



2013
Alternative and Renewable Energy
Resource Planning Assessment

Report to the Governor, Senate President,
and Speaker of the House of Delegates
West Virginia Code §24-2F-9(b)

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This report is the 2013 annual Alternative and Renewable Energy Resource Planning Assessment presented to the Governor, President of the Senate and the Speaker of the House of Delegates. The report has been prepared by the Public Service Commission of West Virginia, in collaboration with the West Virginia Department of Environmental Protection and the West Virginia Division of Energy in accordance with W.Va. Code §24-2F-9(b).

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Overview

Alternative and Renewable Energy Resource Planning Assessment

As part of the requirements under the Alternative and Renewable Energy Portfolio Standard Act (Portfolio Act or Act) enacted by the West Virginia Legislature in 2009, which is codified at W.Va. Code §24-2F-1 et seq., the Public Service Commission of West Virginia (Commission), in cooperation with the West Virginia Department of Environmental Protection (DEP) and the West Virginia Division of Energy (WVDOE), is to prepare on or before July 1, 2012, an Alternative and Renewable Energy Resource Planning Assessment (Assessment) for the Governor, the President of the Senate and the Speaker of the House of Delegates. Thereafter, an annual report is required, pursuant to W.Va. Code §24-2F-9(b).

W.Va. Code §24-2F-9(b) requires that the Alternative and Renewable Energy Resource Planning Assessment:

- (i) Identify current and operating alternative and renewable energy resource facilities in this state;
- (ii) assess the potential to add future generating capacity in this state from alternative and renewable energy resource facilities;
- (iii) assess the conditions of the alternative and renewable energy resource marketplace, including costs associated with alternative and renewable energy;
- (iv) assess the economic impacts of this article on coal and coal mining in West Virginia;
- (v) recommend methods to maintain or increase the relative competitiveness of the alternative and renewable energy resource market in this state; and
- (vi) recommend to the Legislature additional compliance goals for alternative and renewable energy portfolio standards beyond 2025.

On January 1, 2012, initial results of the Alternative and Renewable Energy Resource Planning Assessment were filed with the Joint Committee on Government and Finance in accordance with the requirements of W.Va. Code §24-2F-9(b). The initial results of the Assessment were prepared by the Commission, in collaboration with the West Virginia Public Energy Authority (Authority) under the administration of the WVDOE as required by W.Va. Code §24-2F-9(b).

This annual Assessment was prepared through the collaboration of a working group consisting of representatives from the Commission, DEP and WVDOE, including Richard Hitt, Esq., General Counsel for the Commission, and Jessica M. Lane, Esq., from the Commission's Office of General Counsel; Randy Huffman, Cabinet Secretary, DEP and Vice Chair of the Authority, Lisa McClung, Deputy Cabinet Secretary of the DEP, Ken Ellison, Director of the Division of Land Restoration of the DEP; and Jeff Herholdt,

Director, WVDOE and Chairman of the Authority, Casey Randolph from the WVDOE and the Authority, and Bill Willis of the WVDOE. The working group conferred by email to discuss the topics listed in W.Va. Code §24-2F-9(b) and to collaborate regarding the information included in this report.

On July 1, 2012, the Commission and the Authority updated the information contained in the initial Assessment filed with the Joint Committee on Government and Finance on January 1, 2012. This document updates the July 1, 2012 Assessment.

Portfolio Act

The Portfolio Act, among other things, established an alternative and renewable energy portfolio standard applicable to the State electric utilities that requires the utilities to derive a certain percentage of the electricity sold to West Virginia retail customers from alternative and renewable energy resources in increasing percentage increments: ten percent by 2015, fifteen percent by 2020, and twenty-five percent by 2025. Based on a detailed statutory and regulatory framework set forth in the Act and Commission Rules, the State's electric utilities are required to own alternative and renewable energy resource credits (credits) equal to the specified percentage of electricity sold by the utility in the preceding calendar year to their West Virginia retail customers in order to meet the portfolio standard requirements. Each credit is equal to one megawatt hour of electricity from qualified generation. A utility can obtain credits through its own qualified generation, by purchasing qualified generation or by purchasing credits. In the instance of certain emission reduction or offset projects, a credit is equal to each ton of carbon dioxide equivalent reduced or offset as a result of the project. For utility investments in energy efficiency and demand-side management projects, a credit is equal to each megawatt of electricity conserved as a result of the project.

The Legislative goals of the Portfolio Act are set forth in W.Va. Code §24-2F-2, and include, among other things, lowering emissions associated with electrical generation, expanding the State's economic base, developing a diverse portfolio of electrical generation, and developing the State's natural resources to support the development of alternative and renewable energy resources at a reasonable price. The statute states that “[i]t is in the public interest for the state to encourage the construction of alternative and renewable energy resource facilities that increase the capacity to provide for current and anticipated electric energy demand at a reasonable price.” A majority of the states have enacted portfolio standard requirements. As of January 2012, West Virginia is one of thirty states and the District of Columbia with enforceable renewable portfolio standards or other mandated renewable capacity policies. Seven

additional states have voluntary goals for renewable generation. These programs vary widely in terms of program structure, enforcement mechanisms, size, and application.¹

Compliance Plans and Annual Reports Required by the Act

In 2011, pursuant to the Act requirements, the State's electric utilities were required to file alternative and renewable energy portfolio standard compliance plans with the Commission for review and approval. The compliance plans were approved for the seven electric utilities in the State, including the two major State electric utilities, the entities that are primarily responsible for implementing and complying with the Act requirements: Appalachian Power Company (APCo) and Wheeling Power Company (WPCo), dba American Electric Power (AEP) (together the AEP Companies) and Monongahela Power Company (Mon Power) and The Potomac Edison Company (PE), both affiliates of FirstEnergy (together the FirstEnergy Companies) and formerly dba Allegheny Power.

According to the AEP compliance plan approved in Case No. 10-1914-E-CP, the AEP Companies intend to meet the portfolio standard requirements through the acquisition of credits from the AEP Companies' existing qualifying generation and existing purchase power agreements for qualifying wind generation located within the PJM region, and their energy efficiency and demand response programs. The AEP progress reports filed in 2012 and in 2013 show that AEP continues to have a reasonable expectation of achieving the portfolio standard requirements. AEP reported no change in the cost to comply from the information provided in its Commission approved compliance plan.

According to Mon Power and PE's compliance plan approved in Case No. 10-1912-E-CP, the FirstEnergy Companies planned to meet the portfolio standard requirements through a combination of credits from three Public Utility Regulatory Policy Act of 1978 (PURPA) facilities, including the Hannibal Lock & Dam (Hannibal), a run-of-river project owned by the City of New Martinsville. The Hannibal facility is a Qualifying Facility (QF).

After receiving approval of the Mon Power and PE compliance plan, in Case No. 11-0249-E-P, the utilities filed a petition for declaratory relief and interim relief, seeking a ruling from the Commission that Mon Power was entitled to the credits generated by the QFs pursuant to energy purchase agreements. The Commission granted the City of New Martinsville intervenor status in that proceeding. By an order entered

¹ U.S. Energy Information Administration website article "Most States have Renewable Portfolio Standards" February 3, 2012, <http://www.eia.gov/todayinenergy/detail.cfm?id=4850#>

November 22, 2011, the Commission held that the credits from the Hannibal plant belonged to Mon Power. Issues regarding credits from the Morgantown Energy Associates (MEA) and Grant Town waste coal facilities and the Hannibal plant, all PURPA projects constructed in the late 1980s or early 1990s, were the subject of cases pending before the Supreme Court of Appeals of West Virginia in City of New Martinsville v. The Public Service Commission of West Virginia, Case No. 11-1738 and Morgantown Energy Associates v. The Public Service Commission of West Virginia, Case No. 11-1739. The ownership of the credits for the electricity generated from the facilities and purchased by Mon Power under PURPA contracts that predate the Portfolio Act and the certification of the MEA facility under West Virginia law were contested in these cases by MEA and the City of New Martinsville. On June 11, 2012, the Court issued a *per curiam* decision in which it upheld the Commission ruling that Mon Power owns the credits and the Commission holding that the Commission may certify the MEA facility upon the submission of sufficient evidence by the utilities of the qualification of the facility to meet the Commission Rule requirements to generate credits. The City of New Martinsville filed suit on June 1, 2012, and, later, MEA filed suit on October 9, 2012, in the United States District Court for the Southern District of West Virginia. The City of New Martinsville and the MEA seek a determination that the Commission violated PURPA when it determined that Mon Power owned the credits associated with generation from the three PURPA facilities. Those cases remain pending in federal court.

The 2013 progress report indicates that Mon Power and PE's compliance plan continues to have a reasonable expectation of achieving the portfolio standard requirements, and Mon Power and PE continue to have the burden of meeting the mandates of the Alternative and Renewable Energy Portfolio Standard. If the federal court alters the Commission ruling on the PURPA credits, then in a future filing Mon Power and PE will be required to submit additional information regarding the supercritical units and/or additional sources of required credits. If Mon Power and PE need to rely on additional/different sources of required credits in the future, Mon Power and PE will need to file a revised compliance plan for Commission approval. Similarly, if the Commission decision is not altered by the pending federal court appeal, the City of New Martinsville will need to file a revised compliance plan for Commission approval.

The Mon Power and PE 2013 progress report states that there are currently no anticipated additional incremental cost expectations beyond the costs to achieve any energy efficiency/demand reduction initiatives discussed in the compliance plan filing in Case No. 10-1912-E-CP. The compliance plans approved for the remaining small electric utilities, municipally-owned utilities and rural electric cooperatives stated that these utilities intend to acquire the credits needed to meet the portfolio standard requirements by the acquisition of credits from qualifying generation from their wholesale power suppliers or to purchase credits on the credit markets. The

2013 progress reports for these utilities do not indicate any change in their respective compliance plans.

Alternative and Renewable Energy Resource Facilities Defined by the Act

Eligible alternative and renewable energy resources facilities are defined in the Portfolio Act and the Rules Governing the Alternative and Renewable Energy Portfolio Standard (Portfolio Standard Rules), 150 C.S.R. 34, the Commission Rules promulgated under the Portfolio Act.

W.Va. Code §24-2F-3(13) defines renewable energy resources as solar photovoltaic or other solar electric energy; solar thermal energy; wind power; run of river hydropower; geothermal energy; biomass energy; biologically derived fuel including methane gas, ethanol or biodiesel fuel; fuel cell technology; recycled energy; and any resources, methods, and technologies certified as a renewable energy resource by the Commission.

W.Va. Code §24-2F-3(3) defines alternative energy resources as advanced coal technology; coal bed methane; natural gas, including any component of raw natural gas; fuel produced by a coal gasification or liquefaction facility; synthetic gas; integrated gasification combined cycle technologies; waste coal; tire-derived fuel; pumped storage hydroelectric projects; and any resources, methods, and technologies certified as an alternative energy resource by the Commission. As defined in W.Va. Code §24-2F-3(1), advanced coal technology is a technology that is used in a new or existing energy generating facility to reduce airborne carbon dioxide emissions associated with the combustion or use of coal and includes, but is not limited to, carbon dioxide capture and sequestration technology; supercritical technology; advanced supercritical technology; ultrasupercritical technology and pressurized fluidized bed technology; and any other resource, method, project or technology certified by the Commission as advanced coal technology. There is a statutory ten percent limitation on the credits derived from supercritical technology and natural gas. No more than ten percent of the credits used by a utility each year to meet the portfolio standard requirements may be credits derived from the generation or purchase of electricity from supercritical technology and no more than ten percent can come from generation by natural gas pursuant to W.Va. Code §24-2F-5(b).

Energy Efficiency and Demand-Side Energy Initiative Projects

The Portfolio Act also authorizes the award of credits to electric utilities for greenhouse gas emission or offset projects or energy efficiency and demand-side energy initiative projects pursuant to W.Va. Code §24-2F-4. Although these projects are not specifically included in the items listed for consideration under W.Va. Code §24-2F-9(b),

this report acknowledges that the major electric utilities operating in the State, AEP and FirstEnergy, have undertaken energy efficiency and demand-side energy initiative projects.

The Commission approved AEP's implementation of a SMART lighting program, Residential Home Retrofit, Residential Low Income and Commercial and Industrial (C&I) Incentive for its customers, including annual cost recovery for the programs in the amount of \$6.1 million in Case No. 10-0261-E-GI (Commission Order dated October 5, 2010). The Commission reviewed the AEP energy efficiency and demand response (EE/DR) programs and program rates in Case No. 12-0275-E-GI. In an Order issued in July 2012, the Commission found that AEP successfully implemented the first three EE/DR programs, the Smart Lighting, Residential HomeSMART Energy Audit, and the Commercial and Industrial Prescriptive Program in 2011, but had not yet implemented the Residential Low Income program because of delays in the contract process and coordinating the program with the West Virginia Governor's Office of Economic Opportunity. The parties agreed in a partial stipulation to a continuation of the existing EE/DR programs and program rates, and requested that the Commission resolve certain contested issues: (i) the AEP Companies' request for the recovery of lost revenues, (ii) the AEP Companies' request for recovery of labor expenses, and (iii) an intervenor's proposal to implement additional programs including decoupling as a means to achieve energy efficiency.

The Commission approved the continuation of the EE/DR programs initially approved in Case No. 10-0261-E-GI, and urged the Companies to complete implementation of the Residential Low Income program as soon as reasonably possible so that low income customers can obtain the benefits of the energy efficiency program that may help lower their electric bills.

With regard to the contested issues, the Commission did not allow recovery of the AEP Companies' stated \$292,593 in net lost revenues associated with the implementation of the EE/DR programs during the period ending December 2011 because recovery of net lost revenues was an appropriate subject for review in future base rate proceedings and not in the EE/DR proceedings. The Commission allowed the AEP Companies to recover additional labor expenses attributable to launching and operating the three EE/DR programs and a portion of their expenses associated with the low income weatherization program.

The Commission also addressed an intervenor proposal for additional EE/DR programs and decoupling (i.e. separating the profitability of the utility from the sales volumes of electricity). The Commission decided that these issues should be the subject of a mandatory stakeholder process outlined in the partial settlement of the parties.

The result of the Commission decision issued in Case No. 12-0275-E-GI was to increase the EE/DR rates slightly to allow recovery of the labor costs described above.

The Commission also approved a petition seeking approval of FirstEnergy's Phase I Energy Efficiency and Conservation Plan filed on March 31, 2011, that consists of two energy efficiency and conservation (EE&C) programs: (i) a residential low-income program and (ii) a non-residential high efficiency lighting program for commercial, government and industrial customers. The petition was approved in Commission Case No. 11-0452-E-P-T by Order dated December 30, 2011. The FirstEnergy EE&C programs became effective January 1, 2012. By Order issued December 12, 2012, in Case No. 12-1238-E-GI, the Commission approved a utility-proposed \$0.00001 per kWh increase for its rate schedules A, R, A-8 and S-4, and no change in the EE&C rate increment for other customers. On March 1, 2013, FirstEnergy filed its first Annual Efficiency Report summarizing EE&C program results through December 2012. During 2012, FirstEnergy developed websites to provide customers with information and materials to apply for the EE&C program. In addition, FirstEnergy contracted with network agencies to facilitate the low-income program and with the implementation vendor for the Non-Residential High Efficiency Lighting program. FirstEnergy launched both programs and conducted aggressive marketing activities to promote the lighting program. FirstEnergy states that the companies achieved 3,683 MWh of gross reported savings through December 2012 and coordinated a substantial number of commercial, industrial and government applications that are in various stages of completion for the lighting program. In 2013, FirstEnergy plans to drive conversion of the large projects as well as continue to aggressively market the program to new customers.

On September 1, 2013, FirstEnergy will file its next evaluation, measurement and verification Report addressing the effectiveness of the EE&C programs, including customer participation levels, and energy and demand savings compared to base-line information and EE&C plant targets.

A. Identification of Current and Operating Alternative and Renewable Energy Resource Facilities in the State

Alternative Energy Resource Facilities

As a result of filings for a determination that generation from a particular facility is eligible to generate credits under the Commission Portfolio Standard Rules or as a result of other proceedings, the Commission is aware of the following existing alternative energy resource facilities within the State:

Name	Owner	Location	Fuel Type	Capacity
Longview Power Plant	Private	Maidsville, WV	Advanced Supercritical technology	695 MW
Morgantown Energy Associates	Private	Morgantown, WV	Waste coal	68.9 MW
Grant Town	Private	Grant Town, WV	Waste coal	80 MW
John Amos Plant	AEP	Winfield, WV	Supercritical technology	2900 MW
Mountaineer Plant	AEP	New Haven, WV	Supercritical technology	1300 MW
Ceredo facility	AEP	Huntington, WV	Natural gas-fired	523 MW
Fort Martin Power Station	FirstEnergy	Maidsville, WV	Supercritical technology	1107 MW
Harrison Power Station	FirstEnergy	Haywood, WV	Supercritical technology	1984 MW
Pleasants Power Station	FirstEnergy	Willow Island, WV	Supercritical technology	1300 MW

Renewable Energy Resource Facilities

Based on FERC license data for hydropower projects and Commission certificated wind energy and other renewable projects excluding solar (solar projects are listed in the Net Metering section of this report), the following current and operating renewable energy resource facilities exist in the State:

Name	Location	Fuel Type	Capacity
Summersville Dam	Gauley River	Hydro Power	80 MW
Winfield Dam	Kanawha River	Hydro Power	14.76 MW
London/Marmet Dam	Kanawha River	Hydro Power	28.8 MW
Lake-Lynn Dam	Monongahela River	Hydro Power	51.2 MW
Hawks Nest Dam	New River	Hydro Power	107.5 MW
Belleville Dam	Ohio River	Hydro Power	42 MW
New Martinsville Dam	Ohio River	Hydro Power	35.72 MW
Dam No. 4	Potomac River	Hydro Power	1.9 MW
Dam No. 5	Potomac River	Hydro Power	1.21 MW
Glen Ferris	Kanawha River	Hydro Power	5 MW
Millville Dam	Shenandoah River	Hydro Power	2.84 MW
Willow Island (Under construction)	Ohio River	Hydro Power	35 MW
Racine	Ohio River	Hydro Power	47.5 MW
Jennings Randolph	Potomac River-North Branch	Hydro Power	14 MW
Mountaineer Wind Energy Center	Tucker County	Wind Energy	66 MW
NedPower Mount Storm	Grant County	Wind Energy	264 MW
AES Laurel Mountain	Randolph & Barbour Counties	Wind Energy	98 MW
Beech Ridge	Greenbrier County	Wind Energy	100 MW
Pinnacle Wind Farm	Mineral County	Wind Energy	55 MW
Charleston Landfill Gas	Charleston, WV	Landfill gas	1.9 MW

The Albright facility in Albright, West Virginia, was formerly a certificated renewable energy resource using bio-mass fuel. The Willow Island facility was formerly a certificated energy resource capable of using ten percent tire-derived fuel with coal-fired generation. In Case No. 11-1274-E-P (reopened), the Commission investigated the plans of FirstEnergy to close the Albright and Willow Island facilities, which are wholly owned by Mon Power, because of EPA regulations and the costs associated with bringing the plants into compliance with federal regulations. On July 13, 2012, the Commission issued an order stating that it was reasonable for FirstEnergy to deactivate the plants.² It is, therefore, likely that the Albright and Willow Island plants will not be used to generate electricity using any fuel source in the future.

There are some ongoing proceedings that could potentially affect the status of the existing alternative and renewable energy resource facilities listed in this section. As discussed in more detail on pages 3-4 of this document, federal court litigation continues regarding the MEA and Grant Town waste coal facilities and the New Martinsville Hannibal hydroelectric facility.

Net Metering

The Commission authorized the use of net metering in its Rules Governing Electric Utility Net Metering Arrangements and Interconnections (Net Metering Rules), 150 C.S.R. 33, effective August 30, 2010. According to the annual net metering reports filed with the Commission for the reporting period of June 1, 2011, through May 31, 2012, FirstEnergy has a total of 154 net metered customers within the State, up from its prior total of 97 for the June 1, 2010, through May 31, 2011 reporting period. The new total includes 134 customer units with solar power and twenty customer units with wind power generation. AEP reported that APCo has 44 net metered customers, up from its prior total of twenty, including three customers with both wind and solar power generation, with a total of 38 solar power and eight wind power customer units; that WPCo has eleven net metered customers, up from its prior total of five, including one customer with both wind and solar generation, with a total of ten solar power customer units and two wind power customer units for the same reporting period.³

The Commission Net Metering Rules are regarded nationally as among the best in terms of encouraging the use of alternative energy generation. Freeing the Grid 2013

² This proceeding also involved the planned closure of a third Mon Power-owned coal-fired facility named Rivesville in Marion County, West Virginia.

³ See the utility reports filed as closed entries in General Order No. 258, the proceeding wherein the Commission promulgated the Net Metering Rules. The next annual net metering reports will be filed with the Commission on or before July 30, 2013.

“Best Practices in State Net Metering Policies and Interconnection Procedures” web address <http://freeingthegrid.org/#state-grades/west-virginia>.

In 2011 and 2012, the Commission received several applications to certify residential solar photovoltaic facilities to be qualified to generate credits under the Commission Portfolio Standard Rules. To date, the Commission has certified thirteen residential solar photovoltaic facilities and the following non-residential solar facilities:

Name	Location	Fuel Type	Capacity
Morgan County Courthouse	Berkeley Springs, WV	Solar Power	25.38 kW
Hurricane Waste Water Treatment Plant	Hurricane, WV	Solar Power	20.24 kW
Beech Bottom City Building	Beech Bottom, WV	Solar Power	4.8 kW
Man Town Hall	Man, WV	Solar Power	19.2 kW
Williamson Family Care Center	Williamson, WV	Solar Power	11.7 kW
Appalachian Offroad MC	Cross Lanes, WV	Solar Power	36 kW
American Public University	Ranson, WV	Solar Power	400 kW
Martin Distributing Co.	Martinsburg, WV	Solar Power	60 kW
WVU Book Exchange	Morgantown, WV	Solar Power	60 kW

B. Assessment of the Potential for Future Alternative and Renewable Energy Resource Facilities

The immediate potential for the development of future alternative and renewable energy resource facilities can be assessed by the current number of federal preliminary permits authorizing construction of these facilities. Updated as of June 10, 2013, these are the facilities that currently possess or have pending Federal Energy Regulatory Commission (FERC) preliminary permits that would allow construction or indicate that the facilities are currently under construction in the State:

Name	Location	Fuel Type	Capacity
Sutton Dam	Elk River	Hydro Power	9.2 MW
R.D. Bailey Dam	Guyandotte River	Hydro Power	7.8 MW
Hildebrand Dam	Monongahela River	Hydro Power	20 MW
Morgantown Dam	Monongahela River	Hydro Power	9 MW
Opekiska Dam	Monongahela River	Hydro Power	10 MW
Pike Island Dam	Ohio River	Hydro Power	49.5 MW
New Cumberland	Ohio River	Hydro Power	36 MW
Tygart Dam	Tygart River	Hydro Power	29 MW
Stonewall Jackson Dam	West Fork River	Hydro Power	0.3 MW
Mount Storm pumped storage	Maysville, WV	Hydro Power	350 MW

According to information provided by the WVDOE, the following renewable energy resource facilities are permitted and should be in operation.

Name	Location	Fuel Type	Capacity
US Wind Force Mount Storm	Grant County	Wind Power	150 MW
AES New Creek	Mineral/Grant County	Wind Power	165 MW

By Order entered on June 19, 2013, in Case No. 12-1196-E-CS, the Commission granted a siting certificate to the Beech Ridge Energy II LLC wind project, with a proposed approximate capacity of 53.46 (but not to exceed 85.5) MW consisting of up to 33 wind turbines, each with a rated capacity of 1.62 (but not to exceed 2.5) MW, and ancillary facilities in Greenbrier County. There was considerable local support for the Beech Ridge II project. This siting certificate followed an earlier Commission decision to grant a siting certificate to Beech Ridge Energy LLC, a separate company, for a wind project. The Commission decision for the Beech Ridge Energy LLC project was challenged in federal court. Ultimately, Beech Ridge Energy LLC was allowed to operate the 67 turbines that it had already constructed, so long as it secured an Incidental Take Permit from the US Fish and Wildlife Service. The request for an Incidental Take Permit, which will cover both of the Beech Ridge projects, is pending. The federal court allowed up to 33 more turbines to be constructed to the west of the original 67 turbines and those 33 turbines are the Beech Ridge Energy II LLC project. The total amount of

electricity generated by both Beech Ridge projects will not exceed the 186 MW amount that the Commission initially authorized for the Beech Ridge Energy LLC facility.

The chart information in this section shows the hydroelectric, wind, and solar power renewable energy resource facilities that are being developed in the State. Consistent with the 2012 assessment, hydropower constitutes the majority of projects being developed within the State with nine hydroelectric projects issued preliminary permits by FERC as of this year.

The Transgas project, a coal liquefaction plant privately developed by TransGas Development Systems LLC, is an alternative energy resource facility that is currently under construction in Mingo County, West Virginia. The Transgas facility is expected to convert 3 million tons of coal a year into 18,000 barrels of gasoline and 3,000 barrels of liquefied petroleum gas (LPG) a day. The plant received an air quality permit from the DEP. Groundbreaking of the facility took place in 2011 and the facility is still under construction. Coal liquefaction produces a liquid transportation fuel as an end product. In the process of producing liquids from coal, waste steam is produced. Transgas will purchase and install electric generators to use the waste steam to produce 100 MW of electricity. Transgas will require 250 MW of electricity to operate the coal liquefaction process, of which 100 MW will be met by electricity generated by waste steam, thereby avoiding 100 MW of grid electricity.

As part of this annual Planning Assessment, WVDOE reviewed the new West Virginia State Energy Plan (Plan). In 2012, the Plan was the subject of public hearings before the WVDOE and in February 2013, WVDOE presented the Plan to the Legislative Joint Committee on Government and Finance. The Plan for the period 2013-2017 updates the State's original State Energy Plan prepared and adopted in 2007. The Plan predicts energy prices and growth in energy use by fuel type. In its discussion of electric power generation in West Virginia, the Plan states that nationally "the generation of electricity from natural gas has risen primarily because of the historically low natural gas prices due to increases in supply from shale gas production." Figure 31 on page 76 of the Plan shows the average cost of coal and natural gas for electric generation between January 2010 and February 2012. Early in that period, coal maintained a competitive advantage as compared to the \$6.80 per MCF price of natural gas in January 2010. As natural gas prices approached \$3.00 per MCF in 2012, the competitive cost advantage of coal was challenged. Natural gas prices continued to decline in 2012 and the competitive position of coal eroded further. The Plan states in Section 6.3 on page 69 that "coal plants are running on low capacity factors . . . mostly due to changes in relative prices between coal and natural gas." The Energy Information Administration of the United States Department of Energy (EIA) predicts, however, that low natural gas pricing of \$2 to \$3 per MCF will not be maintained and that coal fired electric generation will return to

a competitive status with natural gas. EIA also states, however that natural gas will “provide a growing share of generation over the next 25 years.” Plan on page 65.

The price of natural gas is also impacting the competitiveness of renewable energy. EIA documents in the Annual Energy Outlook 2012 Forecast state that renewable energy base load plants have high capital costs: wind \$86 per MWh; hydro \$90 per MWh; and solar PV \$144 per MWh. The cost of natural gas combined cycle is \$65 per MWh. Natural gas plants, which are dispatchable and capable of 24 hour operation, compete with renewable energy at sub \$4.00 per MCF pricing. Some states with renewable portfolio requirements guarantee renewable generation a share of the electric market. These markets and cost competitive renewables will enable renewable energy sources to grow to fifteen percent of total electric generation by 2035. In West Virginia, renewables are an option but not a mandate. The following discussion provides an overview of the renewable resource potential in West Virginia.

Wind Power

Currently, West Virginia has nearly 1,000 MW of undeveloped commercial wind potential on privately-owned land. The potential for the development of future wind power facilities in West Virginia will be impacted by federal policy, especially the availability of production tax credits (PTC), a federal incentive, currently at 2.2 cents per kWh for producing electricity from wind, solar, geothermal and closed loop biomass. Without an extension of the credits, the potential for the development of wind power facilities in the State will be limited. Currently, there is an in-service deadline of December 31, 2014, for eligible projects under the federal PTC. If the federal production tax is not extended beyond that date, however, further development of wind projects in the State is expected to be limited.

Solar

The potential for the development of solar power in the State is affected by several factors, including the cost of solar power installations and the availability of State and federal incentives related to the development of solar power. The cost of solar power is still high, compared to other renewable energy resources. However, according to a study prepared by Lawrence Berkeley National Laboratory (September 2011) “Tracking the Sun IV: The Installed Cost of Photovoltaics in the U.S. from 1998-2010,” the overall average installed cost of solar declined 17 percent from 2009 to 2010. The report found that the capacity-weighted average installed cost of all behind-the-meter systems installed in 2010, in terms of real 2010 dollars per installed watt and prior to receipt of direct financial incentives or tax credits, was \$6.2/Watt, which was \$1.3/Watt (17 percent) below the average for systems installed in 2009. According to the study, the costs have gone down further. The number of residential, commercial and industrial solar power

installations can be expected to increase in West Virginia as the cost of solar installations continues to decline.

Hydropower

Hydropower is currently the most utilized renewable energy resource in the State. Historically, hydropower has made up the largest portion of West Virginia's renewable electricity production. It still has significant potential for future development. According to a US DOE study performed in 2004, West Virginia has approximately 2,500 MW of undeveloped hydropower.⁴ As shown with the FERC preliminary permits pending as of 2012, there is a total potential 523.6 MW of hydropower to be constructed in the State. There is still a great deal of potential for future hydropower development. One of the FERC preliminary permits is for a pumped storage system, a resource in West Virginia that has yet to be developed.

Geothermal

The potential for the development of geothermal energy resource facilities in the State was the subject of a WVDOE seminar last year, entitled "Enhanced Geothermal Development Conference: Why West Virginia?" held May 22, 2012, in Flatwoods, West Virginia. According to recent studies by Google Earth (Google, 2011) and Southern Methodist University, West Virginia has potential geothermal energy reserves that could supply 31,000 MW of electrical generation in the State, nearly twice the State's current installed capacity from all sources. The drilling technology to reach the geothermal reserves, which are located between the depths of 15,000 to 20,000 feet, is still in the development stages. The future for the development of geothermal energy is dependent on the development of the drilling technology to access the geothermal reserves located in the State. Some of that technology is being developed as a result of Marcellus Shale drilling.

Biomass

Biomass energy is defined in W.Va. Code §24-2F-3(13)(F) as a nonhazardous organic material that is available on a renewable or recurring basis, including pulp mill sludge. Biomass produces energy from three main sources: wood, waste, and alcohol fuels, such as ethanol. Most ethanol is produced from corn, sorghum and barley. Another potential source of ethanol includes switchgrass. There is the potential for the development of renewable energy resource facilities related to biomass energy produced from switchgrass grown in the State. West Virginia University recently received a grant from the US EPA to develop sustainable energy park opportunities on former surface

⁴ West Virginia Department of Commerce Energy Blueprint at 41.

mines, including the growth of switchgrass on former mine surface sites and the development of wind and solar power facilities on the sites. There is a potential for the development of a production facility in the State to support biomass energy from switchgrass. There is also the potential for the development of combined coal-and-biomass-to-liquid plants in West Virginia, as an outgrowth of the biomass energy industry. Given the amount of forestation in West Virginia, there is also the potential for the development of woody biomass energy. The development of all of these biomass energy resources is still in the development stages.

Advanced Coal Technology

According to information provided by the WVDOE, 96.7 percent of the electricity generated in West Virginia in 2010 was derived from coal. Of the total 80,788,947 MWh electricity generated in 2010, 77,557,389 MWh was from coal-fired generation.⁵ West Virginia is the third-leading energy exporter in the country, exporting 45,241,810 MWh of electricity out of State.⁶ Historically, coal has provided approximately fifty-six percent of the electricity in the United States, and West Virginia has contributed a substantial share of the electricity produced for the country. That share, however, has declined as natural gas, with the development of Marcellus Shale and Utica Shale reserves, has become a more competitive fuel.

The potential for development of new coal-fired generating facilities in the State is affected by both the natural gas and coal markets and federal policies, including the development of a federal energy policy and federal EPA environmental regulations. There are currently no new permits for the construction of coal-fired plants in West Virginia.

As noted in the DEP “State of the Environment,” Fourth Edition, the number of coal prospect permits issued annually by the DEP reflects fluctuations in the coal market. The DEP issued more prospect permits in southern West Virginia in 2008 than in any other time in the last five years. Prospect permits for northern West Virginia fell off slightly in 2009 and 2010 but dropped by nearly 50 percent in southern West Virginia in 2009.⁷ Although coal production dropped slightly in 2010 based on the DEP permits issued, it has remained basically steady for the last several years. At the same time, natural gas production increased dramatically. The trend is toward the use of natural gas as a fuel type for the generation of electricity vs. coal-fired generation, as natural gas has become more competitive. No more recent edition of this report is available.

⁵ USDOE EIA State Energy Profiles.

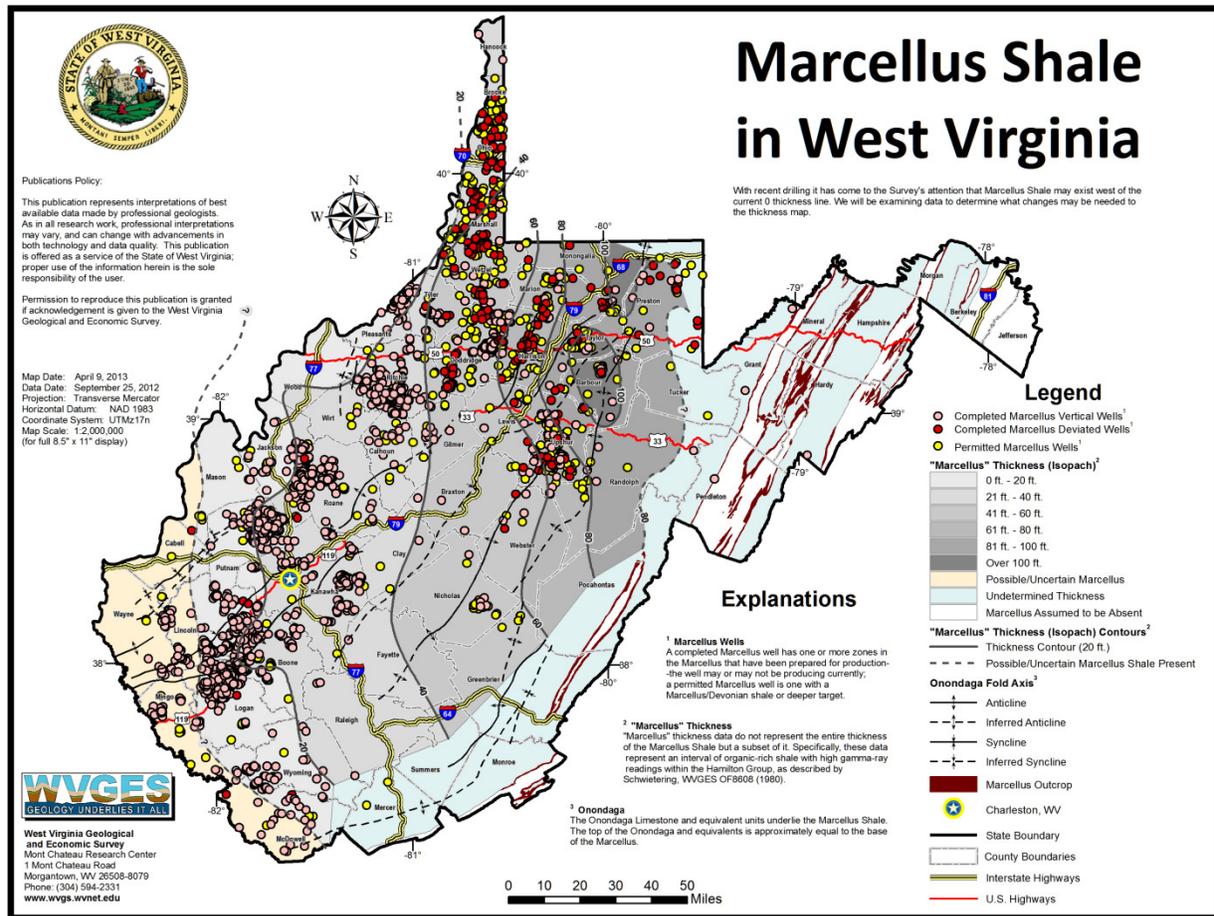
⁶ Id.

⁷ DEP State of the Environment, Fourth Edition, at 21.

Because West Virginia is a major coal producer, the development of additional alternative energy resource facilities that use coal as a fuel type, such as the Transgas facility in Mingo County, is expected.

Natural Gas

According to the DEP, the production of natural gas in the State increased dramatically as a result of the drilling of Marcellus Shale reserves, reaching its highest levels in 2010.⁸ The most recent map of permitted activity by the DEP shows the following level of activity related to Marcellus Shale drilling:



Based on these changes in the natural gas market, the development of future generating facilities that use natural gas or the retrofit of existing facilities to natural gas is expected.

⁸ DEP State of the Environment, Fourth Edition, at 21.

C. Assessment of the Conditions of the Alternative and Renewable Energy Resource Marketplace, including Costs Associated with Alternative and Renewable Energy

According to the National Renewable Energy Laboratory (NREL), for the time period 2007 to 2010, average wind power prices – represented by the price under purchase power agreements (PPAs) – in the East (defined as the States of Tennessee, Kentucky, North Carolina, Virginia, West Virginia, Pennsylvania, New Jersey, Maryland, Delaware, and New York) were the third highest compared to other areas in the U.S. These prices averaged about \$70/MWh compared to the national average of around \$58. These prices do not reflect the cost of producing wind power because of the availability of the PTC, which is received on top of the PPA price. As noted, the PTC is a federal incentive, currently at 2.2 cents per kWh for electricity produced from wind, solar, geothermal and closed loop biomass.

According to the Lawrence Berkeley National Laboratory, since 2008 wind turbine costs in the United States have fallen by nearly one-third on average. This has occurred as a result of a combination of factors, including the relative position of the United States dollar, cheaper inputs, reduced demand for turbines and more international competition.

For solar, the installed costs (behind the meter) have been falling, particularly for large facilities (> 500 KW). Small installations remain the most costly per kWh. The cost per kWh for solar power is still much higher than wind power and other resources. According to EIA, the levelized cost of photovoltaic-generated electricity is \$144/MWh compared to wind at \$87/MWh.

Other market-influencing factors, such as developing FERC actions, may increase the costs of wind energy by allowing utilities to pass along the cost of providing regulation services to counter frequency drag caused by wind turbines. Some new PJM protocols, such as the recently approved process for allowing wind facilities to receive payments for “lost opportunity costs” when they are curtailed because of reliability reasons, are favorable for the competitive position of wind power compared to other resources.

For many of the alternative and renewable energy resources addressed in this document, including advanced coal technology, geothermal and biomass energy, the costs for the development of these facilities remain high relative to other sources. These projects are in the research and development phase. The future development of these resources will be affected by future technological developments, and drivers, including federal government policies and market prices for coal, natural gas and crude oil.

In reviewing and approving the compliance plans of the utilities, the Commission is obligated to consider the reasonableness of the compliance costs to the utility's customers. The costs were addressed in the compliance plan filings of the seven electric utilities considered and approved by the Commission in 2011. Each of the electric utilities operating in West Virginia was required to file and seek approval of an alternative and renewable energy portfolio compliance plan in 2011. The Commission reviewed the utility compliance plan filings with the standard of review set forth in W.Va. Code §24-2F-6 that requires that the estimated compliance costs incurred by the utility customers be reasonable in order for the plan to be approved by the Commission. After the Commission approved the plans, the electric utilities were required to submit an annual progress report.

All seven electric utilities submitted their annual progress reports to the Commission for review in 2013. None of the utilities reported the purchase of credits during 2012 to meet their portfolio standards. Additionally, none of the electric utilities entered into any new energy supply contracts during 2012 for power associated with certified credits. While utilities can currently bank credits, they are not required to own credits until the period beginning January 1, 2015.

As the credit requirements of the portfolio standard increase in subsequent years, this factor will have a greater impact on the credit market and compliance costs associated with the Portfolio Act. To date, however, based on the utility progress reports filed in 2013, the utility compliance costs related to the Portfolio Act have been minimal.

West Virginia ratepayers have faced increasing utility rates as reflected in the recent rate base and Expanded Net Energy Cost (ENEC) proceedings of the major electric utilities as a result of a number of factors unrelated to the Portfolio Act, including fluctuating fuel costs in the ENEC proceedings and increasing environmental compliance costs. The Commission will continue to monitor ratepayer costs and to report on those costs in future Assessments.

D. Assessment of the Economic Impacts of the Portfolio Act on Coal and Coal Mining in West Virginia

The Portfolio Act demonstrates that West Virginia is committed to advancing domestic energy resources. The Portfolio Act does not mandate a change in the resources that West Virginia utilities use to generate electricity. The Portfolio Act establishes a model for the rest of the country to support fuel diversity and to allow the cost of energy to determine the fuels used for electric generation. In West Virginia, coal has had a competitive advantage in electric generation. Because of current market conditions, coal now competes with both natural gas and renewable fuels. The alternative sources identified in the Portfolio Act are, for the most part, clean coal technologies. The inclusion of technologies to reduce CO₂ as eligible for portfolio credits reinforces the Portfolio as a tool to promote the adoption of new coal technologies. The ability of the Portfolio to serve as a market mover would best be illustrated in the encouragement given West Virginia utilities to adopt clean coal technologies.

West Virginia electric utilities have also historically made use of cost competitive renewable energy resources located in the State. The Portfolio Act does not mandate the use of renewables, but instead provides the option for utilities to use renewables as an energy source. The Portfolio Act enables West Virginia to utilize our diverse energy resource base. While other states with portfolio requirements focus almost exclusively on renewable energy, West Virginia capitalizes on the jobs and economic development opportunities of using in-State energy resources for electric production. The portfolio credits for the West Virginia supercritical coal fleet and natural gas production also reflect the legislative intent to foster local jobs and industry.

The coal industry and the future of coal-fired generation in the State will be impacted by factors that are unrelated to the Portfolio Act including changes in natural gas pricing and federal environmental regulations. At the present time, natural gas prices have rebounded above \$4 per MCF allowing coal to better compete.

E. Recommendations for the Methods to Maintain or Increase Competitiveness of Alternative and Renewable Energy Resource Market in West Virginia

A diverse array of energy resources is covered under the Portfolio Act. A number of existing plants considered to be conventional generating plants qualify to meet the portfolio standard. The competitiveness of existing coal plants will be driven by the scope of future federal regulation and the availability and pricing of natural gas.

Development of wind resources in West Virginia is largely the result of geography, transmission access and proximity to load centers. As noted, wind energy

development in West Virginia will be primarily affected by federal policy and the extension of the federal PTC. Without a tax credit, wind development will be limited.

There are other legislative measures that could be enacted to promote the development of alternative and renewable energy resources in the State and energy efficiency and demand-side management projects.

As part of the efforts of the working group, the group identified certain policies that the Governor and West Virginia Legislature may want to consider as recommended methods to promote the competitiveness of the alternative and renewable energy resource marketplace in West Virginia, additional state and local incentives to promote the development of alternative and renewable energy resource facilities, including tax credits and incentives, grant programs, green building codes, and compatible local zoning and permitting policies.

F. Recommendation to the Legislature for Additional Compliance Goals Beyond 2025

At this point, it is premature to recommend future compliance goals beyond 2025 until the marketplace for alternative and renewable energy resources is established and developed in West Virginia. Some of the additional policies that could enhance or affect the effectiveness of the Portfolio Act are discussed above.

Summary of the 2013 Assessment

This annual Assessment reflects current and early-stage information that is available regarding the Portfolio Act prior to the establishment of the credit marketplace in West Virginia. The working group plans to continue to meet and to exchange information related to Portfolio Act policies and will provide additional information and recommendations in future annual Assessments. For comments or suggestions regarding this report, please contact the Public Service Commission of West Virginia, Jessica M. Lane, at (304) 340-0310, jlane@psc.state.wv.us. A copy of this report has been filed electronically with the Legislature through http://www.legis.state.wv.us/Reports/Agency_Reports/AgencyReports.cfm.