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Evaluation of SB 16



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Evaluation of SB 16

FINAL REPORT

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Executive Summary

West Virginia Senate Bill 16, introduced in the 2017 regular legislative session would repeal 11-6A-5a of the West Virginia Code related to wind power projects. The current Code grants pollution control property tax treatment to wind turbines and towers. For property taxation, assessment of the covered facilities is based on salvage value which the statute defines as five percent (5%) of original cost.

Senate Bill 16 would repeal this status for existing and future wind facilities without a grandfathering provision for either operating wind projects, or those currently under development.

- Passage of SB 16 would amount to an increase in the property taxes levied on wind facilities from \$2.7 million to \$11.9 million, a factor of 4.4. To the industry, this would be an average increase in operating costs of 34 percent.
- While it is uncertain what the impact of this policy change would be on future wind development in the State or on the probability that other industries will choose to invest here, one wind developer stopped development on two early-stage projects in West Virginia because of SB 16. Additionally, the company reports to have lost the sale of a mid-stage wind farm to a Fortune 500 company “because of the regulatory uncertainty that SB16 demonstrated in West Virginia.”
- Wind investments in West Virginia currently represent \$27 million in direct spending each year. The direct, indirect and induced economic impact in West Virginia equates to 164 jobs, \$11.5 million in labor income and \$21.6 million in gross state product.
- The wind industry in West Virginia pays \$7.3 million in employee compensation, \$2.7 million in property taxes, \$1.6 million in B&O taxes, \$2 million in lease payments and \$13.3 million in other operating costs annually.
- The wind industry is significant for the seven counties in which the turbines reside. As a portion of property taxes levied, wind turbines currently account for up to five percent of total taxes in Grant and Barbour Counties, and between one and four percent in the other five wind counties.
- The average tax rate per megawatt (MW) of wind energy in West Virginia is currently \$3,900/MW. The tax rate per MW of coal and wind in West Virginia is roughly equal. The upper bound for coal-fired generating assets is \$4,301/MW. Under SB 16 the tax on wind would become about \$17,300/MW.
- Newer wind facilities in WV pay higher rates as the portion of the facility that is not taxed as pollution control equipment has not depreciated much. Older facilities have more accumulated depreciation. Newer facilities would pay higher property taxes than older ones if SB16 were adopted as they would not have experienced as much depreciation. New towers and generators would see the greatest impact.
- The calculated property tax per MWh of wind was \$1.63; for coal, it was roughly half at \$0.85.

- Other states with commercial wind facilities utilize very different methods of taxing wind turbine property. The State of Pennsylvania levies no property taxes on towers and generators and instead taxes based on capitalization of income to the owner of the property on which the turbine pad is located. Other states exempt a specific portion of the facility (EX: 50% in Maryland), while others have payments in lieu of taxes (Ohio). Kansas levies no property taxes on wind turbines for the first 10 years of operation. Oklahoma repealed a five-year property tax exemption in 2016 but allowed it to remain for installed facilities.
- Aside from the pollution control incentive, there are few other incentives to develop wind in West Virginia. Many states that impose higher property taxes on wind have other incentives that the industry can take advantage of such as personal and corporate income tax credits, low cost loans, direct subsidies or renewable portfolio standards.
- Electricity produced by wind power is a fixed-price product. The industry's revenues are from long-term power purchase agreements that do not change over the life of a contract. SB 16 would increase costs on WV wind energy projects and negatively disrupt the economics upon which the projects were based.
- Of the 103 equipment components approved by the Department of Environmental Protection's office of Water Resources or Office of Air Quality, over 100 of them provide tax benefits to other industries, including coal. One provides a benefit to the wind generation industry.
- The U.S. Department of Energy's recent "Staff Report on Electricity Markets and Reliability" states that "The biggest contributor to coal and nuclear plant retirements has been the advantaged economics of natural gas-fired generation."

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Evaluation of the Impact of SB 16 to the Wind Industry in West Virginia

1. Background

West Virginia Senate Bill 16, introduced in the 2017 regular legislative session would repeal 11-6A-5a of the West Virginia Code related to wind power projects. The current Code grants pollution control property tax treatment to wind turbines and towers. For property taxation, appraisal of the covered facilities is based on salvage value which rule §110-6-2.7 defines as five percent (5%) of original cost. This provision is the same for pollution control fixtures related to coal-fired electricity generation, including generators that burn waste coal products, and other fossil generating equipment. Wind turbines are one of 103 items preapproved for pollution abatement status by the West Virginia Department of Environmental Protection (WVDEP). Senate Bill 16 would repeal this status for existing and future wind facilities without a grandfathering provision for either operating wind projects, or those currently under development. The bill has no effect on other forms of generation.

The additional property tax that would be paid by the owners of existing and permitted wind projects is approximately \$9.2 million per year if the bill were adopted. The Marshall University Center for Business and Economic Research (CBER) has prepared this evaluation by compiling data and information on the scale of the additional tax with respect to the wind industry in the State. This report also contains a comparison of property tax treatment of commercial wind projects in other states.

2. Study Limitations

This is an analysis and comparison of property taxes on wind facilities used for commercial, utility-scale generation of electricity. For that reason, there are limitations on the scope of the report.

- Only property taxes are being evaluated. Most states with commercial wind facilities provide other incentives for wind production i.e.: tax credits, loans, grants, renewable portfolio standards, sales tax credits. While these are mentioned later in this report they are not evaluated. Also excluded are federal programs as they are available for all states.
- Preferential treatment of wind generation varies significantly between and among states. These differences make comparisons less valid than if all states treated wind power identically.
- There are taxable benefits which result from wind facilities including lease, royalty and rent payments to land owners. Since the land upon which the tower is placed and surrounding acreage are not covered by any property tax preferences, revenue from these lands can be obtained using property taxes.
- The study only covers commercial wind generation facilities. Many states have incentives for homeowners and business to install renewable energy, but these are small and do not sell to the grid. "Small Wind" incentives are not part of this report.
- Only on-shore wind facilities are included as West Virginia has no off-shore possibilities
- As is the case with all studies of this type, assumptions have been made. Complete, directly comparable data for all wind producers is not available so the results have been extrapolated from the data available from other firms.
- The study when making forecasts and prediction must assume there will be no major changes in the political environment for wind power and that the demand for electricity in general and wind power specifically will not alter in such a way that these estimates become inaccurate.

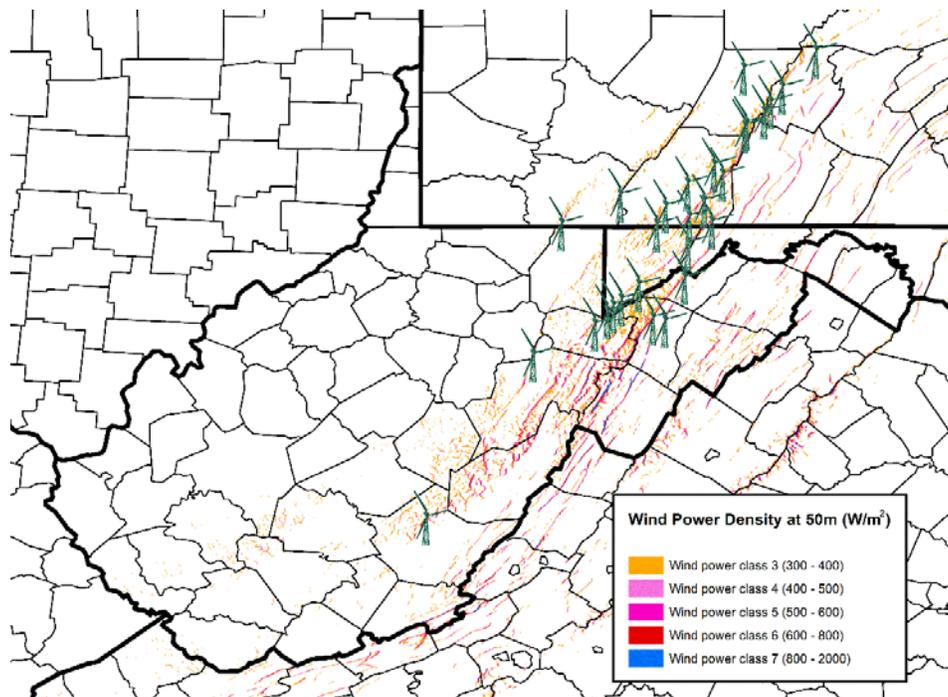
- While this analysis covers West Virginia and surrounding states, information on other states with considerably larger wind production are included. This allows a more detailed appreciation of how wind power is taxed in these states.
- Property taxes are only one element in the legal environment faced by wind farms. Corporate taxes, transmission fees, complexity of permitting process, environmental regulation, and zoning to mention a few will also contribute either negatively or positively to the ease and cost of establishing a wind project in any state. While mentioned these other factors are not part of this analysis.

3. Overview of the Wind Industry in West Virginia

The first commercial wind facility installed in West Virginia was the Mountaineer facility in Tucker and Preston Counties, which began operating in 2002. As of 2017 there are six operating facilities in the State with a combined nameplate generating capacity of 686 megawatts (MW) and 376 turbines. These facilities are in the eastern part of the State in areas with the best wind resources. These facilities are:

- Mountaineer - Florida Power & Light/NextEra Energy
- Beech Ridge - Invenergy
- Mt. Storm - Dominion Resources/Virginia Electric & Power and Shell/NedPower
- Laurel Mountain – AES
- Pinnacle - NRG Energy
- New Creek - Enbridge

The map below shows the location of the six facilities as well as regional facilities in Maryland and Pennsylvania. Wind resource data is also shown by wind power density (watts/m²).



SOURCES: NREL and Truepower for wind data. Location marked by turbine hub, not tower base.

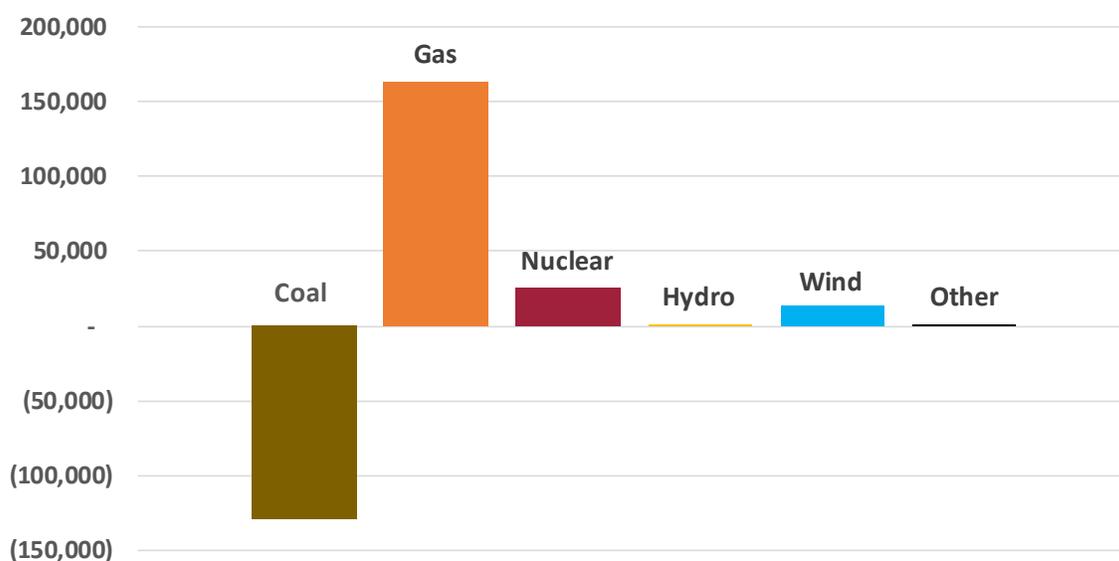
The electricity industry in West Virginia is part of the PJM Interconnection, the regional transmission organization (RTO) for transmission and reliability planning purposes. Wind facilities must participate in PJM’s wholesale electricity market, along with all other generators, and can receive capacity credit if the operator elects to participate in the PJM capacity market. Most West Virginia facilities have long-term, fixed-price power purchase agreements (PPAs) with utilities, government bodies or commercial or industrial customers. The single exception is the Laurel Mountain facility, which generates solely for the merchant wholesale spot market, a market that has faced significant downward price pressure largely because of increased natural gas generation driven by a large supply of competitively-priced gas.

West Virginia wind generation is primarily an export industry. Of the six facilities, only one produces electricity for customers in West Virginia. Appalachian Power purchases the output of the Beech Ridge facility in Greenbrier County for its customers in Virginia and West Virginia. The output of the other five facilities is purchased outside of the State, making wind generation an export product and contributing the West Virginia’s role as a regional energy producer.

Over the last few years, natural gas has produced a growing share of generation in PJM. This capture of market share has been the primary reason for the decline in coal’s market share. A recent report by the U.S. Department of Energy states that “The biggest contributor to coal and nuclear plant retirements has been the advantaged economics of natural gas-fired generation.”¹

Wind output increased by 13,863 GWh (418 percent) between 2008 and 2016, and has contributed to the decline in coal output, but is very small compared to the quantity of and the increase in gas-fired generation. From 2008 to 2016, gas-fired generation increased by 163,662 GWh (306 percent) while coal generation fell by 129,437 GWh (32 percent).² The increase in gas generation was 26 percent larger than the decline in coal generation. Nuclear generation increased by 10 percent.

Change in Generation in PJM, by Source (GWh) – 2008 to 2016

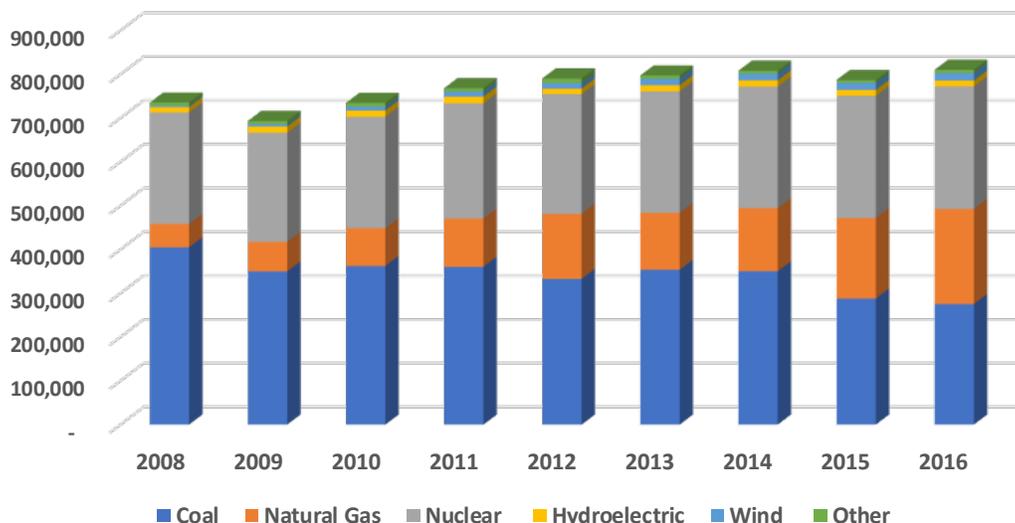


¹ U.S. Department of Energy, “Staff Report to the Secretary on Electricity Markets and Reliability,” August 2017.

² Monitoring Analytics, PJM State of the Market Reports for 2008 through 2016.

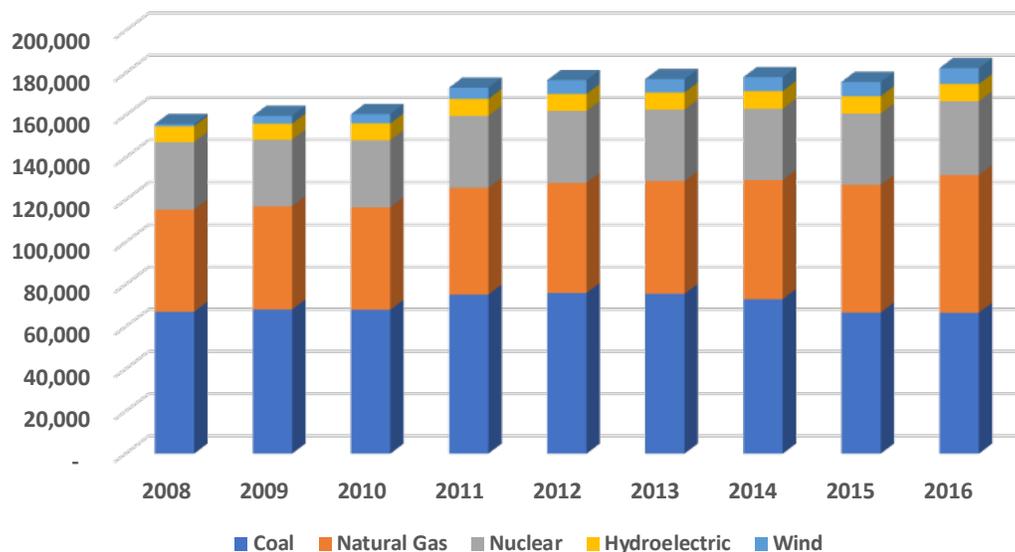
The chart below shows the scale of total generation and components of generation. In 2016, gas-fired generation in PJM was almost 13 times the amount of wind-based generation.

Generation by Source in PJM (GWh) – 2008 to 2016



In terms of capacity, total wind capacity in the PJM system was about 7,500 MW at the end of 2016. This was an increase of 609 percent over 2008. During the same period, natural gas capacity increased by 35 percent and coal capacity declined by one percent. The region’s coal capacity increased by 8,900 MW between 2008 and 2012, much as existing utilities and generating assets joined the PJM system, but fell by 9,400 MW between 2012 and 2016 due to plant closures.³

Generating Capacity in PJM (MW)

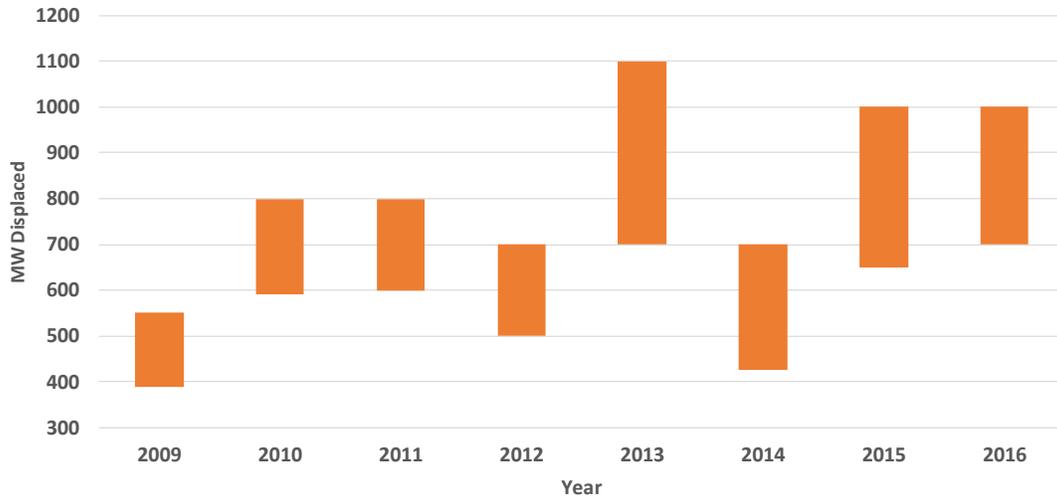


³ Some of the capacity and generation increases in 2011 and 2012 were due to new utilities being integrated into the PJM system. These were American Transmission Systems and Cleveland Public Power in 2011, and Duke Energy Ohio and Duke Energy Kentucky in 2012.

Due to its very low cost of generation, and the Federal Production Tax Credit (PTC)⁴, wind output displaces other resources in the market. In the PJM dispatch process the most expensive resources are displaced first, in “merit order” based on the variable costs to produce a kWh of electricity. For fossil units, these costs include the costs of operating pollution control equipment.

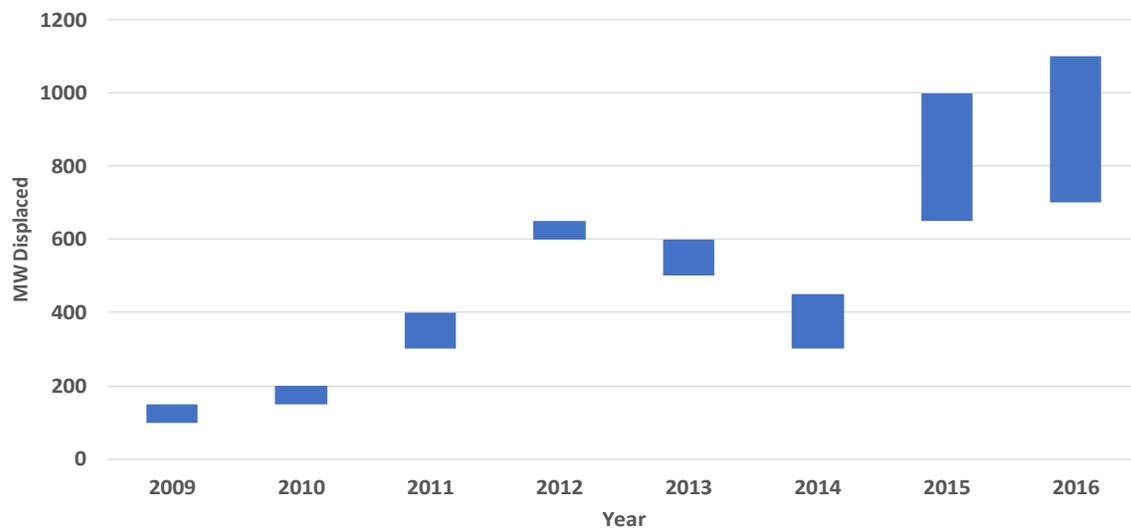
The following charts show the proportion of marginal units by fuel type as a share of average wind generation. These charts are estimates of the capacity that was displaced by wind.⁵

Coal Capacity on the Margin in PJM



As the amount of wind capacity has grown, coal and natural gas have had larger amounts of capacity on the margin, and as the amount of gas capacity has grown more gas has been displaced.

Natural Gas Capacity on the Margin in PJM



⁴ The Federal PTC for wind generation is currently \$0.0184/kWh and will be reduced each year through 2019, and eliminated after 2019.

⁵ Monitoring Analytics, PJM State of the Market Reports for 2008 through 2016.

The cost of generating electricity explains much about the ability to capture market share. Estimates of the capital cost and total levelized cost of electricity (LCOE) of wind are shown below, relative to other types of generating equipment. The calculations are Energy Information Administration (EIA) estimates for plants entering service in 2020 and were made in 2014.⁶

Estimates of Levelized Power Plant Capital and Operating Costs (2013 \$/MWh)

	Capital Cost	Fixed O&M	Variable O&M	Total LCOE - No Tax Credit
Conventional Coal	\$60.4	\$4.2	\$29.4	\$95.1
Natural Gas CC (conventional)	\$14.4	\$1.7	\$57.8	\$75.2
Natural Gas CC (advanced)	\$15.9	\$2.0	\$53.6	\$72.6
Onshore Wind	\$57.7	\$12.8	\$0	\$73.6
Solar PV	\$109.8	\$11.4	\$0	\$125.3

At the time of the 2014 estimates, coal-fired generation and generating capacity was already more expensive relative to natural gas, and the cost of wind energy was very close to the cost of electricity produced from gas. The EIA's 2016 estimates for the cost of natural gas and wind generation show significant declines from previous estimates in both capital and operating costs. The larger decline in the cost of gas-fired generation illustrates the increased competitiveness of that source.

The calculations shown below are for plants entering service in 2019, and are the simple average of regional values for new generation.⁷ The recent estimates exclude conventional coal due to the CO₂ emission requirements of Section 111(b) of the Clean Air Act.

Estimates of Levelized Power Plant Capital and Operating Costs (2016 \$/MWh)

	Capital Cost	Fixed O&M	Variable O&M	Total LCOE - No Tax Credit	Total LCOE - with Tax Credit
Natural Gas CC (conventional)	\$11.9	\$1.4	\$35.6	\$50.1	\$50.1
Natural Gas CC (advanced)	\$13.6	\$1.3	\$32.7	\$48.8	\$48.8
Onshore Wind	\$40.8	\$13.6	\$0	\$57.1	\$39.3
Solar PV	\$62.8	\$10.5	\$0	\$77.7	\$58.8

The variable cost of wind and solar generation is essentially \$0/MWh because the facilities have no fuel costs or waste disposal costs directly related to generation. Maintenance costs for wind and solar are largely included in fixed O&M estimates.

⁶ EIA, "Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2015," June 2015.

⁷ EIA, "Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2017," April 2017.

Remaining Undeveloped Wind Resources

Compared to other states, West Virginia has relatively few wind resources left to develop in terms of what has been considered commercially accessible. West Virginia and Pennsylvania have the largest shares of 80-meter wind resources developed of all wind-producing states.

However, capacity accessible with a hub height of 80-meters is considered by the National Renewable Energy Laboratory (NREL) to be 2008 technology and is significantly less than what could be accessed with taller turbines. Turbines with a 110-meter hub height are considered current technology and could add another 6,950 MW to available wind resources in West Virginia. Eventually, turbines that can economically utilize lower-speed wind resources could allow development of additional resources.

Resource estimates at 110 meters have been developed by NREL and AWS Truepower and are shown in the table below along with the estimates for resources at 80 meters. These estimates are for turbines with a gross capacity factor (CF) greater than or equal to 30% or 35%.

Wind Resources in Regional States

State	Installed Capacity 2017 (MW)	Potential MW at 80 m Hub Height $\geq 30\%$ CF	% 80 m/ 30% CF Installed	MW at 80 m Hub Height $\geq 35\%$ CF	Potential MW at 110 m Hub Height $\geq 35\%$ CF
Pennsylvania	1,369	3,307	41%	878	43,565
West Virginia	686	1,883	36%	806	6,950
Maryland	191	1,483	13%	598	10,258
New Jersey	9	132	7%	855	3,584
Illinois	4,026	249,882	2%	130,711	242,620
Indiana	1,897	148,228	1%	40,259	133,875
Ohio	545	54,920	1%	359	110,439
Kentucky	-	61	0%	-	76,606
Virginia	-	1,793	0%	2,273	9,539

Source: NREL and AWS Truepower, 2015.

This data is an indicator of potential near-term development possibilities above what was considered feasible 10 years prior. These estimates exclude federal lands designated as a park, wilderness, wilderness study area, national monument, battlefield, recreation area, conservation area, wildlife refuge, wild and scenic river or inventoried roadless area. 50 percent of U.S. Department of Defense, USDA Forest Service and State Forest lands are also excluded.

4. Economics of Wind in West Virginia

The wind industry in West Virginia employs 63 people directly to operate and maintain the six facilities. Total annual operating expenditures are about \$27 million. This is broken down as:

Employee Compensation	\$7.3 million
Property Taxes (average of \$3,900/MW)	\$2.7 million
Lease Payments	\$2.0 million
B&O Taxes	\$1.6 million
Other Operating Costs (parts, fuel, vehicles, etc.)	\$13.3 million
<u>Payments to Communities</u>	<u>\$100,000</u>
Total Direct Spending Impacts	\$27.0 million

Property taxes paid average \$3,900 per MW, although some operators pay more and some pay less depending on the age of the facility and the applicable tax rate(s) of the host county in which the project is located. Newer facilities pay higher rates as the portion of the facility that is not taxed as pollution control equipment has not depreciated much. Older facilities have more accumulated depreciation. It should be noted that certain counties in West Virginia have excess bond and/or excess levy obligations that are above and beyond the regular bond and levy rates (see Levy Rate (cents/\$100 property valuation) for Class 3 & 4 Property - FY Ending June 30, 2018 page 21 below).

The wind industry makes \$100,000 in annual charitable payments directly to communities in support of local initiatives related to health, education and community services. An example of this is the US Wind Force Foundation, Inc. which operates a grant program in the area surrounding the Pinnacle wind farm. In 2016, the Foundation awarded funds to 11 different organizations.⁸ NedPower and Invenergy have also provided funds to the school districts in which their facilities are located.

Economic Impact

The total economic impact of the wind industry in West Virginia was estimated by simulating the effect of expenditures calculated above. Not all the \$27.0 million in spending stays in the West Virginia economy, but some spending is recirculated several times. For example, a portion of employee compensation leaves the state via retail sales margins. A portion of the industry's "other operating costs" include insurance, expenditures for replacement parts and other supplies that must be purchased elsewhere because many manufacturers and service providers are not located in West Virginia. Expenses like snow plowing are purchased locally.

Two different models were used to estimate these multiplier effects. Similar impacts were obtained using both the IMPLAN and JEDI⁹ models. The figures below are from the IMPLAN model.

Multiplier Effects from Business and Household spending: 101 jobs and \$4.3 million in income.

Total Economic Impact: 164 jobs, \$11.6 million in income and \$21.6 million of Gross State Product.

⁸ US Wind Force Foundation, "US Wind Force Foundation Names Grant Recipients," Press Release Dec. 1, 2016.

⁹ The Jobs and Economic Development Impact (JEDI) model is a free economic impact model developed by the National Renewable Energy Laboratory.

Direct and Total Economic Impact of Wind in West Virginia

	Employment	Labor Income	Gross State Product
Direct	63	\$7,300,000	\$7,300,000
Indirect (Businesses)	52	\$2,420,000	\$10,890,000
Induced (Households)	49	\$1,850,000	\$3,430,000
Total	164	\$11,570,000	\$21,620,000

Estimates of the State and local tax impact from the operations of the wind industry is shown below. These figures exclude property taxes and B&O taxes paid directly by the operators.

State and Local Tax Impact of the Wind Industry

Category of Tax	Direct	Total
Business Taxes	\$53,000	\$138,000
Consumer Sales & Use Taxes	\$105,000	\$272,000
Personal Taxes	\$157,000	\$408,000
Excise Taxes	\$49,000	\$128,000
Miscellaneous Fees and Transfers	\$2,000	\$4,000
Taxes Collected by Counties	\$1,000	\$1,000
Total	\$366,000	\$953,000

Source: MU CBER based on tax revenue data.

Total Tax Impact: When including the \$4.3 million in property and B&O taxes paid directly by the industry the total tax impact is **\$5.3 million**.

Property Tax Impact

The six West Virginia wind facilities pay \$2.7 million per year in local property taxes. The turbines are in Barbour, Grant, Greenbrier, Mineral, Preston, Randolph and Tucker counties. Property tax payments are thus spread across these seven jurisdictions.

Property Taxes Paid by Wind Industry & Share of Taxes Levied by County

County	Property Tax Paid		% of Class Taxes Levied	
	2016	2017	Total Utility	All Property
Barbour	\$ 430,000	\$ 430,000	71%	5%
Grant	\$ 700,000	\$1,160,000	10%	5%
Greenbrier	\$ 660,000	\$ 400,000	23%	2%
Mineral	\$ 520,000	\$ 320,000	35%	3%
Preston	\$ 20,000	\$ 20,000	0%	0%
Randolph	\$ 190,000	\$ 190,000	9%	1%
Tucker	\$ 160,000	\$ 160,000	17%	2%
TOTAL	\$2,670,000	\$2,670,000		

NOTE: Values are rounded.

Local economic impacts also occur when wind farms are installed. A 100 MW facility will employ about 66 people during the construction phase of a project.¹⁰

5. Taxation of Wind Power Facilities in West Virginia

Basic Approaches to the Valuation of Wind Farms¹¹

Three accepted methods of valuation for property taxation¹² are applicable to wind farm taxation.¹³

- Under the **income approach**, where investors/owners are seeking an income stream, the value can be determined using a discounted net cash flow analysis. This approach is a business valuation model which can be used for any operating entity. The net cash flow is determined by many factors including: characteristics of the wind, turbine efficiency and the price paid for power loaded to the grid. Wind farms usually enter into long-term “power purchase agreements” (PPA) which set the price and conditions under which electricity is sold.
- Under the **sales approach**, wind farms that have been sold can be used (after adjustments) as “comparable sales” to determine market price for facilities which have not sold. Since there are very few qualified sales this approach is rarely if ever used.
- Under the **cost approach** the depreciated replacement value is used. This is the most frequently encountered valuation technique among states taxing wind power facilities. In some cases, original cost less depreciation and trends in costs are used. The costs include materials, labor, supervision, overhead, engineering, sales taxes and insurance. The cost approach, once replacement or original cost is known, is relatively simple to apply.

¹⁰ JEDI.

¹¹ Barton, Delacy (Summer 2014) Wind Farm Valuation Issues for Ad Valorem Taxation Purposes, *Insight*, 86

¹² Sales, income and cost.

¹³ Hegar, Glenn (January 2016) Solar and Wind-Powered Energy Device Exemption and Appraisal Guidelines, Texas Comptroller of Public Accounts, Austin TX

History of Property Taxation of Wind Turbines in West Virginia

In 2001, the legislature passed legislation to establish “parity” between the per megawatt cost of wind and coal fired generation. Parity was to be achieved by reclassifying certain components of the wind energy facility as “pollution control facilities” as it had for other generation related equipment that reduces air pollution, like scrubbers on coal-fired power stations and circulating fluidized-bed boilers that utilize waste coal.

Legislation in 1973 (11-6A-3) passed to cover air and water pollution equipment providing these be taxed at “salvage value”. The Tax Commissioner was to set the salvage value. The Tax Commissioner first set salvage value at 15 percent but later reduced it to five percent.

In 2001, 11-6A-5a (HB 2968) was passed providing for wind tower and turbines for the generation of electricity be defined as tangible personal property and taxed at salvage value. This treatment limited salvage value to 70 percent of the total original cost. All other wind generation related assets were to be taxed without the salvage value treatment, but as any other commercial property. Wind turbines are one of 103 pollution abatement items preapproved by the West Virginia Department of Environmental Protection to receive this status.

In 2007, legislation was passed providing a new definition of salvage value and a cap on the total amount of project cost that could be considered “pollution control facilities” eligible for taxation at salvage value. Legislation in 2007 (HB 441) reads as “...all the value associated with wind turbine and tower shall be accorded salvage value. Provided, that the portion of the total value of the facility assigned salvage value...be no greater than seventy-nine percent of the total value of the facility”. SB 441 defined in detail what was included in “wind turbine and tower”.

The 2017 regular session of the West Virginia Legislature saw the introduction of SB16 which would repeal 11-6A-5a, the section of code granting special treatment to wind power projects. This repeal would mean all wind power facilities would be taxed as all other commercial and industrial property.

The other 102 items approved for pollution abatement status include equipment used to reduce air emissions, control waste water and prevent water pollution. Examples including circulating fluidized-bed boilers used in cogeneration facilities that burn waste coal, coal blending facilities at power plants used to lower the SO₂ content of coal to be burned, baghouses, cooling towers, scrubbers, flares used to destroy waste gases, emissions monitoring equipment, groundwater monitoring and treatment equipment, and waste transportation facilities for use in relocating wastes.

Procedures for Property Taxation of Wind Facilities in West Virginia

The Property Tax Office of the State of West Virginia determines the value of wind facilities in the State. The Department's valuation is provided to each county for placement upon the tax rolls.¹⁴ The property tax rate applied to wind power facilities is the same as applied to any other Class III (real property outside municipal limits) commercial and industrial property. The following are the steps used by the Department

Step One:

The original cost of the wind facility is reported to WV Tax Department by facility operator.

Step Two:

Up to 79 percent of original value is determined to be "pollution abatement control equipment."

Step Three:

The up to 79 percent classified as "pollution control" is appraised at salvage value, set at 5 percent of original cost. This assessment does not change during the useful life of the facility.

Step Four:

The remaining value (21 percent of original cost) is assessed as industrial property (Class Three) using NAICS code 2211 (Electric Power Generation, Transformer & Distribution) This includes:

- Machinery and Equipment,
- Furniture and Fixtures, and
- Leasehold improvements.

Step Five:

The value established in Step Four is then trended using the "percent good table" for 30-year life as provided by Marshall Swift to the West Virginia Property Tax Division.

Step Six

The amount determined in Step Four is depreciated using a 30-year life.

Step Seven:

That amount is then added to the amount in Step Five plus the amount in Step Three.

Step Eight

The figure from Step Seven is provided to the Counties who take 60 percent as taxable value.

Step Nine:

Counties will apply the tax rate for Class III property established in that county.

¹⁴ The authors thank Jeff Amburgey, Director Property Tax Division, West Virginia Department of Tax and Revenue.

Examples

Example: Assume new installation under current legislation

1. \$100 million original cost of equipment
2. $\$100 \text{ million} \times 0.79 = \79 million appraised at 5 percent = \$4 million
3. \$21 million remaining is trended and depreciated and listed as Class III (Since this is a new installation, there is no trending or depreciation) = \$21 million
4. The totals from items 2 and 3 are added = \$25 million
5. 60% assessment ratio applied = \$15 million taxable value ($\$25 \text{ million} \times 60\% \text{ assessment ratio}$)
6. Taxable value taken times millage (assume 0.0140323) = \$210,485 ($\$15 \text{ million} \times 0.0140323$)
7. Effective tax rate ($\$100 \text{ million original cost, } \$210,485 \text{ property taxes}$) = 0.00210

NREL's JEDI model assumes a property tax rate of \$1,515/MW for commercial wind facilities installed in West Virginia. The average rate is currently about \$3,900/MW.¹⁵

Example: Assume removal of 5 percent pollution control salvage value. (SB16)

1. \$100 million original cost of equipment
2. Assessed as Class III Industrial property
3. 60 percent assessment ratio applied = \$60 million
4. Taxable value taken times millage (assume 0.0140323) = \$842,938
5. Effective tax rate ($\$100 \text{ million original cost, } \$842,938 \text{ property taxes}$) = 0.00844
6. Property tax savings with current legislation = \$632,453 ($\$842,938 - \$210,485$) or 75 percent

Taxation of Wind Farm Land in West Virginia

The land upon where the towers are located is usually leased by the operator of the tower. This creates a separate property which can be subject to ad valorem taxation. Prior to the conversion to the pad, the land is taxed on a "use" basis (typically ag land), not on market value. After conversion to a rent or royalty status, the land should be reclassified as Commercial and Industrial Class III (land outside the boundaries of a municipality) and taxed using the income approach.

The State has no rules or procedures for how the counties should determine the assessed value leaving that decision to the local assessor. Conversations with the assessors in the West Virginia counties with wind farms indicates there is no standard or uniform process in place. Some do change the classification to commercial and industrial and assess using the income approach. Others negotiate values with the land owners. The rest continue to tax the land as originally classified.

¹⁵ \$2.7 million in property taxes paid divided by 686 MW of capacity.

6. Property Taxation of Wind Farms

Property Taxation of Wind Facilities in Adjacent States

Maryland.

Maryland is a modest producer of wind power in the Mid-Atlantic region. Currently there are six projects on line with 80 turbines and a combined capacity of 191 MW. Among the states for the number of wind turbines it ranks 33rd. But only 1.41 percent of total state electrical production comes from wind.¹⁶ All commercial wind farms are in Garrett County (see map on page 3).

Maryland has a unique property tax incentive system for renewable energy including wind.¹⁷ The financial incentive is a local option with five counties having taken advantage to date. Counties can define what renewable sources are included. To date, no Maryland county has included wind, and the incentive is thus limited to solar and geothermal. Also, the incentive is applicable only to residential properties. Commercial scale projects are not included.

Wind farms (less land value) are valued by the State and considered to be non-public utility generators. Despite a more general exemption of personal property, wind farm towers, turbines and generators remain taxable as personal property.

The personal property is reported at original cost...The Department uses a 30-year life for long lived electric generation machinery and equipment. The property is depreciated at a standard 3.3% per year down to a 25% floor. (COMAR 18.03.01.02) There is a 50% exemption for machinery and equipment used to generate electricity for sale provided in Tax Property 7-237. The exemption applies to the towers, turbines and generators which are the largest components of the wind farm property.¹⁸

The 50 percent exemption applies to all electric generators, with an off-setting state grant designed to recover the lost revenues to the counties.¹⁹ There is also a provision which allows for the wind farm owner and the county to enter an agreement to a negotiated payment by the owner in lieu of taxes on the land (PILOT). Garrett County, the only county with operating wind farms, has not used that option.²⁰

Maryland does have a Renewable Portfolio Standard which includes wind. 25 percent of the state's energy is to come from renewables in 2020 and a goal of 40 percent by 2025. There is a 2.5 percent "carve out" for wind from off-shore only.

Maryland also enacted a net metering law which does include wind. Net metering is available to all residential and commercial installations.

¹⁶ AWEA (2017) "Maryland Wind Energy" American Wind Energy Association, Washington DC.

¹⁷ MD Code Property Tax 9.203.

¹⁸ Memo to County Supervisors of Assessments (4.28.17) from Laura Kittel, Franchise Tax Manager, Maryland Department of Assessments.

¹⁹ Maryland Department of Budget and Management and Public Service Commission (December 15, 2004) "Power Generation and Maryland's Tax Structure"

²⁰ Smith Phil, Supervisor of Assessments, Garrett County, interview with Calvin Kent September 27, 2017

NREL's JEDI model assumes a property tax rate of \$8,727/MW for commercial wind facilities installed in Maryland. This rate was not validated by CBER, however comparison with a project currently under development indicates that the rate may average about \$21,000/MW over 20 years.

Ohio.

Ohio is potentially a major generator of wind power and is a major wind related products manufacturer. It is claimed that Ohio has "more wind-related manufacturing facilities than any other state in the nation".²¹ The 500 manufacturers produce all components of a wind tower and turbine as well as raw supplies.

Ohio has 34 wind projects on line with 302 turbines with a 545 MW capacity. The number of turbines ranks Ohio 26th in the nation. But wind energy amounts for only 1.05 percent of in-state electrical production.²²

In 2010, Ohio enacted SB 232 which exempted qualified energy projects from tangible personal property and real property taxes (OAC 122.23-1 et. seq.). The exemption applied to wind farms above 250 kW. Payments in lieu of property taxes were required to be paid to the counties. For wind projects, the payment is \$6,000/MW if 75 percent of the work force during construction is Ohio based, if 60 percent is Ohio based the rate is \$7,000/MW, and if 50 percent Ohio employees during construction the rate increases to \$8,000/MW.²³

County commissions must approve the personal property tax exemption and may require an additional payment not to exceed \$9,000/MW. In addition, the project must maintain roads, provide training and equipment to first responders, establish partnerships with universities and offer to sell any renewable energy credits to Ohio utilities.²⁴

Land supporting the wind tower is totally exempt from property taxation up to 1/2 acre²⁵.

Ohio's Renewable Portfolio Standard requires that utilities provide 12.5 percent of their sales from renewable resources by 2026. There is no specific "carve out" for wind.

NREL's JEDI model assumes a property tax rate of \$21,968/MW for commercial wind facilities installed in Ohio. This rate was not validated by CBER.

Pennsylvania

Pennsylvania is a wind generation equipment manufacturing state with 26 plants. It is also a significant producer of wind energy. The State has installed wind capacity of 1,369 MW. There are 22 utility-scale wind projects on-line with 726 turbines. For number of turbines Pennsylvania ranks 18th in the nation. 1.62 percent of in-state production results from wind generation.²⁶

²¹ AWEA (2017) "Ohio Wind Energy", American Wind Energy Association, Washington DC

²² AWEA (2017) Ohio Wind energy

²³ Ohio Development Services Agency, (n.d.) Qualified Energy Project Tax Exemption

²⁴ DSIRE, (May 12, 2016) Qualified Energy Tax Exemptions for Projects over 250 kW (Payment in Lieu)

²⁵ Interview Nancy Dixon, Van Wert County Auditor, with Calvin A. Kent September 27, 2017

²⁶ AWEA (2017) "Pennsylvania Wind Energy", American Wind Energy Association.

The legislature established that wind turbines and related equipment would not be included in the property tax base. The valuation of wind site land is left to the various county assessors who use the income capitalization method. Somerset County, with the greatest number of wind towers, describes the process.

Somerset County has determined to value wind farms by the income approach. Since land is leased by the company, an income to the land is produced by the installation of such a facility. The company assumes the expenses so we are dealing with a net-net lease and all the income to the land is considered net. The capitalization rate is built from local data including an effective tax rate. We determine the rate here to be 15%. Three extra points were added for risk because the wind doesn't blow all the time and the income to the land is a royalty based on the total power generated. The formula is: NET INCOME divided by CAP RATE=VALUE.²⁷

Pennsylvania has a Renewable Portfolio Standard requiring electricity suppliers to obtain 18 percent of their sales from alternative energy sources by 2021. Wind power fulfills 61 percent of that requirement.²⁸

NREL's JEDI model assumes a property tax rate of \$1,750/MW for commercial wind facilities installed in Pennsylvania. This rate was not validated by CBER.

Kentucky.

Kentucky has no commercial wind farms. There is a small wind related manufacturing base of 10 facilities. Use of small wind turbines is being encouraged, but there are no property tax incentives to attract commercial development.²⁹

Virginia.

Currently Virginia has no wind facilities generating commercial electricity. There is on-shore and off-shore potential but none has been developed. Wind related wind manufacturers total five.³⁰

Virginia does have a local option provision which would allow wind facilities to be taxed at a lower rate than other property (HB 1297). While it is possible this provision might apply to commercial wind, since there are no such facilities in Virginia the question is moot.

NREL's JEDI model assumes a property tax rate of \$9,900/MW for commercial wind facilities installed in Virginia. Because no facilities have been installed, this rate has not yet been tested.

²⁷ Correspondence with Calvin Kent by Jane Rizzo, Chief Assessor Somerset County PA, September 15, 2017

²⁸ AWEA (2017) "Pennsylvania Wind Energy" American Wind Energy Association, Washington DC

²⁹ AWEA (2017) "Kentucky wind Energy" American Wind Energy Association, Washington DC

³⁰ AWEA (2017) "Virginia Wind Energy" American Wind Energy Association, Washington DC

Property Taxation in Other Wind Power Producing States

California

California was the first state to have a commercial wind installation in the late 1970s. Currently the State ranks fourth in the nation for installed wind capacity. With 7,465 turbines installed with another 418 under construction or development, California ranks second for number of turbines. Around seven percent of the State's electric production comes from wind. The number of active wind related manufactures totals 12.

California has an ambitious Renewable Portfolio Standard. With steps increasing from 25 percent of retail sales from renewable in 2016 to 50 percent in 2031. All forms of renewable energy are covered (solar, wind, biomass, geothermal hydroelectric). There is no specific requirement for wind.

Although California has a full exemption from property taxes for solar systems, there is no corresponding exemptions for wind. California generates two appraised values for wind farms. The first is the original cost as set under Prop 13 which freezes values at the time of completion. The second is a market approach using the income method. Gross receipts are adjusted to account for the capacity factor and expenses. Operators may use either the Prop 13 valuation or the market value approach whichever is less³¹.

NREL's JEDI model assumes a no property tax is levied on commercial wind facilities installed in California. CBER's research has shown this to be inaccurate as taxes are levied.

Iowa.

Generating 36 percent of electricity consumed from wind power, Iowa ranks first in the nation for wind energy as a percent of total electrical generation. Iowa ranks second in the nation for installed wind capacity with over 4,000 turbines installed or under construction. In addition, there are 11 manufacturing facilities in Iowa related directly to wind.³²

Consistent with state law, commercial wind towers and generation equipment in O'Brian County (the state's largest wind producer) are taxed on original cost. Original cost is furnished by the company to the assessor. For the first year the facility is assessed at zero. For each succeeding year, the taxable value is increased by five percent until 30 percent valuation is reached. The valuation remains at 30 percent for the life of the project. Wind farms are assessed for tax purposes as industrial property. For all industrial property in Iowa 90 percent is taken as taxable value.³³

The land under the pads valuation is changed from ag to non-ag when the tower is placed. There is income approach used to establish the value of pad land.

³¹ Smith, Lee. Assistant Assessor, Kern County CA interview by Calvin Kent October 11, 2017

³² AWEA, (2017) Iowa Wind Energy, American Wind Energy Association, Washington DC

³³ Thomas, Lori, Deputy Assessor, O'Brian County, Iowa, interview by Calvin A. Kent October 10, 2017

Iowa was the first state to adopt a Renewable Energy Portfolio Standard. The goal of 20 percent of installed capacity was exceeded in 1999. The industry has a “goal” of providing 90 percent of Iowa’s retail electric needs from renewables by 2020.³⁴

NREL’s JEDI model assumes a property tax rate of \$4,500/MW for commercial wind facilities installed in Iowa. This rate was not validated by CBER.

Kansas.

Kansas obtains almost 30 percent of its electricity from wind power, ranking Kansas third in the nation for wind as a share of electric generation and fifth for installed wind capacity. In Kansas, there are 2,795 installed turbines ranking it fifth in the nation. There are five manufacturing facilities in Kansas directly related to wind power.

Until December 31, 2016 all renewable energy electric generators, both wind and solar, were totally exempt from either real or personal property taxation. For projects started after that date the full exemption only runs for 10 years. Retail cost new is used as the base with seven-year straight line depreciation (KS Statutes 79-201). The value cannot be depreciated below 20 percent for the 11th year and any year following. The property is then assessed at 25 percent of that value as is all other commercial and industrial property. Retail cost is supplied to the local governments by the operator. Pad land is not exempted, but in most counties, continues with an ag land assessment since that is determined to be its “highest and best” use.

Kansas has a Renewable Energy Standard goal of 20 percent of each utility’s peak demand coming from alternate fuels starting in 2020 (KS Statutes 66-1256, et. seq.).

NREL’s JEDI model assumes a property tax rate of \$2,900/MW for commercial wind facilities installed in Kansas. This assumption contradicts the finding that wind facilities were exempt from this type of taxation through 2016 and that new facilities will be exempt for 10 years.

Oklahoma.

Oklahoma ranks 3rd in the nation for installed wind capacity and wind generation with a capacity of 6,645 MW. Oklahoma has 3,395 turbines with another 913 under construction. Wind provided 25.12 percent of all electricity production in the State.³⁵

Until January of 2017, Oklahoma provided a 5-year property tax exemption for wind power generators. That provision was repealed in May 2015 (SB 498) although projects producing prior to December 31, 2016 retain the exemption. Oklahoma had a goal of 15 percent for use of renewable electricity by 2015. Wind towers are valued under the replacement cost approach less depreciation. The generator is depreciated over a twelve-year life with the remaining being taxed on a 25-year life (some wind counties use a 25-year life for both). Land supporting the pad is taxed as commercial property using the sales comparison approach for all commercial property in the area.³⁶

³⁴ Rushing Ty, (April 16, 2017) “Progress: O’Brian County is the Wind Capital of Iowa”, Sioux City Journal, Sioux City IA.

³⁵ AWEA (2017) “Oklahoma Wind Energy” American Wind Energy Association, Washington DC

³⁶ Shuck, Brian, equalization analyst, Oklahoma Tax Commission by Calvin Kent September 29, 2017

NREL's JEDI model assumes a property tax rate of \$6,435/MW for commercial wind facilities installed in Oklahoma. This rate was not validated by CBER.

Texas.

Texas is the number one state for installed wind capacity as well as generation. Texas has 21,044 MW. In addition, installed capacity with 1,646 MW under development and 5,437 MW under construction. Texas has 40 manufacturing facilities producing products for the wind industry. 12.63 percent of all in-state electricity production comes from wind.³⁷

Although there is an exemption for the incremental value of wind generators used primarily for on-site power, that exemption does not apply to commercial wind farms. The Texas Code (23.26(a) et. Seq.) requires that commercial wind be valued by local assessors as follows:

...cost data be obtained from generally accepted sources and that appropriate adjustments for physical, functional or economic obsolescence be made...the depreciated value of the property be calculated using a useful life that does not exceed 10 years...the chief appraiser (is prohibited) from determining the depreciated value to be less than 20 percent of the total value adjusted for physical, functional, or economic obsolescence.³⁸

Texas has no exemption but has a two-tier system where for school purposes a fixed \$10 million per unit for ten years is set after which it goes on depreciated original cost. A \$1 million per megawatt cost is set for other property with a 60 percent abatement for first five years, 40 percent for the next five then taxed at market value.

Nolan County is the greatest producer of wind power in Texas. The process used there is to establish two separate valuations. For the school district the value of each turbine is set at \$10 million per unit and that value holds for 10 years after which market value is applied. For county purposes the cost approach is used with \$ 1 million per MW being used as original cost. Original cost is then depreciated as described above considering factors such as income received. The value is subject to a 60 percent abatement for the first five years and 40 percent for the next five and then placed on the rolls at full market value.³⁹

It is county option to tax the land under the pads. Noland County does not and the land keeps its ag classification.

NREL's JEDI model assumes a property tax rate of \$10,986/MW for commercial wind facilities installed in Texas. This rate was not validated by CBER.

³⁷ AWEA (2017) "Texas Wind Energy" American Wind Energy Association, Washington DC

³⁸ Hegar, op. cit. p. 8

³⁹ Klepper, Brenda, Chief Appraiser Noland CAD by Calvin A. Kent September 29, 2017

7. Comparison to Other Types of Generation

Comparison of the property tax liability for wind turbines to other types of electricity assets provides information about the equity of the tax structure. West Virginia uses the "Unit rule" method of valuing utility property, which per the code of State rules⁴⁰ "means an appraisal of an integrated property as a whole without any reference to the values of its component parts." Thus, all electric utility assets are valued and taxed together, i.e. generation, transmission and distribution assets.

Tax liabilities for the major electric utilities in West Virginia are shown below along with the capacity of generating assets for each utility. The calculated value for tax liability per MW shown is thus overstated due to the inclusion of any transmission and distribution assets the utility also holds in the State. The \$/MW calculation represents an upper bound for taxes levied per unit of generating capacity, and for Monongahela Power and Appalachian Power is significantly higher than the tax on generating assets alone.

2017 Tax Liability for Utilities Operating in West Virginia w/ Generating Capacity

Utility	State-Wide Class III & IV Tax Liability	Non-Wind Nameplate Capacity (MW)	Wind Portion of Liability	Total Electric Utility Tax Liability/ Non-Wind MW
Appalachian Power	\$48.4 million	5,246	\$0	\$9,230
Dominion/Virginia E&P	\$8.6 million	1,681	\$700,000	\$4,690
Monongahela Power	\$22.7 million	3,204	\$0	\$7,086
Allegheny Energy Supply	\$5.9 million	1,368	\$0	\$4,301

Source: West Virginia State Auditor's Office, Company Tax Liabilities for 2017, EIA Form 860, operator data and CBER calculations.

A true comparison of property taxes levied on generating assets alone is not possible under this system. The closest example is for Allegheny Energy Supply, the operator the Pleasants Power Station. Since Pleasants produces power solely for the wholesale market, Allegheny's additional utility assets will be small compared to the other utilities which also pay tax on assets used to serve retail customers. Thus, the tax rate of \$4,301/MW can be considered an upper-bound for the rate of tax currently levied on coal-fired generating capacity in West Virginia. As wind facilities in the State currently pay about \$3,900/MW in property tax, the rates are similar for both resources.

A comparison of tax liability per unit of production (MWh) for the wind industry and the Pleasants facility shows that wind is taxed more per MWh. This is because, on an annual basis, wind facilities operate at a lower net capacity factor than a baseload coal-fired generator.

Calculated Property Tax per MWh – Wholesale Coal vs. Total Wind

	MWh in 2016	Tax	Tax \$/MWh
Pleasants	6,893,000	\$ 5,883,849	\$ 0.85
All Wind Facilities	1,432,000	\$ 2,335,000	\$ 1.63

Source: West Virginia State Auditor's Office, Company Tax Liabilities for 2017, EIA Form 923 and operator data.

⁴⁰ Title 110, Legislative Rule, State Tax Commission, Series 1M, Valuation of Public Utility Property For Ad Valorem Property Tax Purposes.

8. Tax Implications of SB 16

As proposed, SB 16 would remove the pollution control status allowed to wind turbines in West Virginia. This change would apply to the six facilities that already exist in the State, and would increase the amount of property tax paid. It would also apply to projects currently under development. Using the tax formulas described above, it is estimated that the additional property taxes paid would sum to \$9.2 million. The payments would be spread across the seven wind counties as shown below.

Estimates of Additional Property Taxes Paid Under SB 16 by County

County	Property Tax Paid				
	Current In 2017	Total if SB 16	Additional if SB 16	Percent Increase	Total % of Current
Barbour	\$ 430,000	\$1,110,000	\$680,000	159%	258%
Grant	\$1,160,000	\$5,470,000	\$4,310,000	373%	471%
Greenbrier	\$ 400,000	\$2,320,000	\$1,920,000	480%	580%
Mineral	\$ 320,000	\$1,860,000	\$1,540,000	481%	581%
Preston	\$ 20,000	\$70,000	\$50,000	261%	350%
Randolph	\$ 190,000	\$500,000	\$310,000	161%	263%
Tucker	\$ 160,000	\$560,000	\$400,000	260%	350%
TOTAL	\$2,670,000	\$11,890,000	\$9,220,000	345%	445%

SOURCE: West Virginia State Auditor's Office, operator data and CBER calculations.

Property taxes paid by the wind industry would increase by 345 percent under SB 16 and would be significant to the industry. The additional \$9.2 million in property taxes would increase the industry's \$27 million in annual operating costs by 34 percent, to \$36.2 million. The per MW property tax would become about \$17,300/MW in aggregate.⁴¹

As described earlier, wind projects sell electricity on long-term, fixed-price power purchase agreements, or into competitive wholesale markets that have faced significant downward price pressure from the now abundant natural gas from Marcellus shale and a growing natural gas generation fleet. There is no room for the operators to make up for the increased costs with increased revenues.

⁴¹ \$11.9 million in property taxes paid divided by 686 MW of capacity.

Distribution of Additional Property Tax Collected

The largest portion of additional property tax revenue collected will benefit the State's general fund, not the schools. County property tax payments are a key component of the Public-School Support Program (PSSP). Based primarily on the school census, the PSSP specifies the number of personnel allowed for each school district and allowances for critical elements of school budgets including salaries, retirement fund payments, and transportation. The State determines the amount each county should have available for student support.

The foundation amount consists of two components: local property tax effort and state aid under the PSSP. The State establishes the tax rate to be applied to the property tax base for general support of the district (77.6 cents per \$100 of assessed value). If the amount raised from the local base is not available to fully fund the foundation amount, state aid under PSSP makes up the differences. The local share for each county district is a "computation of each school district's projected regular levy property tax collections for the year...the total local share calculated for each school district is subtracted from the basic foundation allowance to determine the State's share that is appropriated."⁴² Under the School aid formula, 10 percent of the school property tax base is not included in the calculation of the amount of aid for which the school district is eligible. The remaining 90 percent is used to determine local effort. Other things being unchanged, if that 90 percent local base goes up the State share under the formula goes down with the money remaining in the State treasury. The following explanation was provided by the Deputy Secretary of the State Revenue Department.

"I attribute 90% of the regular school levy rate to the State because if there is a tax preference that reduces property tax liability in a manner that lowers the amount of tax collected for school purposes, the State Aid to Schools Formula makes up the difference with State General Revenue Fund aid. The yield from 90% of the regular education levy counts as local contribution toward the amount of funds necessary for education under the formula."⁴³

The following example for Tucker County illustrates the mechanics. Tucker County divides its Class III property taxes as follows (cents per \$100 assessed value).

State Current	1.00
County Current	56.80
<u>Schools Current</u>	<u>77.60</u>
Total	135.40

If the total tax gain from adding wind facilities at full commercial value is \$1 million, the distribution of the gain would be \$57,312 for the Tucker County schools $[(10\% \times 77.60)/135.40 \times \$1 \text{ million} = \$57,312]$. The Tucker County Commission would receive \$419,498 $[(56.8/135.400 \times \$1 \text{ MILLION} = 419,498)]$. The State would be able to decrease its aid under the formula by \$523,191 $(1.00 = (90\% \times 77.60)/135.40 \times \$1 \text{ million})$. That amount would remain in the State general fund for other distribution. The \$1 million in additional property taxes allows the State to retain over 52 percent of the gain due to its reduced obligation under the school aid formula.

⁴² State of West Virginia, Executive Summary of the Public School Support Program.

⁴³ Muchow, op. cit

Most additional money freed up due to an increased property tax base, due to increased taxes on wind farms as proposed under SB 16, would benefit the State general fund. There would be additional money available for school excess levies as these are not included in the PSSP. Assuming tax rates are not changed, income to discharge school construction bonds and county excess levies would also increase, allowing the bonds to be retired earlier, which would increase the amount available for school and county budgets when the bonds are paid. The amounts supporting County excess levies would be increased.

County levy rates and estimates of the distribution of additional property tax collected are shown below.

Levy Rate (cents/\$100 property valuation) for Class 3 & 4 Property - FY Ending June 30, 2018

County	County Regular Levy	Schools Regular Levy	Schools Excess Bonds	County Excess Bonds	Schools Excess Levy	County Excess Levy	Total + State 1 cent/\$100
Barbour	57.2	77.6					191.60
Grant	55.88	77.6		1.32			191.60
Greenbrier	51.72	77.6	27.04		45.9		259.06
Mineral	57.2	77.6			91.8	11.16	294.56
Preston	57.2	77.6	34.2				225.80
Randolph	56.28	77.6					190.68
Tucker	56.8	77.6					191.20

West Virginia State Auditor's Office, Local Government Rates of Levy data for FY Ending June 20, 2018.

In aggregate, the State Treasury would be the greatest beneficiary of SB 16 at 45 percent of the additional \$9.2 million in tax revenue. County Commissions would be the second greatest beneficiary at 35 percent.

Estimated Distribution of Additional Tax (\$)

County	County Regular Levy	Schools Regular Levy	Schools Excess Bonds	County Excess Bonds	Schools Excess Levy	County Excess Levy	State Treasury	Total
Barbour	287,000	39,000	-	-	-	-	355,000	681,000
Grant	1,775,000	246,000	-	42,000	-	-	2,250,000	4,313,000
Greenbrier	489,000	73,000	256,000	-	434,000	-	669,000	1,921,000
Mineral	368,000	50,000	-	-	591,000	72,000	456,000	1,537,000
Preston	17,000	2,000	10,000	-	-	-	21,000	50,000
Randolph	129,000	18,000	-	-	-	-	163,000	310,000
Tucker	170,000	23,000	-	-	-	-	211,000	404,000
TOTAL	\$3,235,000	\$451,000	\$266,000	\$42,000	\$1,025,000	\$72,000	\$4,125,000	\$9,216,000

SOURCE: West Virginia State Auditor's Office, Local Government Rates of Levy data and CBER calculations.

9. Summary

At \$21.6 million of gross state product and 164 jobs, the wind industry is a small portion of West Virginia's economy. However, the industry is significant for the counties in which the turbines reside. As a portion of property taxes levied, wind turbines currently account for up to five percent of total taxes in Grant and Barbour Counties, and between one and four percent in the other five wind counties. The passage of SB 16 as written would increase the amount of taxes levied on wind facilities from \$2.7 million to \$11.9 million, a factor of 4.4. To the industry this would be an increase in operating costs of 34 percent.

Wind is often viewed as a primary cause of coal-fired electricity generation's large loss of market share over the past few years. However, gas-fired generation has caused the largest share of this loss, with wind a much smaller contributor. The increase in regional gas generation since 2008 was 26 percent larger than the decline in coal generation. In 2016, gas-fired generation in PJM was almost 13 times the amount of wind-based generation. A recent report by the U.S. Department of Energy states that "The biggest contributor to coal and nuclear plant retirements has been the advantaged economics of natural gas-fired generation."

In West Virginia, wind is an export product as only 15 percent of generation is purchased by West Virginia utilities. In terms of economic impact, any export product is more valuable because that demand is not tied to population, instead being part of the foundation of the economy like manufacturing and natural resource extraction. Wind is a piece of the energy sector in West Virginia and adds to the State's position as a net producer of coal, gas and electricity.

The current average tax rate of \$3,900 on wind capacity in West Virginia is lower than what is estimated by NREL for some states (e.g. Ohio, Maryland) and higher than what is estimated for others (e.g. Pennsylvania, Kansas). Although NREL's estimate for West Virginia of \$1,550/MW is inaccurate, the rates for other states were not verified by CBER. The \$3,900 rate also appears to be close to the \$4,300/MW upper bound of what is levied on fossil generating assets in West Virginia. Truly comparable rates are likely to be even closer as the \$4,300 likely includes some non-generating assets in the unit calculation of tax liability.

Aside from the pollution control status, there are few other incentives to develop wind in West Virginia. The State repealed its Alternative Energy Portfolio Standard, which provided some incentive for local use of wind energy. Many states that impose higher property taxes on wind have other incentives that the industry can take advantage of such as personal and corporate income tax credits, low cost loans, direct subsidies or renewable portfolio standards.

Wind turbines are one of 103 items preapproved for pollution abatement status by the State of West Virginia. The other 103 items include an array of equipment needed to control air emissions, manage waste water and avoid water pollution, and are used throughout the energy and other sectors of the economy.

Electricity produced by wind power is a fixed-price product. The industry's revenues are from long-term power purchase agreements that do not change over the life of a contract. While SB 16 would be unlikely to cause existing wind facilities to cease operations, the more lasting implications of such an action could be damage to the reputation of West Virginia.

The regulatory uncertainty the SB 16 represents could have no effect on future investment in West Virginia but it is more likely to discourage new capital investment, as potential investors will evaluate if it is worth exposure. This rule change would set a precedent that it is acceptable to change the terms of engagement for businesses that have elected to operate in the State.

Wind is arguably one of a few “new economy” industries to invest in West Virginia in the last two decades. While a large portion of wind resources considered economically viable in the 2000s have already been developed, additional resources above those estimates may soon be developable. Other newer growth industries may consider West Virginia for investment in the future. These industries could be other renewable energy developers, related emerging industries like energy storage or technology firms that seek locales favorable to renewables.

It is uncertain what the impact of this policy change would be on future wind development in the State or on the probability that other industries will choose to invest here. However, one wind developer has reported to have stopped development on two early-stage projects in West Virginia because of SB16 and to have lost the sale of a mid-stage wind farm to a Fortune 500 company directly because of SB16 when the company pulled out “because of the regulatory uncertainty that SB16 demonstrated in West Virginia.”⁴⁴

Market conditions are changing for the wind industry. The federal Production Tax Credit (PTC) has been reduced for projects coming online in 2017 through 2019 and will be completely phased out after 2019. These incentives have been a key factor in inducing wind development since the 1990s. This change, combined with increasingly low-cost wind from the Midwest and low wholesale electricity prices due to natural gas are already making West Virginia-based wind less competitive. SB 16 would add to this trend.

⁴⁴ Dave Friend, Managing Partner, Laurel Renewable Partners, LLC.