

A topographic map of Northeastern Pennsylvania with several regions highlighted in blue. The highlighted areas include the Pocono Mountains region in the north, the Susquehanna River valley, and several smaller mountainous areas in the south and west. County names like Luzerne, Carbon, and Wyoming are visible. A white box with a black border is overlaid on the top left of the map.

Appalachian Regional Commission Study:

Economic Impacts and
Effects of Coal Mining in
Northeastern Pennsylvania

The **INSTITUTE** for

Public Policy & Economic Development

at Wilkes University

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Executive Summary

Northeastern Pennsylvania is commonly referred to as the “Coal Region;” it has the world’s largest reserves of anthracite coal. The landscape is covered with mines, culm banks, and abandoned or dilapidated patch towns. The regional identity is forever intertwined with coal and its subsequent demise. Coal helped shape transportation routes and networks throughout northeastern Pennsylvania, connecting it to New York, New York City, Philadelphia, and Baltimore. It helped shape labor movements locally and nationally, which resulted in the United Mine Workers of America enacting legislation that ended child labor in the mines.

Anthracite coal mining was the region’s leading industry and the economy heavily relied on its prosperity and growth. Pennsylvania led the national coal market until the Great Depression, when it suffered a drop in sales. The industry was revived by the World Wars but then fell again following the growing prevalence and declining cost of natural gas in the 1960s and 1970s. The coal industry has continued to experience decline over the years, matched in decreases in employment, unstable market prices, and less overall production.

The coal mining industry did not just affect northeast Pennsylvania’s economy. It is dangerous work. The region suffered a loss in economic development and human capital as a result of the 31,085 people who lost their lives in anthracite mines from 1870 to 2017. Miners also have health issues due to their profession; recently there has been an upsurge in diagnosis of black lung, or coal worker’s pneumoconiosis, and the disease is deadlier than ever.

Mining affects the environment as well. The area suffers from incidents of subsidence, mine and culm bank fires, and acid mine drainage as well as other consequences of abandoned mine lands. The region is characterized by vacant and blighted infrastructure. As a result of historical and current lack of a diversified economy, the region is at risk of further decline. The majority of the area is ranked as highly dependent on the coal industry and has a high risk of experiencing more economic hardship due to continued decrease in individual county coal-related activities.

The total effect of the loss of coal, its supply chain, adjacent industries, and fossil fuel generation from 2001 – 2018 in northeastern Pennsylvania exceeds \$783 million and 1,426 jobs. Some counties have been hit more severely than others, but it is important to note that some counties’ loss of coal mining could not be measured because the loss was considered too small for the U.S. Bureau of Labor Statistics to measure. This does not mean there was no loss. Even counties with positive impact from fossil fuel generation could net much smaller returns if coal mining was factored into the equation. Further, the impact of rail and blight is not factored into each county’s analysis. It is presented in the aggregate. Finally, it should be noted that these counties comprise a larger economic region; negative effects can still be felt across the county lines because commute patterns were not able to be factored into the models.

| | Total Effect | | | | | | Total |
|--------------------|--------------|----------------|-------------------|-----------------|----------------|---------------------|-----------------|
| | Employment | Labor Income | Total Value Added | Output | Federal Taxes | State & Local Taxes | |
| Bradford | -317.4 | (\$17,197,077) | (\$55,948,909) | (\$118,945,434) | (\$6,112,846) | (\$11,490,709) | (\$209,695,292) |
| Carbon | -42.8 | (\$252,177) | (\$6,689,570) | (\$22,801,124) | (\$808,071) | (\$3,013,055) | (\$33,564,040) |
| Columbia | 23.2 | \$753,118 | \$2,911,551 | \$8,298,258 | \$259,071 | \$488,542 | \$12,710,563 |
| Lackawanna | 147.1 | \$11,821,455 | \$28,356,057 | \$62,850,101 | \$3,236,322 | \$6,144,460 | \$112,408,542 |
| Luzerne | -640.6 | (\$46,189,016) | (\$142,833,403) | (\$257,815,682) | (\$15,408,171) | (\$17,327,107) | (\$479,574,020) |
| Monroe | -354.5 | (\$20,106,507) | (\$48,249,726) | (\$107,986,917) | (\$4,911,563) | (\$11,548,222) | (\$192,803,290) |
| Montour | 108.9 | \$15,877,350 | \$43,508,452 | \$93,171,604 | \$5,058,474 | \$8,202,964 | \$165,818,953 |
| Pike | -46.5 | (\$2,048,425) | (\$5,973,265) | (\$14,507,672) | (\$600,316) | (\$1,600,033) | (\$24,729,758) |
| Schuylkill | 137.1 | \$9,103,680 | \$27,511,048 | \$64,574,001 | \$3,049,140 | \$6,048,116 | \$110,286,122 |
| Sullivan | 0 | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Susquehanna | -77.4 | (\$4,167,557) | (\$14,641,231) | (\$30,288,692) | (\$1,580,475) | (\$2,942,106) | (\$53,620,138) |
| Wayne | -287.1 | (\$12,972,820) | (\$33,861,751) | (\$79,690,926) | (\$3,241,257) | (\$8,922,427) | (\$138,689,468) |
| Wyoming | -76 | (\$4,288,931) | (\$14,143,928) | (\$29,791,581) | (\$1,385,966) | (\$2,905,416) | (\$52,515,898) |
| Total | -1,426 | (\$69,666,907) | (\$220,054,675) | (\$432,934,064) | (\$22,445,658) | (\$38,864,993) | (\$783,967,723) |

Out of the thirteen counties comprising the geographic scope of this report, just four – Carbon, Columbia, Luzerne, and Schuylkill – are currently home to an active coal mining industry. But even these last holdouts of Northeastern Pennsylvania’s coal economy are not immune from the inexorable decline of the coal industry. From 2001 to 2018, the Coal Mining and Fossil Fuel Electric Power Generation industries in these four counties shed a total of 473 positions, either from within those industries or through supply chain vendors and other regional firms, as well as \$36 million in lost labor income and \$182.4 million in lost economic output. Jobs affected by this shift span a wide range of industries, from employment services and wholesale trade to market research and commercial repair and maintenance.

| Total Economic Impact, Coal-Producing Counties | | | | |
|--|---------------|-----------------------|------------------------|------------------------|
| Impact Type | Employment | Labor Income | Value Added | Output |
| Direct Effect | -167.0 | (\$18,352,906) | (\$66,736,484) | (\$140,628,357) |
| Indirect Effect | -119.8 | (\$9,781,135) | (\$21,466,204) | (\$18,472,494) |
| Induced Effect | -186.4 | (\$7,898,714) | (\$23,139,566) | (\$23,253,695) |
| Total Effect | -473.2 | (\$36,032,755) | (\$111,342,254) | (\$182,354,546) |

| Employment Impact of Coal and Coal-Adjacent Industries, Coal-Producing Counties | | | | |
|---|------------|----------------|----------------|-----------------|
| Industry Sector | Employment | Labor Income | Value Added | Output |
| Coal mining | -97.9 | (\$7,131,545) | (\$27,820,752) | (\$46,848,393) |
| Electric power generation - fossil fuel | -90.9 | (\$12,069,742) | (\$44,753,769) | (\$116,609,740) |
| Employment services | -25.9 | (\$662,125) | (\$925,883) | (\$1,460,149) |
| Full service restaurants | -17.8 | (\$370,016) | (\$415,775) | (\$833,690) |
| Real estate | -9.2 | (\$45,628) | (\$697,537) | (\$1,200,652) |
| Wholesale trade | -9.1 | (\$647,001) | (\$1,291,702) | (\$1,982,492) |
| Marketing research and all other miscellaneous professional, scientific, and technical services | -8.7 | (\$340,485) | (\$322,705) | (\$521,554) |
| Maintenance and repair construction of nonresidential structures | -8.7 | (\$470,563) | (\$636,058) | (\$1,345,361) |
| Hospitals | -8.6 | (\$630,591) | (\$700,255) | (\$1,345,256) |
| Limited-service restaurants | -7.3 | (\$144,652) | (\$343,254) | (\$617,195) |

Over the last seventeen years, the decline of coal and coal-supported industries in these four counties has deprived tax offices on the federal, state, and local government of \$26.7 million in lost revenue. Specifically, state and local governments have been deprived of approximately \$13.8 million in lost revenue, with most of that coming from lost sales and property taxes, as well as other indirect business fees. The federal government has also lost roughly \$12.9 in revenue during this period as well, with the majority coming from taxes on personal income, social insurance, and corporate profits.

| State and Local Tax Impact of Coal and Coal-Adjacent Industries, Coal-Producing Counties | | | | | |
|---|-----------------------|-------------------|-------------------------------|--------------------|--------------------|
| Description | Employee Compensation | Proprietor Income | Tax on Production and Imports | Households | Corporations |
| Dividends | - | - | - | - | (\$11,016) |
| Social Insurance Tax - Employee Contribution | (\$3,511) | - | - | - | - |
| Social Insurance Tax - Employer Contribution | (\$7,025) | - | - | - | - |
| Sales Tax | - | - | (\$6,730,504) | - | - |
| Property Tax | - | - | (\$5,431,600) | - | - |
| Motor Vehicle Licensing | - | - | (\$80,736) | - | - |
| Severance Tax | - | - | - | - | - |
| Other Taxes | - | - | (\$809,070) | - | - |
| Miscellaneous Indirect Business Taxes | - | - | (\$13,054) | - | - |
| Corporate Profits Tax | - | - | - | - | (\$142,717) |
| Personal Tax: Income Tax | - | - | - | (\$468,306) | - |
| Personal Tax: Non Taxes (Fines-Fees) | - | - | - | (\$67,523) | - |
| Personal Tax: Motor Vehicle License | - | - | - | (\$16,519) | - |
| Personal Tax: Property Taxes | - | - | - | (\$11,125) | - |
| Personal Tax: Other Tax (Fish/Hunt) | - | - | - | (\$7,232) | - |
| Total State and Local Tax | (\$10,536) | \$0 | (\$13,064,964) | (\$570,705) | (\$153,733) |

| Federal Tax Impact of Coal and Coal-Adjacent Industries, Coal-Producing Counties | | | | | |
|---|-----------------------|--------------------|-------------------------------|----------------------|----------------------|
| Description | Employee Compensation | Proprietor Income | Tax on Production and Imports | Households | Corporations |
| Social Insurance Tax- Employee Contribution | (\$2,430,341) | (\$152,033) | - | - | - |
| Social Insurance Tax- Employer Contribution | (\$2,305,843) | - | - | - | - |
| Excise Taxes | - | - | (\$1,405,006) | - | - |
| Custom Duty | - | - | (\$582,701) | - | - |
| Miscellaneous Federal Fees | - | - | (\$91,187) | - | - |
| Corporate Profits Tax | - | - | - | - | (\$2,736,184) |
| Personal Tax: Income Tax | - | - | - | (\$3,205,195) | - |
| Total Federal Tax | (\$4,736,184) | (\$152,033) | (\$2,078,894) | (\$3,205,195) | (\$2,736,184) |

For workers in Bradford, Monroe, Pike, Susquehanna, Sullivan, Wayne, and Wyoming counties, coal mining represents nothing more than an outmoded career from a distant age. Moreover, the extinction of the coal mining industry across Northeastern Pennsylvania has resulted in the elimination of other industries relying on the production of coal in these counties. For communities in this region, the Fossil Fuel Electric Power Generation industry is the most adversely affected by this economic trend. From 1990 to 2017, coal as a source of total net generation by electric power facilities has fallen from 60 to 22 percent, and is declining at a more rapid rate than any corresponding growth of alternative fuel sources.

Since 2001, both Coal Mining and Fossil Fuel Electric Power Generation industries have been effectively wiped out in seven of the 13 Northeastern Pennsylvania counties comprising the geographic scope of this report. The counties are Bradford, Monroe, Pike, Susquehanna, Sullivan, Wayne, and Wyoming. The extinction of these industries has resulted (either directly or indirectly) in the loss of approximately 1,159 jobs, \$60.7 million in labor income, and \$381.2 million in economic output since 2001.

Of these 1,159 positions lost, approximately 304 came directly from the aforementioned industries (Coal Mining and Fossil Fuel Electric Power Generation), which resulted in the loss of both \$33.7 million in labor income and \$290.1 million in economic output over the last 17 years. The effect of the coal economy’s elimination in these counties has also disrupted economic conditions for supply chain vendors, resulting in the loss of another 550 jobs, \$18.9 million in lost labor income, and \$65.4 million in economic output for those vendors. Moreover, the resulting decrease in consumption of community goods and services from workers in these industries has generated additional losses of nearly 305 positions, along with \$8.1 million in lost labor income and \$25.7 million in economic output. Finally, as observed in the employment impact graphic below, the elimination of coal and coal-adjacent industries across Northeastern Pennsylvania has generated a ripple effect across a wide variety of other industries and occupations, ranging from fossil fuel extraction and commercial maintenance positions to those in the medical, legal, and service industries – impacting hospitals, legal services, full-service restaurants, and real estate.

| Economic Losses from Vanished Industries, Northeastern Pennsylvania: 2001-2018 | | | | |
|---|-----------------|-----------------------|------------------------|------------------------|
| Impact Type | Employment | Labor Income | Value Added | Output |
| Direct Effect | -304.0 | (\$33,746,542) | (\$119,980,418) | (\$290,083,469) |
| Indirect Effect | -550.2 | (\$18,916,575) | (\$38,334,732) | (\$65,402,974) |
| Induced Effect | -304.7 | (\$8,118,110) | (\$14,503,660) | (\$25,724,779) |
| Total Effect | -1,158.9 | (\$60,781,227) | (\$172,818,810) | (\$381,211,222) |

| Employment Impact from Vanished Industries (Top 10 Industries), Northeastern Pennsylvania: 2001-2018 | | | | |
|---|------------|----------------|-----------------|-----------------|
| Industry Sector | Employment | Labor Income | Value Added | Output |
| Electric power generation - fossil fuels | -297.0 | (\$33,430,086) | (\$118,307,882) | (\$287,891,967) |
| Extraction of natural gas and crude petroleum | -148.7 | (\$1,871,140) | (\$10,915,086) | (\$24,659,615) |
| Marketing research and all other miscellaneous professional, scientific, and technical services | -75.0 | (\$1,377,219) | (\$1,250,404) | (\$2,504,876) |
| Maintenance and repair construction of nonresidential structures | -45.4 | (\$2,000,207) | (\$2,515,663) | (\$4,813,649) |
| Full-service restaurants | -41.0 | (\$627,853) | (\$715,984) | (\$1,400,921) |
| Scenic and sightseeing transportation and support activities for transportation | -28.5 | (\$1,964,183) | (\$2,294,166) | (\$4,729,955) |
| Real estate | -26.2 | (\$232,964) | (\$1,357,843) | (\$2,527,987) |
| Employment services | -22.5 | (\$539,799) | (\$747,943) | (\$1,202,007) |
| Extraction of natural gas liquids | -19.2 | (\$491,439) | (\$6,786,421) | (\$8,411,679) |
| Hospitals | -18.3 | (\$972,249) | (\$1,084,893) | (\$2,006,619) |
| Legal services | -14.2 | (\$305,353) | (\$628,040) | (\$1,147,858) |
| Coal mining | -7.0 | (\$316,546) | (\$1,672,536) | (\$2,191,502) |

The extinction of the coal mining and coal-reliant industries in Northeastern Pennsylvania has not only spawned hundreds of job losses and lost economic output, but also has deprived state, local, and federal governments of approximately \$57.2 million of lost revenue collected from a wide range of revenue streams since 2001, including taxes on income, corporations, property, and sales. On the state and local government levels, tax offices have lost a total of \$39.4 million in revenue, including \$37.3 million from indirect business taxes, \$1.3 million in personal income taxes and fees, \$735,000 in corporate taxes and dividends, and nearly \$30,000 in social insurance taxes. For federal government tax offices, the elimination of these industries have spawned another \$17.8 million in losses — \$6.8 million in social insurance taxes, \$4.4 million in personal income taxes and fees, \$3.1 million in indirect business taxes, \$3 million in corporate taxes and dividends, and approximately \$452,000 in proprietor income.

| State and Local Tax Impact of Vanishing Industries, Northeastern Pennsylvania: 2001-2018 | | | | | |
|---|-----------------------|-------------------|-------------------------------|----------------------|--------------------|
| Description | Employee Compensation | Proprietor Income | Tax on Production and Imports | Households | Corporations |
| Dividends | - | - | - | - | (\$64,097) |
| Social Insurance Tax- Employee Contribution | (\$9,960) | - | - | - | - |
| Social Insurance Tax- Employer Contribution | (\$19,927) | - | - | - | - |
| Sales Tax | - | - | (\$15,249,798) | - | - |
| Property Tax | - | - | (\$19,965,301) | - | - |
| Motor Vehicle Licensing | - | - | (\$237,495) | - | - |
| Severance Tax | - | - | - | - | - |
| Other Taxes | - | - | (\$1,826,447) | - | - |
| Miscellaneous Indirect Business Taxes | - | - | (\$63,835) | - | - |
| Corporate Profits Tax | - | - | - | - | (\$670,707) |
| Personal Tax: Income Tax | - | - | - | (\$1,068,283) | - |
| Personal Tax: Non Taxes (Fines-Fees) | - | - | - | (\$123,517) | - |
| Personal Tax: Motor Vehicle License | - | - | - | (\$45,653) | - |
| Personal Tax: Property Taxes | - | - | - | (\$42,435) | - |
| Personal Tax: Other Tax (Fish/Hunt) | - | - | - | (\$18,521) | - |
| Total State and Local Tax | (\$29,887) | \$0 | (\$37,342,876) | (\$1,298,409) | (\$734,804) |

| Federal Tax Impact of Vanishing Industries, Northeastern Pennsylvania: 2001-2018 | | | | | |
|---|-----------------------|--------------------|-------------------------------|----------------------|----------------------|
| Description | Employee Compensation | Proprietor Income | Tax on Production and Imports | Households | Corporations |
| Social Insurance Tax- Employee Contribution | (\$3,510,243) | (\$451,856) | - | - | - |
| Social Insurance Tax- Employer Contribution | (\$3,330,042) | - | - | - | - |
| Excise Taxes | - | - | (\$2,126,139) | - | - |
| Custom Duty | - | - | (\$881,866) | - | - |
| Miscellaneous Federal Fees | - | - | (\$138,011) | - | - |
| Corporate Profits Tax | - | - | - | - | (\$3,038,567) |
| Personal Tax: Income Tax | - | - | - | (\$4,357,509) | - |
| Total Federal Tax | (\$6,840,285) | (\$451,856) | (\$3,146,016) | (\$4,357,509) | (\$3,038,567) |

In two counties, however, the Fossil Fuel Electric Power Generation industry still survives, either because it has been partially insulated from the effects of the coal economy's contraction, or because fossil fuel electric power generation facilities have started to utilize cheaper and cleaner sources of energy to sustain production of electricity more affordably. Lackawanna County's Fossil Fuel Electric Power Generation industry was revived in 2015 due to the creation of a natural gas-burning electric power plant in Jessup, and now employs 36 workers in the area. This industry also survives in Montour County, which is home to a decades-old coal-fired electric power plant in Washingtonville, and employs 59 workers as of 2018. However, recent interest in converting the Washingtonville plant's coal-firing facilities into a natural-gas co-firing plant portend the inevitable decline in coal demand in Northeastern Pennsylvania. As of 2018, the last remnants of this industry in both Lackawanna and Montour counties directly employ 95 workers, and support another 81 jobs in a wide variety of industries, from depository credit intermediation to full-service restaurants and wholesale trade. In sum, this industry still supports \$27.7 million in labor income and \$156 million in economic output in both counties, including directly employed workers, supply chain vendors, and other firms across the region. Finally, the Fossil Fuel Electric Power Generation industry still supplies approximately \$22.6 million in tax revenue for state, local, and federal governments.

Beyond the modeled economic impacts, it is likely that the decline of coal mining and related industries has negatively affected community stability. When mapping residential vacancy data from the United States Postal Service, a pattern emerged that suggested a strong correlation between census tracts adjacent to anthracite coal fields and higher rates of long-term (36 months or more) residential vacancy. High rates of long-term residential vacancy are signs of weak market demand and serve to approximate housing blight. The average 36-month vacancy rate for the 176 anthracite-adjacent tracts was 2.1 percent, compared with 0.32 percent for the remaining 157 tracts. This difference was determined to be extremely statistically significant.

According to the Association of American Railroads' May 2018 report, the volume of coal transported by rail has decreased in recent years. This follows the decreased production of coal and decreased use of coal in U.S. electric power generation. In 2008, railroads transported 7.71 million car loads of coal. By 2017, this number decreased by 42 percent – thereby negatively affecting overall railroad revenue and employment. The overall drop in rail freight cargo coincides with the decrease in coal production after 2008.

The 94 jobs lost affect 123 jobs in other sectors and result in over \$41.3 million in annual economic loss to the counties in the study region. In addition, nearly \$4.2 million in federal taxes and another \$409,000 to state and local government is lost annually. In some counties, railroad jobs paid more than the average county wage.

The ARC study, *An Economic Analysis of the Appalachian Coal Industry Ecosystem* by West Virginia University and the University of Tennessee devoted an entire module to the implications of decreased coal production on transportation (specifically rail). The study indicates that just between 2015 and 2016, the reduction in coal rail transportation was responsible for the loss of 2,000 jobs and \$150 million in income in Appalachia.