.7% of the workforce in the region**.

- In Southwest Virginia, the coal industry pays a much higher wage than the overall regional average. At $101,268, **the average coal industry salary in 2024 was more than twice as large as the region's average annual salary** of $45,926.

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[1] The study region is defined as the state of Virginia and region of Southwest Virginia. Southwest Virginia includes the following cities and counties: counties of Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, Washington, and Wise, and the cities of Bristol and Norton.
[2] The VCEDA region includes the following localities: counties of Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, and Wise, and the City of Norton.
[3] In this study, the coal industry includes coal mining and coal mining support businesses.

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State Impact:

- Chmura estimated that, in 2024, the total revenue (or sales) of Virginia's coal industry was $1.4 billion. Moreover, the industry employed 2,511 workers. These figures represent the direct impacts of the coal industry on output and employment in the state. After accounting for indirect and induced impacts, Chmura estimated the total annual economic impact of Virginia's coal industry was $2.0 billion in 2024, which supported 6,372 jobs in Virginia (Table 1.1).

Table 1.1: Coal and Gas Industries and VCEDA Make Significant Economic Impact in Southwest Virginia

			Direct	Total Impact (Direct, Indirect, Induced)	Tax
Coal Industry	Southwest Virginia	Economic Output (Millions)	$1,384.7	$1,785.4	$37.0
		Employment	2,446	5,085	
	Virginia	Economic Output (Millions)	$1,410.6	$1,987.1	$29.0
		Employment	2,511	6,372	
Natural Gas Industry	Southwest Virginia	Economic Output (Millions)	$393.3	$481.7	$18.2
		Employment	423	1,115	
	Virginia	Economic Output (Millions)	$487.2	$772.4	$5.8
		Employment	692	2,368	
VCEDA	Southwest Virginia	Economic Output (Millions)	$8,386.2	$11,212.3	
		Employment	28,036	45,045	
	Virginia	Economic Output (Millions)	$8,386.2	$12,756.0	
		Employment	28,036	53,051	

Note: Numbers may not sum due to rounding

Source: JobsEQ by Chmura

Regional Impact

- Chmura estimated the total annual economic impact (direct, indirect, and induced) of the coal industry in Southwest Virginia at $1.8 billion, which supported 5,085 jobs in 2024.

- In terms of total economic impact (direct, indirect, and induced), **the coal industry contributed 9.9% of the regional economy** (total output) of Southwest Virginia, and 5.6% of the regional employment in 2024. The impact of the coal industry is lower in the entire state, accounting for only 0.2% of the state's total output and 0.1% of the state's employment.

Fiscal Impact

- In 2024, Chmura estimated that Virginia's state government received $29.0 million in individual and corporate income tax revenue from the coal industry. In addition, Chmura estimated that the total tax generated by the coal industry for local governments in Southwest Virginia was $37.0 million in 2024, including severance tax, property

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tax, and machinery and tools tax. In addition, Virginia's coal industry generated $43.4 million federal income tax in 2024.

1.2. Natural Gas Impact Summary

Natural gas is considered a clean energy source with lower greenhouse gas emissions. In 2023, the total production of natural gas in Virginia reached 83.4 billion cubic feet.[4] More than four-fifths of Virginia's natural gas production was from coalbed wells.

- In 2024, the natural gas industry[5] employed 692 workers in Virginia. Approximately **90% of Virginia's employment in the natural gas extraction industry was concentrated in Southwest Virginia**.

- In Southwest Virginia, the natural gas industry pays much higher wages than the overall regional average. In 2024, the annual average regional wage was $45,926, which is less than half the **average salary of $111,131** in the natural gas industry.

State Impact**:**

- Chmura estimated that, in 2024, total revenues (or sales) of Virginia's natural gas industry were $487.2 million. The industry employed 692 workers in Virginia. Those figures are the direct impacts of the natural gas industry in the state. Adding indirect and induced impacts, Chmura estimated that the total annual economic impact of Virginia's natural gas industry was $772.4 million in 2024, supporting **2,368 jobs in Virginia**.

Regional Impact:

- Chmura estimated that the total annual economic impact (direct, indirect, and induced) of the natural gas industry in Southwest Virginia was $481.7 million, supporting **1,115 jobs in 2024**.

- In terms of total economic impact (direct, indirect, and induced), the natural gas industry contributed 2.7% of the regional economy (total output) of Southwest Virginia and 1.2% of the regional employment in 2024.

Fiscal Impact:

- In 2024, Chmura estimated that Virginia's state government received $5.8 million in individual and corporate income tax revenue from the natural gas industry. In addition, Chmura estimated that total tax generated by the natural gas industry for local governments in Southwest Virginia was $18.2 million in 2024, including severance tax and property tax. Virginia's natural gas industry also generated $12.7 million federal income tax in 2024.

[4] 2023 is the latest year when the data are available from US Department of Energy, Energy Information Administration.
[5] In this study, the natural gas industry includes natural gas extraction, drilling oil & gas wells, and support activities for oil & gas operations.

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1.3. VCEDA Impact Summary

Since its establishment in 1988, VCEDA has successfully orchestrated 530 business attraction and expansion projects, resulting in the creation and retention of 28,036 jobs in Southwest Virginia. Those jobs, mostly outside the coal and natural gas industries, helped to diversify the regional economy.

- Chmura estimated that the total 2024 economic impact (direct, indirect, and induced) of VCEDA-assisted businesses (including new and expanding businesses) in Southwest Virginia stood at $11.2 billion and supported 45,045 jobs. Looking at the direct impact only, Chmura estimated that, in 2024, VCEDA-assisted businesses generated $8.4 billion in total gross revenues and 28,036 jobs.

- In the state of Virginia, Chmura estimated that the total annual economic impact (direct, indirect, and induced) of VCEDA-assisted businesses was $12.8 billion, which supported 53,051 jobs in the state in 2024.

- VCEDA helped to significantly diversify the regional economy. In 2024, the industry diversity index of the region was 29.9%. However, without the jobs related to VCEDA, the diversity index would fall to 23.5%.[6]

- VCEDA made considerable contributions to reducing unemployment in Southwest Virginia. Based on the latest 2024 data, the unemployment rate in the region was 3.9%, 1.0 percentage points higher than the state average of 2.9%. Without the jobs attracted to the region by VCEDA, the region's unemployment rate would rise to 15.8%.

- Without the jobs brought to the region by VCEDA's projects, more families in Southwest Virginia would need to utilize government assistance programs such as unemployment insurance, supplemental nutrition assistance program (SNAP), and temporary assistance for needy families (TANF). VCEDA-assisted jobs saved the state government an average of $4.2 million per year from reduced government payments. Total savings were estimated at $151.6 million from 1989 to 2024.

[6] The higher index implies a more diversified industry base.

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2. Background

Coal and natural gas are important energy sources in the United States, providing close to 60% of the fuel used to generate electricity.[7] Since renewable energy, such as solar and wind power, accounts for only a small portion of the American energy supply, without coal and natural gas, Americans would face potentially higher electricity costs.

In Virginia, state energy production, such as coal mining and natural gas production from coalbed methane gas or coal mine methane gas, is concentrated in the Appalachian Mountain region of Southwest Virginia. For many decades, these industries have been the mainstay of the regional economy, providing steady employment for thousands of workers.

The economy of Southwest Virginia underwent significant transformation over the past few decades, while the regional coal industry also experienced prolonged declines. In 1990, the coal industry accounted for 13.2% of total employment in Southwest Virginia; however, by 2024, it employed only 2.7% of the regional workforce.

In 1988, anticipating the future challenges of the coal industry, the Virginia General Assembly established the Virginia Coalfield Economic Development Authority (VCEDA). VCEDA's goals included bringing jobs to the region and diversifying the economic base of Southwest Virginia. VCEDA region includes the counties of Lee, Wise, Scott, Buchanan, Russell, Tazewell, and Dickenson, and the City of Norton.

In 2015, Chmura Economics & Analytics (Chmura) estimated the economic impact of the coal industry in Virginia and Southwest Virginia. In 2018, Chmura conducted an economic impact study focusing on the economic impact of VCEDA in conjunction with the celebration of VCEDA's 30th anniversary. VCEDA seeks to update these two studies, extending the analysis to encompass the natural gas industry in Virginia.

The remainder of this report is organized as follows:

- Section 3 presents the economic impact of the coal industry in Virginia, including a profile of the industry in the region and state
- Section 4 presents the economic impact of the natural gas industry in Virginia, including a profile of the industry in the region and state.
- Section 5 analyzes the economic impact of VCEDA in Virginia and Southwest Virginia, as well as its effect in reducing the unemployment rate and diversifying the regional economy
- Appendix 1 illustrates Chmura's economic impact methodology.

[7] U.S. Department of Energy, Energy Information Administration, assessed February 11, 2025, https://www.eia.gov/tools/faqs/faq.php?id=427&t=3.

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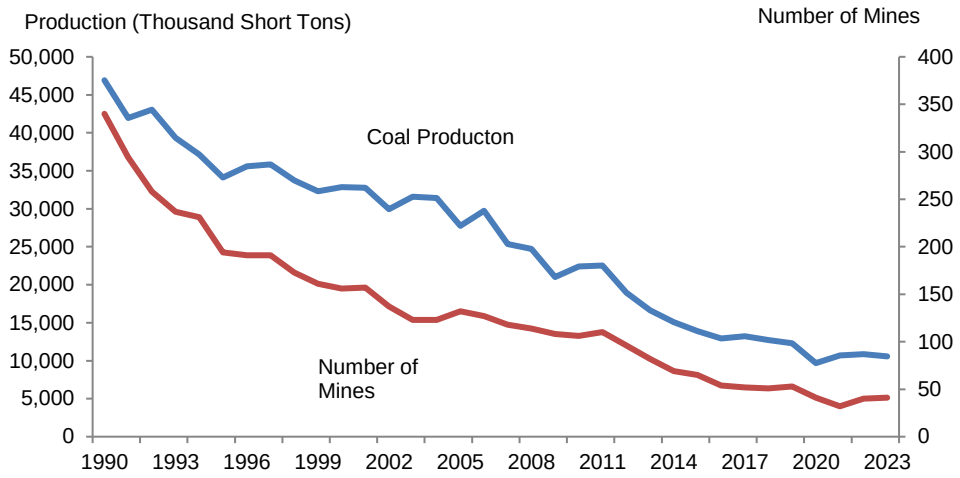
3. Economic Impact of Coal Industry

3.1. Profile of the Coal Industry in Virginia

3.1.1 Virginia's Coal Production

The total amount of coal produced in Virginia declined over the past three decades. According to data from the U.S. Department of Energy, 41 active coal mines operated in Virginia, producing 10.0 million short tons of coal in 2023 (Figure 4.1). The 2023 coal production in Virginia was less than a quarter of the 1990 production level. Virginia's coal production fell from 46.9 million short tons in 1990 to 10.5 million in 2023, averaging a 4.4% decline per year. As a comparison, national coal production decreased only 1.7% per year during the same period.[8] Declining coal production in Virginia demonstrates a waning role of the industry in Virginia compared to the national trend. In 1990, Virginia accounted for 4.6% of total national coal production, which declined to 1.8% in 2023. The latest estimate from Energy Information Administration shows that in 2024, coal production in Virginia declined to 8.6 million short tons. Over 75% of Virginia coal is metallurgical, which is used for steel production, and only a small portion of Virginia's coal production is used for power generation.[9]

Figure 3.1: Virginia Coal Production Has Been Declining



Source: Energy Information Administration, U.S. Department of Energy

3.1.2 Coal Employment and Wages

Total employment in Virginia's coal industry was 2,511 in 2024, with 2,446 in Southwest Virginia (Table 3.1). In this study, Chmura defines the coal industry as including the following two industries based on the North America Industrial Classification System (NAICS):

- NAICS 2121: Coal Mining
- NAICS 213113: Support Activities for Coal Mining

Almost all of Virginia's coal industry employment (97.4%) was located in Southwest Virginia. In 2024, of the total coal industry employment in Virginia, 2,336 were employed in coal mines and 176 workers performed coal mining support functions. Also in 2024, 2.7% of total employment in Southwest Virginia and 0.1% of statewide employment were in the coal industry.

[8] U.S. Energy Information Administration "Annual Coal Report, 2023," accessed February 26, 2025, https://www.eia.gov/coal/annual/pdf/acr.pdf.
[9] Metallurgical Coal Producers Association, 2024 Virginia Coal Update.

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The size of the industry, measured by total employment, declined over the past three decades. In Southwest Virginia, the number of jobs in the coal industry declined from 11,874 in 1990 to 2,446 in 2024, averaging a 4.5% annual decrease (Figure 3.2). During the same period, overall employment in the region increased by a modest 0.01% per year.[10]

The declining coal industry employment, combined with modest employment growth in other industries in the region, is an indicator of the waning role of coal production in the regional economy. In 1990, 13.2% of regional workers were employed in the coal industry, but that number fell to 5.5% in 2000 and 2.7% in 2024 (Figure 3.3).

In Southwest Virginia, the coal industry pays a higher wage than the overall regional average (Figure 3.4). In 2024, the annual average regional wage was $45,926, less than half the $101,268 average wage for the regional coal industry. Statewide, the annual average wage of Virginia's coal industry was $98,047, as compared with the $74,760 state average wage. While accounting for only 2.7% of the regional employment, the coal industry accounted for 5.7% of its total wages and salaries in 2024.

Not only are the coal industry's wages much higher than the regional average, but they are also growing faster. From 1990 to 2024, the annual average wage of the Southwest Virginia coal industry grew an average of 3.3% per year in nominal terms. This growth rate is faster than the 2.6% for the region.

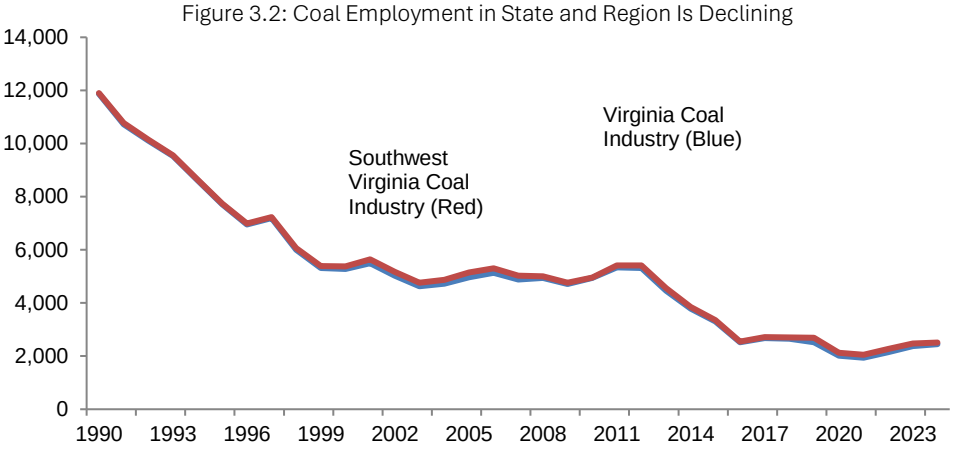
Table 3.1: Almost All State Coal Employment is In Southwest Virginia (2024)

	Southwest Virginia	Virginia	% of Virginia's Employment in Southwest VA
Coal Mining	2,305	2,336	98.7%
Coal Mining Support	141	176	80.1%
Total	**2,446**	**2,511**	**97.4%**

Note: Data reflects the first three quarters of 2024

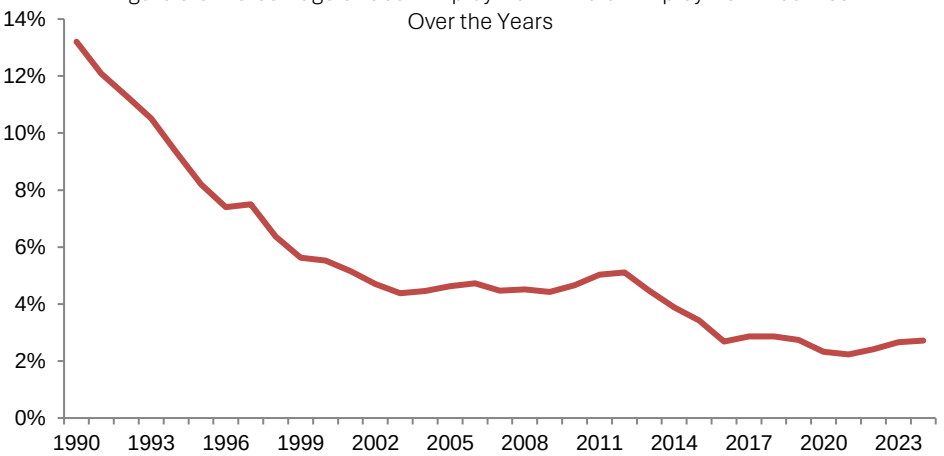
Source: JobsEQ by Chmura

Figure 3.2: Coal Employment in State and Region Is Declining



Source: JobsEQ by Chmura

Figure 3.3: Percentage of Coal Employment in Total Employment Declines Over the Years



Source: JobsEQ by Chmura

[10] Employments of 1990 came from Chmura 2015 report on the economic impact of coal industry in Virginia

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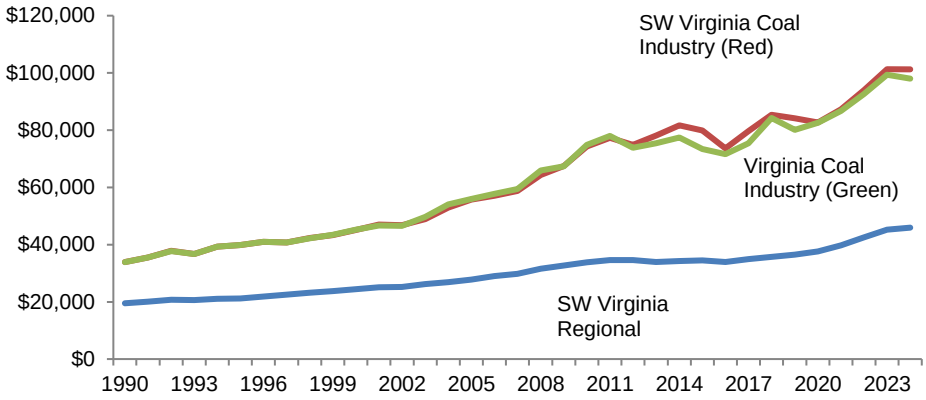
The relatively higher wages paid by the coal industry in Southwest Virginia will have important repercussions on the ripple economic impact, especially the induced impact of the coal industry. The higher average wage indicates that one coal job will support more jobs in service industries, when compared to jobs in low-wage industries, such as retail shops and food services.

Figure 3.4: Coal Industry Pays Higher Wage than Regional Average



Source: JobsEQ by Chmura

3.2. Economic Impact of Virginia's Coal Industry

The coal industry has a significant economic impact in Southwest Virginia and the state of Virginia. Outside coal production, the ongoing operations of the coal industry will support other businesses in the region and state. For example, the coal industry relies on transportation to ship its coal to its final markets; it utilizes machinery, equipment, and electricity in its production process. Therefore, regional businesses in those sectors benefit from the coal industry (indirect impact). Additionally, when coal industry employees spend their wages, local consumer-related services, such as retail stores, restaurants, and hospitals, will see an increase in revenue (induced impact).

Chmura estimated that the total annual economic impact (direct, indirect, and induced) of the coal industry in Southwest Virginia was $1.8 billion in 2024, which supported 5,085 jobs in the region. In terms of direct impact, the total revenue (or sales) of Southwest Virginia's coal industry was an estimated $1.4 billion.[11] The industry employed 2,446 workers in the region in 2024. An additional indirect impact of $184.6 million and 628 jobs benefited other regional businesses that support the coal industry. Examples of those businesses include engineering services, rail transportation, truck transportation, and equipment maintenance and repair. Chmura estimated that the number of jobs supported from the induced impact are 2,011 with associated spending of $216.1 million in 2024. This impact is mostly created when Southwest Virginia coal workers spend their incomes at restaurants, medical offices, and retail establishments around the region.

A standardized method for measuring indirect and induced impacts is through the use of an economic multiplier. The output multiplier measures the amount of indirect and induced impact based on each dollar of the coal industry's direct impact. For the coal industry, the regional output multiplier is 1.29, meaning each dollar in sales of Southwest Virginia's coal production can generate $0.29 in additional regional spending. Similarly, the employment multiplier measures additional jobs that one coal industry job can support. The employment multiplier is 2.1, meaning **each job in Southwest Virginia's coal industry can support an additional 1.1 jobs in the region**.

[11] The direct spending figure is representative of the gross sales (or revenue) of the coal industry.

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The total economic impact (direct, indirect, and induced) of the coal industry in Virginia is larger than in Southwest Virginia. A small component of that increase is due to coal firms in the state outside the Southwest regions.[12] In addition, businesses outside Southwest Virginia can also benefit from the coal industry, boosting statewide indirect and induced impacts. Chmura estimated that the total annual impact of the coal industry in the state reached $2.0 billion, which supported 6,372 jobs in Virginia in 2024. In terms of multipliers, each dollar of sales of Virginia's coal production can generate 41 cents of additional economic value for the state (output multiplier), while **each job in Virginia's coal industry can support an additional 1.5 jobs in the state** (employment multiplier).

Table 3.2: Annual Impact of Coal Industry Reaches $2.0 Billion in Virginia

		Direct	Indirect	Induced	Total
Southwest Virginia	Economic Output (Millions)	$1,384.7	$184.6	$216.1	$1,785.4
	Employment	2,446	628	2,011	5,085
Virginia	Economic Output (Millions)	$1,410.6	$317.9	$258.6	$1,987.1
	Employment	2,511	1,333	2,527	6,372

Note: Numbers may not sum due to rounding

Source: JobsEQ by Chmura

Table 3.3: Coal Industry Contributes 9.9% of the Output in the Regional Economy

		Coal Industry	Overall Economy	Coal Industry Contribution
Southwest Virginia	Economic Output (Millions)	$1,785.4	$17,964.4	9.9%
	Employment	5,330	90,126	5.6%
Virginia	Economic Output (Millions)	$1,987.1	$1,293,940.1	0.2%
	Employment	6,372	4,366,316	0.1%

Source: JobsEQ by Chmura

In 2024, the total economic output of all industries in Southwest Virginia was $18.0 billion.[13] The total economic impact of the regional coal industry was $1.8 billion. As a result, the coal industry contributed 9.9% of the regional output and 5.6% of regional employment, indicating that the productivity of the coal industry is significantly higher than the regional average. These percentages further indicate that the coal industry is one of the most important industries in Southwest Virginia.

Coal shows a relatively larger impact on the Southwest Virginia regional economy than in the statewide economy. In 2024, the total output of all industries in Virginia was $1.3 trillion,[14] while the total economic impact of the coal industry in Virginia was $2.0 billion. As a result, Virginia's coal industry contributed 0.2% of the state industry output and 0.1% of the state employment.

3.3. Fiscal Impact of Coal Industry

In addition to creating jobs and injecting billions of dollars into the state and regional economies, the coal industry also produces tax revenue for the localities in Southwest Virginia and for the state. For the state, the two main tax sources are individual and corporate income tax. For localities in Southwest Virginia, major revenue sources from the coal industry are severance tax (including coal and gas road improvement tax), machinery and tools tax, and property taxes. Chmura also estimated federal income tax from the coal industry. To be conservative, Chmura only estimated the tax revenue from the direct impact.[15]

[12] Please note that the Virginia impact is inclusive of the impact in Southwest Virginia.

[13] This is Chmura estimate based on GDP data from JobsEQ database.

[14] Ibid.

[15] This approach is recommended by Burchell and Listokin in *The Fiscal Impact Handbook*. Center for Urban Policy Research, Rutgers, The State University of New Jersey, New Brunswick, New Jersey, 1978.

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In 2024, Chmura estimated that the Virginia state government received $14.0 million in individual income tax revenue (Table 3.4). To derive this estimate, Chmura first estimated the total wages and salaries of the industry based on the number of employees and average wages. Chmura then applied the state individual income tax rate of 5.5% to these estimates.[16] Finally, after accounting for the estimated profit margin of the coal industry in Virginia, Chmura concluded that **the state government received $15.0 million in corporate income tax in 2024.**

Except for Washington County and the City of Bristol, all localities in Southwest Virginia have a coal severance tax. For those localities, the coal severance tax is levied as 2% of gross receipts of coal mining businesses, of which 1% of the gross receipts is used for coal road improvement.[17] This figure implies the coal industry contributed $27.4 million in severance tax, with $13.7 million allocated for coal road improvement. This number represents all severance tax revenue generated by the coal industry. The actual tax revenue allocated to each locality was less, as Virginia law requires that for localities in the VCEDA region, one-quarter of the coal road improvement revenue must be remitted to VCEDA.[18]

Table 3.4: Coal Industry Contributed $109.3 Million Tax to Federal, State and Local Governments

	Local Governments in Southwest Virginia (Million)	Virginia (Million)	Federal (Million)
Severance Tax (Including Road Improvement Tax)	$27.4		
Real Estate Tax	$2.6		
Machinery & Tool Tax	$7.0		
Individual Income Tax		$14.0	$43.4
Corporate Income Tax		$15.0	
Total	**$37.0**	**$29.0**	**$43.4**

Note: Numbers may not sum due to rounding

Source: Chmura, VCEDA, MCPA

The coal industry in Southwest Virginia also pays real estate taxes and machinery and tools taxes to local governments. Data from the Metallurgical Coal Producers Association (MCPA) showed that coal producers paid $2.6 million in real estate taxes and $7.0 million in machinery and tool taxes for localities in Southwest Virginia.

Based on the average industry wage, Virginia's coal industry also contributed $43.4 million in federal income tax in 2024.

In summary, the coal industry contributed **$37.0 million** in tax to local governments and agencies in Southwest Virginia in 2024**, $29.0 million** to the Virginia state government, and **$43.4 million** to the federal government.

Counties in Southwest Virginia that are more dependent on coal production generate a significant portion of their tax revenues from the industry. In Buchanan County, for example, the coal industry contributed an estimated $18.2 million in taxes in 2024, accounting for 34.7% of the county's local revenue. For Tazewell County, tax revenue from the coal industry contributed an estimated 5.1% of local tax revenue. The coal industry also made significant contributions to local governments in Dickenson County.[19]

In addition to state and local taxes, the coal industry also paid fees to the state agencies. In Virginia, the Department of Energy issues mining permits and licenses for all mining operations, requiring the coal industry to pay annual permit fees for its operations in the state. In addition, the coal industry contributes to the Surface Mine Reclamation Fund, which is used

[16] Virginia has a progressive income tax rate. Chmura estimated this tax rate based on the average wage of the industry. Source: Virginia Tax Department, accessed March 4, 2025,

[17] An additional 1% severance tax can be applied for natural gas production, which will be analyzed in the next section.

[18] Virginia Department of Taxation. "Study of Severance Tax," accessed March 4, 2025, https://www.tax.virginia.gov/study-severance-tax

[19] Chmura was not able to locate the budget document for Dickenson County, thus the percentage contribution was not computed.

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to restore the land after mining operations cease. Data from the Virginia Department of Energy shows that in 2023 and 2024, the state coal industry paid $2.0 million in fees to the state, averaging $1.0 million per year.[20,21]

[20] Data from the Department of Energy via Freedom of Information Act (FOIA). Chmura also filed an FOIA request to the Virginia Department of Environmental Quality and Department of Transportation for information on fees paid by the coal industry but had not received the data at the time of this report.
[21] Not included in these numbers is the benefit of coal industry to the Port of Virginia. Coal is one of the most important commodities exported from the Port of Virginia. Data from Metallurgical Coal Producers Association indicate that over 60% of Virginia Coal is exported and 40% of U.S. coal exports are shipped from the Port of Virginia.

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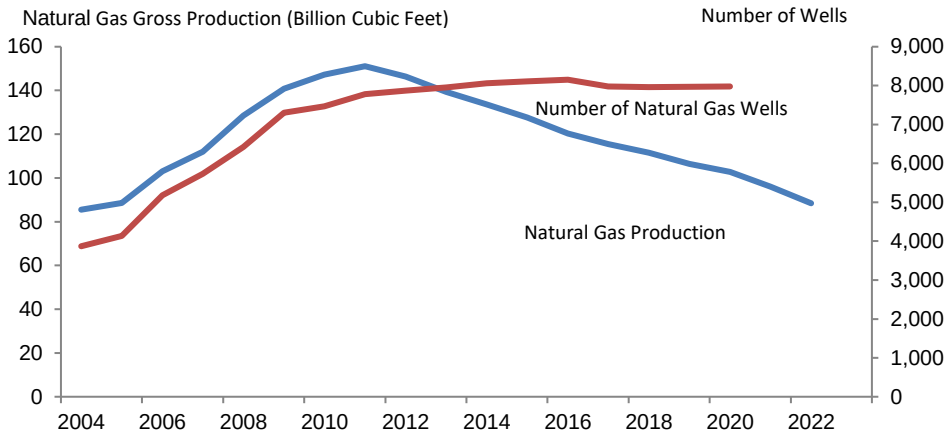
4. Economic Impact of Natural Gas Industry

4.1. Profile of Virginia's Natural Gas Industry

4.1.1 Virginia's Natural Gas Production

Like the coal industry, the majority of Virginia's natural gas production occurs in Southwest Virginia. A large portion of the state's natural gas production is from coalbed methane gas, as well as coal mine methane gas, a type of natural gas produced from organic materials as they are transformed into coal.[22] In 2023, more than four-fifths of Virginia's natural gas production was from coalbed wells.

Figure 4.1: Virginia Natural Gas Production Peaked in 2011



Source: Energy Information Administration, U.S. Department of Energy

Figure 4.1 presents the number of natural gas wells and natural gas production in Virginia, based on the data from the U.S. Department of Energy. The latest data indicate that 7,971 active natural gas wells existed in Virginia as of 2023. After peaking in 2010, the state's natural gas production has steadily declined. The latest production data revealed that Virginia produced 83.4 billion cubic feet of natural gas in 2023.[23]

4.1.2 Natural Gas Employment and Wages

Total employment in Virginia's natural gas industry was 692 in 2024, with 423 in Southwest Virginia (Table 4.1).[24] In this study, Chmura defined the natural gas industry as including these three industries (based on the North America Industrial Classification System -NAICS):

- NAICS 21113: Natural Gas Extraction
- NAICS 213111: Drilling Oil & Gas Wells
- NAICS 213112: Support Activities for Oil & Gas Operations

[22] U.S. Energy Information Administration "Virginia Profile Analysis, 2025," accessed February 27, 2025, https://www.eia.gov/state/analysis.php?sid=VA#:~:text=Most%20of%20Virginia%27s%20natural%20gas,natural%20gas%20reserves%20and%20production.&text=All%20of%20the%20state%27s%20natural,counties%20located%20in%20southwestern%20Virginia.

[23] Ibid.

[24] Data from industry participants are not complete.

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Since Virginia has virtually no petroleum production, Chmura assumes that all businesses belonging to the industries of "Drilling Oil & Gas Wells" and "Support Activities for Oil & Gas Operations" relate to natural gas production.

More than 60% of Virginia's natural gas industry labor force is located in Southwest Virginia. More importantly, nearly 90% of all natural gas extraction employment is located in Southwest Virginia.

The size of Virginia's natural gas industry, measured by its total employment, increased from 2001 to 2008 (Figure 4.2). It has been declining afterward but appears to have stabilized after 2017. Compared with coal, natural gas is considered a cleaner energy source with fewer greenhouse gas emissions. As a result, the demand for natural gas remains strong as many coal-fired power plants switch to natural gas.

Similar to the coal industry in Southwest Virginia, the regional salaries for the natural gas industry are significantly higher than the average regional salaries (Figure 4.3). In 2024, the annual average regional wage was $45,926, which is less than half the average regional wage of $111,131 for the natural gas industry. Meanwhile, the annual average wage of Virginia's natural gas industry was $103,300, compared with the $74,760 state average wage.

Not only are the wages in the natural gas industry higher than the regional average, but they are also

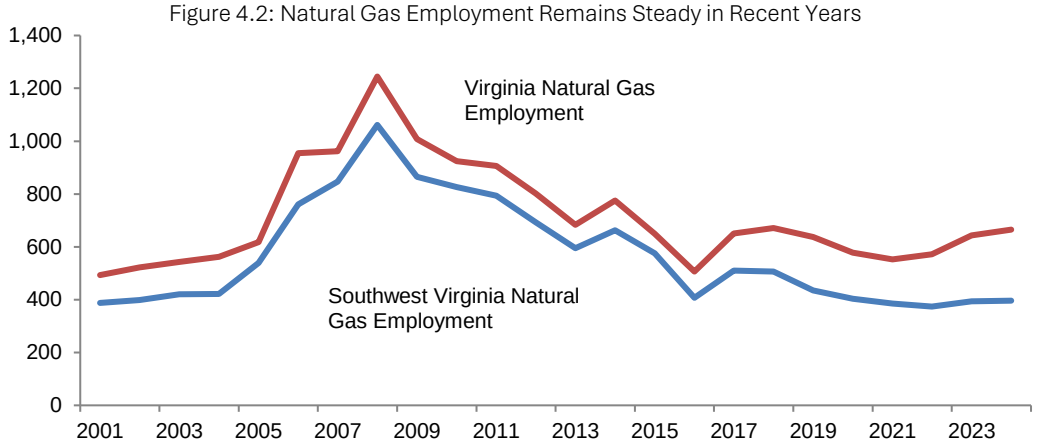
Table 4.1: More than 60% State Natural Gas Employments are In Southwest Virginia (2024)

	Southwest Virginia	Virginia	% of Virginia's Employment in Southwest VA
Natural Gas Extraction	194	216	89.9%
Drilling Oil & Gas Wells	152	207	73.5%
Support Activities for Oil & Gas Operations	77	269	28.5%
Total	**423**	**692**	**61.1%**

Note: Data reflects the first three quarters of 2024

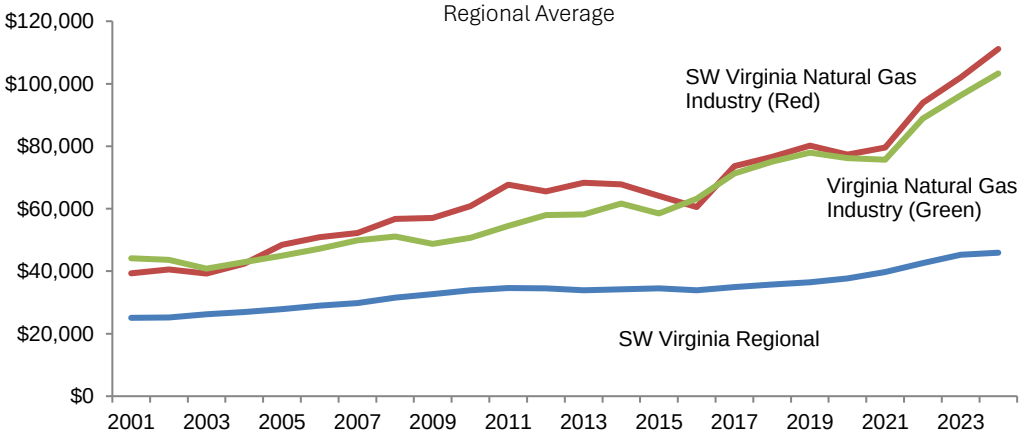
Source: JobsEQ by Chmura and VCEDA

Figure 4.2: Natural Gas Employment Remains Steady in Recent Years



Source: JobsEQ by Chmura

Figure 4.3: Wages of Natural Gas Industry in Southwest Much Higher than Regional Average



Source: JobsEQ by Chmura

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growing faster. From 2001 to 2024, the annual average wage in the Southwest Virginia natural gas industry increased by an average of 4.6% per year. This rate is higher than the regional average wage's 2.7% growth.

4.2. Economic Impact of Virginia's Natural Gas Industry

The ongoing operations of the natural gas industry support other businesses in Southwest Virginia and the state. Chmura estimated that the total annual economic impact (direct, indirect, and induced) of Southwest Virginia's natural gas industry was $481.7 million in 2024, which supported 1,115 jobs in the region. In terms of direct impact, Chmura estimated that the total revenue (or sales) of Southwest Virginia's natural gas industry was $393.3 million.[25] The industry employed 423 workers in the region in 2024. An additional indirect impact of $51.7 million and 327 jobs benefited other regional businesses that support the natural gas industry.[26] Chmura estimated that the number of jobs supported from the induced impact was 366, with associated annual spending of $36.6 million in 2024. In terms of multipliers, each dollar of sales in Southwest Virginia's natural gas industry can generate 22 cents of additional economic value for the region (output multiplier), while **each job in Southwest Virginia's natural gas industry can support an additional 1.6 jobs in the region** (employment multiplier).

The total economic impact (direct, indirect, and induced) of the natural gas industry in Virginia is greater than that of the southwest region. Chmura estimated that the total annual impact in the state reached $772.4 million, supporting 2,368 jobs in 2024. In terms of multipliers, each dollar of sales in Virginia's natural gas industry can generate 59 cents of additional economic value for the state (output multiplier), while each job in the state's natural gas industry can support an additional 2.4 jobs in the state (employment multiplier).

Table 4.2: Annual Impact of Natural Gas Industry Reaches $772 Million in Virginia

		Direct	Indirect	Induced	Total
Southwest Virginia	Economic Output (Million)	$393.3	$51.7	$36.6	$481.7
	Employment	423	327	366	1,115
Virginia	Economic Output (Million)	$487.2	$219.8	$65.4	$772.4
	Employment	692	1,036	640	2,368

Note: Numbers may not sum due to rounding

Source: JobsEQ by Chmura

Table 4.3: The Natural Gas Industry Contributes 2.5% of the Output in the Regional Economy

		Natural Gas Industry	Overall Economy	Natural Gas Industry Contribution
Southwest Virginia	Economic Output (Millions)	$481.7	$17,964.4	2.7%
	Employment	1,115	90,126	1.2%
Virginia	Economic Output (Millions)	$772.4	$1,293,940.1	0.1%
	Employment	2,368	4,366,316	0.1%

Source: JobsEQ by Chmura

In 2024, the total output of all industries in Southwest Virginia was $18.0 billion.[27] The total economic impact of the regional natural gas industry was $481.7 million. As a result, the natural gas industry contributed 2.7% to the regional output and 1.2% to regional employment, indicating that the productivity of the regional natural gas industry is significantly higher than the regional average (Table 4.3).

[25] The direct spending figure represents the gross sales (or revenue) of the natural gas industry. This estimate is consistent with the output and prices of the natural gas in Virginia.
[26] Please note that onsite contractors for gas extraction industries are included either as direct employment of supporting industries or indirect impact.
[27] This figure is based on GDP data from Chmura's proprietary JobsEQ platform.

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4.3. Fiscal Impact of Natural Gas Industry

In addition to creating jobs and injecting millions of dollars into the state and regional economies, the natural gas industry also generates tax revenue for localities in Southwest Virginia, the state of Virginia, and the federal government.

In 2024, Chmura estimated that the Virginia state government received $4.1 million in individual income tax revenue (Table 4.4). Chmura derived this estimate based on the average wage and salaries of the industry and an individual income tax rate of 5.5%. After accounting for the estimated natural gas industry profit margin, Chmura concluded that the state government received $1.8 million in corporate income tax in 2024.

Table 4.4: Natural Gas Industry Contributed $36.7 Million Tax to Federal, State and Local Governments

	Local Governments in Southwest Virginia (Million)	Virginia (Million)	Federal (Million)
Severance Tax (including Road Improvement Tax)	$10.3		
Property Tax	$7.9		
Individual Income Tax		$4.1	$12.7
Corporate Income Tax		$1.8	
Total	**$18.2**	**$5.8**	**$12.7**

Note: Numbers may not sum due to rounding

Source: Chmura and VCEDA

Except for Washington County and the City of Bristol, all localities in the region have natural gas severance tax. The tax rate is 3% of gross receipts of natural gas extraction. Of the total severance tax, 1% is set aside for gas road improvement. Based on the industry revenue, Chmura estimated that the natural gas industry contributed $10.3 million in total severance tax, including $3.4 million in road improvement tax in Southwest Virginia in 2024. This number represents all severance tax revenue generated by the natural gas industry, including the portion remitted to VCEDA.

The natural gas industry in Southwest Virginia also pays property taxes (including real estate tax and machinery and tools tax) to the local governments. Data from industry participants showed that they paid $7.9 million in property tax in 2023.[28]

Based on the average industry wage, Virginia's natural gas industry also contributed $12.7 million in federal income tax in 2024.

In summary, natural gas industry contributed **$18.2 million** tax to local governments and agencies in Southwest Virginia in 2024, **$5.8 million** to the Virginia state government, and **$12.7 million** to the federal government.

[28] Based on reported data from the industry participants, and this number is not complete as some participants chose not to report the data. 2024 data were not available at the time of this report.

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5. Economic Impact of VCEDA

The Virginia Coalfield Economic Development Authority (VCEDA) was created in 1988 by the General Assembly of Virginia to enhance and diversify the economic base of Southwest Virginia's coal-producing region. This authority encompasses the counties of Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, and Wise, as well as the city of Norton (VCEDA region).

This section examines the economic impact of VCEDA in Southwest Virginia and the Commonwealth of Virginia.[29] The source of economic impact is the businesses attracted and retained with the help of VCEDA.[30] Since its inception, VCEDA has helped many businesses to locate and expand in the region. Those jobs generate sustained economic impact in Southwest Virginia by employing thousands of workers and generating business sales and revenues.

5.1. Jobs Attributed to VCEDA

Since its establishment in 1988, VCEDA has facilitated 530 business attraction and expansion projects through 2024. Those projects include attracting new businesses to the region and assisting existing businesses in their expansion. In total, VCEDA's efforts helped attract and retain a total of 28,036 full-time and part-time jobs (VCEDA-assisted jobs) in the region (Table 5.1). The total investment of these projects reached $3.3 billion.[32] All localities in the VCEDA region benefited from the job attraction and retention efforts by VCEDA, with each locality adding more than one thousand jobs.

Table 5.1: VCEDA Helps Attract and Retain 28,000 Jobs

Locality	Number of Businesses	Number of Jobs
Buchanan	54	3,273
Dickenson	64	2,316
Lee	35	1,620
Russell	85	6,664
Scott	57	3,218
Tazewell	118	3,900
Wise/Norton	104	5,490
Various Locations[31]	13	1,555
VCEDA Total	**530**	**28,036**

Source: VCEDA

In addition to supporting job creation in Southwest Virginia, VCEDA also helps diversify the regional economy, which lays the foundation for sustained future economic growth. Challenged with the declining coal mining industry, VCEDA attracted jobs in a wide range of advanced manufacturing and professional and business industries. As Table 5.2 shows, 12,838 of all VCEDA-assisted jobs were in manufacturing, and 8,448 were in professional and business services. Tourism industries also grew with the support from VCEDA, generating many jobs in the trade and leisure sectors. Those efforts helped diversify the regional economy.[33]

[29] In 2018, Chmura estimated the economic impact of VCEDA with data up to 2018. This analysis updates that study with the data from 2019 to 2024.
[30] The one-time economic impact of capital expenditures and investment is not included in this analysis.
[31] Various locations are those projects with jobs in multiple locations, or region-wide projects.
[32] Those projects do not include VCEDA investment in site development or utility construction not involving third-party businesses. VCEDA initiated several infrastructure development projects, such as extending water-sewer lines, without permanent jobs attached. Those projects are excluded in this study.
[33] Section 5.3 provides a more detailed analysis of the effect of VCEDA on economic diversity.

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5.2. Economic Impact of VCEDA

The economic impact of VCEDA is measured using 2024 as a benchmark, assuming jobs brought to the region by VCEDA are permanent jobs.[34] The 28,036 jobs in the VCEDA region will also support other businesses in Southwest Virginia and throughout the state due to the multiplier effect.

Chmura estimated that the total annual economic impact (direct, indirect, and induced) of VCEDA reached $11.2 billion in 2024 and supported 45,045 jobs in Southwest Virginia (Table 5.3). In terms of direct impact, Chmura estimated that the total revenue (or sales) of all businesses assisted by VCEDA was $8.4 billion in 2024, with associated direct employment of 28,036. An additional indirect impact of $1.8 billion and 8,814 jobs benefited other Southwest Virginia businesses that support VCEDA-assisted businesses. The number of jobs supported by the induced impact is an estimated 8,195, with associated annual spending of $1.0 billion. In terms of multipliers, each dollar of sales in VCEDA-assisted businesses can generate 34 cents in additional economic value for the region (output multiplier), while each VCEDA-assisted job can support an additional 0.61 jobs in the region (employment multiplier).

Table 5.2: VCEDA Helps Jobs in Diverse Industries

Industry Sector	Number of Businesses	Number of Jobs
Construction	9	452
Education & Health	35	854
Finance, Insurance, & Real Estate	10	115
Government	7	886
Information	12	838
Leisure	93	1,369
Manufacturing	184	12,838
Natural Resources	20	742
Other Services	19	245
Professional & Business Services	88	8,448
Trade (Wholesale & Retail)	44	801
Transportation, Warehousing, & Utility	9	448
Total	**530**	**28,036**

Source: VCEDA

The total annual economic impact (direct, indirect, and induced) of VCEDA in Virginia is larger than the Southwest Virginia regional impact. Chmura estimated that the total impact in the state reached $12.8 billion that supported 53,051 jobs in Virginia in 2024. The direct impact in Virginia is the same as that in Southwest Virginia, estimated at $8.4 billion and 28,036 jobs. Indirect impacts of $2.6 billion and 12,039 jobs benefited other Virginia businesses that provided materials and services to VCEDA-assisted businesses. The number of jobs supported due to the induced impact was 12,976 with associated annual spending of $1.7 billion in 2024. In terms of multipliers, each dollar of sales in VCEDA-assisted businesses can generate 52 cents in additional economic value for the state (output multiplier), while each VCEDA-assisted job can support an additional 0.89 jobs in Virginia (employment multiplier).

Table 5.3: Annual Impact of VCEDA Reached $12.8 Billion in Virginia in 2024

		Direct	Indirect	Induced	Total
Southwest Virginia	Spending (Million)	$8,386.2	$1,794.4	$1,031.7	$11,212.3
	Employment	28,036	8,814	8,195	45,045
Virginia	Spending (Million)	$8,386.2	$2,640.9	$1,728.8	$12,756.0
	Employment	28,036	12,039	12,976	53,051

Note: Number may not sum due to rounding

Source: JobsEQ by Chmura

[34] It is possible that some of these jobs may been lost due to the recession or other economic forces. However, the firm-specific data are not available to confirm if such is the case.

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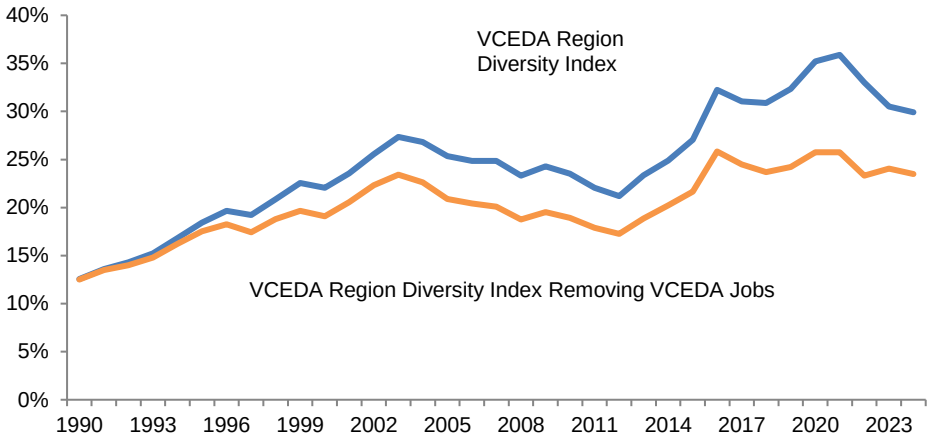
5.3. Other Benefits of VCEDA

In addition to the economic impact generated by VCEDA in terms of total revenue and jobs, Chmura also analyzed the effect of VCEDA in enhancing economic diversity, reducing unemployment, and lowering payments from government-assistance programs in the VCEDA region.

5.3.1. Impact on Economic Diversity

According to Virginia law, one of the key missions of VCEDA is to enhance and diversify the economic base of Virginia's coal-producing region. As presented in Section 5.1, VCEDA has attracted businesses from a wide range of industries to the region, particularly those in the manufacturing and professional and business services sectors. Those efforts helped diversify the regional economy.

Figure 5.1: VCEDA Improved Economic Diversity



Note: 2024 data represent the first three quarters
Source: VCEDA, JobsEQ by Chmura

To quantify the effect of VCEDA-assisted jobs on regional economic diversity, Chmura first constructed an industry diversity measure with employment data from 1990 to 2024. Chmura then computed the diversity measure of the regional economy, excluding jobs brought to the region by VCEDA.[35] In doing so, Chmura chose the Hachman diversity index to measure the economic diversity of the region. This index utilizes Virginia's industry structure as a benchmark. The value of the diversity index ranges from 0% to 100%, with higher values indicating a more diversified regional economy. The Hachman diversity index is calculated as the inverse of the sum of the weighted location quotients of all industries in the region.[36]

Chmura's analysis indicates that VCEDA has significantly contributed to diversifying the regional economy since 1990. In 2024, the diversity index of the region was 29.9%, representing a significant improvement from 12.6% in 1990 (Figure 5.1). Since 2012, diversification has accelerated and reached its peak in 2021. Without jobs attracted or retained by VCEDA, however, the diversity index score for 2024 would lower to 23.5%.[37] While this number remains higher than the diversity scores in the 1990s and 2000s, showing that the regional economy is becoming more diversified over time, the efforts by VCEDA greatly accelerated the process.

The regional diversity index peaked in 2021 and declined in subsequent years. The main reason is that the industry that is highly concentrated in the region—mining and extraction—added more jobs during this period. This sector added 500 jobs from 2021 to 2024. While coal mining jobs declined, the success of regional natural gas industry reinforces the industry concentration in the mining and extraction sector. On the other hand, sectors such as professional and business services

[35] This methodology is the same methodology used in the previous Chmura studies.
[36] Hatchman, "Economic Report to the Governor, State of Utah", by Hachman, 1995.
[37] In this analysis, Chmura assumed that VCEDA-assisted jobs have the same turnover rate as the industry average.

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lost over 900 jobs from 2021 to 2024. During the Covid-19 pandemic, several large call centers in the region closed. Professional and business service are industries the region has been making a strong effort to attract to diversify the economic base. The loss of those jobs also negatively affects the economic diversity of the region

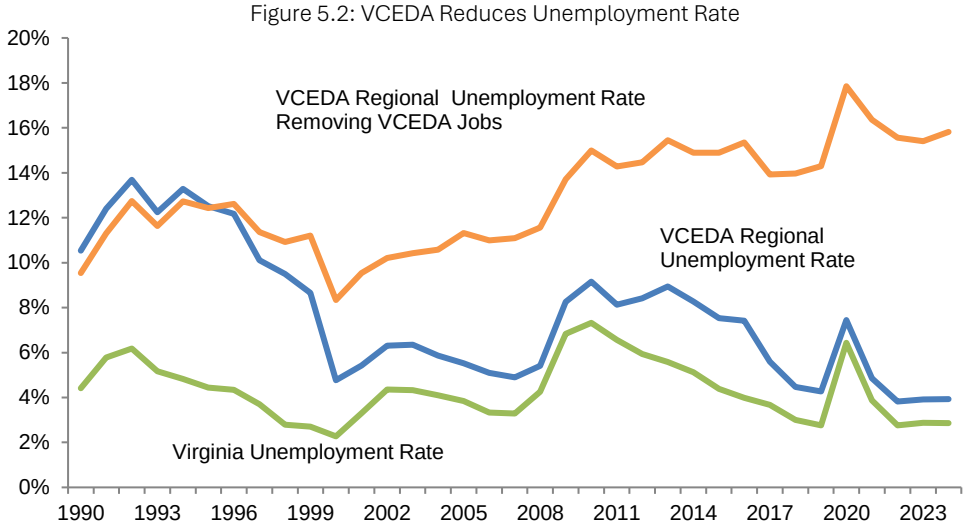
5.3.2. Impact on Unemployment Reduction

VCEDA-assisted jobs also help to reduce unemployment in the region. To estimate the effect of VCEDA-assisted jobs in reducing the regional unemployment rate, Chmura calculated the regional unemployment rate from 1990 to 2024, and the "would-be" unemployment rate of the region – removing jobs brought to the region by VCEDA.[38]

VCEDA made considerable contributions in reducing the unemployment rate in the region (Figure 5.2). Based on the latest data, the regional unemployment rate was 3.9% in 2024, higher than the state average of 2.9%. In the 1990s, however, the region's unemployment situation was much worse than the state average. For example, in 1990, shortly after VCEDA was established, the region's unemployment rate was 10.7%, more than double the state average of 4.4%. The gap between state and regional unemployment rates narrowed significantly after 2000.

Without VCEDA's attraction or retention efforts, the region's unemployment rate would be much higher. For example, the estimate would put the 2024 unemployment rate at 15.8% when jobs related to VCEDA were removed and added to regional unemployment.[39] The effect of VCEDA in reducing regional unemployment became more pronounced, especially after the 2007-09 recession. Without VCEDA-assisted jobs, the region's unemployment rate would have remained in double digits from 2010 to 2024. However, the actual regional unemployment rate declined sharply, from 9.0% in 2010 to 3.9% in 2024.

Figure 5.2: VCEDA Reduces Unemployment Rate



Source: JobsEQ by Chmura

5.3.3. Impact on Payment of Government Assistance Programs

The jobs attracted and retained by VCEDA help regional residents earn wages and salaries. These jobs also reduce payments from government-assistance programs to regional households. In this analysis, Chmura estimated the effect of VCEDA on three types of government assistance programs: unemployment insurance (UI), Supplemental Nutrition

[38] This methodology is the same methodology used in previous Chmura studies.

[39] In this estimate, Chmura took into consideration commuting and migration patterns and did not add back estimated commuters and those who may move out of the region.

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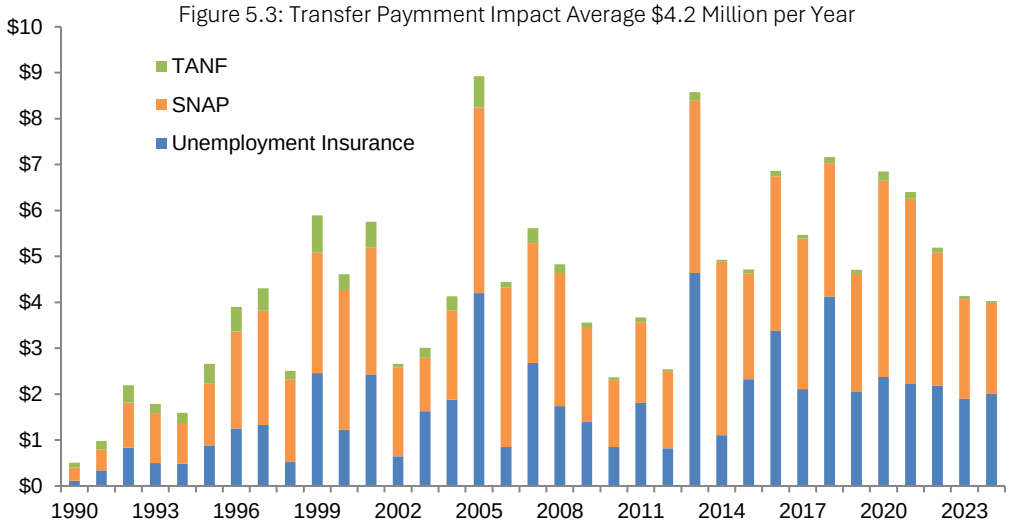
Assistance Program (SNAP, formerly known as food stamps), and Temporary Assistance for Needy Families (TANF).[40] In this exercise, Chmura took a broad view of the impact of VCEDA on those programs and assumed that the number of VCEDA-assisted jobs will eventually reduce the number of unemployed individuals in the region.[41]

Figure 5.3 presents the potential increase in government-assistance program payments if VCEDA-assisted jobs were not available in the region. This figure only includes the impact for the state government of Virginia, as some of those jobs may be taken by residents in other states.

Figure 5.3: Transfer Paymment Impact Average $4.2 Million per Year



Source: Virginia Department of Social Service & Chmura

For unemployment insurance programs, Chmura used the following methodology. In 2024, for example, VCEDA was involved in various projects that resulted in 529 new jobs for the region. Based on commuting patterns, Chmura estimated that 89% of those jobs would be taken by Virginia residents, resulting in 468 jobs for Virginians. If those workers were unemployed, they could apply for unemployment benefits in Virginia. The latest data indicate that the average benefit was $352.3 per week for a duration of 12.1 weeks.[42] As a result, VCEDA-assisted jobs would save the state government $2.1 million in 2024. From 1989 to 2024, VCEDA-assisted jobs would have saved Virginia $61.4 million in cumulative unemployment insurance payments.

Low-income households are eligible for SNAP and TANF assistance programs, which are based on household income. The average annual wages for VCEDA-assisted jobs from 2019 to 2024 was about $36,152[43], while the current federal poverty line is $32,150 for a family of four.[44] It is conceivable that for individuals receiving government assistance such as SNAP or TANF, VCEDA-assisted jobs helped them exit those two programs.

For the SNAP program, the challenge is to estimate how many Virginia residents might be able to leave the program due to new job opportunities created by VCEDA. Not every Virginia resident, even if they are unemployed, receives SNAP benefits because they may live in a household where the household income exceeds SNAP income criteria. Data from the

[40] SNAP and TANF are two popular programs for low-income families. These families can also benefit from programs such as housing assistance or Medicaid. Chmura did not include housing assistance due to the relatively small size of the program. Those programs are not included to be consistent with prior studies.

[41] It is possible that some VCEDA-assisted jobs will be filled by currently unemployed individuals, and some will be filled by people switching jobs from other businesses in the region. When VCEDA jobs are taken by job-switchers, it will set off a chain reaction as the businesses losing workers will look to replace the individuals who leave. The result is that unemployment in VCEDA region will eventually be reduced.

[42] Those numbers are the latest Virginia state average payment and duration amounts, based on the 2024 data. Source: Bureau of Labor Statistics, http://www.oui.doleta.gov/unemploy/claimssum.asp.

[43] Chmura's calculation based on data from VCEDA from 2019 to 2024.

[44] U.S. Department of Health and Human Services, "HHS Poverty guidelines for 2025,' accessed March 25, 2025, https://aspe.hhs.gov/poverty-guidelines. The federal poverty line is published once a year.

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United States Department of Agriculture indicate that in 2016, 89% of the country's unemployed population participated in the SNAP program.[45] Using this parameter, Chmura estimated that 417 of the 468 unemployed Virginians who gained new jobs due to VCEDA would leave the SNAP program in 2025.

The latest data from the Virginia Department of Social Services indicate that qualified households received a monthly payment of $331.7 per month from the SNAP program in 2024,[46] for a duration of 16.3 months.[47] As a result, with VCEDA-assisted jobs in 2024, the state government could save $2.0 million from reduced SNAP payments. From 1989 to 2024, VCEDA-attracted jobs would have saved Virginia $82.2 million in SNAP program payments.

Fewer families receive TANF benefits when compared to SNAP, as the qualifying criteria for the TANF program are stricter. According to 2024 data from the Virginia Department of Social Services, a monthly average of 14,194 households received TANF benefits, compared with 452,550 households receiving SNAP benefits. Using this information as a guide, Chmura estimated that for newly employed Virginia residents due to VCEDA-assisted jobs in 2024, an estimated 15 can leave the TANF program. The latest data indicate that in 2024, households in the TANF program received an average monthly cash payment of $416.0[48] for a duration of 14.2 months.[49] As a result, with jobs opportunities generated by VCEDA, the state government could save $0.1 million in 2024. From 1989 to 2024, VCEDA-assisted jobs would have saved Virginia $8.0 million in SNAP program payments.

In summary, Chmura estimated that VCEDA-assisted jobs could have saved the Virginia government $4.2 million per year from reduced payments of three government assistance programs. Total savings are $151.6 million from 1989 to 2024.

[45] USDA, "Characteristics of Supplemental Nutrition Assistance Program Households: Fiscal Year 2016." https://www.fns.usda.gov/snap/characteristics-supplemental-nutrition-assistance-program-households-fiscal-year-2016. This data is still the latest data.
[46] Virginia Department of Social Services, "SNAP Case Load & Expenditures," accessed February 25, 2025, http://www.dss.virginia.gov/geninfo/annual_report/benefits/index.html?pageID=1.
[47] USDA, "SNAP Household State Average for SNAP Benefits (FY2020)," accessed February 25, 2025, https://www.fns.usda.gov/SNAP-household-state-averages/2020
[48] Virginia Department of Social Services, "TANF Case Load & Payments," accessed February 25, 2025, ahttp://www.dss.virginia.gov/geninfo/annual_report/benefits/index.html?pageID=3.
[49] US Census, "Dynamics of Economic Well-Being: Participation in Government Programs, 2009-2012: Who Gets Assistance," accessed Marh 25, 2025, https://www.census.gov/content/dam/Census/library/publications/2015/demo/p70-141.pdf

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Appendix 1. Methodology

A1.1. Economic Impact Methodology

This section estimates the economic impact of both Virginia's coal industry, natural gas industry, and VCEDA.

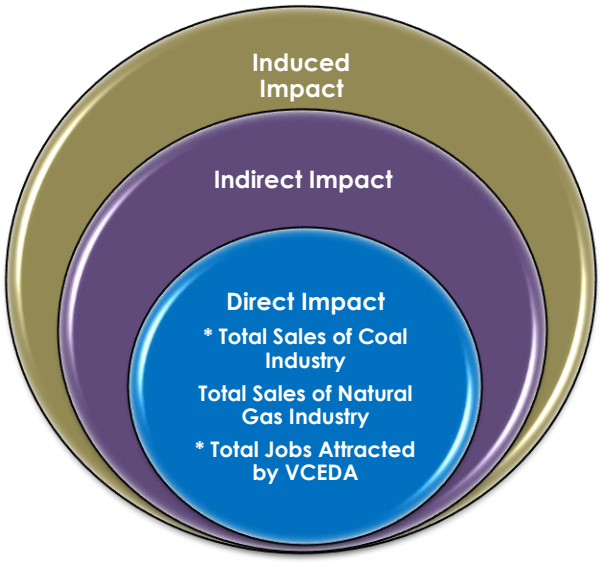
- For Virginia's coal industry, the economic impact mainly comes from revenue generated from coal production, as well as businesses supporting coal production. Those businesses employ thousands of workers in Southwest Virginia and Virginia, benefiting the regional economy.

- For Virginia's natural gas industry, similarly, the economic impact mainly comes from revenue generated from natural gas production, as well as businesses supporting natural gas production. Those businesses employ hundreds of workers in Southwest Virginia and Virginia, benefiting the regional economy.

- For VCEDA, its economic impact comes from new businesses it helps to attract to Southwest Virginia, generating thousands of jobs in the region.

While the three components above constitute the direct economic impact of the coal, natural gas industries, and VCEDA, the total economic impact also includes ripple effects of the direct impact (Figure 3.1). Ripple effects, categorized as indirect and induced impacts,[50] measure secondary benefits that can be generated by the coal industry or the operations of VCEDA-attracted businesses. Using coal mining as an example, indirect impact is increased sales and employment for local businesses that support coal mining operations, such as truck transportation, utilities, and equipment rentals. Induced impact is increased sales and employment that occur in local communities where employees of the coal industry live and spend their wages. The benefactors of the induced impact are primarily consumer-related businesses such as retail stores, restaurants, and hospitals.

Figure A.1: Economic Impact Illustration



Source: Chmura

[50] See the appendix for terms and definitions.

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Data for the direct impact, such as employment in Virginia's coal industry, as well as Southwest Virginia jobs VCEDA helps to attract, came from Chmura's JobsEQ database and VCEDA. The indirect and induced impacts were estimated with Chmura's proprietary JobsEQ Economic Impact model software after the direct impact was identified.

In addition to analyzing spending and employment impacts of the coal industry, this study also estimates the contribution of the coal industry to state and local governments. Local governments will collect tax revenue from the following sources:

- Severance taxes from coal and gas industries, including coal and gas road improvement tax
- Other local taxes from the coal industry such as property tax, and machinery and tools tax

The Virginia State Government can benefit from individual and corporate income taxes from the coal industry. In addition, Virginia's coal industry also pays a variety of permit fees to the Department of Energy and other state agencies. Chmura obtained data on those fees by contacting the agencies directly. In addition, this study also analyzes the benefits of VCEDA, since its inception, in reducing the unemployment rate and diversifying the regional economy.

A1.2. Impact Analysis Glossary

JobsEQ Economic Impact – an economic impact assessment modeling system. It allows the user to build economic models to estimate the impacts of economic changes in states, counties, or communities.

Input-Output Analysis – an examination of business-business and business-consumer economic relationships capturing all monetary transactions in a given period, allowing one to calculate the effects of a change in an economic activity on the entire economy (impact analysis).

Direct Impact – economic activity generated by a project or operation. For construction, this represents the activity of the contractor; for operations, this represents activity by tenants of the property.

Indirect Impact – secondary economic activity that is generated by a project or operation. An example might be a new office building generating demand for parking garages.

Induced (Household) Impact – economic activity generated by household income resulting from direct and indirect impacts.

Ripple Effect – the sum of induced and indirect impacts. In some projects, it is more appropriate to report ripple effects than indirect and induced impacts separately.

Multiplier – the cumulative impacts of a unit change in economic activity on the entire economy

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Direct Impact

- Economic activity generated by ongoing operations of a business (typically measured by total revenue or total operational ex-penditure).
- Example: Business revenue.

Indirect Impact

- Secondary economic activity generated by business operations.
- Example: Landscaping companies, office supply companies, etc.

Induced Impact

- Economic activity generated when workers and business suppliers spend their income at retail stores, restaurants, and professional offices.
- Example: Workers spending money at a gas station.

Total

Direct
+
Indirect
+
Induced

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