Ad Valorem Taxation of Coal Property in West Virginia and Other States—Part 1

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This article is the first of a two-part series exploring the issues in ad valorem taxation of coal-mining properties. The topic was presented by the author at the 76th Annual International Conference on Assessment Administration sponsored by the International Association of Assessing Officers (IAAO) and held in Orlando, Florida, August 30–September 1, 2010. The two articles are a condensation of a research report prepared as a requirement for the AAS designation.

Coal is an important resource for U.S. economic growth and provides a necessary source of revenue for governments in major coal-producing states. West Virginia is second in production of coal in the United States. Coal and coal-dependent businesses constitute the state's major industry. Ad valorem taxes provide a significant source of revenue for local governments, and the loss of coal-related revenue would seriously impede the function of many counties. How West Virginia appraises coal interests, both coal currently being mined (active coal) and coal available for mining but not in production (reserve coal), is examined in detail.

West Virginia, however, is not the only state that produces coal. The methods other major coal-producing states use to levy property taxes are explored as well. Only two of these states have as complete a process of appraisal as West Virginia. In those states that leave the assessment in local hands, the methods employed are often simplistic, outdated, and inaccurate.

Coal in the United States Economy

Demand for Coal

For at least the next quarter-century, the U.S. economy is going to rely primarily on coal for the generation of electricity. The U.S. Energy Information Administration (EIA) projects that, "Total electricity demand increases by 30 percent … from 2008 to 2035." (EIA 2010, 65) Coal currently provides a 48 percent share of all fuels used in electric generation; this share is predicted to fall to 44 percent by 2035. EIA reports, "With the slow growth in electricity demand, little new coal-fired capacity is added" during the period (EIA 2010, 66).

Geographic sources of the coal supply also will change. Coal production from the western (Wyoming, North Dakota, Montana and Colorado) fields and in-

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terior (Western Kentucky, Illinois and Indiana) fields will expand, while that from Central Appalachia will decline, because of the completed mining of the better reserves and the decreased demand for low-sulfur coal (produced primarily in Central Appalachia) due to the required installation of sulfur scrubbers on most coal-burning electric generation plants (EIA 2010).

Coal Reserves

Ample coal reserves exist in the 14 states covered in this article. These states hold almost 90 percent of the total recoverable coal reserves in the United States (see table 1). Recoverable reserves are the quantity of coal that can be mined from existing coal reserves at current prices and costs of production (EIA 2008, 36).

Table 1. Recoverable coal reserves by state in 2008

Reserve Rank	State	Recoverable Reserves 2008 (million short tons)	Percentage of U.S. Total 2008
1	Wyoming	7,010	39.217%
2	West Virginia	1,908	10.674%
3	North Dakota	1,225	6.853%
4	Illinois	1,189	6.652%
5	Kentucky	1,167	6.529%
6	Montana	925	5.175%
7	Texas	752	4.207%
9	Pennsylvania	526	2.943%
10	Indiana	421	2.355%
12	Colorado	325	1.818%
13	Ohio	308	1.723%
14	Virginia	217	1.214%
17	Maryland	22	0.123%
Subtotal		15,995	89.483%

Source: EIA (2010)

Importance of Coal in West Virginia

In a study of the economic importance of the coal economy in West Virginia (BBER [Bureau of Business and Economic Research] and CBER [Center for Business and Economic Research] 2010), both the historical and current importance of coal mining and related industries were examined. In addition, an input–output analysis was completed to capture all the direct, indirect, and induced effects of coal-related operations in the state. Unless otherwise noted, all data that follow come from that report.

Gross Domestic Product

For West Virginia, coal mining has accounted for 5 to 7 percent of the state's gross domestic product between 1997 and 2007. For 2008, the percentage was 6.2. Since this percentage considers only the output from coal mining and does not include coal-related industries, the percentage understates the impact of coal.

Coal Production

U.S. coal production reached a peak in 2008 with 1.17 billion tons of coal produced (13.5 percent, or 158 million short tons of total production came from West Virginia). Wyoming contributed 40 percent to continue as the nation's largest producer. Coal in West Virginia is produced from both surface (40 percent) and underground mines (60 percent).

Employment

Since 1997, employment in coal mining has fallen by 21 percent. In 2008, 15,743 individuals worked in West Virginia mines. There was an uptick in mining employment from 2002 through 2008 due to the runup in coal prices. Since then, employment has been falling due to the recession.

Compensation and Wages

Average weekly wages in coal mining have risen during the past decade, reflecting the higher per-worker productivity. In 2008, weekly wages averaged $1,313, which was 49 percent higher than wages in the state's second-highest paying industry, manufacturing. In total, the coal-mining industry paid $5.8 billion in wages to employees in 2008.

Taxes Paid by Coal Companies

Eight different taxes are levied on coal production in West Virginia. These include ad valorem taxes (both real and personal), severance tax, workers compensation tax, corporation net income tax, sales and use tax, coal resource transportation fund tax, and the personal income tax paid by employees and royalty owners in the state. The amount collected from each of these revenue sources is shown in table 2.

Table 2. Taxes and fees levied on coal in West Virginia in 2008

Tax Type	Amount ($ millions)
Property Taxes Levied	
Real property	
Producing coal property	$19.7
Nonproducing coal property	$13.3
Buildings and Land	$3.0
Personal property	$54.8
Severance Taxes	$412.7
Workers Compensation Tax	$80.0
Corporation Net Income Taxes	$25.6
Special Reclamation Taxes	$13.6
Sales and Use Taxes	$3.6
Coal Resource Transportation Road Fund	$3.9
Personal Income Taxes	$46.0
Total	$676.2

Source: WV State Tax Department (Property Tax Division; Research and Development Division), WV Department of Environmental Protection (Division of Mining and Reclamation), and WV Department of Transportation (Division of Highways)

Funds collected from the eight taxes and fees support the West Virginia General Revenue Fund, the Special Reclamation Fund, and the Coal Resource Transportation Fund. Severance taxes are shared with counties, while property taxes remain at the county level.

Economic Impact of the Coal Industry

The full economic impact of the coal industry in West Virginia was estimated using the IMPLAN® input–output modeling system (IMPLAN 2004). Other industries are dependent on coal production in West Virginia, including the transportation of coal by rail or river and the generation of electricity from coal (98 percent of all electricity generated in West Virginia comes from coal and more than 70 percent is exported to other states). When the impacts from these industries are included, the coal economy accounts for more than $25 billion in business volume, almost $4 billion in employee compensation, approximately 62,000 jobs, and $721.65 million in state and local taxes.

Importance of Coal Property Taxes to West Virginia

Ad valorem taxes on all coal-producing property and reserves totaled $91 million in 2008. This is a conservative estimate, because data on ad valorem taxes on equipment, machinery, and inventory was available only from the 10 largest coal companies. Property taxes paid by their subsidiary companies or by the transportation companies and electric utilities that depend on coal are not included.

Ad valorem taxes are the major source of revenue for the state's 55 counties. State government takes only a small percentage to partially offset the costs of administration. While municipalities rely more heavily on other sources of revenue, ad valorem levies account for 10 to 30 percent of their income.

Under the state's school aid formula, county school districts must make a minimum property tax effort established by the state to receive state support (Kent and Sowards 2009). In addition, most counties have bonds underwritten by property tax revenues, special levies to support schools and county functions such as health departments, transit authorities, hospitals, and libraries, or both.

Coal production is found in 24 of the 55 counties in the state. Many of these are the lowest income counties in West Virginia, located in the southern and

central mountains. Table 3 illustrates the importance of property taxes on the budgets of the 10 largest coal-producing counties. For the top coal county, Boone, 60 percent of its revenue comes from coal property taxes. While the percentages are less in other counties, ranging from 43 to 2.3 percent, many of the counties would not be capable of meeting their bond obligations or performing their required functions under the West Virginia Constitution without the revenue from ad valorem taxes on coal.

The ad valorem taxation of active coal production and coal reserves in West Virginia dates back to 1932 (Morgan 1997), when West Virginia was in the throes of the Great Depression and many homes, farms, and businesses were being forced into foreclosure. That year the state constitution was amended to provide that, "…taxation shall be equal and uniform throughout the state and all property both real and personal shall be taxed in proportion to its value…" (W.Va. Const. Art. 10-1). The West Virginia Legislature established four classes of property: Class I, personal property used in agriculture and intangible property; Class II, owner occupied homes; Class III, real and personal property outside of municipalities; and Class IV, all real and personal property inside municipalities (W.Va. Code 11-1C-10). Active coal and coal reserves are Class III property.

The state tax commissioner was given the authority to appraise all industrial, transportation, utility, and natural resource property including coal. County assessors were to assess all other property and were given the discretion to vary valuations from 50 to 100 percent. This method was declared unconstitutional in the case of *Killen v. Logan County Commission* (1982). The state constitution was further amended to establish 60 percent as the standard for assessment (W.Va. Const. Art.10-1b).

In 1990, legislation was enacted directing the state tax commissioner to establish how coal and other natural resources were to be taxed (W.Va. Code 11-1C-10; W.Va. Code 11-1C-5(b)). The commissioner used the comparable sales approach, which proved highly unsatisfactory due to few coal transactions and the problems of determining which sales were truly "arm's-length" (Morgan 1997). A Natural Resource Property Valuations Task Force established in 1995 found the method used to value coal reserves did not meet any acceptable statistical standards and resulted in extreme variations ranging from 50 to 600 percent of value (Morgan 1997).

After several lawsuits and reports from two consultants, the commissioner adopted the current methodology, called the Reserve Coal Valuation Model (RCVM); it employs a discounted cash

Table 3. Property tax revenue of top ten West Virginia coal counties for tax year 2008

Rank	County	Total Revenue	Coal Revenue	Coal Revenue as a Percentage of Total
1	Boone	$35,423,995	$21,290,788	60.1%
2	Logan	$30,389,807	$13,029,578	42.9%
3	Mingo	$22,264,153	$7,095,782	31.9%
4	Kanawha	$176,601,643	$7,186,715	4.1%
5	Marshall	$34,058,791	$5,438,560	16.0%
6	Raleigh	$51,241,583	$7,563,371	14.8%
7	Harrison	$59,241,057	$1,375,720	2.3%
8	Marion	$36,525,039	$3,066,935	8.4%
9	Fayette	$24,861,810	$3,062,242	12.3%
10	Monongalia	$66,410,203	$2,315,597	3.5%

Source: EIA and WV State Tax Department, Property Tax Division

flow income approach to determining the value of active coal and coal reserves.

Real Property Taxes on Coal and Coal Reserves

West Virginia determines the appraised value of coal by using the income approach, as detailed in a report to the West Virginia Legislature (Kent and Eastham 2010a) and discussed by others (Hansen et al. 2009). Before coal is severed from the ground, a real property tax is levied on the present worth of future income of the coal in situ. To determine the present worth, the tons of coal held in the ground and the approximate time of mining are estimated and then discounted to determine the current value. This method is now codified in the West Virginia Code of State Rules (WVCSR 110-1I).

The appraised value of the real property tax on coal property varies based on the type of property being taxed. The five types of coal property for taxation purposes are active mining property, reserve coal property, unmineable coal property, mined-out coal property, and barren coal property.

Active mining property refers to a coal bed in which a coal-mining operation is permitted and actively taking place. Active mining property is appraised by the income approach. To qualify as a mineable coal bed, the seam thickness must be at least 30 inches. An active acre on mining property is defined as the mineable acreage of a coal bed that will be exhausted prior to the maximum mine life. Mine life for active mining properties is 15 years for underground mines and 5 years for surface mines (WV CSR 110-1I).

The present value of the property is calculated by taking a weighted average of the previous 3 years' production figures and converting these production figures into estimated income using coal prices over the previous year. The present value is determined through discounting. Estimated income is determined from production figures by using the average prices per ton for steam and metallurgical coal (S. Burgess, Property Tax Division, West Virginia State Tax Department, interview by E. Eastham, July 16, 2010).

Reserve coal property is defined as property not currently under permit or being actively mined but capable of being mined. The mineral rights are usually owned separately from the surface rights to the land. There are two steps involved in determining the value of reserve coal property: (1) determine the value of each individual reserve coal property and (2) determine the *aggregate value*, which represents the overall value of all coal property in the state compared to the value of reserve coal property.

The valuation of reserve coal property relies on the RCVM. This model uses six reserve coal bed valuation factors to determine the estimated value of reserve coal property:

- Market interest factor relates to the level of coal mining activity in the area.
- Market mineability factor is the estimated cost of recovery for that reserve.
- Prime coal bed factor indicates which seam is to be mined first if more than one seam exists at a location and seams overlap.
- Environmental factor considers limitations or impediments to mining such as regulations.
- Use conflict factor occurs when mining may interfere with other uses of the land or subsurface.
- Volatility factor determines if the coal is or is not suitable to use at projected prices.

When reserve coal property is being appraised, each of these six factors is considered to determine when mining is estimated to begin. These factors are measured and labeled as a factor of 20,

40, or 80. The values for all six valuation factors are added together, divided by three (representing the three possible factor values of 20, 40, and 80), and rounded to the nearest of 20, 40, or 80. The result of this calculation is the coal bed index factor.

An index factor of 20 represents a *good bucket*, which would be roughly equal to $1,000 per acre. A factor valuation of 40 represents a *medium bucket*, which would be roughly equal to $100 per acre, and a factor valuation of 80 represents a *bad bucket*, which is roughly equal to $5 per acre. The minimum valuation of reserve coal property in West Virginia is $5 per acre. *Bucket* is a term referring to the quality of the coal seams. The values of 20, 40, and 80 indicate the approximate number of years remaining in which the coal seam is likely to be mined.

The appraised value of reserve coal property is represented by the present worth formula:

(1)

$$\frac{\$}{\frac{ac}{bed}} = \left(\frac{\$}{mmBTU}\right)(ROY)[1''(BTU+S)]\left[\left(\frac{1}{(1+I)^{(t+0.5)}}\right)\left(\frac{1}{10^6}\right)\right](BTU)(2000)(1800)(RR)(Thk)$$

where

$(\$/ac)/bed$ = the present value per acre of an individual coal bed on a property

$\$/mmBTU$ = the coal price (FOB source) per million BTU

ROY = the average royalty rate

$1''(BTU+S)$ = BTU and sulfur adjustment factor

$1/(1+I)^{(t+0.5)}$ = standard mid-year present worth factor

BTU = the BTU content of one pound of dry coal by coal bed by location

2000 = 2000 pounds per ton conversion factor

1800 = 1800 tons per acre foot conversion factor

RR = the clean coal recovery rate

Thk = the coal bed thickness in feet (WVCSR 110-1I).

The *coal price per million BTU* represents the sale price of coal over the past year. This figure is determined annually through surveys given to power plants and published information on the sale price of coal. Coal prices from the past year are averaged to create each annual figure.

The *royalty rate* is determined through an annual survey of the leasors of coal operating leases. The surveys are given to as many operating leasors as possible. An average royalty rate value is calculated from the results of these surveys. The final figure is generally between 5 and 6 percent.

The *BTU and sulfur adjustment factor* refers to the characteristics of coal in a particular seam. The BTU and sulfur content of coal is determined in the seams located in that area. Seam locations and thicknesses are obtained through mapping by the West Virginia Geological and Economic Survey (WVGES). In addition, the WVGES determines the BTU and sulfur contents of each coal seam. Coal with lower sulfur content is given a higher value because lower sulfur coal commands a higher price. Similarly, the BTU content per pound of coal measures the BTU content of coal in a particular seam—coal with a higher BTU has a higher value.

The *mid-year present worth factor* is a key component. The I in this factor represents the discount rate (capitalization rate), and the t variable is a time factor denoting the estimated time of mining as 20, 40, or 80 as previously described. The exponent $(t + 0.5)$ expresses time as a mid-year factor. This variable uses a capitalization rate, which in 2008 was calculated as approximately 12.1 percent. To determine the capitalization rate used for coal valuation, a discount rate is determined through five subcomponents:

safe rate, nonliquidity rate, risk rate, management rate, and inflation rate.

The *safe rate* is similar to the rate of return on an investment that poses low risk. This rate is calculated by taking a 3-year average on 13-week U.S. Constant Maturity Treasury Yields (WVCSR 110-1I-4.1.7.1.a).

Determining the *nonliquidity rate* begins with a yearly study that estimates the length of time coal property is for sale before being sold. This length of time is then used to determine the U.S. Constant Maturity Treasury Yields, which has a comparable time differential. The only requirement is that the term must be greater than 13 weeks. The nonliquidity rate is the interest differential between the selected U.S. Constant Maturity Treasury Yields and the 13-week U.S. Constant Maturity Treasury Yields.

Estimating the *risk* of coal property investment involves the interest rates applied to loans for the purchase and/or development of coal properties. These interest rates are determined by first taking the prime rate as established "in the economic indicators prepared by the Council of Economic Advisors for the Joint Economic Committee" (WVCSR 110-1I-4.1.7.1.c). Then 2 percent is added to the rate and an average of the rates of the past 3 years is calculated. The interest differential is taken between this 3-year average and the 3-year average of 13-week U.S. Constant Maturity Treasury Yields, as determined previously, to calculate the risk rate.

By rule, the *management rate* is a fixed rate of 0.5 percent.

The state tax commissioner is responsible for determining an appropriate price index from the U.S. Department of Labor Bureau of Labor Statistics (BLS). With this price index from the BLS, inflation rates from the past 3 years are used to estimate the average inflation rate.

From these five subcomponents of the discount rate, the statewide capitalization rate used to value coal is calculated. The safe rate, nonliquidity rate, risk rate, and management rate are added together. The inflation rate is then subtracted from this figure. A non-inflating income series is assumed in the calculation of the capitalization rate.

The *clean coal recovery rate* is dependent on the type of mining. For active mines, the clean coal recovery rate is the percentage of tons of clean coal extracted. This rate is represented by the tons of coal mined subtracted from the total tons of coal located in the bed. For reserve coal property, the clean coal recovery rate is the percentage of the tons of clean coal expected to be extracted when mining occurs. The clean coal recovery rate for reserve coal properties is determined by considering the total tons of coal estimated in the coal bed as well as the estimated recoveries from both mining and cleaning of the coal (WVCSR 110-1I-3.19.2).

After the present value per acre of a coal bed has been determined, this value is multiplied by the number of mineable acres of the coal seam and the aggregate ratio.

To determine the *aggregate ratio*, the total value of all unmined coal in the state is estimated (WVCSR 110-1I), as follows:

(2)

$$AgVal = \frac{(\text{Average Coal Price})(\text{Average Royalty Rate})(\text{Annual Production})}{\text{Capitalization Rate}}$$

The aggregate active value is determined next. The aggregate active value is the value of all acres on active mining property (WVCSR 110-1I-4.2.3.20). Subtracting the aggregate active value from the aggregate value yields the aggregate reserve value, which is then divided by the aggregate reserve index to calculate the aggregate ratio. The aggregate reserve index is calculated by adding the values of every individual property coal bed together (WVCSR 110-1I-4.2.3.22.a). This aggregate ratio is currently calculated at 0.9388.

The following is a hypothetical example of the application of equation 1.

Assume a fictional coal bed called Coal Bed A. To calculate the present value per acre of Coal Bed A, certain variables must be identified:

- The sale price per million BTU is $2.00.
- The average royalty rate is 5 percent.
- The BTU and sulfur adjustment factor for Coal Bed A, which is determined by the WVGES for each coal bed is 1.2, due to a high BTU and low sulfur content.
- The BTU content per pound of dry coal is 14,000 BTU.
- The clean coal recovery rate is 60 percent
- The thickness of the seam of coal in Coal Bed A is 5 feet.
- There are 1,000 mineable acres in Coal Bed A.
- Coal Bed A is a T20 reserve coal property.
- The mid-year present worth factor of Coal Bed A is 0.07732.

The final variable, the standard mid-year present worth factor, is calculated as follows. Assuming that the current approximate capitalization rate is 12.1 percent and that Coal Bed A is T20, the formula for the present worth factor would be

$$\text{Present Worth} = \frac{1}{(1+I)^{(t+0.5)}} = \frac{1}{(1+.123)^{(20+0.5)}} = 0.07732$$

Inserting each of the assumed variables mentioned above into equation 1, the present value per acre of Coal Bed A can be calculated as follows:

$$PV/ac. = (\$2.00)(.05)(1.2)(0.07732)\left(\frac{1}{10^6}\right)(14{,}000)(2{,}000)(1{,}800)(0.6)(5) = \$1{,}402.89$$

The present value per acre of Coal Bed A is then multiplied by the number of mineable acres (1,000 mineable acres is assumed in this example) and the aggregate ratio. The result of this calculation is the adjusted individual coal bed value of Coal Bed A:

$$Adj.\ Val._{Coal\ Bed\ A} = (\$1{,}402.89)(1{,}000)(0.9388) = \$1{,}317{,}036.92$$

Thus, the adjusted individual coal bed value of Coal Bed A is $1,317,036.92.

The value of this fictional coal bed is relatively large for several reasons. Coal Bed A is assumed to be a T20 coal bed, which increases its value per acre because it is likely to be mined in the near future. The thickness of the coal seam is 5 feet, which increases the amount of reserve coal in the bed. The assumption of 14,000 BTU per pound of coal and an assumption of low sulfur content increase the BTU and sulfur adjustment factor.

Unmineable coal beds contain seams of less than 30 inches. The appraised value of unmineable coal property is determined by one of two scenarios. The first includes properties where either each coal bed located on the property is unmineable or where a portion of the coal beds located on the property is unmineable and the other portion is mined out. The property is valued at $5 per deed acre (a deed acre refers to any land book acreage and represents the acres conveyed in a deed). In the second scenario, where at least 1 acre of a coal bed is unmineable but other portions are mineable, the value of the property is determined by multiplying $5 by the number of unmineable acres.

Mined-out coal property includes coal beds, or portions of coal beds, in which previous mining operations have removed coal to the extent that no additional coal could be extracted by "generally accepted mining practices and suitable equipment" (WVCSR 110-1I-3.37). As with unmineable coal property, mined-out coal property is valued one of two ways. If a property includes only mined-out coal beds, then that property is valued at $1 per deed acre. However,

if a property includes at least 1 acre of mined-out coal while the remaining portions of the coal bed are mineable, that property is valued multiplying $1 times the number of mined-out acres.

Barren coal property exists where coal has either eroded away or never existed, yet coal rights, severed from the surface rights, are still owned. If all coal beds on a piece of property are barren, then the appraised value of that property is $1 per deed acre. However, if at least 1 acre of any coal bed is barren while the remaining portion is mineable, the property is valued by multiplying $1 times the number of barren acres.

Final determination is to calculate the appraisal per deed acre of each of the five coal properties summed together. Once the appraised value of coal property is determined, the assessed value is calculated. The assessed value of coal property is 60 percent of the appraised value. Finally the tax rate, or levy rate, is applied to the assessed value. Though levy rates vary by county, the average rate was 2.05 percent for 2008.

Personal Property Taxes on Coal Related Machinery and Equipment

Coal-related personal property in West Virginia is considered commercial and industrial. This includes not only the machinery and equipment used to extract and process coal, but also furniture, fixtures, inventory, materials, and supplies (WVCSR 110-1-11.10). Whether commercial and industrial personal property is subject to personal property taxation in West Virginia depends on the location of the property and the residency of the owner. Commercial and industrial personal property is subject to taxation if either:

- The owner of the commercial and industrial personal property resides in West Virginia, so long as the property is not permanently located in another state and taxed as personal property in that state
- The commercial and industrial personal property is located in West Virginia regardless of whether the owner resides in West Virginia or another state.

Commercial and industrial personal property is appraised by determining the fair market value of the equipment or machinery. Although all three approaches to determining the fair market value of the property may be considered, the cost approach is the most frequently used due to the availability of usable data. Determining fair market value through the cost approach takes two different figures into consideration: the replacement cost of the improvements minus the amount of accrued depreciation:

(3)

$$FMV_{CA} = (Replace.\ Cost - Accrued\ Depr.)$$

where

FMV_{CA} = fair market value using the cost approach

Replace. Cost = the replacement cost

Accrued Depr. = the amount of accrued depreciation.

In determining the amount of accrued depreciation, three types of depreciation are considered: physical deterioration, functional obsolescence, and economic obsolescence.

Similar to the appraisal and assessment of real property, once coal-related personal property is appraised by the state, the assessment is 60 percent. For taxation purposes, coal-related personal property is considered to be Class III property and is subject to the same levy rate as real property.

Although West Virginia has developed a complex model that attempts to incorporate all the factors that would determine the market value of coal reserves, neither the supporters nor detractors of the coal economy are satisfied.

Coal's critics believe that the property taxes on coal interests are too low when the cost of providing coal-related services by the state is considered (McIlmoil et al. 2010). Other detractors feel that the health-related costs associated with coal mining, particularly surface mining, exceed the benefits from coal production (Hendryx and Ahern 2009). Coal's supporters point to data concerning the importance of coal in the state's economy. Resolving this issue is beyond the scope of this article.

Mapping of Coal Reserves

Before coal interests can be subject to property taxes, the location of the coal seams, their characteristics, and ownership must be mapped. Mapping has become a major issue in West Virginia. (Hansen et al. 2009). Since coal is located underground at depths varying from a few feet to several miles below the surface, coal seams overlap and vary in thickness from a few inches to several feet and possess different characteristics such as sulfur and BTU content. Estimating the location of the reserves and determining their characteristics are responsibilities assigned to the West Virginia Geological and Economic Survey (WVGES).

A variety of methods are used to locate coal seams; the most dominant is thousands of *bore holes* drilled across the coal fields. This method has resulted in the mapping of more than 80 percent of the state's reserves, and the process is continuing, with mapping of all reserves to be completed by 2011 (J. Amburgey, Property Tax Division, West Virginia State Tax Department, interview by C. Kent, July 6, 2010).

The reserve properties must be matched with ownership. Since most surface parcels have severed mineral interests often held by multiple entities, determining ownership is dependent on county records of mineral deeds. The West Virginia State Tax Department has developed the Mineral Parcel Mapping Program (MPMP), which has digitized tax parcels so they can be overlaid on surface maps. More than 70 percent of the state has been included in the MPMP. More than 90 percent of the coal seams are covered (J. Amburgey, Property Tax Division, West Virginia State Tax Department, interview by C. Kent, July 6, 2010). The tax department has recorded a quarter million coal parcels and almost three quarter million parcel seams in the state when the overlapping of seams is considered. The tax department uses the MPMP in the RCVM to determine the value of coal in each county by seam and by tax parcel.

This method was implemented in 2009. In that year the West Virginia State Tax Department reclassified 3.7 million acres of seams from *unmineable* to *mineable*. Previous to the reclassification, only 4.9 million acres was classified as mineable (Kasey 2009). The original parcel-by-parcel classifications were based on $20 coal. With the price of coal consistently above $40, more coal that would not have been mined at the lower price became profitable to extract. Unmineable coal is taxed at $5, but mineable coal at about $1,000 per deed acre.

The result was a significant increase in property valuations for many parcel owners. Many owners protested the valuations (McCloud 2009). The tax department, in mapping coal reserves, assigns a rating from G-0 to G-4 depending on its confidence in determining the precise location of the coal seam. Those seams with the highest rating (G-3 or G-4) have the greatest certainty regarding their location. Seeing their coal reclassified, many owners objected, and in response the director of the Property Tax Division issued a letter to all 55 county commissions indicating that for G-0, G-1, and G-2 properties, the previous year's values were to be used because of *premature* reclassification (J. Amburgey, Property Tax Division, West Virginia State Tax Department, letter to the commissioners, Feb. 12, 2009). For parcels classified as G-3 or G-4, the new values were to be used.

This decision to return to the old values affected county commissions. Budgets had been prepared based on the previous values, and the rollback was costly. It was estimated that the difference in revenue to all the coal-producing counties would be about $5 million (Marks 2009). For tax year 2010, the 2009 values were used. These values will continue for the next tax year as well for incompletely mapped properties. Amburgey (2010) comments, "…basically the parcels that are not precisely mapped…cannot be a T-20." Only property classified as T-20 was considered mineable.

For the 2009–2010 tax year, the West Virginia State Tax Department completed mapping of 50,000 additional parcels, moving them into G-4 classification. The result was 135,000 of the 220,000 parcels (61 percent) have been completely mapped. Mapping continues with all parcels programmed to be mapped by 2011 (J. Foreman, West Virginia State Tax Department, interview by C. Kent. July 9, 2010).

Ad Valorem Taxation of Coal in Other States

Differences in taxation methods of the ten largest coal-producing states and states bordering West Virginia were examined (table 4). In 2008 these 13 states produced a combined total of 92.2 percent of coal produced in the United States (Kent and Eastham 2010b). The taxation methods of these states are described in the following paragraphs.

Three states do not impose a real property tax on either active or reserve coal property. Indiana imposes a real property tax on reserve coal property but not on active coal. Montana imposes a real property tax on active coal property only. Five states do not impose a personal property tax. Localities in four states are allowed real and/or personal property taxes on coal at their discretion, but there are no statewide standards or requirements.

Colorado

Real Property Tax

Colorado values coal real property dependent on use classification (Colorado Division of Property Taxation 2010). Coal property can be considered either *producing* or *nonproducing*. If a coal mine is classified as producing, production occurred during the last calendar year. However, if a coal mine is nonproducing, no production occurred during the last calendar year, but the mine is also not *abandoned*. To be abandoned, a coal mine must file a map of abandonment through the Division of Mines. Abandoned coal mines are valued as part of the surface rights only.

Producing coal mines are valued by using an income formula. This formula is calculated by multiplying seven factors to find the actual value of the property:

- Raw tons of coal extracted
- Royalty rate based on mining method (surface or underground)
- Discount rate (currently set at 12.07 percent)
- Coal price per ton based on type of coal mined (steam or metallurgical)
- BTU content (steam coal only)
- Whether coal has been washed
- Estimated remaining economic life of the mine.

Of these seven factors, the royalty rate is equal to 6 percent of the market price for coal produced underground and 9 percent of the market price for coal produced through surface-mining methods. The coal prices per ton are available in the *Colorado Land Valuation Manual* (Colorado Division of Property Taxation 2010). If coal has been washed, the tonnage after washing is used to compensate for the sand and gravel removed, and a higher BTU price is used. If coal

Table 4. Property taxation methods of coal-producing states

State (Number of Counties)	Real Property Tax		Personal Property
	Active Coal Property	Reserve Coal Property	
Colorado (9)	Income formula	Three approaches to market value	29% of actual value
Illinois (8)	33-1/3% developed coal reserve economic value	$75 per acre maximum	No tax imposed
Indiana (7)	No tax imposed	$60 per acre	Assessed at 33-1/3% true tax value
Kentucky (3)	Coal Assessment Calculation Formula	Coal assessment calculation formula	$0.15 per $100 value for manufacturing machinery
Maryland (18)	No tax imposed	No tax imposed	No tax imposed
Montana (5)	Coal gross proceeds tax: 5% of value	No tax imposed	3% market value
North Dakota (10)	No tax imposed	No tax imposed	No tax imposed
Ohio (11)	Determined at the local level	Determined at the local level	No tax imposed
Pennsylvania (4)	Determined at the local level; assessed by determining fair market value	Determined at the local level; assessed by determining fair market value	No tax imposed
Texas (6)	Determined at the local level (use outside contractors)	Determined at the local level (use outside contractors)	Determined at the local level (use outside contractors)
Virginia (13)	Determined at the local level; assessed by determining fair market value of land book	Determined at the local level; assessed by determining fair market value of land book	Determined at the local level
West Virginia (2)	Present worth through discounting from 3-year weighted average of production	Reserve appraisal formula	Three approaches to market value
Wyoming	No tax imposed	No tax imposed	Above ground equipment assessed at market value

has not been washed, the BTU price is reduced by $3 per ton.

Once calculated, the income formula provides the value of the producing coal mine. Coal property that is being leased to produce coal is termed "producing coal leaseholds and lands." The three approaches to value are considered.

Producing coal leaseholds and lands are valued by using an income formula similar to the producing coal mine income formula discussed previously. The income formula is calculated by multiplying four factors to find the actual value of the property:

- Production (in tons)
- Steam coal price per ton
- Royalty rate
- Hoskold factor.

The coal price per ton and royalty rate factors used in this formula are the same as those used in the producing coal mine income formula. The Hoskold factor is based on the capitalization rate. The capitalization rate is calculated by adding:

- Discount rate
- Sinking fund factor
- Effective tax rate.

The Hoskold factor is then calculated by dividing one by the capitalization rate. Once the appraised value of the coal leaseholds and lands is determined, the assessment rate of 29 percent is applied.

The cost approach to determining value of coal reserves owned or leased can be used before the mine is actually producing coal by considering the costs associated with developing the property for mining. This approach involves the summation of two factors: the cost of development of the coal seam and the market value of the land.

The market approach to value involves sales information of comparable coal leaseholds and lands. These values are often represented as value per ton of reserves available. In most cases the income approach is used, but the other approaches are available for verification and for handling appeals. Nonproducing coal mines are classified as "other real property" and are valued considering the income, cost, and sales comparison (market) approaches to market value (Colorado Division of Property Taxation 2010).

Personal Property Tax

Personal property, including equipment and machinery used to produce coal in Colorado, is classified as commercial and industrial. Personal property is assessed at 29 percent of the actual value of the equipment. The determination of actual value is made by considering the equipment's replacement cost, depreciation, and the expected economic life of the property.

Illinois

Real Property Tax

Illinois classifies coal as *developed* or *undeveloped*. Developed coal is permitted. The land must contain coal "anticipated to be mined during the lesser of 5 years following the current assessment date, the term of the permit, or the life of the mine, if initial extraction of coal from the land will occur in the year immediately following the assessment date" (35 ILCS 200/1-45). Illinois assesses developed coal at 33-1/3 percent of the coal reserve economic value, which represents the present value of anticipated net income during the life of the property (35 ILCS 200/10-180). There are three variables used to determine the coal reserve economic value: interest rate, net income, and recoverable coal tons per acre.

The interest rate used represents 3 percent added to the average prime interest rates provided by the four largest U.S. banks. Net income is represented by 4 percent of the Illinois coal average spot market price times production. Both the interest rate and net income are determined by using the current assessment date and the two preceding assessment dates.

Recoverable coal is taxed on the basis of tons per acre, which is the equivalent of 1,742 tons per acre-foot. This is multiplied by the net income to determine the coal reserve economic value. The recoverable coal tons per acre variable is made up of 3 parts: seam thickness, tons per acre-foot conversion, and recovery ratio.

The conversion of 1,742 tons per acre-foot is multiplied by seam thickness and the recovery ratio to calculate the coal tons per acre. The recovery ratio is equal to the least of either the "actual historical recovery ratio for the mining operation" or the recovery percentage applicable to the type of mining occurring (35 ILCS 200/10-180(e)). The applicable recovery percentages are equal to 80 percent for surface mining and 50 percent for underground mining.

Once the coal reserve economic value is determined for developed coal, the assessed value is applied. The assessment of both developed and undeveloped coal is prorated when mining begins after the assessment date or ends prior to the end of the calendar year.

Undeveloped coal in Illinois is valued by using the coal reserve economic value as well. Property in which the coal is located must not have been mined

during the previous year. The value of the undeveloped coal reserve economic value is set at a maximum cap of $75 per acre (35 ILCS 200/10-175).

Personal Property Tax

Personal property in the State of Illinois is exempt from taxation (Bjur et al. 2009).

Indiana

Real Property Tax

In Indiana, coal that is in the ground prior to extraction is valued at $60 per acre. Once coal is extracted, the mineral is considered inventory and is no longer subject to any type of taxation in Indiana (J. Lukomski, Assessor/Auditor 1, Indiana Department of Local Government Finance, interview by E Eastham, Jan. 26, 2010).

Indiana does have a special condition for strip-mined, agricultural land after mining has ceased. Not all strip-mined land, though, is considered agricultural land. If coal was extracted before December 31, 1977, agricultural land is subject to a productivity factor of 0.50. For strip-mined agricultural land where coal was extracted after December 31, 1977, the land is subject to a productivity factor of 0.68.

Personal Property Tax

Mining equipment and machinery used to extract and process coal are considered business tangible personal property and assessed for taxation based on the *true taxable value* of the personal property and assessed at 33-1/3 percent (50 IAC 4.2). To calculate the appraised value, information is collected on the personal property including the date that the mining equipment and machinery is put into service and the taxable life of the personal property. Depending on the tax life, the property is placed in one of four categories (called *pools*):

- Pool 1, depreciable property with a life of 1–4 years;
- Pool 2, depreciable property with a life of 5–8 years;
- Pool 3, depreciable property with a life of 9–12 years;
- Pool 4, depreciable property with a life of 13 or more years.

A true tax value percentage is applied to the cost of the mining equipment and machinery depending on the life of the personal property and the date in which it is put into service. This value is then assessed at 33-1/3 percent.

Kentucky

Real Property Tax

Both active and reserve coal property are valued by the income approach using the coal assessment calculation formula (R. Murray, Minerals Severance Tax Section, Minerals Taxation and GIS Services Branch, Kentucky Department of Revenue, interview by C. Kent and E. Eastham, Oct. 21, 2009). This formula involves seven factors and is similar to the West Virginia system:

- Mineable acres
- Coal thickness (in inches)
- Density factor (in tons per acre inch) equal to 145
- Mine recovery rate
- Royalty rate
- Discount factor (dependent on mine life)
- Capitalization rate.

The recovery rate factor designates a different rate depending on the type of mining. The recovery rate for surface mining is 90 percent. Deep mines have a recovery rate of 50 percent. The royalty rate varies by county and mining method. Royalty rates for deep mines range from $2.76 per ton to $3.45 per ton; for surface mines, from $2.76 per ton to $3.68 per ton.

The discount factor depends on the mine life of the property. A smaller mine

life classification, 1 year, for example, receives a discount factor of 94.15 percent. A longer mine life of 15 years, however, receives a discount factor of 28.84 percent. The capitalization rate is calculated in the same fashion as in West Virginia's RCVM.

Personal Property Tax

Manufacturing machinery used to "crush, size, blend, chemically treat, and wash" coal is taxed at a rate of $0.15 on every $100 of assessed value (103 KAR 8:130). Machinery used to extract, sever, dredge, or mine coal in Kentucky is not considered "manufacturing machinery" and thus taxed at $0.45 per $100 of value (KRS §132.020(1)(r)).

Maryland

Real Property Tax

In Maryland, the only real property taxes imposed are for the surface rights. Neither the mineral rights on coal nor the coal itself is taxed (M. Arrington, Maryland Department of the Environment, Bureau of Mines, interview by E. Eastham, Nov. 17, 2009).

Personal Property Tax

Maryland does not impose a personal property tax on the machinery and equipment used to produce coal (Bjur et al. 2009).

Montana

Real Property Tax

While no actual property tax is levied on coal real property in Montana, the coal gross proceeds tax is implemented in lieu (Montana Code Annotated §15-23-703). The coal gross proceeds tax is equal to 5 percent of the coal's value. The value of coal is determined by considering the contract sales price, which represents either the price of coal when extracted or a price imposed by the Montana Department of Revenue (Montana Code Annotated §15-35-102(7)). The price may be imposed if (Montana Code Annotated §15-35-107(1)):

- The extracted coal is used by the operator in a manufacturing process.
- The coal is refined to improve quality through drying, cleaning, or additional processing.
- The coal is sold through a contract and that contract is not an arm's-length agreement.
- The gross yield statement for a mine is not filed (Montana Code Annotated §15-23-701).

There is no tax levied on reserve coal property in Montana.

Personal Property Tax

Coal-related personal property owned by coal companies in Montana is taxed at 3 percent of its market value (Montana Code Annotated §15-6-138(2)).

North Dakota

Real Property Tax

Coal reserves in North Dakota are exempt from ad valorem taxation. Coal is taxed only when it is extracted from the ground with the severance tax (North Dakota Century Code §57-02-08(32))

Personal Property Tax

Personal property owned by coal companies is exempt from property taxation (North Dakota Century Code §57-02-08(32)).

Ohio

Real Property Tax

Real property taxes on coal property in Ohio are determined at the county level (S. Shoup, Property Tax Division, Ohio Department of Taxation, interview by C. Kent, Feb. 19, 2010). To determine the different ways coal real property is taxed in Ohio, several Ohio coal counties were contacted. In all cases the methods used and often the values applied have not been changed for decades.

Belmont County, one of the largest coal-producing counties in the state,

taxes coal real property based on a number of classifications (L. Craig, Belmont County, Ohio, Auditor's Office, interview by C. Kent, Feb. 19, 2010). Coal real property is identified by whether strip or deep mining is used. In addition, the coal property is divided into either active or reserve coal property, depending if mining has commenced.

With both mining methods, reserve coal property refers to coal that is not currently being developed and that is not currently assigned to an operating mine. Active coal property associated with a strip mine is considered property that will be mined over the next 3 years. Active coal property associated with a deep mine is considered property that will be mined over the next 5 years.

The value per acre of coal real property in Belmont County varies by the coal classification and the type of mining taking place (Craig 2010). This valuation was established in 1990.

Noble County divides coal real property into three classifications: active, inactive, and reserve (A. Warner, Noble County, Ohio, Auditor's Office, interview by C. Kent, Feb. 19, 2010).

Active coal property under permit and currently being mined is valued at $2,400 per acre. Inactive coal property is defined as coal that has previously been identified for mining, but on which there is not currently a mining operation in place. Inactive coal property is valued at $600 per acre. Reserve coal property is valued at $400 per acre and is defined as property in which the mineral interests are severed from the surface interests but have not yet been identified for mining. This valuation was established in the late 1980s and has remained unaltered.

Reserve coal property in Meigs County is valued at $60 per acre (M.A. Parsons, Meigs County, Ohio, Auditor's Office, interview by C. Kent, Feb. 19, 2010). This value has been the same for the past several decades. Currently, there is no coal being produced in Meigs County.

Personal Property Tax

Ohio no longer taxes personal property (Bjur et al. 2009).

Pennsylvania

Real Property Tax

Pennsylvania does not assess most real property at the state level. Instead, property taxation is the decision of each county or other local government. To determine methodologies used to value coal property, the assessment offices of the top five coal-producing counties were contacted: Greene, Somerset, Clearfield, Armstrong, and Indiana.

Greene County produces nearly two-thirds of total coal production in the state. Coal property is appraised by using the income approach (J. Frazier, Assessor, Green County, Pa., Assessment Office, interview by E. Eastham, Nov. 20, 2009). The formula used involves the following:

- Ease of transportation
- Quality of the coal
- Quantity of the coal
- Mineability
- Sulfur content
- Ash content
- Moisture content
- Location
- Discount rate.

The factors are multiplied together and divided by the total acreage to determine the per-acre value. Once the market value is determined, the tax rates of each municipality within the county are applied.

Coal property in Armstrong, Indiana, and Somerset Counties is valued on a per-acre basis (H. Ingler, Somerset County, Pa., Assessment Office, interview by E. Eastham, Dec. 14, 2009; M. Medvetz, Indiana County, Pa., Assessment Office, interview by E. Eastham, March 10, 2010; M. Renosky, Armstrong County, Pa., As-

sessment Office, interview by C. Kent, Feb. 19, 2010). In each county, a value per acre is set depending on the classification of the coal property. These classifications are as follows:

- Active
- Permitted for future mining
- Reserve
- Reserved unmineable (overburden)
- Depleted (mined out)
- Barren.

Clearfield County also values coal property on a per-acre basis, but does not differentiate between property classifications (J. Wooster, Clearfield County, Pa., Assessment Office, interview by E. Eastham, Jan. 22, 2010). The county levies a set per-acre value of $47 per acre with a minimum of $790 levied in taxes for each coal property.

Personal Property Tax

The State of Pennsylvania does not levy a state personal property tax (Bjur et al. 2009). Personal property is not assessed for taxation in any of the Pennsylvania counties contacted.

Texas

Real Property Tax

In Texas, real property is valued at the local level. Texas coal counties contract with private firms to assess the value of their coal property (V. Henderson, Manager, Engineering Services, Pritchard and Abbott, Inc., interview by E. Eastham, Feb. 5, 2010; G. Davis, Capital Appraisal Group, LLC, interview by E. Eastham, Dec, 22, 2009). Of the ten counties in Texas that produce coal, three counties contract with Capitol Appraisal Group and four counties contract with Pritchard and Abbott. Two counties contract with Wardlaw Appraisal Group. Assessment information for Harrison County was not available. The general appraisal methods used by these firms were provided, but no detailed information was available.

Two of the firms indicated they utilize the income approach to determine the market value of active mining coal property. Pritchard and Abbott projects the estimated income for 4 years and discounts to determine the current value. Capitol Appraisal Group uses current income of the coal property as an indicator for estimating net income between 1 and 6 years in the future.

Reserve coal property is valued by these two private firms as well. Pritchard and Abbott discount potential income of reserves for only 4 years. Capitol Appraisal Group utilizes both the market rate for coal and the estimated total production capability of the reserve coal to determine income potential.

Personal Property Tax

Personal property related to coal mining in Texas is valued at the local level and by private firms.

Virginia

Real Property Tax

Real property taxes levied on coal property are determined at the local level. Coal-related real property is to be appraised by estimating the *fair market value* (Virginia Code §58.1-3286). To determine the methodologies used, the assessment offices of three of the largest coal-producing counties in the state were contacted.

Wise County assesses coal "under development" using an income formula. This formula includes such factors as acreage, amount of coal removed (tons), and capitalization rate (D. Mullins, Wise County, Va., Commissioner of the Revenue, interview by E. Eastham, March 12, 2010).

Coal mineral rights that are owned but not currently under development are also assessed as real property for taxation. No further explanation of the formula for mineral rights assessment was provided (Mullins 2010).

Actively mined coal property in Dickenson County is assessed by using an income formula. The factors involved in calculating the formula include seam height, tonnage mined, acreage, years left to mine, and BTU/sulfur content.

Mined-out coal property in Dickenson County is assessed at a flat rate of $100 per acre.

Russell County assesses reserve and residual coal property based on a flat rate per acre. Reserve coal property is assessed at $500 per acre, and residual coal property is assessed at $100 per acre (H. Ferguson, Assessor, Russell County, Va., interview by E. Eastham, Nov. 20, 2009).

Personal Property Tax

Personal property in Virginia is subject to taxation at the local level (Virginia Code §58.1-3500). Tangible personal property of coal companies has not been specifically exempted from taxation.

Wyoming

Real Property Tax

All minerals, including coal, produced in Wyoming are exempt from property taxes (C. Grenvik, Mineral Tax Division, Wyoming Department of Revenue, interview by E. Eastham, Dec. 3, 2009). The only tax levied on coal is a production (severance) tax.

Personal Property Tax

Wyoming values personal property related to surface coal mining by determining the market value for above ground equipment and then applying a rate of 11.5 percent (Bjur et al. 2009). Equipment used to mine coal underground is not taxed in this state (Grenvik 2009).

Conclusions

Ad valorem taxation of coal interests serves as an important source of revenue for governments in major coal-producing states. West Virginia uses a comprehensive model based on the income approach. The model for taxation of both active and reserve coal includes all the factors determining the probable market value of coal, including heat content, sulfur content, thickness of seam, type of mining method to be used, and date of probable extraction. Problems associated with mapping of coal seams and assigning them to parcels has impeded the full implementation of West Virginia's system.

There are a variety of ways in which coal property is taxed in other states. Kentucky and Colorado have models similar to West Virginia's, but Colorado does not tax coal reserves. The income approach is used in other states, but factors related to coal quality often are not included. The more comprehensive formulas used in West Virginia, Kentucky, and Colorado better reflect the value of active and reserve coal.

In states with local assessment, the methods often used are simple and outdated and do not reflect the value of the coal. The variations in the methods could raise issues of uniform treatment, because reserves do not observe county boundaries. It does appear that in many instances local governments are undervaluing a source of revenue.

Author's Note

The full research report on which this article is based, "Ad Valorem Taxation of Mineral Interests: Coal in West Virginia and Other Coal-Producing States," can be obtained by contacting the IAAO library.

References

BBER and CBER. 2010. *The West Virginia coal economy 2008*. BBER, West Virginia University; CBER, Marshall University.

Bjur, T., et al., eds. 2009. *State tax handbook*. Chicago: CCH.

Colorado Division of Property Taxation. 2010. *Land valuation manual*. Denver, CO: Department of Local Affairs, Division of Property Taxation.

EIA. 2008. *Annual coal report: 2008*. Washington, DC: Energy Information Administration.

EIA. 2010. *Annual energy outlook 2010: With projections to 2035*. Washington, DC: Energy Information Administration.

Hansen, E., et al. 2009. *Taxing West Virginia's coal reserves: A primer*. Charleston: West Virginia Center on Budget and Policy.

Hendryx, M., and M. Ahern. 2009. Mortality in Appalachian coal mining regions: The value of statistical life lost. *Public Health Reports*, 124.

IMPLAN. 2004. IMPLAN Professional® Version 2.0, February. Social Accounting and Impact Analysis Software, 3rd ed. http://www.implan.com.

Kasey, P. 2009. A taxing year. *The State Journal*. http://statejournal.com/story.cfm?func=viewstory&storyid=53644 (accessed June 22, 2010).

Kent, C., and E. Eastham. 2010a. *Coal taxation in West Virginia*. CBER, Marshall University.

Kent, C., and E. Eastham. 2010b. *Taxation of coal: A comparative analysis*. CBER, Marshall University.

Kent, C., and K. Sowards. 2009. Property taxation and equity in public school finance. *Journal of Property Tax Assessment & Administration* 6 (1): 25–42.

Killen v. Logan County Commission, 170 W. Va. 602, 295 S.E.2d 689 (1982).

Marks, R. 2009. Kanawha coal reserves miscalculated by $19 million. *iStockAnalyst*. http://www.istockanalyst.com/article/viewiStockNews/articleid/3040181 (accessed June 22, 2010).

McCloud, C. 2009. State tax officials roll back some coal tax values. *The State Journal*. http://statejournal.com/story.cfm?func=viewstory&storyid=52678 (accessed June 22, 2010).

McIlmoil, R., et al. 2010. *Coal and renewables in Central Appalachia: The impact of coal on the West Virginia state budget*. Charleston: West Virginia Center on Budget and Policy.

Morgan, R. 1997. Worth its weight in gold: Legal analysis of the current appraisal of coal property in West Virginia. *West Virginia Law Review* 99:541.