



ENVIRONMENTAL  
SOLUTIONS  
INITIATIVE



## WHITE PAPER SERIES

# Changes in the contribution of coal to tax revenues in Greene County, PA, 2010-2019

Caroline White-Nockleby, Mimi Wahid, Caroline Boone,  
and Benjamin Delhees

Sponsored by the MIT Environmental  
Solutions Initiative Here & Real Project

MARCH 2021



Massachusetts  
Institute of  
Technology

# Changes in the Contribution of Coal to Tax Revenues in Greene County, PA, 2010-2019

Caroline White-Nockleby<sup>a</sup>, Mimi Wahid<sup>b</sup>, Caroline Boone<sup>c</sup>, and Benjamin Delhees<sup>d</sup>

---

## Abstract

- Coal companies have provided a key source of financial support to Greene County not only through employment, but also by contributing to the real estate and mineral value taxes that fund a significant portion of county, township, and school district activities.
- Due in part to company closures, tax revenue contributed by coal companies did not keep up with inflation, and in many cases decreased, between the years 2010 and 2019.
- Green County's heavy reliance on coal companies for tax revenue poses a significant risk to its present and future economic health.
- These data show that current and projected declines in coal production impact not only employment, but also tax revenues. Declining revenues have the potential to affect all residents and town activities, and may particularly impact vulnerable residents.
- Finally, while the coal industry is on the decline, this region has seen an increase in methane gas (also called natural gas) production as part of the shale gas boom. However, because of the structure of the tax base, we show that increases in gas production, and taxes paid by gas companies, are unlikely to make up for lost coal tax revenue. Taxes paid by large retail firms, property developers, and medical institutions also do not make up for lost tax revenue.

---

<sup>a</sup> MIT Doctoral Program in History, Anthropology, Science, Technology, and Society

<sup>b</sup> Undergraduate, MIT Department of Urban Studies and Planning, and MIT Comparative Media Studies

<sup>c</sup> Undergraduate, MIT Department of Mechanical Engineering

<sup>d</sup> Undergraduate, MIT Department of Economics and MIT Sloan School of Management

**Table of Contents**

1	Introduction.....	4
2	Methods .....	6
2.1	Summary of Greene County Tax Assessment Processes.....	6
2.2	Analysis of Mineral Value Taxes.....	6
2.3	Analysis of Real Estate Value Taxes.....	6
3	Results and Discussion .....	7
3.1	Mineral value tax .....	7
3.2	Real Estate Tax.....	13
4	Conclusions .....	19
5	Bibliography .....	21
6	Appendix I: Access to Data Spreadsheets .....	24
7	About the Here and Real Project .....	24
8	Acknowledgements .....	24
9	Community Engagement and Impact.....	24
10	Notes.....	25

## 1 Introduction

Coal mining has long been a foundational industry in Greene County. The county's commercial coal industry dates to 1892; since 1986, it has produced more coal than any other county in Pennsylvania.<sup>1</sup> Yet, though coal played a crucial role in Greene County's past, the decline of the industry now poses a financial risk to its future. Moreover, operations have long contributed to environmental risks, and even as the industry declines the county will be left with the legacy of environmental issues for decades with fewer resources to remediate them.

Over the past two decades, the U.S. energy supply has increasingly transitioned away from coal, with national production decreasing 37 percent between 2008 and 2016.<sup>2</sup> This shift is primarily due to the falling price of methane gas with the expansion of the domestic gas industry, though the implementation of stricter environmental regulations governing coal refinement has also played a minor role.<sup>3</sup> In Pennsylvania, the industry has contracted considerably; coal production was 18 percent lower in 2019 than 2014, while the average number of employees decreased by 32 percent between 2014 and 2019.<sup>4</sup> In Greene County, which in 2018 accounted for 75 percent of state coal production, the financial risks of this decline are particularly acute.

Coal industry employment trends in Greene County track those statewide: in the county alone, jobs in underground bituminous mines dropped from 3,889 in 2013 to 2,845 in 2018, while production fell by nearly five percent.<sup>5</sup> The county's population decreased by over six percent between 2010 and 2019, a sign that it may be struggling to attract and retain residents.<sup>6</sup> The continued decline of the industry in this region of the state will almost certainly continue, in part because regional coal reserves have become increasingly depleted; in 2014, the University of Pittsburgh estimated that at current rates of mining, the Pittsburgh Coalbed (spanning Greene and Washington Counties) would run out in 37 years.<sup>7</sup>

Nevertheless, energy remains the largest employer in Greene County. In 2018, mining and extraction, manufacturing, construction, transportation, and warehousing – largely related to the coal industry – together accounted for 30.74 percent of jobs.<sup>8</sup> Other significant sectors are health care and social assistance (17.6 percent), education (10.1 percent), retail (10.8 percent), and public administration (6.12 percent).<sup>9</sup> Outside of energy, the most prominent source of income in Greene County is tourism. In 2019, for instance, those visiting the county, including employees associated with the natural gas industry, spent \$78.7 million and contributed \$7.1 million in state/local and federal taxes combined.<sup>10</sup> The same year, 509 individuals were employed in tourism industry jobs, which span the lodging, food and beverages, retail, recreation, and transportation sectors.<sup>11</sup> The county's income from tourism, which peaked in 2014 at \$94.7, is substantially less than those of nearby counties; in 2019 visitors to adjacent Washington County, for instance, spent \$714.3 million.<sup>12</sup> Nevertheless, the tourism sector offers one possibility for future financial growth in the county.<sup>13</sup>

In recent decades, a vast body of research has also illuminated the impacts of coal on human health, local environments, and global climate.<sup>14</sup> Coal combustion contributes to air pollution, releasing the highest levels of nitrogen oxides, sulfur dioxide, heavy metals, and particulates of any fuel.<sup>15</sup> These pollutants in turn impact respiratory, urinary, reproductive, neurologic, digestive, nervous, and cardiovascular systems.<sup>16</sup> Environmental degradation caused by coal extraction can also impact mental health.<sup>17</sup> Indeed, studies show that shifting U.S. coal-fired

power plants to cleaner sources of energy such as solar power could considerably improve health outcomes and save thousands of lives per year.<sup>18</sup> Moreover, coal combustion contributes significantly to climate change; to meet the IPCC goal of limiting average global warming to 2°C, over 80 percent of known coal reserves would have to remain in the ground.<sup>19</sup> These environmental and health externalities cost an estimated one third to one half trillion dollars per year in the U.S.<sup>20</sup> In Greene County, coal mining contributes to land subsidence, air pollution, and water contamination and has also been linked to health risks such as cancer.<sup>21</sup>

For both economic and environmental reasons, energy experts and advocates have in recent years highlighted the need for practical and equitable “Just Transition” plans to develop financially and ecologically sustainable industries in historically coal-producing areas.<sup>22</sup> Many transition frameworks emphasize the need to provide skills training and employment opportunities to replace the jobs lost due to closures of coal mines and production facilities.

Yet the decline of the coal industry also reduces the fiscal stability of the jurisdictions in which coal mines and coal plants operate. In Greene County, PA, a decrease in tax revenue resulting from coal industry closures is having a direct impact on county, school district, and township budgets. In the absence of alternate sources of revenue, such a shortfall will soon impact a broad range of county activities and services, from education to healthcare to environmental conservation.<sup>23</sup> The financial risk posed by the disproportionate amount of tax revenue generated from the coal industry has been recognized in recent municipal credit reports.<sup>24</sup>

County and school district budget decreases could affect a range of residents. These funds support a range of crucial activities from parks and recreation, to school funding, to human services. Families and individuals unable to relocate due to economic, health, or other reasons will likely be the most vulnerable to any funding cuts. For these reasons, determining the current quantity and rate of change in coal company tax revenue – and making this information available to the public – is crucial to assessing and mitigating current and projected budget shortfalls.

This report aims to address this need by using publicly available data to estimate the impact of declining coal production on county revenues over the past fifteen years. We first quantify the contributions of coal companies to school district, county, and township mineral value taxes, as well as shifts in these contributions, between 2010 and 2019. We then calculate shifts in total county tax revenue (including mineral value, property, and improvement taxes) for the years 2003 through 2019. Finally, we examine the changes in the composition and total contributions, via mineral value, property, and improvement taxes, of the county’s top ten taxpayers – the majority of which are coal companies – for the years 2015 through 2019. The data reveal that the coal industry is a key source of financial support to Greene County not only through employment, but also through substantial tax contributions. However, tax revenues from coal companies did not keep pace with inflation, and in many cases decreased over the past decade.

The results of this research indicate that the current and projected closure of coal plants in Greene County will likely affect its tax revenues significantly. We also show that because of the structure of the tax base, recent increases in gas production, and in taxes paid by gas companies, are unlikely to make up for lost coal tax revenue. Taxes paid by non-energy companies, including large retail firms such as Wal-Mart, property developers, and medical institutions, similarly do not make up for lost tax revenue from coal company closures. Despite these

challenges, coal industry closures also present an opportunity for Greene County to expand its legacy of creativity, innovation, and technical skill into new industries and arenas.

## **2 Methods**

### *2.1 Summary of Greene County Tax Assessment Processes*

In Greene County, coal companies pay mineral value taxes on the minerals for which they own the rights at the county, township and school district levels. Gas companies do not pay mineral value taxes. This tax is determined by two figures: the value of the minerals beneath the county (assessed by an independent auditor) and the millage rate, which is calculated by taking the revenue required to fit the district's budget and dividing it by the total taxable value of the district.<sup>25</sup>

Coal companies also pay property and improvement taxes. The Greene County Assessment Office determines the Fair Market Value of each property, determined by state-certified real-estate appraisers via a Computer Assisted Mass Appraisal Software. As with mineral value taxes, each tax authority (county, school district, and township) determines the millage rate by dividing the annual budget needs slated to be met by property taxes by the cumulative value of property located in the jurisdiction.<sup>26</sup> The total real estate value for an entity is a combination of property, improvement, and, if applicable, mineral value taxes.

### *2.2 Analysis of Mineral Value Taxes*

We used year-end mineral value reports and millage yearly log sheets from the Greene County Assessment Office to calculate mineral value tax contributions to Greene County budgets between 2010 and 2019. Though the majority of data was accessed in paper documents held at the Assessment Office, millage rates for the years 2019 and 2020 are also available on the Greene County website.<sup>27</sup> We then used Excel to analyze the yearly and total changes in mineral value tax contributions to county, school district, and township budgets (See Appendix I for full data spreadsheets). We also compared these changes to average U.S. inflation rates based on the U.S. Consumer Price Index (CPI).

### *2.3 Analysis of Real Estate Value Taxes*

We used publicly available data to analyze the changes in (1) County real estate tax assessments and revenues from 2003 and 2019 (which comprise total property, improvement, and mineral value taxes) and (2) composition and contributions of the top ten real estate taxpayers from 2015 to 2019 (the years for which the data was available online). Data about the top ten taxpayers for 2015 to 2019, the total county real estate value assessed from 2003 to 2019, and documents regarding county credit ratings from 2011 and 2013, were available on the website of the Municipal Securities Rulemaking Board (MSRB) Electronic Municipal Market Access (EMMA) platform.<sup>28</sup> EMMA is the organization that regulates municipal securities, which provides public access to any financial data that the county is legally required to disclose.

We analyzed the data in Excel to calculate shifts in both absolute monetary terms and percentage terms, and also compared these shifts to the average nation-wide inflation for the years analyzed based on the U.S. Consumer Price Index (CPI) (See Appendix 1 for full data spreadsheets).<sup>29</sup> It is important to note that the overall real estate tax data, available from 2003 to 2019, does not isolate specific entities or industries such as coal. However, given the significant contributions of coal companies to county taxes, it offers one metric to understand the broader impact of coal's decline on County finances. Moreover, the long-timespan of these data can thus offer a broader view of change in real estate values over time. Data about the specific composition and contributions of the top ten taxpayers, meanwhile, was available for the years 2015, 2016, 2017, 2018, and 2019. In our calculations, "coal companies" includes both coal extraction endeavors and electricity generation companies that primarily rely on coal combustion. For the coal companies in the top ten, the real estate value includes both subsurface (mineral value) and surface (property and improvement values). For non-mining companies such as Walmart, this number includes only surface property value.

### **3 Results and Discussion**

#### *3.1 Mineral value tax*

The county, school districts, and townships each set tax rates independently, and each collect taxes on assessed values of minerals, property, and improvement. Mineral value taxes contribute significantly to Greene County's overall tax revenue, and are particularly vital for school districts, which have millage rates that are approximately three to four times higher than the county rates. This reliance puts the county, and many of its school districts, at risk of additional budget cuts due to declining coal revenues. Indeed, though they still comprise a significant proportion of the overall budget, coal tax revenues are declining. The total amount of tax that both the county and school districts receive from mineral value taxes has, overall, decreased over the past decade.

With respect to the county, between 2010 and 2019 total taxable mineral value fell by 12.8 percent, a total loss of \$61,111,040 (Figure 1). This decline is even more significant in the context of the magnitude of inflation during the same period, which was 17.24 percent (Figure 1). Additionally, the total proportion of taxable value (which includes mineral, property, and improvement values) provided by mineral value has been decreasing (Figure 2). In 2019, mineral value taxes still comprised nearly 27 percent of Greene County's tax revenue, though this represents a decrease from nearly 32 percent in 2010 (Figure 2).

With respect to school districts, assessed mineral value varies significantly; in 2019, West Greene and Central Greene, together, contained nearly 98 percent of all mineral value assessed county-wide (Figure 3). Along similar lines, each district draws a different proportion of its budget from mineral value taxes revenues, though some districts continue to rely even more on mineral value taxes as a proportion of overall budget than the county as a whole (Figure 4). Mineral value taxes comprise an even greater proportion of the budget for some school districts (though for others, they are a minor source of revenue). In the West Greene School District, for instance, mineral value taxes accounted for nearly 65 percent of tax revenue in 2019 (a decrease from 67

percent in 2010). Carmichaels District, meanwhile, drew only 0.05 percent of its budget from mineral value taxes (Figure 4).

Meanwhile, in three of the five Greene County school districts, total taxable value decreased between 2010 and 2019 (Figures 5b, 5c, and 5d). For all three school districts, the lost revenue was significant. Central Greene School District saw a decrease of 49.5 percent in taxable value, or \$55,842,140 (Figure 5b). Jefferson Morgan, meanwhile, had a drop of 49.8 percent, or \$8,025,180 (Figure 5b), while Southeastern's mineral value decreased by 71.5 percent, or \$3,947,070 (Figure 5c). In both Carmichaels Area and West Greene, where taxable value grew slightly (3.4 and 2.5 percent, respectively), increases were outpaced by inflation (Figures 5a and 5e, respectively). All districts except for Southeastern Greene have also raised millage rates (See mineral value data, Appendix 1). Thus far, most districts have avoided raising taxes further by cutting budgets.

### County assessed mineral value, 2010-2019

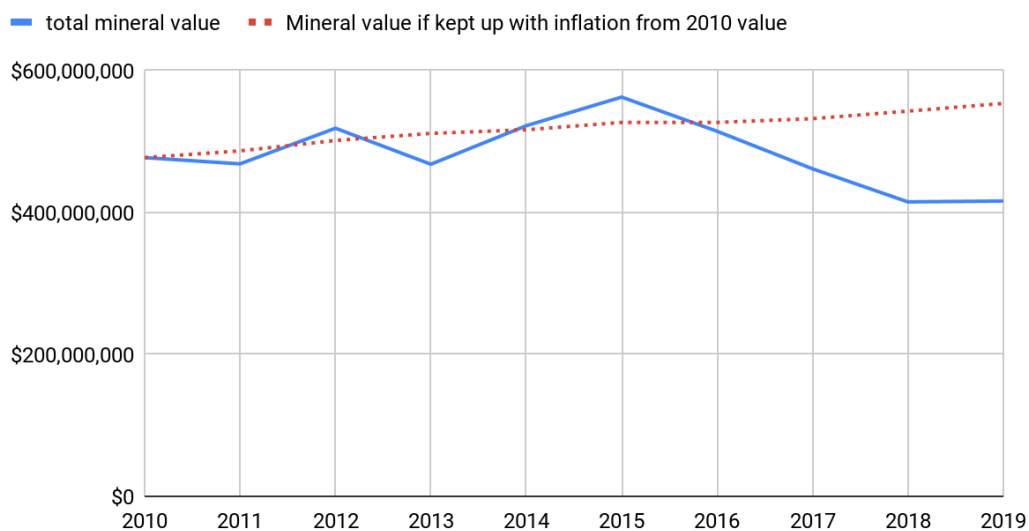
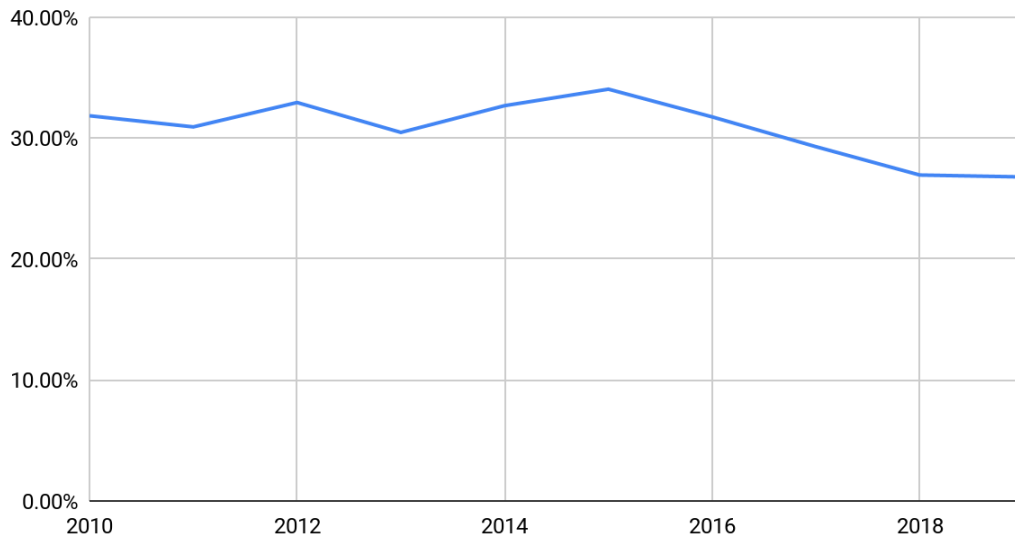


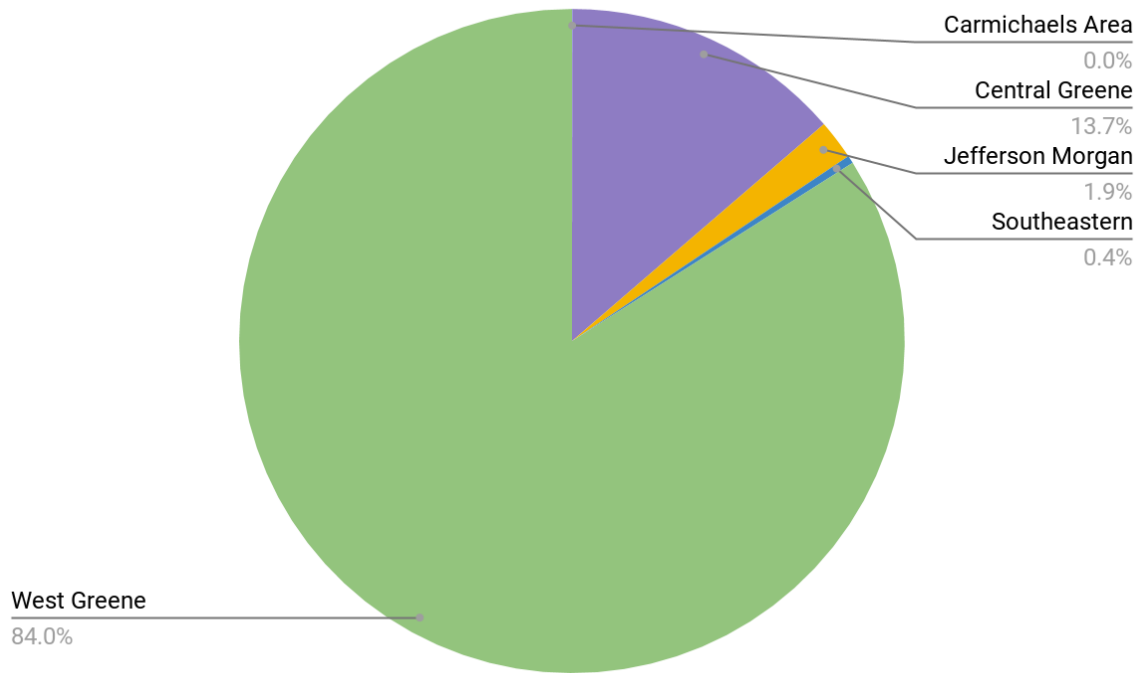
Figure 1. Total mineral value assessed in Greene County, 2010-2019, as compared to inflation.



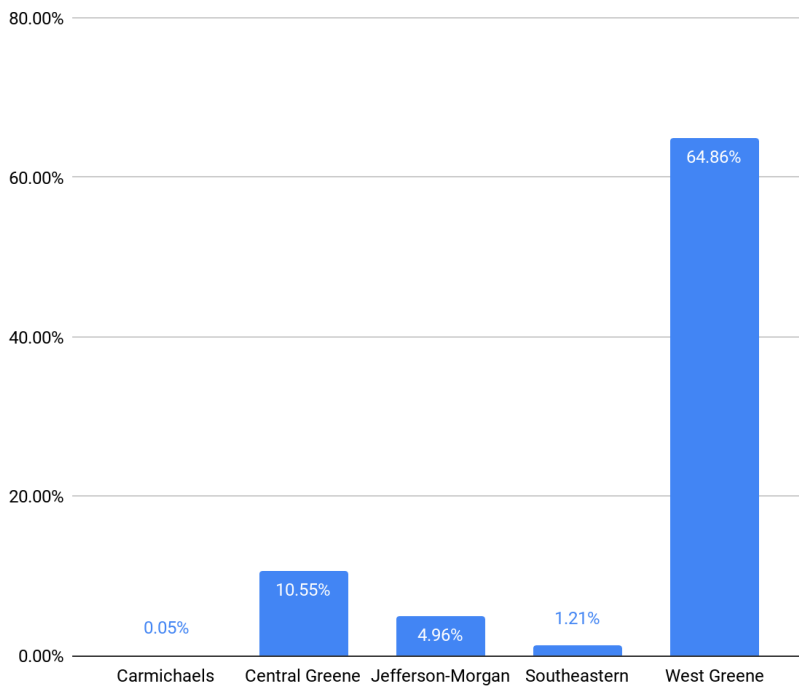
### Percent taxable value from mineral value in County budget



**Figure 2.** Percent of Greene County Real Estate taxable value (which includes property, improvement, and mineral values) that came from assessed mineral value, 2010-2019.



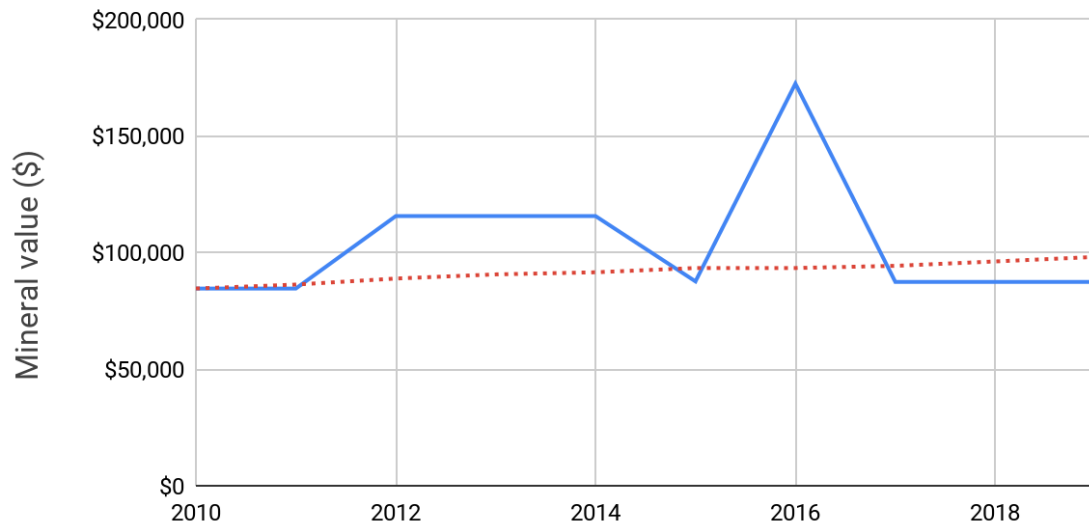
**Figure 3.** Relative quantity of assessed mineral value for each of the five school districts in Greene County, 2019.



**Figure 4.** Percentage of total budget that came from mineral value taxes for each of the five school districts in Greene County, 2019.

### Carmichaels Area School District Mineral Value

— Carmichaels Area    - - - Carmichaels Area mineral value if kept up with inflation from 2010 value



**Figure 5a.** Total mineral value assessed in Carmichaels School District, 2010-2019, as compared to inflation.

### Central Greene School District Mineral Value

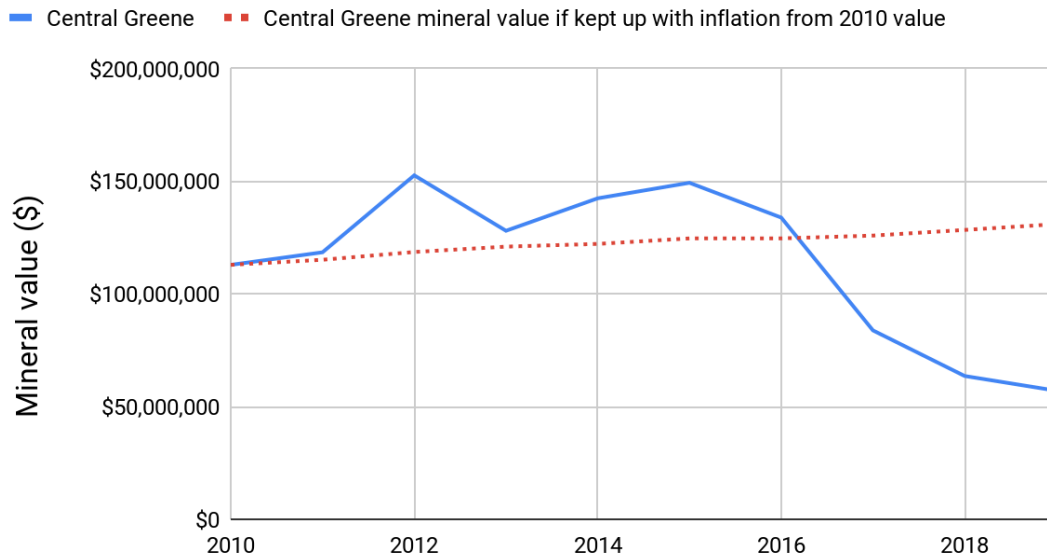


Figure 5b. Total mineral value assessed in Central Greene School District, 2010-2019, as compared to inflation.

### Jefferson Morgan School District Mineral Value

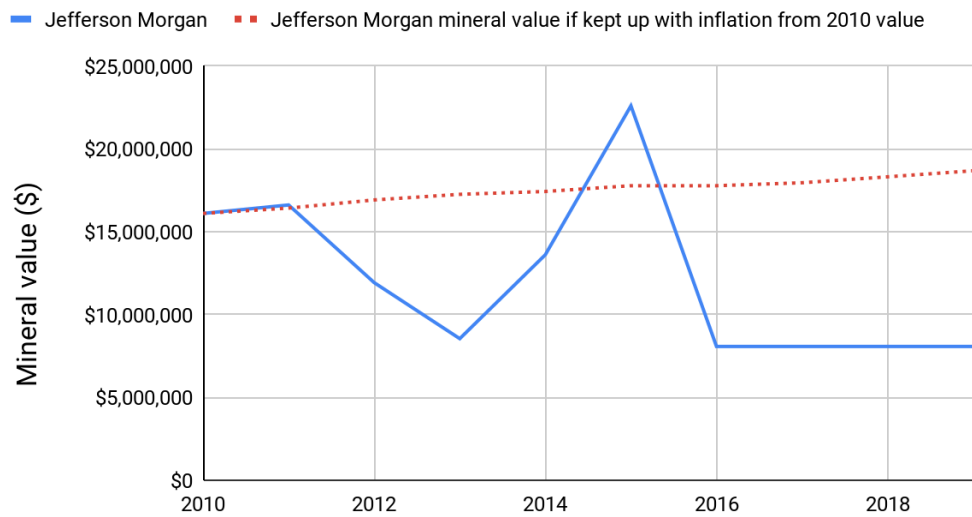


Figure 5c. Total mineral value assessed in Jefferson Morgan School District, 2010-2019, as compared to inflation.

### Southeastern School District Mineral Value

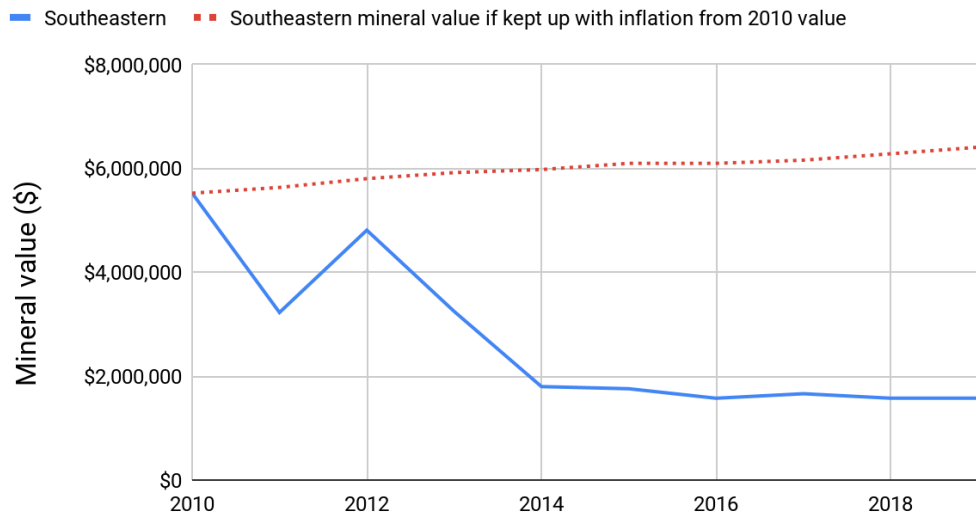


Figure 5d. Total mineral value assessed in Southeastern School District, 2010-2019, as compared to inflation.

### West Greene School District Mineral Value

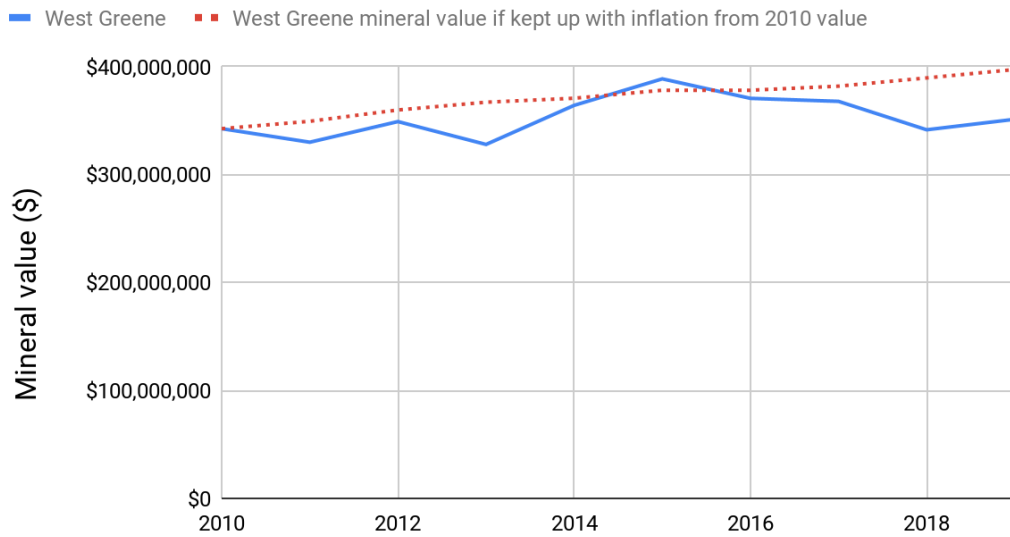


Figure 5e. Total mineral value assessed in West Greene School District, 2010-2019, as compared to inflation.

### 3.2 Real Estate Tax

In Greene County, the County Assessment Office is responsible for determining the value of real estate, aiming to arrive at a “fair market value” defined as “the amount for which one could willingly sell property to a willing purchaser/buyer”. The office uses a “Computer Assisted Mass Appraisal software utilized by licensed, state certified real-estate evaluators (CPE)”. The office also maintains updated tax parcel maps, as well as historical records of sales. Real estate taxes, which comprise property, improvement, and mineral value taxes, play a key role in county revenues, hovering around 70 percent of the money available for spending in the County General Fund. In 2009, for instance, real estate taxes formed 71.2 percent of the general fund revenues. “Intergovernmental revenues”, meanwhile, comprised roughly 12 percent of revenues, while service, fine, and permit fee charges accounted for approximately 12 percent as well.<sup>30</sup>

The assessed value of real estate in Greene County did not keep up with inflation between 2003 and 2019. While inflation was 36.5 percent over this period, real estate value increased only 3.46 percent (Figure 6). This change departs significantly from the much higher average increase in the median sales price of houses sold both in the United States as a whole during this period (66.7 percent) and in the Northeast census region, which consists of nine states including Pennsylvania (87.7 percent).<sup>31</sup> In Greene County, the slow increase in real estate value reflects in part a decrease in mineral value taxes. The failure of the county’s tax base to keep up with inflation was mitigated by a tax rate increase from 6.42 mills to 7.64 mills in 2010 (followed by a decrease to 7.535 mills in 2011). But even with this net increase in tax rate, assessed taxes increased only 21.43 percent from 2003-2019, failing to keep up with inflation (Figure 7).

Assessed Greene County Real Estate Value, 2003-2018, as compared to inflation

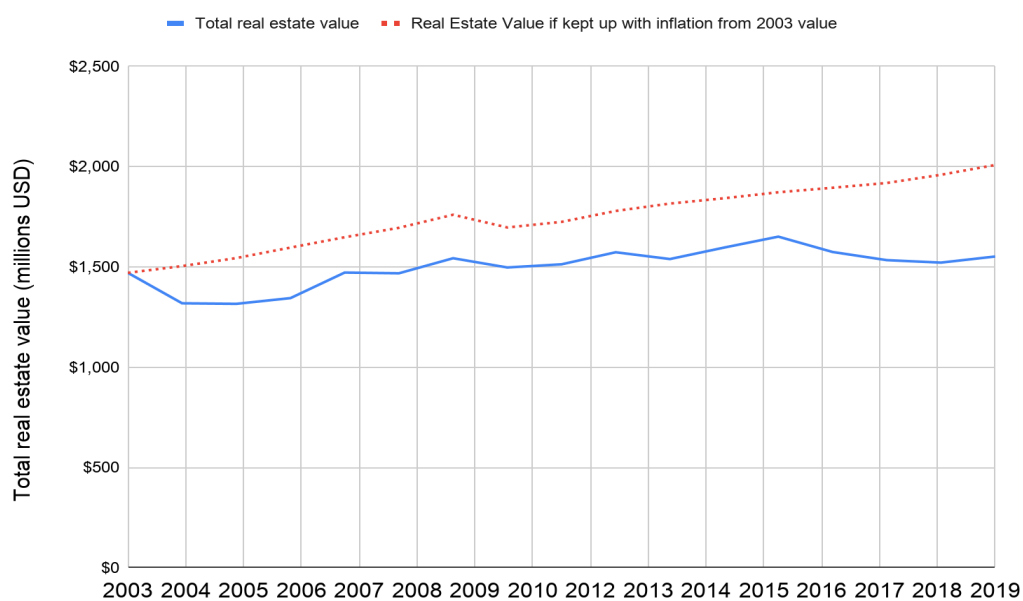
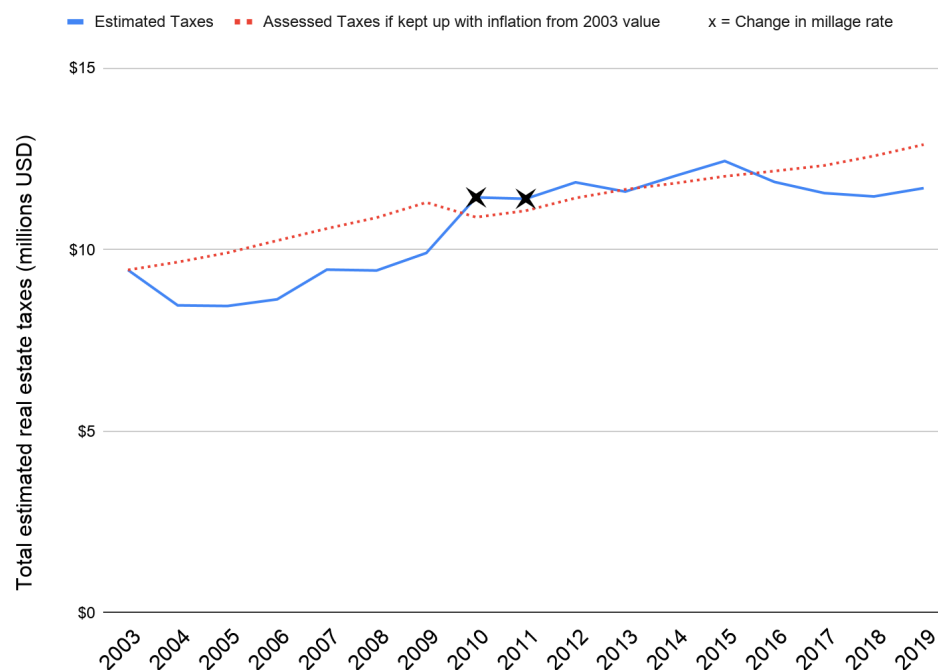


Figure 6. Assessed Greene County Real Estate Value, 2003-2019, as compared to inflation.

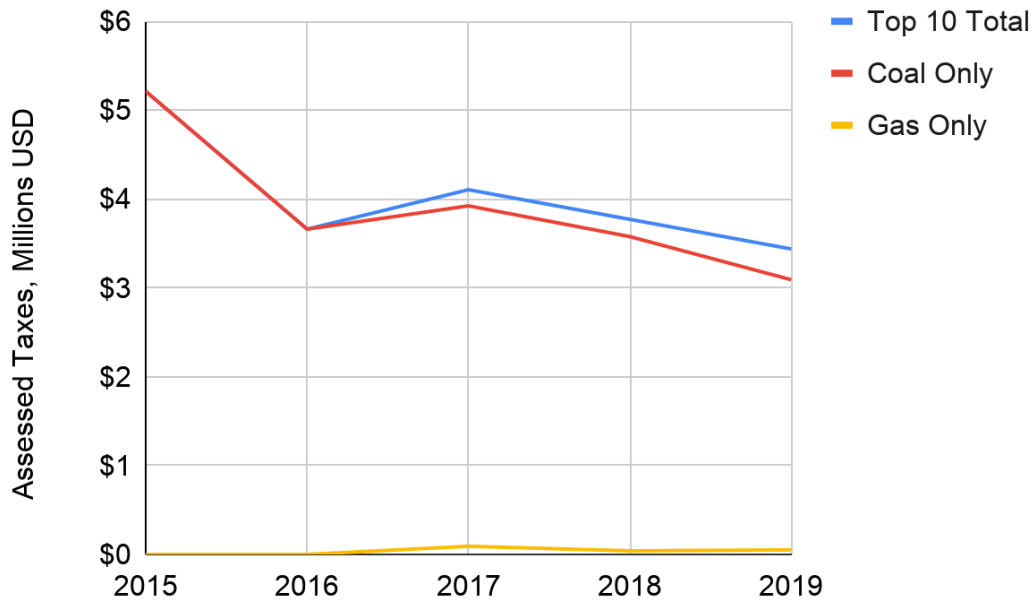
### Greene County Estimated Real Estate Taxes, 2003-2018, as compared to inflation



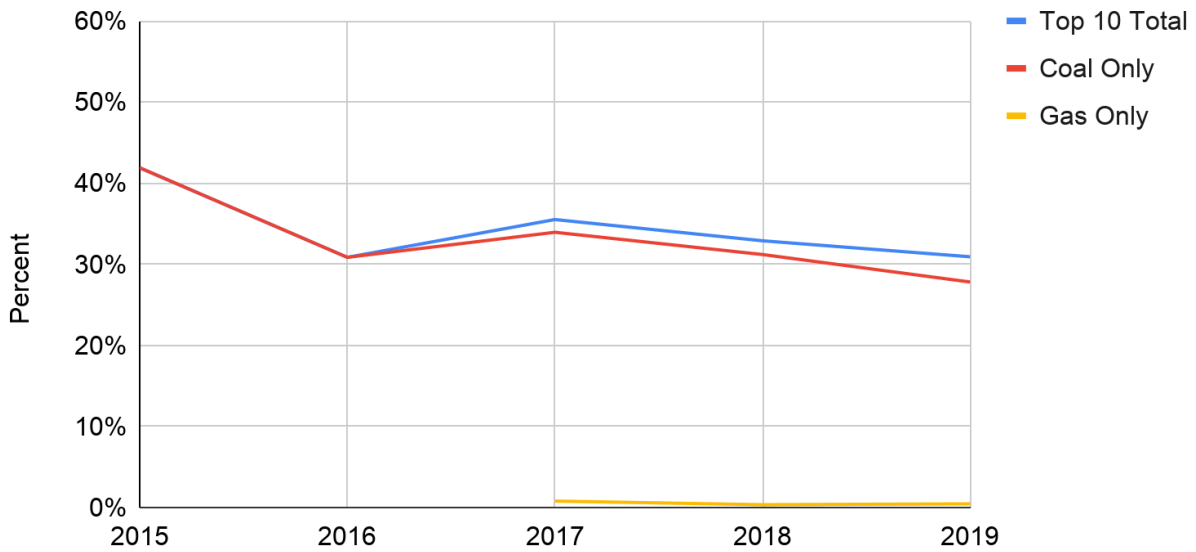
**Figure 7.** Greene County estimated real estate taxes, 2003-2019, as compared to inflation (x's mark the years the county tax rate was adjusted).

Coal companies provide a significant source of the county's real estate tax revenue. Of the 22 companies listed during the entire period, and when accounting for company consolidations, eleven are coal, four are methane gas production, and five are other industries such as real estate development, manufacturing, or retail (Table 1). However, coal companies pay nearly all of the total taxes provided by this group, which in turn comprise approximately one third of total county revenues collected from mineral, property, and improvement taxes (Figure 9). Though the number of fossil fuels companies among the top ten taxpayers decreased from ten in 2015 to five in 2019, coal companies have continued to pay the majority of the tax revenues of the top ten contributors.

However, since 2015, the contribution of coal extraction and generation companies, in both absolute value and as a proportion of total taxes paid, has decreased significantly. The total tax paid by this group was \$5.2 million in 2015 but just \$3.1 million in 2019 (Figure 8), a decrease from 41.9 to 27.8 percent of total real estate taxes received by the county in this period (Figure 9). Though the real estate value of one coal company, Consolidation Coal Company, did increase between 2016 and 2017, this was in part because Conhrein and Greene Hill, previously assessed separately, were in 2017 included as subsidiaries of Consolidation Coal Company (Figure 10).



**Figure 8.** Assessed real estate taxes for top ten Greene County taxpayers, as well as coal and gas companies in isolation, for 2015-2019.



**Figure 9.** Percentage of total Greene County assessed real estate value held by top ten taxpayers and by coal and gas companies in the top ten, 2015-2019.

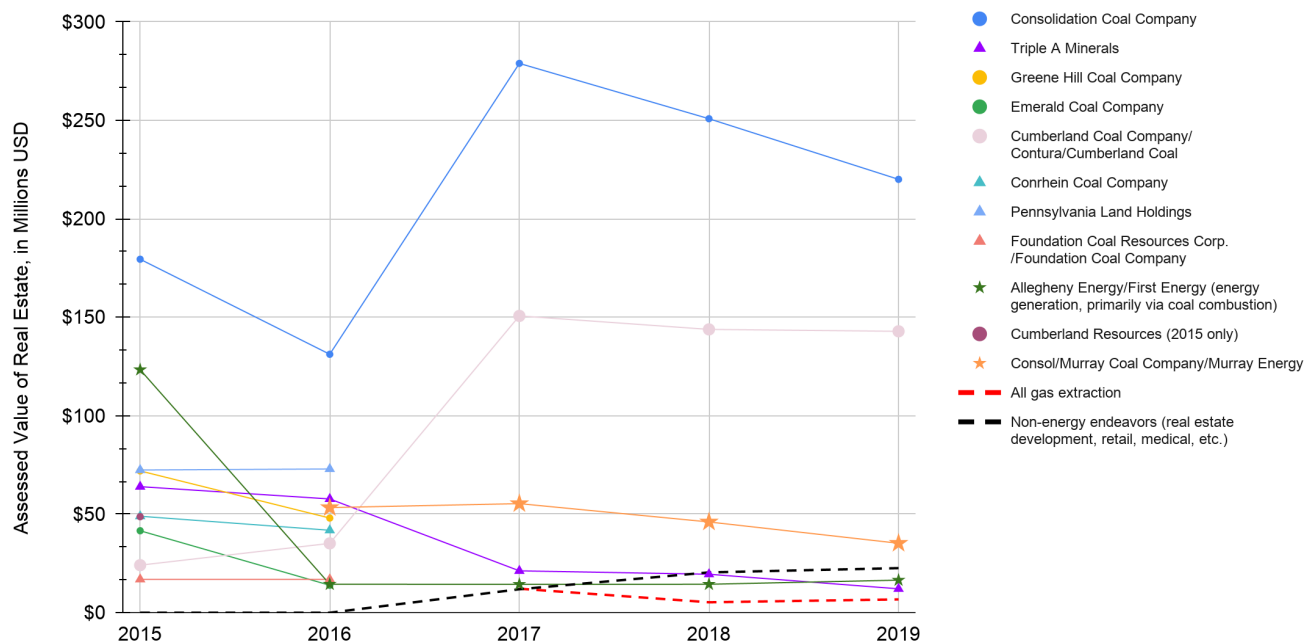
All top ten companies, 2015-18	Years Listed	Category
Consolidation Coal Company (in addition to subsidiaries listed below, Conhrein and Greene Hill, this listing also includes Consol PA, CNX Gas, Mon Railway, and Ninevah Coal)	2015, 2016, 2017, 2018, 2019	coal
Greene Hill Coal Company	2015, 2016 (grouped with Consolidation Coal Company for 2017 and 2018)	coal
Emerald Coal Company	2015, 2016 (Emerald Mine closed in Fall 2015 with bankruptcy of parent company, Alpha Natural Resources)	coal
Triple A Minerals	2015, 2016, 2017, 2018, 2019	coal
Cumberland Coal Company; Contura/Cumberland Coal	Listed as Cumberland Coal Company: 2015, 2016; Listed as Contura/Cumberland Coal: 2017, 2018 (parent company Alpha Natural Resources went bankrupt in mid-2015); Listed as Contura Energy & Subsidiaries: 2019	coal
Conrhein Coal Company	2015, 2016 (grouped with for Consolidation Coal Company for 2017 and 2018)	coal
Pennsylvania Land Holdings	2015, 2016 (parent company Alpha Natural Resources went bankrupt in mid-2015)	coal
Foundation Coal Resources Corp./Foundation Coal Company	Listed as Foundation Coal Resources Corp: 2015; Listed as Foundation Coal Company: 2016 (Foundation Coal Resources Corp's parent company Alpha Natural Resources went bankrupt in mid-2015)	coal
Allegheny Energy/First Energy	Listed as Allegheny Energy: 2015, 2016, 2017, 2018 Listed as First Energy: 2019	Energy generation, primarily via coal combustion
Cumberland Resources	2015 (parent company Alpha Natural Resources went bankrupt in mid-2015)	coal
Consol/Murray Coal Company/Murray Energy	Listed as Consol/Murray Coal Company: 2016, 2017, 2018 Listed as Murray Energy: 2019	coal



Kari Resources LP	2017; 2018; 2019	gas
EQM Gathering/EQT	2017	gas
Rice Drilling LLC	2017	gas
Vista Gathering LLC/EQM	2019 (affiliated with EQM Gathering/EQT and Rice Drilling)	gas
Wal-Mart Real Estate/ Walmart Total	2017; 2018	other (retail)
Kirby Development/Kirby Developments LLC	Listed as Kirby Development: 2018 Listed as Kirby Developments LLC: 2019	other (real estate dev.)
Suncap Waynesburg LLC	2018	other (real estate dev.)
Waynesburg Associates LP	2018	Other (real estate dev.)
MEPCO LLC	2017	other (steam & hydronic products)
American Realty Capital LLC (also listed as ARG EQWBGPAooi LLC)	2019	other (real estate dev.)
WVU Medical	2019	other

**Table 1.** All companies listed as top ten real estate taxpayers in any year between 2015 and 2019 for which each was listed, the category of industry the company falls under (coal, gas, or other), and additional relevant information.

Assessed Value of Coal &amp; Energy Companies in Top Ten Taxpayers, 2015-18



**Figure 10.** Assessed value of coal extraction and generation companies in top ten taxpayers, 2015-2019. Dotted red line shows the assessed value of all gas companies combined; the dotted black line shows the assessed value of all non-energy endeavors, including real estate development, retail, and medical operations.

This data also indicates that the budgetary losses due to coal industry closures will not be fully mitigated by an expansion of the gas industry. The real estate tax contributions of gas companies such as Rice Drilling LLC, Kari Resources LP, and EQM Gathering/EQT, are much lower than the real estate taxes paid by most coal companies (Figure 10). For instance, gas companies in the top ten comprised just 0.79 percent of county real estate taxes assessed in 2017. This may be due in part to the low property footprint of operations, which means that gas companies likely pay low property and improvement taxes. Along similar lines, the real estate taxes paid by non-energy endeavors, including large retail corporations such as Wal-Mart, property developers, and medical corporations do not adequately replace the tax revenue lost from coal company closures (Figure 10). Indeed, the contributions of endeavors in both gas and real estate development sectors are two orders of magnitude lower than those of the largest coal companies (Figure 10).<sup>32</sup>

Moreover, the gas industry does not pay mineral value taxes, which comprise a significant portion of real estate value for coal companies. Instead of a mineral value tax, the gas industry pays an impact fee for each well drilled under Pennsylvania's Unconventional Gas Well Impact Fee Act, or Act 13, signed into law in February 2012.<sup>33</sup> Sixty percent of impact fee revenues are given to local municipalities where drilling is taking place.<sup>34</sup> In recent years, the county has relied heavily on Impact Fee revenues to balance the budget, spending \$5 million from this fund (of a total county allocation of \$6 million) in 2020 alone. Yet the balance of the county Act 13 fund, or the difference between fund assets and expenditures, has continued to decrease, dropping from over \$4.7 million in 2014 to \$1.3 million in 2019.<sup>35</sup>

## 4 Conclusions

In recent years, research has indicated that the coal industry in southwestern Pennsylvania has been contracting and will likely continue to do so. Greene County, where the majority of Pennsylvania's coal is extracted, is the region of the state most acutely affected by these changes. Today, coal companies provide a key source of financial support not only through employment, but also by contributing to the property, improvement, and mineral value taxes that fund a significant portion of county, township, and school district activities.

Our analysis shows that because of the structure of the tax base, the decline of the coal industry has a disproportionate impact on local tax revenues. The total real estate tax paid by coal companies did not keep up with inflation and in many cases decreased over the past decade, despite increases in the millage rates at both county and school district levels. Contributions by the top ten county taxpayers, which comprise about one third of total tax revenues, also decreased from 2015 to 2019, principally due to decreases in the real estate tax contributions by coal companies. Neither real estate taxes paid by gas companies nor other industry contributions have compensated for this decline.

The consolidation of Greene County's revenue base among a small number of primarily coal industry actors, combined with the past and projected decline of the industry, poses a significant financial risk. This projected budget shortfall, along with falling employment, may cause residents to leave the county. Indeed, the county's population has decreased in recent years. Such declines may, in turn, further decrease its tax base. Declining revenues, moreover, impact most county activities and residents, even those not directly linked to the coal industry. Such stresses may be felt acutely by many county residents. Moreover, vulnerable persons such as youth and elderly, disabled, or low-income individuals may be particularly impacted, as they may rely more on county services or be unable to relocate.

This assessment aligns with recent projections from Greene County financial officials. In September 2020, Scott Kelley, Greene County's Chief Financial Officer, warned at a board meeting that ongoing and recent coal company bankruptcies would produce budget shortfalls in the near future. As reported by the regional newspaper the Observer-Reporter, Kelley explained to the board: "Moving forward, the annual budget needs to be balanced, and we need to stop using Act 13 money to do that. If we don't, the short version is that we may run out of money by 2023, assuming that the county's taxable value does not drop."<sup>36</sup> Kelley proposed a few options to balance the budget, which demonstrate the magnitude of the projected shortfall: increasing taxes by 66 percent, increasing county taxable value by 43 percent, decreasing budget spending 26 percent, generating \$5 million in new funds, or a combination of these activities.<sup>37</sup>

Our analysis both confirms Mr. Kelley's assessment and seeks to make the data informing these conclusions available to a broader audience. We demonstrate that a significant portion of current county, school district, and township funding is not sustainable over the long term due to the ongoing and projected contraction of the coal industry. Alongside an anticipated decline in available employment, the county may face budget shortfalls due to these closures. However, the contraction of its coal industry also presents an opportunity to transition toward new sources of employment and revenue.

At present, as Mr. Kelley's assessment demonstrates, the county does not have sufficient funds to support a just transition from coal to other industries such as tourism. Financing thus would need to be provided, at least in part, from external sources such as state or federal actors. Though multiple means of addressing these budget shortfalls exist, it is likely that collaborative action across multiple actors, sectors, and scales would most effectively leverage the County's creativity, resources, and workforce to take advantage of a changing energy landscape.

## 5 Bibliography

- “2003 Dollars in 2018 | Inflation Calculator.” Accessed October 16, 2020.  
<https://www.in2013dollars.com/us/inflation/2003>.
- “2013 Bituminous Employees and Production Tonnage - Summary by County.” 2013 Coal and Industrial Minerals Mining Activities. Pennsylvania Department of Environmental Protection, 2013.  
[http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Annual\\_Reports/BituminousAnnualReports/2013/2013BituminousEmployeesandProductionTonnage\\_SummarybyCounty.pdf](http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Annual_Reports/BituminousAnnualReports/2013/2013BituminousEmployeesandProductionTonnage_SummarybyCounty.pdf).
- “2018 Bituminous Underground Mines Reporting Production - Listed by County.” 2018 Coal and Industrial Minerals Mining Activities. Pennsylvania Department of Environmental Protection, 2018.  
[http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Annual\\_Reports/BituminousAnnualReports/2018/2018BituminousUndergroundMines\\_ListedbyCounty.pdf](http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Annual_Reports/BituminousAnnualReports/2018/2018BituminousUndergroundMines_ListedbyCounty.pdf).
- Ten Mile Creek Country. “A Look At Greene County Coal Mines,” June 9, 2010.  
<http://tenmilecreekcountry.blogspot.com/2010/06/brief-overview-of-greene-county-coal.html>.
- Greene County Pennsylvania. “Assessment Office,” 2019.  
<https://www.co.greene.pa.us/departments-assessment-office#section-resource-box2088>.
- Barrett, Steve. “Greene Commissioners Receive Dire Budget Warning.” *The Observer-Reporter*, September 5, 2020. [https://observer-reporter.com/news/localnews/greene-commissioners-receive-dire-budget-warning/article\\_316feaf4-ee31-11ea-988f-2f320d2ebf91.html](https://observer-reporter.com/news/localnews/greene-commissioners-receive-dire-budget-warning/article_316feaf4-ee31-11ea-988f-2f320d2ebf91.html).
- Barrett, Timothy W., and Linda Yip. “Summary: Greene County, Pennsylvania; General Obligation.” Standard & Poor’s Global Credit Portal RatingsDirect, November 27, 2013. <https://emma.msrb.org/ER930677-ER726726-ER1128184.pdf>.
- Buchanan, Susan, Erica Burt, and Peter Orris. “Beyond Black Lung: Scientific Evidence of Health Effects from Coal Use in Electricity Generation.” *Journal of Public Health Policy* 35, no. 3 (August 1, 2014): 266–77. <https://doi.org/10.1057/jphp.2014.16>.
- Coglianesi, John, Todd Gerarden, and James H. Stock. “The Effects of Fuel Prices, Regulations, and Other Factors on U.S. Coal Production, 2008-2016.” *The Energy Journal* 41, no. 1 (2020).
- Edwards, Gareth A. S. “Coal and Climate Change.” *WIREs Climate Change* 10, no. 5 (2019): e607. <https://doi.org/10.1002/wcc.607>.
- Epstein, Paul R., Jonathan J. Buonocore, Kevin Eckerle, Michael Hendryx, Benjamin M. Stout Iii, Richard Heinberg, Richard W. Clapp, et al. “Full Cost Accounting for the Life Cycle of Coal.” *Annals of the New York Academy of Sciences* 1219 (February 2011): 73–98. <https://doi.org/10.1111/j.1749-6632.2010.05890.x>.
- Data USA. “Greene County, PA,” 2020. <https://datausa.io/profile/geo/greene-county-pa/#economy>.
- Hampton, Rachel L., and Barry G. Rabe. “Leaving Money on the Table: Pennsylvania Exceptionalism in Resisting Energy Severance Taxes.” *Commonwealth* 19, no. 1 (2017).
- Hendryx, Michael, and Kestrel A. Innes-Wimsatt. “Increased Risk of Depression for People Living in Coal Mining Areas of Central Appalachia.” *Ecopsychology* 5, no. 3 (September 1, 2013): 179–87. <https://doi.org/10.1089/eco.2013.0029>.

- Hendryx, Michael, Keith J. Zullig, and Juhua Luo. "Impacts of Coal Use on Health." *Annual Review of Public Health* 41, no. 1 (April 2, 2020): 397–415. <https://doi.org/10.1146/annurev-publhealth-040119-094104>.
- Just Transition Fund. "The National Economic Transition Platform," 2020. <https://nationaleconomictransition.org/platform/>.
- Kelley, Scott. "2021 Budget." Greene County Finance Office, November 2020. <https://www.co.greene.pa.us/resources/11256>.
- . "Annual Financial Information and Operating Data: Combined Supplemental Operating Data for FY 2010, 2011, and 2012, for the Year Ended 12/31/2012." Greene, Pennsylvania: County of Greene, Pennsylvania, 2013. <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/ER737030>.
- . "Annual Financial Information and Operating Data: County of Greene Operating Data 2018, for the Year Ended 12/31/2018." Greene, Pennsylvania: County of Greene, Pennsylvania, 2019. <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/ER954288>.
- . "Annual Financial Information and Operating Data: County of Greene Operating Data for 2019, for the Year Ended 12/31/2019." Greene, Pennsylvania: County of Greene, Pennsylvania, 2020. <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/SS1070190>.
- . "Annual Financial Information and Operating Data: Operating Data - FY 2015 for the Year Ended 12/31/2015." Greene, Pennsylvania: County of Greene, Pennsylvania, 2016. <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/ES646705>.
- . "Annual Financial Information and Operating Data: Operating Data and DRAFT 2017 Audit/Annual Financial Information, for the Year Ended 12/31/2017." Greene, Pennsylvania: County of Greene, Pennsylvania, 2018. <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/ER884978>.
- . "Annual Financial Information and Operating Data: Operating Data per CDC's for the 2014 and 2016 Bonds, for the Year Ended 12/31/2016." Greene, Pennsylvania: County of Greene, Pennsylvania, 2017. <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/EP788359>.
- McGlade, Christophe, and Paul Ekins. "The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2 °C." *Nature* 517, no. 7533 (January 2015): 187–90. <https://doi.org/10.1038/nature14016>.
- "Millage Rates for 2019." Greene, Pennsylvania: Greene County Assessment Office, 2019. <https://www.co.greene.pa.us/resources/2688>.
- "Millage Rates for 2020." Greene, Pennsylvania: Greene County Assessment Office, 2020. <https://www.co.greene.pa.us/resources/10230>.
- Morrice, Emily, and Ruth Colagiuri. "Coal Mining, Social Injustice and Health: A Universal Conflict of Power and Priorities." *Health & Place* 19 (January 1, 2013): 74–79. <https://doi.org/10.1016/j.healthplace.2012.10.006>.
- "Municipal Securities Rulemaking Board::EMMA." Accessed October 16, 2020. <https://emma.msrb.org/IssuerHomePage/Issuer?id=4A2660FABE14114175C359E6A25E596E&type=G>.
- Nyland, Danielle. "Mining in Greene." *GreeneScene Magazine* (blog), July 16, 2019. <https://greensaver.com/mining-in-greene/>.
- Olson, Erik D., and Mayra Quirindongo. "Pollution Unchecked: A Case Study of Greene County, Pennsylvania." Natural Resources Defense Council; Pennsylvania Environmental Council; Monongahela Riverkeeper, December 2004.

- <https://www.nrdc.org/sites/default/files/greene.pdf>.
- Prehoda, Emily W., and Joshua M. Pearce. “Potential Lives Saved by Replacing Coal with Solar Photovoltaic Electricity Production in the U.S.” *Renewable and Sustainable Energy Reviews* 80 (December 1, 2017): 710–15. <https://doi.org/10.1016/j.rser.2017.05.119>.
- “Ryerson Station State Park Ryerson Station Dam Damage Claim Number SA1736.” Interim Report. Pennsylvania Department of Environmental Protection: California District Office, February 16, 2010.  
[http://files.dep.state.pa.us/Mining/District%20Mining/DistrictMinePortalFiles/California/Ryerson\\_Station\\_Dam\\_Damage\\_Claim\\_Report\\_revised\\_2-12.pdf](http://files.dep.state.pa.us/Mining/District%20Mining/DistrictMinePortalFiles/California/Ryerson_Station_Dam_Damage_Claim_Report_revised_2-12.pdf).
- Teras, Andrew R., and Henry W. Henderson. “Summary: Greene County, Pennsylvania; General Obligation.” Standard & Poor’s Global Credit Portal RatingsDirect, August 17, 2011. <https://emma.msrb.org/ER930676-ER726725-ER1128183.pdf>.
- StateImpact Pennsylvania. “The Oil and Gas Law of the Land: Act 13.” Accessed November 8, 2020. <https://stateimpact.npr.org/pennsylvania/tag/act-13/>.
- “The Tourism Economy in Greene County: Summary of Findings and Recommendations.” Wayne, PA: Tourism Economics; Marshall Murdaugh Marketing, October 2010. <https://greencountyedc.com/wp-content/uploads/2019/04/Tourism-Economic-Impact-Analysis-Strategic-Goals-102610.pdf>.
- Tonsor, Stephen J., Alison N. Hale, Anthony Iannacchione, Daniel J. Bain, Michael Keener, Erin Pfeil-McCullough, and Keith Garmire. “The Effects of Subsidence Resulting from Underground Bituminous Coal Mining, 2008-2013.” Five-Year Report. Bituminous Mine Subsidence and Land Conservation Act Act 54 Amendments. University of Pittsburgh; Pennsylvania Department of Environmental Protection, August 30, 2014. [http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Act%2054/Act%2054%20Report%20-%204th%20\(2008%20-%202013\).pdf](http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Act%2054/Act%2054%20Report%20-%204th%20(2008%20-%202013).pdf).
- “U.S. Census Bureau QuickFacts: Greene County, Pennsylvania.” Accessed October 17, 2020. <https://www.census.gov/quickfacts/greencountypennsylvania>.
- U.S. Census Bureau and U.S. Department of Housing and Urban Development. “Median Sales Price of Houses Sold for the Northeast Census Region.” FRED, Federal Reserve Bank of St. Louis. FRED, Federal Reserve Bank of St. Louis, 2020. <https://fred.stlouisfed.org/series/MSPNE>.
- . “Median Sales Price of Houses Sold for the United States.” FRED, Federal Reserve Bank of St. Louis. FRED, Federal Reserve Bank of St. Louis, 2020. <https://fred.stlouisfed.org/series/MSPUS>.
- U.S. Energy Information Administration. “Coal Data Browser.” Accessed October 17, 2020. <https://www.eia.gov/coal/data/browser/#/topic/37?agg=1,0&geo=nvg1qag9vvlpnsoo&mntp=g&freq=A&start=2001&end=2019&ctype=map&ltype=pin&rtype=s&pin=&rse=0&maptype=0>.
- White-Nockleby, Caroline. Interview with Scott Kelley, Greene County Chief Finance Officer. Phone, November 16, 2020.

## **6 Appendix 1: Access to Data Spreadsheets**

Mineral Value and Real Estate Tax Data, 2003-2019:

*Please contact Laur Hesse Fisher, [climate@mit.edu](mailto:climate@mit.edu), for access to this data spreadsheet.*

Top Ten Real Estate Tax Payers Data, 2015-2019:

*Please contact Laur Hesse Fisher, [climate@mit.edu](mailto:climate@mit.edu), for access to this data spreadsheet.*

## **7 About the Here and Real Project**

This white paper was produced as a part of Here & Real, a project of the MIT Environmental Solutions Initiative. The Here & Real project is dedicated to direct engagement with U.S. regions as they tackle conversations around climate change and an emerging low-carbon economy. Partnering with local and state leadership, Here & Real staff and students combine world-class research with local values and economic realities in order to support decision-makers and residents as they plan—and help create—a more resilient future. Read more at <https://environmentalsolutions.mit.edu/here-and-real/>.

## **8 Acknowledgements**

The authors would like to acknowledge Veronica Coptis and Heaven Sensky of the Center for Coalfield Justice (CCJ), a community organization located in Greene County, PA, for their role in providing context and contacts, and for hosting ESI students; Scott Kelley, Greene County Chief Finance Officer, for the data he provided and his wealth of knowledge; Dr. John Reilly of the MIT Joint Program on the Science and Policy of Global Change and Professor Clare Balboni of the MIT Department of Economics for their critical reviews and insightful feedback; the MIT PKG Center for administering Mimi Wahid and Caroline Boone's first internship in Greene County; Laur Hesse Fisher, director of the Here & Real Project, for inspiring the production of this paper and for her mentorship; and Prof. John Fernandez, director of the MIT Environmental Solutions Initiative, for establishing the initial relationship with Greene County.

## **9 Community Engagement and Impact**

The Here & Real project is committed to co-producing and co-disseminating research findings with its local partners. To engage Greene County residents in the results of this work, research findings were included in CCJ's 2019 door-to-door canvassing and in a series of workshops to educate residents on their local tax structure, how it was changing, and what that means for their county. Here & Real partnered with the enGageMENT Lab at Emerson College, whose students developed a hands-on educational game that CCJ adapted and ran at three summer county fairs in 2019 to communicate these and related findings. In all, CCJ estimates that over 1,160 county residents engaged with the results of this research by the time of publication.



## 10 Notes

---

<sup>1</sup> “A Look At Greene County Coal Mines,” *Ten Mile Creek Country* (blog), June 9, 2010, <http://tenmilecreekcountry.blogspot.com/2010/06/brief-overview-of-greene-county-coal.html>; Danielle Nyland, “Mining in Greene,” *GreeneScene Magazine* (blog), July 16, 2019, <https://greenesaver.com/mining-in-greene/>.

<sup>2</sup> John Coglianesi, Todd Gerarden, and James H. Stock, “The Effects of Fuel Prices, Regulations, and Other Factors on U.S. Coal Production, 2008-2016,” *The Energy Journal* 41, no. 1 (2020).

<sup>3</sup> Coglianesi, Gerarden, and Stock.

<sup>4</sup> U.S. Energy Information Administration, “Coal Data Browser,” accessed October 17, 2020, <https://www.eia.gov/coal/data/browser/#/topic/37?agg=1,0&geo=nvgtqag9vvlpnsoo&mntp=g&freq=A&start=2001&end=2019&ctype=map&ltype=pin&rtype=s&pin=&rse=o&maptype=o>.

<sup>5</sup> “2018 Bituminous Underground Mines Reporting Production - Listed by County,” 2018 Coal and Industrial Minerals Mining Activities (Pennsylvania Department of Environmental Protection, 2018), [http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Annual\\_Reports/BituminousAnnualReports/2018/2018BituminousUndergroundMines\\_ListedbyCounty.pdf](http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Annual_Reports/BituminousAnnualReports/2018/2018BituminousUndergroundMines_ListedbyCounty.pdf); “2013 Bituminous Employees and Production Tonnage - Summary by County,” 2013 Coal and Industrial Minerals Mining Activities (Pennsylvania Department of Environmental Protection, 2013), [http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Annual\\_Reports/BituminousAnnualReports/2013/2013BituminousEmployeesandProductionTonnage\\_SummarybyCounty.pdf](http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Annual_Reports/BituminousAnnualReports/2013/2013BituminousEmployeesandProductionTonnage_SummarybyCounty.pdf).

<sup>6</sup> “U.S. Census Bureau QuickFacts: Greene County, Pennsylvania,” accessed October 17, 2020, <https://www.census.gov/quickfacts/greencountypennsylvania>.

<sup>7</sup> Stephen J. Tonsor et al., “The Effects of Subsidence Resulting from Underground Bituminous Coal Mining, 2008-2013,” Five-Year Report, Bituminous Mine Subsidence and Land Conservation Act Act 54 Amendments (University of Pittsburgh; Pennsylvania Department of Environmental Protection, August 30, 2014), [http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Act%2054/Act%2054%20Report%20-%204th%20\(2008%20-%202013\).pdf](http://files.dep.state.pa.us/Mining/BureauOfMiningPrograms/BMPPortalFiles/Act%2054/Act%2054%20Report%20-%204th%20(2008%20-%202013).pdf).

<sup>8</sup> “Greene County, PA,” Data USA, 2020, <https://datausa.io/profile/geo/greene-county-pa/#economy>.

<sup>9</sup> “Greene County, PA.”

<sup>10</sup> Tourism Economics, “Economic Impact of Travel & Tourism in Pennsylvania 2019” (Pennsylvania, USA: Prep Tourism Economics. “Economic Impact of Travel & Tourism in Pennsylvania 2019.” Pennsylvania, USA: Prepared for: Pennsylvania Tourism Office, Department of Community and Economic Development, 2019. [https://www.visitpa.com/sites/default/files/pdfs/Economic%20Impact%20of%20Tourism%20in%20PA%202019\\_FINAL-min.pdf](https://www.visitpa.com/sites/default/files/pdfs/Economic%20Impact%20of%20Tourism%20in%20PA%202019_FINAL-min.pdf).

<sup>11</sup> Tourism Economics, 74.

<sup>12</sup> Tourism Economics, 71; 74.

<sup>13</sup> Caroline White-Nockleby, Interview with Scott Kelley, Greene County Chief Finance Officer, Phone, November 16, 2020.

<sup>14</sup> e.g. Emily Morrice and Ruth Colagiuri, “Coal Mining, Social Injustice and Health: A Universal Conflict of Power and Priorities,” *Health & Place* 19 (January 1, 2013): 74–79, <https://doi.org/10.1016/j.healthplace.2012.10.006>; Gareth A. S. Edwards, “Coal and Climate Change,” *WIREs Climate Change* 10, no. 5 (2019): e607, <https://doi.org/10.1002/wcc.607>.

- 
- <sup>15</sup> Michael Hendryx, Keith J. Zullig, and Juhua Luo, “Impacts of Coal Use on Health,” *Annual Review of Public Health* 41, no. 1 (April 2, 2020): 397–415, <https://doi.org/10.1146/annurev-publhealth-040119-094104>.
- <sup>16</sup> Susan Buchanan, Erica Burt, and Peter Orris, “Beyond Black Lung: Scientific Evidence of Health Effects from Coal Use in Electricity Generation,” *Journal of Public Health Policy* 35, no. 3 (August 1, 2014): 266–77, <https://doi.org/10.1057/jphp.2014.16>.
- <sup>17</sup> Michael Hendryx and Kestrel A. Innes-Wimsatt, “Increased Risk of Depression for People Living in Coal Mining Areas of Central Appalachia,” *Ecopsychology* 5, no. 3 (September 1, 2013): 179–87, <https://doi.org/10.1089/eco.2013.0029>.
- <sup>18</sup> Emily W. Prehoda and Joshua M. Pearce, “Potential Lives Saved by Replacing Coal with Solar Photovoltaic Electricity Production in the U.S.,” *Renewable and Sustainable Energy Reviews* 80 (December 1, 2017): 710–15, <https://doi.org/10.1016/j.rser.2017.05.119>.
- <sup>19</sup> Christophe McGlade and Paul Ekins, “The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2 °C,” *Nature* 517, no. 7533 (January 2015): 187–90, <https://doi.org/10.1038/nature14016>.
- <sup>20</sup> Paul R. Epstein et al., “Full Cost Accounting for the Life Cycle of Coal,” *Annals of the New York Academy of Sciences* 1219 (February 2011): 73–98, <https://doi.org/10.1111/j.1749-6632.2010.05890.x>.
- <sup>21</sup> “Ryerson Station State Park Ryerson Station Dam Damage Claim Number SA1736,” Interim Report (Pennsylvania Department of Environmental Protection: California District Office, February 16, 2010), [http://files.dep.state.pa.us/Mining/District%20Mining/DistrictMinePortalFiles/California/Ryerson\\_Station\\_Dam\\_Damage\\_Claim\\_Report\\_revised\\_2-12.pdf](http://files.dep.state.pa.us/Mining/District%20Mining/DistrictMinePortalFiles/California/Ryerson_Station_Dam_Damage_Claim_Report_revised_2-12.pdf); Erik D. Olson and Mayra Quirindongo, “Pollution Unchecked: A Case Study of Greene County, Pennsylvania” (Natural Resources Defense Council; Pennsylvania Environmental Council; Monongahela Riverkeeper, December 2004), <https://www.nrdc.org/sites/default/files/greene.pdf>.
- <sup>22</sup> e.g. Just Transition Fund, “The National Economic Transition Platform,” 2020, <https://nationaleconomictransition.org/platform/>.
- <sup>23</sup> Scott Kelley, “2021 Budget” (Greene County Finance Office, November 2020), <https://www.co.greene.pa.us/resources/11256>.
- <sup>24</sup> In 2011, despite awarding Greene County a credit rating of “A”, the county’s credit report stated: “The 10 leading taxpayers comprise 30 percent of total assessed value, a level we consider moderately concentrated; eight of these taxpayers are entities involved in coal-related activities” (Teras and Henderson 2011, 3). In 2013, the report, though awarding the County an “A+”, explained that though gas industry growth had generated new jobs, “We view the county’s economic profile as very weak due to below-average income and wealth levels, as well as taxpayer concentration and industry concentration in coal mining... The 10 leading taxpayers comprise 29.3 percent of total assessed value, a level we consider concentrated; eight of these taxpayers are entities involved in coal-related activities” (Barrett and Yip 2013, 3).
- <sup>25</sup> “Assessment Office,” Greene County Pennsylvania, 2019, <https://www.co.greene.pa.us/departments-assessment-office#section-resource-box2088>.
- <sup>26</sup> “Assessment Office.”
- <sup>27</sup> “Millage Rates for 2019” (Greene, Pennsylvania: Greene County Assessment Office, 2019), <https://www.co.greene.pa.us/resources/2688>; “Millage Rates for 2020” (Greene, Pennsylvania: Greene County Assessment Office, 2020), <https://www.co.greene.pa.us/resources/10230>.
- <sup>28</sup> EMMA website: “Municipal Securities Rulemaking Board::EMMA,” accessed October 16, 2020, <https://emma.msrb.org/IssuerHomePage/Issuer?id=4A2660FABE14114175C359E6A25E596E&type=G>; Scott Kelley, “Annual Financial Information and Operating Data: Combined Supplemental Operating Data for FY 2010, 2011, and 2012, for the Year Ended 12/31/2012” (Greene, Pennsylvania: County of Greene, Pennsylvania, 2013), <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/ER737030>; Credit rating 2011: Andrew R. Teras and Henry W. Henderson, “Summary: Greene County, Pennsylvania; General Obligation” (Standard & Poor’s Global Credit Portal RatingsDirect, August 17, 2011), <https://emma.msrb.org/ER930676-ER726725->

ER1128183.pdf; Credit rating 2013: Timothy W. Barrett and Linda Yip, “Summary: Greene County, Pennsylvania; General Obligation” (Standard & Poor’s Global Credit Portal RatingsDirect, November 27, 2013), <https://emma.msrb.org/ER930677-ER726726-ER1128184.pdf>; 2015 Operating Data: Scott Kelley, “Annual Financial Information and Operating Data: Operating Data - FY 2015 for the Year Ended 12/31/2015” (Greene, Pennsylvania: County of Greene, Pennsylvania, 2016), <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/ES646705>; 2016 Operating Data: Scott Kelley, “Annual Financial Information and Operating Data: Operating Data per CDC’s for the 2014 and 2016 Bonds, for the Year Ended 12/31/2016” (Greene, Pennsylvania: County of Greene, Pennsylvania, 2017), <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/EP788359>; 2017 Operating Data: Scott Kelley, “Annual Financial Information and Operating Data: Operating Data and DRAFT 2017 Audit/Annual Financial Information, for the Year Ended 12/31/2017” (Greene, Pennsylvania: County of Greene, Pennsylvania, 2018), <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/ER884978>; 2018 Operating Data: Scott Kelley, “Annual Financial Information and Operating Data: County of Greene Operating Data 2018, for the Year Ended 12/31/2018” (Greene, Pennsylvania: County of Greene, Pennsylvania, 2019), <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/ER954288>; 2019 Operating Data: Scott Kelley, “Annual Financial Information and Operating Data: County of Greene Operating Data for 2019, for the Year Ended 12/31/2019” (Greene, Pennsylvania: County of Greene, Pennsylvania, 2020), <https://emma.msrb.org/MarketActivity/ContinuingDisclosureDetails/SS1070190>.

<sup>29</sup> “2003 Dollars in 2018 | Inflation Calculator,” accessed October 16, 2020, <https://www.in2013dollars.com/us/inflation/2003>.

<sup>30</sup> Teras and Henderson, “Summary: Greene County, Pennsylvania; General Obligation,” 3.

<sup>31</sup> U.S. Census Bureau and U.S. Department of Housing and Urban Development, “Median Sales Price of Houses Sold for the United States,” FRED, Federal Reserve Bank of St. Louis (FRED, Federal Reserve Bank of St. Louis, 2020), <https://fred.stlouisfed.org/series/MSPUS>; U.S. Census Bureau and U.S. Department of Housing and Urban Development, “Median Sales Price of Houses Sold for the Northeast Census Region,” FRED, Federal Reserve Bank of St. Louis (FRED, Federal Reserve Bank of St. Louis, 2020), <https://fred.stlouisfed.org/series/MSPNE>.

<sup>32</sup> It should be noted that company bankruptcies do not necessarily immediately impact assessed real estate value for the tax year in which they take place, though as this analysis shows, they do begin to impact budgets in subsequent years. For instance, following the bankruptcy of Alpha Natural Resources - the parent company for Cumberland Coal, Cumberland Resources, Emerald Coal Company, Foundation Coal Resources Corp, and Pennsylvania Land Holdings - and the closure of its Emerald Mine, in mid-2015, the county wrote: “These events have not affected the assessed value of the mineral reserves or surface properties for 2016. Alpha and its subsidiaries has to date, and is reasonably expected to pay in the future, its annual real estate taxes” (Kelley, “Annual Financial Information and Operating Data: Operating Data - FY 2015 for the Year Ended 12/31/2015.”)

<sup>33</sup> The structure of the impact fee differs significantly from the severance taxes levied by the other top fifteen oil and gas producing states in the U.S. Severance taxes are assessed on either the volume of gas extracted, market value of gas extracted, or a combination of both, impact fees are assessed on wells drilled. The impact fee, meanwhile, is a fee assessed annually for a set number of years for each well drilled. Under this fee structure, revenues from methane gas extraction might decrease even as the volume of gas extracted increases. Moreover, the fee, which is set each year based on methane gas prices and the Consumer Price Index, was initially assessed only in counties that complied with state regulations regarding drilling. Because local jurisdictions were required to comply with state regulations to qualify to levee the fee the Act also, in effect, prevented local authorities from enacting tougher regulations on gas companies than those in force at the state level. The compliance portion of the law, however, has since been struck down by the PA Supreme Court (Rachel L. Hampton and Barry G. Rabe, “Leaving Money on the Table: Pennsylvania Exceptionalism in Resisting Energy Severance Taxes,” *Commonwealth* 19, no. 1 (2017)).

<sup>34</sup> “The Oil and Gas Law of the Land: Act 13,” *StateImpact Pennsylvania* (blog), accessed November 8, 2020, <https://stateimpact.npr.org/pennsylvania/tag/act-13/>.

<sup>35</sup> Steve Barrett, “Greene Commissioners Receive Dire Budget Warning,” *The Observer-Reporter*, September 5, 2020, [https://observer-reporter.com/news/localnews/greene-commissioners-receive-dire-budget-warning/article\\_316feaf4-ee31-11ea-988f-2f320d2ebf91.html](https://observer-reporter.com/news/localnews/greene-commissioners-receive-dire-budget-warning/article_316feaf4-ee31-11ea-988f-2f320d2ebf91.html).

---

<sup>36</sup> Barrett.

<sup>37</sup> Kelley, “2021 Budget.”