



2012
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 2012 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 Amy Haden, Esq., from the Commission's Office of General Counsel; Randy Huffman, Director, DEP and Vice Chair of the Authority, Lisa McClung, Deputy Director of the DEP, Ken Ellison 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 met on March 23, 2012, April 25, 2012, and May 24, 2012, to discuss the topics listed in W.Va. Code §24-2F-9(b) and to collaborate regarding the information included in this report.

This report updates the information contained in the initial Assessment filed with the Joint Committee on Government and Finance on January 1, 2012.

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, the goals of 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. West Virginia is one of thirty states, and the District of Columbia, that have enacted that type of legislation.

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 (MonPower) and The Potomac Edison Company (PE), dba Allegheny Power (Mon Power and PE) (together the FirstEnergy Companies), now affiliates of FirstEnergy (sometimes hereinafter referred to as FirstEnergy).

According to the AEP compliance plan approved in Case No. 10-1914-E-P, 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. According to Mon Power and PE's compliance plan approved in Case No. 10-1912-E-P, the FirstEnergy Companies intend to acquire the credits from qualifying electric generating units owned and partially-owned by Mon Power, and from three qualifying PURPA facilities, including Grant Town, Morgantown Energy Associates, and the Hannibal Lock & Dam owned by the City of New Martinsville, pursuant to PURPA contracts predating the Act. As discussed more fully herein, the ownership of the credits from the three PURPA facilities has been the subject of dispute in recent court cases.

The remaining small electric utilities, municipally-owned utilities and rural electric cooperatives 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.

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).

The Portfolio Act also authorizes the awarding 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 is currently reviewing the AEP energy efficiency and demand response (EE/DR) programs and program rates in Case No. 12-0275-E-GI.

The Commission has also approved a petition seeking approval of FirstEnergy's Phase I Energy Efficiency and Conservation Plan (Phase I 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 in Case No. 11-0452-E-P-T (Commission Order, dated December 30, 2011). The FirstEnergy energy efficiency and conservation programs became effective January 1, 2012.

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	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 (with partial carbon capture and sequestration technology demonstration project)	1300 MW
Ceredo facility	AEP	Huntington, WV	Natural gas-fired	523 MW
Fort Martin Power Station	Allegheny Power	Maidsville, WV	Supercritical technology	1107 MW
Harrison Power Station	Allegheny Power	Haywood, WV	Supercritical technology	1984 MW

Name	Owner	Location	Fuel Type	Capacity
Pleasants Power Station	Allegheny Power	Willow Island, WV	Supercritical technology	1300 MW
Willow Island **	Allegheny Power	Willow Island, WV	10% tire –derived fuel with coal-fired generation	187 MW

*Currently certificated by PSC under the definition of advanced coal technology as supercritical technology, but can reapply as advanced supercritical technology.

**Certificated by PSC as alternative energy resource when using tire-derived fuel.

Renewable Energy Resource Facilities

Based on FERC license data for hydropower projects and information on solar power projects provided by the WVDOE, 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

Name	Location	Fuel Type	Capacity
Millville Dam	Shenandoah River	Hydro Power	2.84 MW
Willow Island	Ohio River	Hydro Power	35 MW
Racine	Ohio River	Hydro Power	47.5 MW
Jennings Randolph	Potomac River	Hydro Power	14 MW
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
Mountaineer Wind Energy Center	Tucker County	Wind Energy	66 MW
NedPower Mount Storm	Grant County	Wind Energy	264 MW
AES Laurel Mountain	Randolph and Barbour Counties	Wind Energy	98 MW

Name	Location	Fuel Type	Capacity
Beech Ridge	Greenbrier County	Wind Energy	100 MW
Pinnacle Wind Farm	Mineral County	Wind Energy	55 MW
Albright facility*	Albright, WV	10% biomass with coal-fired generation	140 MW
Charleston Landfill Gas	Charleston, WV	Landfill gas	1.9 MW

*Currently certificated by the Commission as renewable energy resource when using biomass fuel; however, the certification of the Albright facility to generate renewable energy resource credits may be affected by the recent announcement of FirstEnergy of its intention to close three subcritical generating facilities in West Virginia including Albright #'s 1, 2 and 3, Rivesville #'s 5 and 6 and Willow Island #'s 1 and 2 by September 1, 2012 due to EPA regulations and the costs associated with bringing the plants into compliance with the federal regulations.

Another indicia of the number of renewable energy facilities in the State is the number of net metered customers in the State reported by the electric utilities. According to the annual net metering reports filed with the Commission for the reporting period of June 1, 2010, through May 31, 2011, FirstEnergy has a total of 97 net metered customers within the State, including 78 customer units with solar power and 19 customer units with wind power generation. AEP reported that APCo has twenty net metered customers, including two customers with both wind and solar power generation, with a total of fifteen solar power and seven wind power customer units; that WPCo has five net metered customers, including one customer with both wind and solar generation, with a total of four solar power customer units and two wind power customer units for the same reporting period.¹

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 received eleven certification applications for the residential solar photovoltaic facilities.

¹ See the utility reports filed as closed entries in General Order No. 258, the proceeding in which the Commission issued the final Commission Rules Governing Electric Utility Net Metering Arrangements and Interconnections (Net Metering Rules), 150 C.S.R. 33, effective August 30, 2010, which authorize net metering. The next annual net metering reports will be filed with the Commission on or before July 30, 2012.

There were some events in 2012 that affect the status of the current and existing alternative and renewable energy resource facilities listed in this section. The Morgantown Energy Associates (MEA) and Grant Town waste coal facilities and the New Martinsville hydroelectric facility owned by the City of New Martinsville, that are PURPA projects constructed in the late 1980's or early 1990's, 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 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 preexisted the Portfolio Act and the certification of the MEA facility under West Virginia law was 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 the Court upheld the Commission ruling that the utilities own the credits and the Commission holding that it may certify the Morgantown 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 in the United States Southern District Court for the Southern District of West Virginia, seeking a determination that the Commission violated PURPA when it determined that the utilities owned the credits associated with generation from the three PURPA facilities. That case remains pending in federal court.

AEP informed the Commission that it does not intend to continue operation of the carbon capture and sequestration (CCS) project at the Mountaineer plant in its certification application proceeding before the Commission in Case No. 11-1034-E-P. The Mountaineer facility is currently certified under the category of supercritical technology; it will not operate or generate credits for CCS technology because AEP does not intend to continue the CCS project.

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 4, 2012, 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	12 MW

Name	Location	Fuel Type	Capacity
R.D. Bailey Dam (pending)	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
Green Dream	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 or under construction in the State in 2012.

Name	Location	Fuel Type	Capacity
DEP Headquarters	Charleston, WV	Solar Power	24.26 kW
US Wind Force Mount Storm	Grant County	Wind Power	150 MW
AES New Creek	Mineral/Grant County	Wind Power	165 MW

This information shows that currently the hydroelectric, wind, and solar power renewable energy resource facilities, are being developed in the State. Based on this information, currently, hydropower projects are primarily being developed within the State with ten hydroelectric projects issued preliminary permits by FERC as of this year.

The Transgas project, a coal liquefaction plant, is an alternative energy resource facility that is currently under construction in Mingo County, West Virginia. The Transgas facility that is being privately developed by TransGas Development Systems LLC 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. Construction of the facility began in 2011. 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 Assessment, the working group would also like to note the upcoming publication of an important study regarding the State's alternative and renewable energy resources this year. The long-term potential for the development of future alternative and renewable energy resources in the State is the subject of a new study prepared by the WVDOE that is expected to be released in the fall of 2012. When the State established the WVDOE in 2007, under W.Va. Code §5B-2F-2, the WVDOE was required to prepare a five-year energy plan.

According to W.Va. Code §5B-2F-2, the plan is to address:

“[D]eveloping energy policies emphasizing the increased efficiency of energy use, the increased development and production of new and existing domestic energy sources, the increased awareness of energy use on the environment and the economy, dependable, efficient and economical statewide energy systems capable of supporting the needs of the state, increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased, reduce the ratio energy consumption to economic activity and maintain low-cost energy. The energy policies and development plans shall also provide direction for the private sector.”

The first plan, referred to as the Energy Opportunities Document (EOD), addressed the period of 2008-2012. The WVDOE is currently in the process of developing a new five-year energy EOD for the period of 2013-2017 that identifies West Virginia fossil, renewable and energy efficiency resources and the future of alternative and renewable energy resource facilities and energy efficiency projects in the State.

The development of the EOD has been contracted to Marshall University for the renewable energy and energy efficiency component of the plan and to West Virginia

University for the fossil energy component of the plan. The EOD is being developed with the Marshall University Center for Business and Economic Research (MUCBER) and the West Virginia University Bureau of Business and Economic Research (WVBBER) College of Business and Economics, in conjunction with WVDOE.

MUCBER is responsible for providing analysis of (i) renewable energy, including wind (commercial and residential); solar (utility scale, residential, net metering impact); geothermal (co-production, thermal, electric generation, relevance to CO₂ sequestration); biomass (power plants fired by wood, wood pellets, liquid fuels, and grasses); landfill gas; chicken litter; vehicles (hybrids, electric, biodiesel); and small scale hydro; and (ii) energy efficiency (industrial, commercial, and residential programs). The analysis will enable portfolio eligible resources, if appropriate, to be reviewed and contrasted for their economic competitiveness as electric generation fuels.

WVBBER is responsible for providing analysis of fossil energy, including (i) coal, coal to liquids, coal bed methane, waste coal, advanced electric generation technologies, including IGCC, advanced supercritical, and oxy combustion, and hydrogen including fuel cells (vehicles and stationary), vehicles, and electric generation (FutureGen 1), carbon capture and sequestration, including technology and West Virginia sequestration opportunities; (ii) natural gas: conventional, Marcellus Shale and Utica Shale; natural gas liquids including ethane, propane and butane; infrastructure; and compressed natural gas (CNG) and (iii) oil, including enhanced oil recovery and oil shale.

As noted, the final results of the study are not yet available for inclusion in this annual Assessment because the EOD for the period 2013-2017 will be completed sometime in the fall of 2012. Some of the preliminary research, however, prepared by MUCBER and WVBBER involving the potential for development of additional alternative and renewable energy resource facilities in the State is reflected in this annual Assessment. According to research by the MUCBER, nonhydro renewables (primarily wind and biomass) and natural gas are expected to be the two fastest growing sources of energy production in the U.S. over the next quarter century. This annual Assessment addresses the potential for additional alternative and renewable energy resource facilities in the State for wind, solar, hydropower, geothermal, biomass, advanced coal technology and natural gas.

Wind Power

Currently, West Virginia has more than 1,000 MW of undeveloped commercial wind potential on privately-owned land based on results of a 2006 report by Marshall University. The potential for the development of future wind power facilities in West Virginia will be affected almost entirely 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, 2012, for eligible projects under the federal PTC. If the federal production tax is not extended beyond December 31, 2012, 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 recent 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” that tracks data through 2010, the overall average installed cost of solar is declining. The overall average installed cost for 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. Note that the data in the study was collected through 2010 and does not reflect current data. According to 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 for solar installations continue 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.² As shown with the FERC preliminary permits pending as of 2012 with a total of potential 532.6 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.

² West Virginia Department of Commerce Energy Blueprint at 41.

Geothermal

The potential for the development of geothermal energy resource facilities in the State was the subject of a recent WVDOE seminar, 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 upon the development of the drilling technology to access the geothermal reserves located in the State, some of which 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 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 need 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, 96.8 percent of the electricity of the generated in West Virginia in 2010 is derived from coal. Of the total 81,024,000 MWh electricity generated in 2010, 78,394,000 MWh is from coal-fired generation.³ West Virginia is the third-leading energy exporter in the country, exporting

³ West Virginia Department of Commerce Energy Blueprint at 15.

45,541,000 MWh of electricity out of State.⁴ Historically, coal has provided approximately 50 percent of the electricity in the United States, and West Virginia has contributed a large 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.⁵

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. For a variety of reasons, including the costs associated with the technology, AEP announced that it will cease operations of the CCS project at the Mountaineer plant. As noted, FirstEnergy recently announced plans to close its older coal-fired units at Rivesville, Willow Island and Albright, because of EPA regulations and the cost of updating the older plants to meet the federal environmental regulations.

As noted in the most recent 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 2009.⁶ 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.

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.

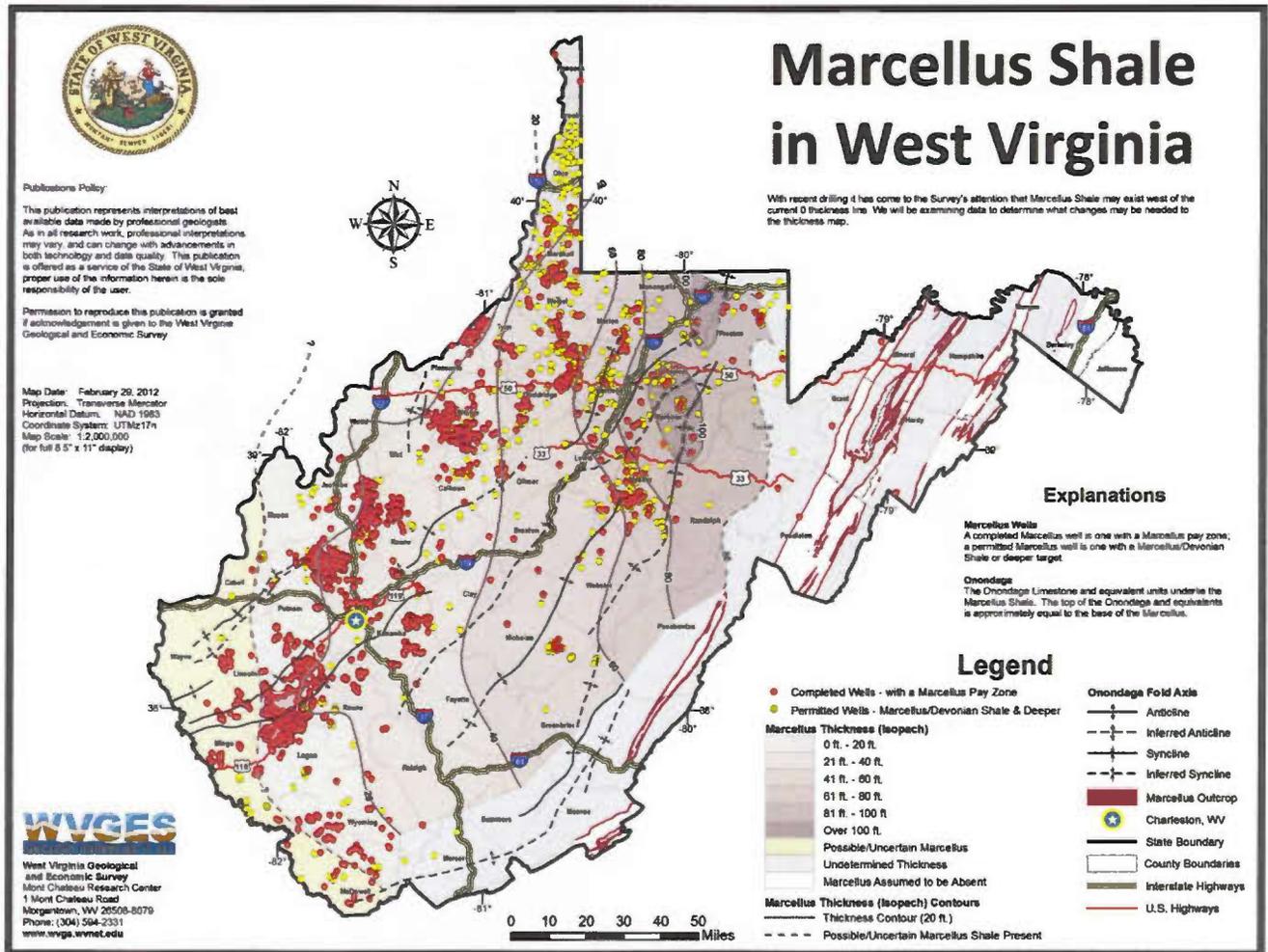
⁴ *Id.* at 17, 20.

⁵ *Id.* at p. 10

⁶ DEP State of the Environment, Fourth Edition, at 21.

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 2010.⁷ 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.

⁷ 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 national average of around \$58. These prices do not reflect the cost of producing wind power due to the availability of the federal production tax credit (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. The East's position relative to other areas in the country has become more favorable, falling from having the highest prices for the 2006 to 2009 time period. California and the Northwest became first and second in 2010 for having the highest price for wind generation. These higher prices appear to be due mainly to lower wind speeds and lower capacity factors that make the cost per MWh higher in the East. Prices have declined, particularly in the Midwest, and are expected to decline further.

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 Energy Information Administration of the US Department of Energy (EIA) the levelized cost of photovoltaic-generated electricity is \$210/MWh compared to wind at \$97/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 due to 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 report, 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 stand 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 of the plans, the electric utilities were required to submit an annual progress report.

To date, six of the seven electric utilities submitted their annual progress reports to the Commission for review in 2012. None of the utilities reported the purchase of credits during 2011 to meet their portfolio standards. Additionally, none of the reporting electric utilities entered into any new energy supply contracts during 2011 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 2012, the utility compliance costs related to the Portfolio Act have been minimal or nonexistent.

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 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 Act on Coal and Coal Mining in West Virginia

To date, the net effect of the Portfolio Act on the coal mining industry has been minimal. The West Virginia utilities have stated that they will not need to build any new non-coal generation to meet the Portfolio Act standards, meaning near-term impact on the coal industry through displacement of coal-fired generation by the Portfolio Act is negligible. In recent years, West Virginia has used approximately 15 percent of the coal produced in the State to generate electricity at power plants within our borders. Of the electricity generated in West Virginia only 40 percent is sold in West Virginia. In 2015, eligible electric generation sources identified in the Portfolio Act will be responsible for 10 percent of the utility's retail sales. Assuming the aforementioned ratios remain constant, the 10 percent portfolio standard requirement in 2015 should only impact 4 percent of the electricity generated and approximately 0.5 percent of the coal produced in West Virginia. Inversely, 96 percent of the electricity generated and 99.5 percent of the coal produced in West Virginia will not be subject to the Portfolio Act's 2015 standards.

The coal industry and the future of coal-fired generation in the State is more likely to be directly affected by two factors that are unrelated to the Portfolio Act: (i) changes in the natural gas market related to the development of Marcellus Shale reserves, and (ii) federal environmental regulations. Related to the combination of these factors, the State's major electric utilities announced plans to direct any future generation investments toward natural gas as a fuel source because it is less expensive and available.

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 are 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.

As noted, wind energy development in West Virginia will be primarily affected by federal policy and the extension of the federal production tax credit. Without a tax credit, wind development will be limited. Development of wind resources in West Virginia is largely the result of geography, transmission access and proximity to load centers.

In 2012, the Legislature enacted an energy efficient building property tax credit in H.B. 4044. 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 2012 Assessment

This annual Assessment reflects preliminary 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, Amy Haden, at (304) 340-0435, ahaden@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