AN ENERGY AND SUSTAINABILITY ROADMAP FOR WEST VIRGINIA

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This Article will explore the measures that West Virginia policymakers can take to position the state for a more sustainable energy future. Throughout its history, energy resources have been a driver for the West Virginia economy, with a heavy emphasis on fossil fuels (coal, oil, and natural gas) in particular. In more recent years, the state is moving rapidly toward developing its natural gas resources in the Marcellus Shale. Going forward, policymakers in West Virginia need to consider a future where the national economy is less dependent on the coal industry. While electricity generation in the U.S. historically has depended on coal for about one half of its fuel source,[1] that dependency has declined considerably in recent years due to the cost advantage of natural gas,[2] the retirement of older, dirtier coal generating plants in the face of more stringent regulations of emissions by the U.S. Environmental Protection Agency ("EPA"),[3] and global demands for coal that have raised the domestic price to levels that threaten its cost-competitiveness compared to other fuel sources for electric generation, such as natural gas.[4] West Virginia policymakers can take a number of steps to prepare the state for this new energy future. This Article will examine some of these options.

First, electric utilities operating in the state need to be required to engage in a rigorous process of long-term planning that takes a critical look at the various resource options for procuring a reasonably priced and reliable electricity supply. West Virginians have not been well-served in recent years by the heavy dependence of local utilities on coal for electricity generation. As coal prices have doubled in response to worldwide demand, electricity rates have soared.[5] More recently, as natural gas prices have plummeted, West

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1 The U.S. Energy Information Administration shows that total electricity production during the 2012 summer rose by just 6% over the past decade. However, during this same period, electricity generation by natural gas surged by 61%. Power generation from coal fell 17% during this time. *Coal Declines as Fuel for Power Generation, Natural Gas Usage Surges*, OIL & GAS FIN. J. (Jan. 9, 2013), http://www.ogfj.com/articles/2013/01/coal-declines.html.

2 Elizabeth Shogren, *Coal Loses Crown as King of Power Generation*, NPR.ORG (Jan. 11, 2013), http://www.npr.org/2013/01/11/169153322/coal-loses-crown-as-king-of-power-generation.

3 The Associated Press reports more than thirty-two mostly coal-fired power plants will close and another thirty-six plants could also be forced to shut down as a result of new EPA rules regulating air pollution. *Coal Plants Affected by EPA Regulation*, GOVERNING, http://www.governing.com/gov-data/energy-environment/coal-plants-to-shut-down-from-EPA-regulations.html (last visited Mar. 4, 2013).

4 U.S. ENERGY INFO. ADMIN., ANNUAL COAL REPORT 2011, at vii (Nov. 2012), *available at* http://www.eia.gov/coal/annual/pdf/acr.pdf.

5 The price of delivered coal to the electric sector increased from $1.20 per million British Thermal Units ("MMBtu") in 2000 to $2.64 per MMBtu in 2009—a 220% increase—and recently have declined to $2.39 per MMBtu in 2011, which still represents a price twice as high as prevailing prices in 2000. The electricity prices of the four utilities serving West Virginia, Appalachian Power and Wheeling Power (subsidiaries of American Electric Power, or AEP) and Monongahela Power and The Potomac Edison Company (subsidiaries of FirstEnergy), have

Virginia utilities have not been positioned to take advantage of lower-priced natural gas-fired generation, or the lower wholesale electricity prices in the region that have accompanied the drop in natural gas prices.[6] The solution is to require long-term system planning, a process that is followed in the majority of the states and, was included in the Energy Policy Act of 1992 as a federal "standard" to be considered by state utility regulators.[7] A rigorous long-term resource acquisition process—also known as "integrated resource planning" ("IRP")—would require sophisticated modeling of various resource scenarios, using a variety of assumptions, in order to determine a portfolio of resources that results in the lowest cost, over time, to utility customers. Such modeling would include, for example, different coal price scenarios that would have highlighted the risk of heavy, and virtually exclusive, dependence upon coal-fired generation. West Virginia utilities are not currently required to engage in integrated resource planning, and electricity ratepayers throughout the state are paying the price.[8] Part I of this Article will examine the widespread use of integrated resource planning in the United States, and the advantages of implementing this tool in West Virginia.

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similarly soared over this period, as the higher coal prices are ultimately reflected in electricity prices. From 2000 to 2011, AEP's residential electricity prices increased by 68%, while FirstEnergy's residential rates increased by 39.4%. *See infra* notes 15–19 and accompanying text.

[6] Pennsylvania, which produces 23% of its electricity from natural gas, has been able to reduce its electric rates in recent years. *Pennsylvania Profile Overview*, *Pennsylvania Net Electricity Generation by Source*, U.S. ENERGY INFO. ADMIN. (Nov. 2012), http://www.eia.gov/beta/state/?sid=PA#tabs-4 (last visited Apr. 24, 2013). Four utilities in the Pittsburgh region, for example, have decreased their rates by 30% to 41% in the past three years, primarily due to their ability to take advantage of lower natural gas prices. *Low Natural Gas Prices Have Kept Commercial Electricity Rates Down in Pennsylvania*, ELECTRICITYWATCH.ORG, http://www.electricitywatch.org/low-natural-gas-prices-have-kept-commercial-electricity-rates-down-in-pennsylvania (last visited Mar. 4, 2013). Wholesale electricity prices in the region are also at all-time lows, thanks to low-priced natural gas. In 2012, wholesale electricity prices in the PJM wholesale electricity market, which serves West Virginia and twelve other mid-Atlantic states, dropped 29.2% from 2011. *See* MONITORING ANALYTICS FOR PJM, STATE OF THE MARKET REPORT FOR PJM JANUARY THROUGH SEPTEMBER 16 tbl.1–7 (Nov. 15, 2012), *available at* http://www.monitoringanalytics.net/reports/PJMState_of_the_Market/2012/2012q3-som-pjm.pdf. This is concurrent with an increase in gas generation of 42.2%, while coal generation fell by 19.1%. *Id.* at 21 tbl.2–3.

[7] Energy Policy Act of 1992, Pub. L. No. 102-486, § 111(d)(19), 106 Stat. 2796 (codified as amended in 16 U.S.C. § 2602(19) (2006)). The Public Utility Regulatory Policies Act of 1978, or PURPA, adopted several federal standards that state regulatory authorities were required to consider "and make a determination concerning whether or not it is appropriate to implement such a standard." Pub. L. No. 95-617, § 111(a), 92 Stat. 3119 (codified as amended by 16 U.S.C. § 2602). The Energy Policy Act of 1992 amended PURPA to include the adoption of integrated resource planning as one such standard. Energy Policy Act § 111(a)(7).

[8] State law does not currently impose such a requirement, and the West Virginia Public Service Commission ("PSC") declined to adopt the ratemaking "standard" for integrated resource planning from the 1992 Energy Policy Act.

Second, an integrated resource planning process would likely result in utilities devoting more resources to energy efficiency and conservation. The "integration" part of integrated resource planning means that supply-side options (*i.e*., generation) are placed on the same footing as demand-side options (*i.e*., energy efficiency, demand response, and conservation) when a utility determines its resource acquisition path.[9] In other words, a utility will decide how much to pay to "acquire" conservation—through energy efficiency programs offered to retail customers—by reference to the costs it would avoid by *not* having to build new generation, or not investing in emissions reduction technology in existing coal plants. West Virginia utilities currently undertake no such analysis and, as a result, customers have virtually no opportunity to participate in energy efficiency and conservation programs offered by their utilities. These programs for the most part are not offered in West Virginia, in sharp contrast to the programs offered in surrounding states—and in many cases by the same utilities that operate within West Virginia—because the policies in this state do not require or encourage it. Energy efficiency programs in many cases are the most cost-effective means of meeting new demands for electricity, but the analysis demonstrating that is simply not performed in West Virginia. As a result, our utility ratepayers are burdened with high energy bills, with no options to invest in the measures that could reduce them. Part II of this Article will look at the role of energy efficiency programs in other states, and the policies that can be implemented to stimulate more investment in energy efficiency and conservation.

Third, West Virginia should consider policies that promote the development of renewable resources within the state. Part of the diversification of the electricity generating resources should include increased reliance on the development of the state's substantial potential for renewable energy production. The majority of the states in the United States have a renewable portfolio standard ("RPS") that requires utilities to obtain a specified portion of their electricity supply from renewable resources, which thereby stimulates renewable energy development.[10] West Virginia, for its part, has a renewable and alternative energy portfolio standard requiring that a quarter of each utility's electricity supply be procured from renewable and alternative energy sources by 2025.[11] Yet "alternative" is defined in such a manner as to include many forms of coal-fired generation, "tire-derived fuel" and other "dirty" fossil fuel-based generation that makes West Virginia's procurement standard unlike any other in the United States.[12] In fact, the West Virginia standard, as

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9 A key element of integrated resource planning is the requirement that demand- and supply-side resources be treated on a "consistent and integrated basis." Energy Policy Act § 111(d)(19).

10 *See Renewable Portfolio Standard Policies*, U.S. DEP'T OF ENERGY (2013) [hereinafter *RPS Policies*], *available at* http://www.dsireusa.org/documents/summarymaps/RPS_map.pdf.

11 W. VA. CODE ANN. § 24-2F-5(c) (LexisNexis Supp. 2012).

12 *Id.* § 24-2F-3(3).

currently written and implemented, requires *no* new renewable energy generation—with "renewable" defined as in most other states to include wind, solar, geothermal, biomass, and small-scale hydro—in order to meet its requirements. Thus, there is nothing as a matter of state policy, unlike the vast majority of states in the country, that encourages development of renewable energy resources. Part III of this Article will examine the role of RPSs in promoting renewable energy development and diversification of utility fuel supplies, and will include recommendations for strengthening West Virginia's renewable and alternative energy portfolio standard.

Fourth, a more aggressive RPS in West Virginia could trigger development of the state's considerable renewable resource potential. Several large wind projects are already located within the state; these projects, however, were not stimulated by anything in West Virginia's energy policies, but rather were developed to help regional utilities meet compliance obligations under more rigorous RPS policies of surrounding states.

West Virginia has tremendous untapped potential for biomass and geothermal energy, for example, that could be developed pursuant to policies designed to stimulate investment in these industries. In the case of biomass, research is currently underway in West Virginia University's Forestry Department to quantify the energy and economic benefits of developing a robust biomass industry in the state, based on the vast forests that could be sustainably harvested to produce a long-term feedstock for biomass-fired electricity generation.[13] Moreover, biomass can effectively be combined with coal in existing coal-fired generating units—referred to as "co-firing"—to reduce the dependence on coal and achieve a gradual "greening" of the energy supply. With respect to geothermal resources, a recent study performed at Southern Methodist University has identified significant geothermal potential in West Virginia that could be tapped as a new source of electricity generation.[14]

There are currently no state policies in effect, however, that encourage development of these biomass and geothermal resources. These resources could result in a cleaner supply of electricity, achieve resource diversity that would reduce dependence on ever-more-costly coal generation, and stimulate jobs and economic development in new industries, thereby diversifying the state's economic base away from heavy dependence on fossil fuels. Part IV of this

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[13] JINGXIN WANG ET AL., W. VA. UNIV., BIOMASS RESOURCES, USES AND OPPORTUNITIES IN WEST VIRGINIA 1–3 (2007), *available at* http://www.wdscapps.caf.wvu.edu/biomatwurctr/files/wvbiomass09102007.pdf.

[14] David Blackwell, Zachary Frone & Maria Richards, *Elevated Crustal Temperatures in West Virginia: Potential for Geothermal Power*, S. METHODIST UNIV., http://smu.edu/smunews/geothermal/documents/west-virginia-temperatures.asp (last visited Mar. 4, 2013).

Article will examine policies that West Virginia should consider to stimulate development of renewable energy resources within the state.

Finally, the development of the Marcellus Shale within West Virginia holds significant promise for increased economic activity and reduced dependence on the coal industry for jobs. Because natural gas-fired electric generation is roughly twice as clean as coal-fired generation, the state can benefit substantially as the United States moves toward a "cleaner" electricity supply through displacement of coal-fired generation with natural gas-fired generation. But the economic benefits flowing from shale gas development within the state are threatened by the low natural gas prices currently prevailing as a result of the shale gas development around the nation.[15] Quite simply, hydraulic fracturing and horizontal drilling have been "game changers" in the energy industry in terms of unleashing vast quantities of natural gas at relatively low prices, resulting in an over-supply of natural gas that is depressing prices and threatening to dampen the economic benefits of shale gas development as the drilling rigs are idled.[16]

Policymakers in West Virginia should be considering measures that could stimulate the demand for natural gas in the hopes of stabilizing natural gas prices at sustainable levels. These measures could include (1) incentives to encourage development of the infrastructure to support the use of natural gas vehicles ("NGV"), using both compressed natural gas ("CNG") or liquefied natural gas ("LNG") for transportation; and (2) encouraging natural gas distribution companies in West Virginia to promote combined heat and power ("CHP") for commercial and industrial customers. CHP facilities typically are fueled by natural gas and, in addition to providing on-site generation for large customers, achieve substantial improvement in energy efficiency by capturing the waste heat that would otherwise be released into the atmosphere and using it to heat and cool buildings. Part V of this Article will examine the policies that state policymakers could implement to stimulate demand for natural gas in West Virginia, which would take advantage of the state's native resources as well as help achieve a balance of supply and demand at a level where the abundant natural gas resources can continue to be developed.

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[15] *Natural Gas Weekly Update*, U.S. ENERGY INFO. ADMIN. (Jan. 10, 2013), http://www.eia.gov/naturalgas/weekly/archive/2013/01_10/index.cfm ("Natural gas prices fell over the last week, continuing an overall downward trend from the past few weeks. The Henry Hub spot price fell 16 cents per MMBtu from $3.30 per MMBtu last week to $3.14 per MMBtu yesterday. Prices declined similarly in most other areas of the country, and most prices are in the $3 per MMBtu range.").

[16] *US Drilling Rig Count Off Slightly to 1,762*, OIL & GAS J. (Jan. 4, 2013), http://www.ogj.com/articles/2013/01/us-drilling-rig-count-off-slightly-to-1762.html ("The US drilling rig count fell by 1 unit during the week ended Jan. 4, with the total number of rotary rigs reaching 1,762 . . . [which] compares with 2,007 rigs working in the comparable week last year.").

Based on these and similar analyses, the final Part of this Article will offer several policy recommendations to be considered as West Virginia considers its future energy and environmental policies.

I. THE CASE FOR INTEGRATED RESOURCE PLANNING

Electric utilities operating in West Virginia need to engage in a rigorous process of long-term planning that takes a critical look at the various resource options for procuring a reasonably priced and reliable electricity supply. West Virginians have not been well-served in recent years by the heavy dependence of local utilities on coal for electricity generation. In fact, 96.8% of the electricity generated in West Virginia is coal-fired.[17] As coal prices have doubled in response to worldwide demand, electricity rates have soared. The price of delivered coal to the electric sector increased from $1.20 per million British Thermal Units ("MMBtu") in 2000 to $2.64 per MMBtu in 2009—a 220% increase—and recently have declined to $2.39 per MMBtu in 2011,[18] which still represents a price that is twice as high as prevailing prices in 2000. The electricity prices of the four utilities serving West Virginia, Appalachian Power and Wheeling Power (subsidiaries of American Electric Power ("AEP")) and Monongahela Power and The Potomac Edison Company (subsidiaries of FirstEnergy), have similarly soared over this period, as the higher coal prices are ultimately reflected in electricity prices. From 2000 to 2011, AEP's residential electricity prices increased by 68% while FirstEnergy's residential rates increased by 39.4%.[19]

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17 W. VA. DIV. OF ENERGY, ENERGY BLUEPRINT 15 (Mar. 2012) [hereinafter ENERGY BLUEPRINT, *available at* http://www.wvcommerce.org/App_Media/assets/doc/energy/WV_ENERGY_BLUEPRINT.pdf].

18 U.S. ENERGY INFO. ADMIN., SHORT-TERM ENERGY OUTLOOK 8 (Feb. 2013), *available at* http://www.eia.gov/forecasts/steo/pdf/steo_full.pdf.

19 AEP's residential electric rates increased from 5.5 cents per kilowatt-hour (kWh) in 2000 to 9.2 cents/kWh in 2011. It should be noted that AEP's residential rates are artificially low, in that they do not reflect $311.8 million of "legacy fuel expenses" that AEP is proposing to recover through securitization. AEP has a pending filing before the West Virginia PSC to issue $422.3 million in bonds for a term of ten to thirteen years to recover these "legacy fuel expenses" and various other charges, including financing costs. Mary Powers, *West Virginia Utilities Ask Regulators to Securitize Legacy Fuel Charges*, PLATTS (Aug. 24, 2012, 1:37 PM), http://www.platts.com/RSSFeedDetailedNews/RSSFeed/ElectricPower/6585989. AEP's residential rates will be 3.3% higher during the term of the bonds to recover these costs; its residential rates would increase by 0.0309 cents/kWh. Joint Application, Pub. Serv. Comm'n of West Virginia v. Appalachian Power Co., No. 12-1188-E-PC (W. Va. Aug. 22, 2012), *available at* http://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=351760&NotType='WebDocket. FirstEnergy's residential electric rates increased from 7.2 cents/kWh in 2000 to 10.0 cents/kWh in 2011. *Form EIA-826 Detailed Data*, U.S. ENERGY INFO. ADMIN, http://www.eia.gov/cneaf/electricity/page/eia826.html (last visited Apr. 10, 2013). Average rates are obtained by dividing residential revenues by residential sales, in megawatthours ("MWh").

A practice that may have prevented this outcome, and an essential ingredient for a stable and resilient future for West Virginia, is the requirement that utilities engage in "integrated resource planning,"[20] a process that has been widely accepted since the late 1980s as the prudent means for utilities to develop long-term resource plans.[21] Thirty-nine of fifty states have a rule or requirement for long-term planning or procurement.[22] The Federal Energy Policy Act of 1992 defines integrated resource planning as "a planning and selection process for new energy resources that evaluates the full range of alternatives . . . in order to provide adequate and reliable service to [an electric utility's] customers at the lowest system cost."[23] A key element of integrated resource planning is the requirement that demand- and supply-side resources be treated on a "consistent and integrated basis."[24] In other words, when a utility evaluates its options for meeting its future system needs, the utility must consider energy efficiency and conservation measures (demand-side resources) on the same footing as the addition of generating capacity (supply-side resources).[25] This feature is the "integrated" aspect of integrated resource

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[20] "Steps taken in the development of an IRP include: forecasting future loads, identifying potential resource options to meet those future loads and their associated costs, determining the optimal mix of resources, receiving and responding to public participation (where applicable), and creating and implementing a resource plan." RACHEL WILSON & PAUL PETERSON, SYNAPSE ENERGY ECON., A BRIEF SURVEY OF STATE INTEGRATED RESOURCE PLANNING RULES AND REQUIREMENTS 3 (2011), *available at* http://www.cleanskies.org/wp-content/uploads/2011/05/ACSF_IRP-Survey_Final_2011-04-28.pdf.

[21] *Id.* at 1.

[22] *Id.* at 16. The variations between the state rules are "substantial." States with only procurement rules, for example, may not necessarily require an "integrated" planning process.

[23] Energy Policy Act of 1992, Pub. L. No. 102-486, § 111(d)(19), 106 Stat. 2796 (codified as amended in 16 U.S.C. § 2602(19) (2006)). This "full range of alternatives" is defined to include, among other things, "new generating capacity, power purchases, energy conservation and efficiency, cogeneration and district heating and cooling applications, and renewable energy resources." *Id.*

[24] *Id.*

[25] As will be discussed more fully in Part II, utilities have less incentive to devote resources to demand-side resources than to supply-side resources, given the manner in which utility rates are set. When a utility builds a new generating plant, it adds that investment to its "rate base" upon completion of the plant, and it is allowed to earn a reasonable return on that investment, thus increasing the utility's overall profits. Investments in demand-side resources, on the other hand, typically do not increase the utility's rate base, although the utility would recover the costs associated with offering the demand-side program in its rates. BEN FOSTER ET AL., AM. COUNCIL FOR AN ENERGY-EFFICIENT ECON., THE 2012 STATE ENERGY EFFICIENCY SCORECARD 20 (2012), *available at* http://www.aceee.org/sites/default/files/publications/researchreports/e12c.pdf. ("Since utilities' earnings are usually based on the total amount of capital invested in certain asset categories (such as transmission lines and power plants) and the amount of electricity sold, the financial incentives are very much tilted in favor of increased electricity sales and expanding supply-side systems."). A number of regulatory policies are available to level the playing field between demand-side and supply-side resources in terms of the economic impact on the utility

planning. This integration is completely missing in the current practices of West Virginia utilities, as will be discussed below.

In addition to the integration of supply- and demand-side resources, a rigorous long-term resource acquisition process would require sophisticated modeling of various resource scenarios, using a variety of assumptions, in order to determine a portfolio of resources that results in adequate and reliable electric service at the lowest system cost, over time, to utility customers.[26] Such modeling would include, for example, different coal price scenarios that would have highlighted the risk of heavy, and virtually exclusive, dependence upon coal-fired generation. West Virginia utilities are not currently required to engage in integrated resource planning, and electricity ratepayers throughout the state are paying the price.

A. "Integration" of Demand- and Supply-Side Options

While electric utilities operating in West Virginia may engage in some form of a long-term resource planning process, it is clear that they fail to treat supply- and demand-side options on an equal footing (i.e., they are not treated on a "consistent and integrated basis" as required by the Energy Policy Act of 1992). In a "Resource Plan" filed in August 2012 with the West Virginia Public Service Commission ("PSC") by FirstEnergy's subsidiaries operating in West Virginia—Monongahela Power ("Mon Power") and The Potomac Edison Company—FirstEnergy stated that its objective in preparing the plan was "to identify the resources necessary to meet the companies' future energy and capacity obligations in a cost effective, prudent, and reliable manner."[27] According to the *FE Resource Plan*, the "options for meeting these future needs consist of supply and demand-side resources and market purchases."[28] While this statement would seem to suggest an equal consideration of supply and demand-side options, the *FE Resource Plan* later makes clear that demand-side options were dismissed as "not a viable solution capable of meeting Mon Power's obligations."[29] According to the *FE Resource Plan*, "[p]rograms to

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but, for the most part, these policies are not in place in West Virginia. *See infra* Part II. Utilities thus generally have a profit-motivated incentive to prefer supply-side options over demand-side options.

26 "Common risks that are addressed by scenario or sensitivity analysis in IRPs include: fuel prices (coal, oil, and natural gas), load growth, electricity spot prices, variability of hydro resources, market structure, environmental regulation, and carbon dioxide and other emission regulations." WILSON & PETERSON, *supra* note 20, at 3–4.

27 FIRST ENERGY, 2012 RESOURCE PLAN MONONGAHELA POWER COMPANY AND THE POTOMAC EDISON COMPANY 1 (2012) [hereinafter FE RESOURCE PLAN], *available at* http://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=352359&NotType='WebDocket'.

28 *Id.*

29 *Id.* at 56.

reduce demand simply cannot fulfill the need for to [sic] supply side resources on this scale."[30] Accordingly, "demand-side resources were not considered as a viable, long-term solution to Mon Power's significant energy and capacity needs."[31]

After dismissing the demand-side options, the *FE Resource Plan* went on to evaluate the various generation, or supply-side, alternatives. These alternatives included retrofitting Mon Power's existing generation to comply with the new air emissions standards promulgated by the EPA in its Mercury and Air Toxics Standard ("MATS"), which is scheduled to take effect in April 2015;[32] building new baseload generation (coal, nuclear, or natural gas-fired combined cycle combustion turbines);[33] building or acquiring alternative energy resources (e.g., wind, solar, or hydro);[34] and the acquisition of existing plants.[35] The "preferred approach," according to the *FE Resource Plan*, is to acquire existing generating plants from Mon Power's affiliate, FirstEnergy Solutions.[36] The document claims that "Mon Power is fortunate to have uncovered such an opportunity" to acquire an existing source of generation, given that such opportunities are "scarce since they require the intersection of a willing seller and an asset that meets the requirements of the prospective buyer."[37] Under the transaction for which Mon Power seeks West Virginia PSC approval, Mon Power would acquire about 80% of the Harrison plant, a supercritical coal plant built in 1972 in Haywood, West Virginia, which has a generating capacity of 1984 megawatts ("MW").[38]

In other words, in the face of dramatic increases in the price of coal over the past decade, and the likely additional cost increases associated with compliance with ever more stringent air emissions regulations from the EPA,

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30 *Id.* The *FE Resource Plan* states that "[d]emand-side resources are inherently capacity-only resources and do not address energy shortfalls as significant as the shortfall faced by Mon Power; nor can DR [demand response] programs be developed in sufficient quantity to satisfy Mon Power's capacity deficiency shortfall." *Id.* In dismissing demand response programs, the *FE Resource Plan* states that "DR resources are short-term in nature, and pledged capacity would vary from year to year." *Id.*

31 *Id.* The *FE Resource Plan* claims that demand-side resources cannot "be examined through a levelized cost analysis because of their inherent capacity-only nature." *Id.*

32 *Id.* at 48–50.

33 *Id.* at 50–52.

34 *Id.* at 52–53.

35 *Id.* at 54–56.

36 *Id.* at 54.

37 *Id.*

38 Mon Power currently owns 20.54% of the capacity of the Harrison plant. *Id.* at 24. In addition to the Harrison plant, Mon Power seeks PSC approval of the assignment by AE Supply and FirstEnergy Generation Corporation of their power participation rights in the generation produced by Ohio Valley Electric Corporation ("OVEC"). *Id.* at 4.

FirstEnergy's solution for West Virginia is to increase the state's reliance on coal, by purchasing existing coal plants from an affiliate, without a thorough evaluation of alternatives that may indeed be cheaper for West Virginians. The need for integrated resource planning cannot be made more clear than through the obvious inadequacies of the *FE Resource Plan*, with its self-serving "analysis" that concludes how "fortunate" West Virginia ratepayers are to be able to take these uncompetitive plants off the hands of the FirstEnergy affiliates.

Appalachian Power, while not being required to submit any sort of long-term plan to West Virginia regulators, prepares an "integrated resource plan" that it submits to the Virginia State Corporation Commission ("SCC") pursuant to Virginia statute requiring the preparation of such a document periodically.[39] Appalachian Power's most recent "integrated resource plan"—*AEP Resource Plan*—was filed with the Virginia SCC on September 1, 2011.[40] Although the Virginia statute contemplates an "integrated" resource plan, and Appalachian Power's filing appears to comply with the requirements of the statute, the resource plan is in fact not integrated. Specifically, there is nothing in the plan that evaluates demand- and supply-side resources on a "consistent and integrated basis," as required by the standard included in the Energy Policy Act of 1992. In fact, the plan clearly states that Appalachian Power will primarily, if not exclusively, be looking to supply-side resources to meet its energy and capacity needs: "As an underpinning, this IRP is based on the need to ultimately 'build' generating capability to meet the requirements of its customers for which it has assumed an obligation to reliably serve."[41]

Rather than putting demand- and supply-side resources on an equal footing for purposes of analysis and comparison, the *AEP Resource Plan* only evaluated two different levels of energy efficiency programs in Virginia,

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[39] Section 56-599 of the Virginia Code requires that electric utilities file integrated resource plans every two years. In preparing such a plan, utilities are required to "systematically evaluate" a variety of resource options, including short-term and long-term electric power purchase contracts, owning and operating electric power generating facilities, building new generation facilities, relying on purchases from the short term or spot markets, making investment in demand-side resources, including energy efficiency and demand-side management services, and taking other actions "to diversify its generation supply portfolio." VA. CODE ANN. § 56-599(D) (2012). The Virginia SCC then reviews the plans and "make[s] a determination as to whether an IRP is reasonable and is in the public interest." *Id.* § 56-599(E).

[40] Motion for Protective Order, Virginia State Corp. Comm'n v. Appalachian Power Co., No. PUE-2011-00100 (Va. Sept. 1, 2011) [hereinafter AEP RESOURCE PLAN], *available at* http://docket.scc.state.va.us /CyberDocs/Libraries/Default_Library/Common/frameviewdsp.asp?doc=114581&lib=CASEWEBP%5FLIB&mimetype=application%2Fpdf&rendition=native.

[41] *Id.* at 83.

without any explanation for how the levels were determined.[42] Demand-side resources were not treated as a resource to be optimized alongside supply-side options; instead, the *AEP Resource Plan* simply subtracts the assumed savings from these two levels of energy efficiency programs from the load forecast.[43] In other words, the "supply gap" to be filled by a resource acquisition strategy, representing the difference between the projected loads and the available resources, is narrowed because the load forecast incorporates the assumed savings from identified demand-side programs.[44] Demand-side options are not otherwise evaluated alongside supply-side options for purposes of filling the "supply gap." The "integrated" aspect of integrated resource planning generally requires that all resource options be "stacked" from least costly to most costly, with the expectation that in developing its resource acquisition strategy, the utility will work its way up this "resource option" curve until the supply achieves equilibrium with demand.[45] There is no integration under the approach followed in the *AEP Resource Plan*.

Moreover, for purposes of analysis, the *AEP Resource Plan* assigns an arbitrary levelized cost figure ($40/megawatthour ("MWh")) to demand-side resources. This "cost" figure does not necessarily reflect the actual cost of those resources and, more importantly, fails to reflect the relationship to the comparative costs of supply-side resources. In the *AEP Resource Plan*, demand-side resources are arbitrarily assigned the levelized cost figure of $40/MWh, which AEP claims is "consistent with numerous studies (approximately equivalent to $4.00/MMBtu)."[46] Under the approach followed in the *AEP Resource Plan*, it is irrelevant that this $40/MWh levelized cost figure may be substantially lower than the levelized cost of the supply-side options evaluated in the plan. Rather, the level of commitment to demand-side

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42 According to the *AEP Resource Plan*, the "base" level assumes a 4.9% reduction in ten years, by 2022, from the energy consumed in a "business-as-usual" forecast. The other scenario simply assumes a level of reduction two times higher than this base case." *Id.* at 64.

43 *Id*. at 69, exhibit 4-4.

44 *Id*. at 121. "[T]he value of the APCo and Virginia DR/EE/IVV was determined by removing the demand and energy reduction impacts of those programs from the load forecast and comparing the APCo (g)-COS for those cases to a case where the DR/EE/IVV was included."

45 Ralph C. Cavanagh, *Least-Cost Planning Imperatives for Electric Utilities and Their Regulators*, 10 HARV. ENVTL. L. REV. 299, 324 (1986). ("The gap between the two forecasts—which conservation has narrowed but not eliminated—represents a range of outcomes with which the utility must be prepared to deal. The enterprise is analogous to purchasing an insurance policy; the goal is to minimize the cost of coping with contingencies of varying probability. New generating units may be one element of the response, but other options will bear close scrutiny. Load management programs that shift consumption away from peak periods, without necessarily affecting total consumption, are an obvious example. Also worth investigating is the willingness of large industrial and commercial customers to sell interruption rights to the utility system, which would provide additional reserves in the event of unexpected shortfalls.").

46 *Id.*

resources is determined by external factors (as discussed further below), and is merely "priced" by AEP for analysis purposes at $40/MWh. This approach falls woefully short of treating demand-side resources on a "consistent and integrated basis" with supply-side resources.

To illustrate, virtually *all* of the supply-side options have a levelized cost per MWh far in excess of the $40/MWh figure assigned by AEP to demand-side resources. According to the Energy Information Administration's estimates of levelized cost of new generation resources, the cheapest supply-side resource, a natural gas-fired advanced combine cycle combustion turbine, has a levelized cost of $63.10/MWh.[47] The estimates for other generating resource climb steadily higher: $88.90/MWh for hydro, $96.00/MWh for wind, $97.70/MWh for a conventional coal-fired plant, $110.90/MWh for an "advanced" coal-fired plant, $111.40/MWh for a nuclear plant, $115.40/MWh for biomass, and $152.70/MWh for solar photovoltaic.[48] If the *AEP Resource Plan* were truly integrated, then demand-side resources would fare very well when "stacked" against these more expensive supply-side resources.

Under the "silo" approach followed by the *AEP Resource Plan*, however, where demand-side resources are considered in isolation from supply-side options, the extent of reliance on demand-side options is based not upon head-to-head comparative costs, but rather on whatever resources Appalachian Power chooses to devote to demand-side activities.[49] It is thus not surprising that the "five year action plan" for Appalachian Power includes no demand-side initiatives, but rather includes only supply-side options.[50] The *AEP Resource Plan* acknowledges that "[d]emand-side resources will likely play a significant role in satisfying capacity and energy requirements prospectively *as they are the least-cost resource, even in significant amounts*."[51] Notwithstanding this striking admission that demand-side resources are cheaper for customers than generating resources, Appalachian Power refuses to allow demand-side resource to compete directly with supply-side measures, and proceeds with a resource plan that is almost exclusively devoted to more expensive supply-side measures.

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47 U.S. ENERGY INFO. ADMIN., LEVELIZED COST OF NEW GENERATION RESOURCES IN THE ANNUAL ENERGY OUTLOOK 2012 4 (2012) [hereinafter ENERGY OUTLOOK], *available at* http://www.eia.gov/forecasts/aeo/pdf/electricity_generation.pdf.

48 *Id.*

49 The levelized cost of the EE portfolio was assumed to be $40/MWh. AEP RESOURCE PLAN, *supra* note 40, at 64. The demand and energy reductions produced by programs at that level of investment were subtracted from the load forecast. *Id.* at 121.

50 The *AEP Resource Plan* identifies the following measures in its Five-Year Action Plan: environmental retrofits at its Mountaineer and Amos plants; a new natural gas-fired combined cycle combustion turbine at Dresden; fuel switch the Clinch River Units 1 and 2 from coal to natural gas; and retirement of Clinch River Unit 3, Glen Lyn Units 5 and 6, and Sporn Units 1 and 3. *Id.* at 137.

51 *Id.* at 137–38 (emphasis added).

Instead, as noted above, the levels of demand-side measures in the *AEP Resource Plan* were determined by external factors, in the form of energy efficiency programs mandated by the utility regulatory agencies, or PUCs,[52] in the various states in which AEP operates.[53] These mandated targets are incorporated as the basis for the assumed levels of demand-side measures in the *AEP Resource Plan*. There is no "integration" in the sense that the levels of investment in demand-side measures are determined by comparison of their cost-effectiveness with supply-side measures. Rather, after acknowledging that demand-side measures are the "least-cost resource, even in significant amounts,"[54] the *AEP Resource Plan* makes it clear that its focus will be on supply-side resources, with its attention diverted to demand-side resources only as required by the PUCs in the various states in which AEP operates.[55] As explored in Part II of this Article, West Virginia has imposed very modest requirements on Appalachian Power and Wheeling Power, both absolutely and by reference, to the more aggressive mandates with which AEP is complying in the surrounding states.

B. Other Elements of Integrated Resource Planning

The other common elements of an IRP requirement include (1) an objective of selecting a portfolio of resources with the lowest system cost, (2) a long-term planning horizon, (3) periodic updates, (4) stakeholder involvement,

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[52] "PUC," or public utility commission, will be used as the generic term for the state regulatory agency responsible for setting retail utility rates. In West Virginia, this agency is the PSC, while in Virginia, it is the State Corporation Commission.

[53] Virginia has a voluntary target of achieving 10% savings through energy efficiency by 2020. Mandated levels of demand reduction are also in place in Ohio, Indiana, and Michigan. Ohio requires installed energy efficiency measures to achieve savings equal to over 20% of all energy otherwise supplied by 2025. Indiana's standard requires installed energy efficiency reductions of 13.9% by 2020. Michigan, for its part, requires a 10.55% reduction by 2020. AEP RESOURCE PLAN, *supra* note 40, at 25. The comparable figure for West Virginia is the two-year program approved in February 2011 that, according to the *AEP Resource Plan*, will result in 1.1 % of installed savings in 2012. *Id.* at 64. In contrast to the planned savings of 1.1% in 2012; however, AEP actually achieved savings of only 0.4% in West Virginia in 2012. It reported 66 million KWh in savings for 2012. Pam Kasey, *APCo, Wheeling Power Efficiency Programs Cutting Bills*, WV STATE J. (Feb. 5, 2005), http://www.statejournal.com/story/20969972/apco-wheeling-power-efficiency-programs-cutting-bills. APCo and Wheeling's West Virginia load was 17,000 GWh in 2011, so 64 million KWh represents about 0.4% of sales. *Sales by State and Utility: All Sectors*, 2011, ENERGY INFORMATION ADMINISTRATION, *available at* http://www.eia.gov/electricity/sales_revenue_price/pdf/table10.pdf.

[54] AEP RESOURCE PLAN, *supra* note 40, at 138.

[55] *Id*. at 72. ("Aggressive programs resulting from mandates in Ohio and Indiana should result in a significant reduction in demand and energy requirements of APCo affiliates in those states.").

and (5) subsequent use by PUCs as the basis for evaluating the prudence of the utility's resource acquisitions. These are discussed in turn below.

Lowest System Cost. As noted above, the federal Energy Policy Act of 1992 defines integrated resource planning as "a planning and selection process for new energy resources that evaluates the full range of alternatives . . . in order to provide adequate and reliable service to [an electric utility's] customers *at the lowest system cost*."[56] In other words, a common objective of the IRP process is to select resources that will result in the lowest costs to utility customers over time.[57] This objective is typically evaluated by looking at the present value revenue requirement ("PVRR") of the utility's resource portfolio.[58] The resource alternatives available to a utility have different upfront capital cost and operating cost characteristics, *i.e.*, some resources with higher capital costs, such as nuclear plants, have very low operating costs, while other resources with lower initial capital costs, such as natural gas-fired simple cycle combustion turbines, have higher operating costs.[59] The PVRR calculation attempts to capture the per-kilowatthour ("kWh") cost of building and operating the various resource options over an assumed financial life and duty cycle, and to reflect these costs in real, current dollars to facilitate evaluation for resource selection purposes.[60]

Planning Horizon. Integrated resource plans are long-term in nature. The *2011 AEP Resource Plan*, for example, uses a fifteen-year planning period,[61] while the *FE Resource Plan* looks at projected loads and resources for a similar period, through 2028.[62] Of those states with IRP requirements, twenty

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[56] Energy Policy Act of 1992, Pub. L. No. 102-486, § 111(d)(19), 106 Stat. 2796 (codified as amended in 16 U.S.C. § 2602(19) (2006) (emphasis added)). This "full range of alternatives" is defined to include, among other things, "new generating capacity, power purchases, energy conservation and efficiency, cogeneration and district heating and cooling applications, and renewable energy resources . . . ." *Id.*

[57] Cynthia Mitchell, *Lagging in Least-Cost Planning—Not As Far Along As We Thought*, 2 ELECTRICITY J., Dec. 1989, at 24, 28 ("The criterion most often utilized in determining 'least cost' is minimizing the present worth of revenue requirements or of average total bills."); WILSON & PETERSON, *supra* note 20, at 3 ("Simply put, integrated resource planning means ensuring the long-term reliability of delivered energy at the lowest practical cost.").

[58] WILSON & PETERSON, *supra* note 20, at 10.

[59] According to the *Energy Outlook*, a nuclear plant has a levelized capital cost of $87.5/MWh and variable O&M costs (including fuel) of $11.60/MWh, while a conventional natural gas-fired combustion turbine has a levelized capital cost of $45.30/MWh and variable O&M costs of $76.40/MWh. ENERGY OUTLOOK, *supra* note 47, at 4.

[60] According to the Energy Information Administration, "key inputs to calculating levelized costs for generating plants include overnight capital costs, fuel costs, fixed and variable operations and maintenance ("O&M") costs, financing costs, and an assumed utilization rate for each plant type." *Id.* at 1.

[61] AEP RESOURCE PLAN, *supra* note 40, at 6.

[62] FE RESOURCE PLAN, *supra* note 27, at 4.

years is most commonly used as the planning horizon; half of the IRP states adopt this planning period.[63] Six states use a planning horizon of ten years, while another six states use a fifteen-year planning horizon.[64]

Frequency of Updates. Integrated resource plans are typically updated every two to three years, to reflect changes in circumstances, including load forecasts, fuel prices, capital costs, conditions in the electricity markets, and environmental regulations.[65] Of the twenty-seven states included in the *Synapse Study*, fourteen of the states require IRP updates every two years, while eleven states follow a three-year cycle.[66] In deciding how often to require an IRP to be updated, policymakers will need to consider the volatility of the underlying conditions and the frequency of the changes, and the capability of the jurisdictional utilities in performing the analysis necessary to support an IRP. The costs of preparing IRPs are ordinary and reasonable operating expenses that are properly recoverable in rates, so the compliance costs should be an element in the policymakers' analysis.

Stakeholder Involvement. Many states require that participants[67] in the utility ratemaking process be involved in the development of an IRP or, at a minimum, that the PUC provide some public process for the commissioners to receive comments on proposed IRPs.[68] In defining the characteristics comprising a "full featured" IRP process, the authors of the *Synapse Study* required that the process be "subject to public review."[69] The Virginia statute, for example, requires that the State Corporation Commission give "notice and an opportunity to be heard."[70] The rule in Washington provides that "public participation [is] essential to the development of an effective plan," and specifically requires the utility commission to "hear comment on the plan at a public hearing scheduled after the utility submits its plan for commission review."[71] The purpose of stakeholder involvement is to give interested parties an opportunity to help shape the utility's resource acquisition decisions early in the decision-making process.

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63 WILSON & PETERSON, *supra* note 20, at 7.

64 *Id.*

65 *Id.* at 8.

66 *Id.*

67 Common participants in utility rate proceedings, or stakeholders, include the PSC's trial or advocacy staff, a consumer advocate representing the residential and small business customers, an organization representing large industrial customers, and an environmental non-governmental organization.

68 The "standard" enunciated in the Energy Policy Act of 1992 provides that State regulatory authorities "must provide the opportunity for public participation and comment." Energy Policy Act of 1992, 16 U.S.C. § 2621(d)(7) (2006).

69 WILSON & PETERSON, *supra* note 20, at 2.

70 VA. CODE ANN. § 56-599(E) (2012).

71 WASH. ADMIN. CODE § 480-100-238(5) (2013).

Under utility ratemaking practices, the impact of utility resource acquisition decision is felt only at the end of the process, when the plant is completed and the investment in the resource is added to the utility's rate base, usually resulting in a rate increase. It is too late at that point to encourage the utility to take a different path, and the recourse available to opposing stakeholders is to intervene in a rate proceeding and propose a disallowance reflecting the difference between the actual resource cost and the lower cost that the stakeholder's preferred path would have produced, based on a demonstration of imprudence. It is very difficult to carry the burden of proof to support such a disallowance, however, and the need to maintain a utility's financial integrity may constrain the PUC from imposing a disallowance, irrespective of the evidence.

Subsequent Commission Action. IRP requirements typically contemplate that the state PUCs will take some action in response to the preparation and filing of an IRP. The Virginia statute, for example, requires that the State Corporation Commission "make a determination as to whether an IRP is reasonable and in the public interest."[72] In addition to taking action at the time the IRP is filed, state PUCs will commonly consider the information contained in an IRP in determining whether a utility's resource acquisition decisions were prudent. The Washington rule, for example, states that "[t]he commission will consider the information reported in the integrated resource plan when it evaluates the performance of the utility in rate and other proceedings."[73]

C. The Need for a Legislative Solution

As noted in the *Synapse Study*, "IRP rules governing utilities have been created in a number of ways."[74] Some states have passed laws requiring integrated resource planning,[75] while other states have enacted rules through actions of their PUCs.[76] Finally, some state PUCs have imposed the requirement through a formal order in a docketed proceeding.[77] As discussed in Part VI of this Article, it is recommended that the integrated resource planning process in West Virginia be imposed by statute, through the action of the State Legislature.

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72 VA. CODE ANN. § 56-599(E).

73 WASH. ADMIN. CODE § 480-100-238(6).

74 WILSON & PETERSON, *supra* note 20, at 5.

75 Twelve states have passed such laws. *Id.* at 17 app. 1.

76 Eleven states have enacted such rules. *Id.*

77 Four states have implemented IRP through administrative order. *Id.*

II. THE CASE FOR ENERGY EFFICIENCY

Energy efficiency,[78] conservation,[79] and other demand-side measures[80] should be considered high priority resources in West Virginia's energy future. West Virginians use too much electricity compared to neighboring states; among the thirteen Appalachian states, West Virginia has the highest residential energy consumption per household.[81] This high consumption can be

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[78] Energy efficiency is generally defined as using resources that require less electricity to perform the same process or activity, or improving the energy output per unit of energy consumed. *What is Energy Efficiency*, LAWRENCE BERKELEY NAT'L LAB., http://eetd.lbl.gov/ee/ee-1.html (last visited Mar. 8, 2013). Energy efficiency programs encourage the installation of equipment designed to produce measurable and verifiable reductions in electricity usage, while still producing the same or similar outcomes. Examples of energy efficiency programs include efficient lighting retrofits; heating, ventilating and air conditioning ("HVAC") retrofits; appliance retrofits; building improvements and commercial and industrial process improvements that reduce electricity use or losses. *Id.*; *see also Energy Efficiency*, U.S. DEPT. OF ENERGY, http://www.eere.energy.gov/topics/energy_efficiency.html (last updated July 12, 2012) (providing a resource for energy efficiency in homes, buildings, vehicles, manufacturing, and government).

[79] "[C]onservation represents a reduction in the amount of energy output consumed at the enduser stage." FRED BOSSELMAN ET AL., ENERGY, ECONOMICS AND THE ENVIRONMENT 963 (Robert C. Clark et al. eds., 3d ed. 2010). An example would be turning down the thermostat during the winter so that the furnace runs less often, or turning off unneeded lighting. *What is Energy Efficiency*, *supra* note 78.

[80] Other demand-side measures include demand-response programs, or DR programs, which shift the time electricity is used from peak-demand periods to times of lower demand by providing incentives for retail electricity customers to curtail usage, either by shifting some high energy use activities to other times or by using onsite generation. FED. ENERGY REGULATORY COMM'N, ENERGY PRIMER: A HANDBOOK OF ENERGY MARKET BASICS 46–47 (2012), *available at* http://www.ferc.gov/market-oversight/guide/energy-primer.pdf. Peak demand, measured in megawatts ("MWs"), can be thought of as the amount of power used at the time of maximum power usage, which in this region is likely to occur on the hottest summer weekday of the year, in the late afternoon. DR resources are also referred to as "load management products." These products also include interruptible loads (where a utility, pursuant to a contractual arrangement with the customer, can "interrupt" or reduce power consumption during peak periods) and direct load control (which involves remote deactivation of appliances such as air conditioners or hot water heaters). *Id.* at 47. According to FERC's 2012 *Assessment of Demand Response and Advanced Metering*, West Virginia is ranked last in advanced meter market penetration. FED. ENERGY REGULATORY COMM'N, ASSESSMENT OF DEMAND RESPONSE AND ADVANCED METERING 12 tbl.2–3 (2012), *available at* http://www.ferc.gov/legal/staff-reports/12-20-12-demand-response.pdf.

[81] Of the thirteen Appalachian states as defined by the Appalachian Regional Council ("ARC"), West Virginia leads the group with the highest residential energy consumption per household with the average household consuming 220.70 MMBtus") per year. This figure is nearly 20% higher than the annual national average of 185.07 MMBtus. Kentucky is the second largest residential energy consumer in the ARC states with per household consumption of 211.37 MMBtus per year. Tennessee ranks third with 210.62 MMBtus consumed annually per household. CALVIN KENT ET AL., MARSHALL UNIV. CTR. FOR BUS. AND ECON. RESEARCH, ENERGY EFFICIENCY POLICY OUTLOOK FOR WEST VIRGINIA 9 (2012), *available at*

explained to some extent by the historically low price of electricity in the state (which reduces the incentive to invest in energy efficiency), at a time when coal prices were low.[82] But, as noted in Part I of this Article, electricity prices have risen dramatically in West Virginia over the past decade, so the need to turn to demand-side resources is more urgent. An additional explanation for the relatively high consumption of electricity in West Virginia is the failure to treat energy efficiency and conservation as a resource, as described in Part I. If electric utilities in the state do not consider demand-side measures to be a realistic alternative to investments in supply-side measures (*e.g.*, generating units), they are unlikely to devote significant resources to demand-side resources. And they have not. In terms of commitment to energy efficiency policy and program efforts, West Virginia ranks at virtually the bottom of the fifty states. The American Council for an Energy-Efficient Economy ("ACEEE") ranks West Virginia 49th in its *2012 State Energy Efficiency Scorecard* ("*ACEEE Scorecard*").[83]

A. The Benefits of Energy Efficiency

Investing in demand-side resources can be beneficial to West Virginians in many ways. First, it would give the state's ratepayers tools and allow them some control over their utility bills. Ratepayers have virtually no control over the *rates* charged by the investor-owned utilities in the state; these rates are regulated by the West Virginia PSC.[84] But if energy efficiency programs were available to them, ratepayers may have some ability to control the size of the *bills* they pay. This is a key distinction that is often overlooked—the assumption is that with relatively low electricity rates, utility bills will be low as well.[85] Low rates do not lead to low energy costs, however. According to a study performed by ACEEE, "residential customers in some of the bottom-ranking states [in the *ACEEE Scorecard*] actually pay some of the highest

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http://wvcommerce.org/App_Media/assets/doc/energy/EOD_Recommendations_-_Energy_ Efficiency. pdf.

82 An ACEEE Report interviewed fifty-five stakeholders ranked in the bottom ten of the ACEEE Scorecard to explore why they have not embraced energy efficiency. According to the report, many of the respondents claimed that "because rates are low, energy is cheap and consumers will not participate in energy efficiency programs." MICHAEL SCIORTINO ET AL., ACEEE, OPPORTUNITY KNOCKS: EXAMINING LOW-RANKING STATES IN THE STATE ENERGY EFFICIENCY SCORECARD 9 (2012), *available at* http://www.aceee.org/sites/default/files/publications/researchreports/e126.pdf.

83 FOSTER ET AL., *supra* note 25, at ix tbl.ES-1.

84 The PSC has the authority to set "just and reasonable rates." W. VA. CODE ANN. § 24-2-3 (LexisNexis 2008).

85 As stated in an ACEEE Report, "[i]n reality, however, low rates do not equal low energy costs." SCIORTINO ET AL., *supra* note 82, at 9.

electricity bills in the country."[86] The average bill for residents in West Virginia in 2010 ($105.05) of the *ACEEE Scorecard* was higher than the average bill for customers in the ten highest cost states ($103.62).[87] West Virginia had the eleventh lowest residential electricity rates in the country, at about 9.2 cents per kWh in 2010.[88] But West Virginia ranks in the bottom half—at number twenty-seven—when residential electricity bills for 2010 are ranked from lowest to highest.[89]

Second, investing in demand-side resources should lead to lower electricity rates, inasmuch as energy efficiency is a lower-cost resource than most supply-side (i.e., generation) options. This is one of the beneficial outcomes to integrated resource planning: IRP is considered to be one of four "major categories of lever" in developing and implementing demand-side resources.[90] It is cheaper for utilities to fund energy efficiency measures than to devote additional resources to building new power plants and expanding the transmission and distribution ("T&D") infrastructure.[91] Americans spend approximately $215 billion per year on the production of electricity at a price of six to twelve cents per kWh, while investments in energy efficiency, amounting to approximately $2.6 billion per year, cost only about three cents per kWh.[92]

In the neighboring state of Ohio, where 86% of its electricity is generated from coal-fired power plants, the implementation of energy efficiency measures is projected to result in a levelized cost of saved energy of 2.9 cents per kWh during the period 2009–2025.[93] In addition to being less expensive than supply-side resources, energy efficiency investments can save money. According to a comprehensive study of the savings potential of energy efficiency performed by McKinsey & Company, the United States could consume 23% less energy per year by 2020 by investing $520 billion in energy efficiency, and this investment would yield present-value savings of roughly

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86 *Id.*

87 *Id.*

88 Jess Jiang, *The Price of Electricity in Your State*, NPR PLANET MONEY (Oct. 28, 2011, 10:17 AM), http://www.npr.org/blogs/money/2011/10/27/141766341/the-price-of-electricity-in-your-state (citing the Energy Information Administration).

89 SCIORTINO ET AL., *supra* note 82, at tbl.4.

90 David Nichols, *The Role of Regulators: Energy Efficiency*, 18 PACE ENVTL. L. REV. 295, 296–97 (2001).

91 *See generally* Larry Blank & Doug Gegax, *Objectively Designing Shared Savings Incentive Mechanisms: An Opportunity Cost Model for Electric Utility Efficiency Programs*, 24 ELECTRICITY J., Nov. 2011, at 31.

92 KENT ET AL., *supra* note 81, at 4–5 (citing JAMIE HOWLAND ET AL., ENV'T NE., ENERGY EFFICIENCY: ENGINE OF ECONOMIC GROWTH (2009).

93 *Id.* at 5.

$1.2 trillion.[94] In other words, the benefits from the savings achieved are more than twice as great as the costs.

Third, investments in energy efficiency produce other benefits to the electricity grid. Energy efficiency and demand response programs reduce the load placed on the grid—particularly so during peak times—and thereby increase the reliability of the grid.[95] Energy efficiency and demand response can also reduce or defer the need for utilities to invest in T&D infrastructure, because fewer electrons are moving over the wires.[96] All other things being equal, vertically integrated utilities and other T&D firms can invest less in T&D capabilities if energy efficiency is effective and consumption decreases. This reduced investment ultimately should be reflected in lower utility rates over time.[97]

Fourth, energy savings from demand-side resources produce environmental benefits because of the reduction of fossil-based resources in utilities' generation mixes. A study performed by Environment Northeast calculated that expanded energy efficiency programs in the six New England states would result in avoided emissions from carbon dioxide, or CO_2 (the primary greenhouse gas ("GHG") pollutant from fossil fuel combustion) of about eighteen million short tons, or a reduction of 8.3% below 2005 emission levels.[98] The exact amount and mix of reduced GHG emissions depends on when the energy savings occur, and on the nature of the carbon-emitting fuel used as a primary source in utilities' generation mixes.[99] Because of the emissions benefits of energy efficiency, the EPA allows states to use energy efficiency to meet air quality regulations. In fact, states are able to receive direct credit for improvements in energy efficiency as part of their State

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[94] HANNAH CHOI GRANADE ET AL., MCKINSEY CO., UNLOCKING ENERGY EFFICIENCY IN THE U.S. ECONOMY: EXECUTIVE SUMMARY 5 (2009), *available at* http://www.mckinsey.com/client_service/electric_power_and_natural_gas/latest_thinking/unlocking_energy_efficiency_in_the_us_economy.

[95] *See generally* NED RAYNOLDS & RICH COWART, THE CONTRIBUTION OF ENERGY EFFICIENCY TO THE RELIABILITY OF THE U.S. ELECTRIC SYSTEM 5 (2000), *available at* http://ase.org/sites/default/files/ElecReliabilityWP.pdf.

[96] *See generally* ENVTL. ENERGIES TECH. DIV., U.S. DEP'T OF ENERGY, BENEFITS OF DEMAND RESPONSE IN ELECTRICITY MARKETS AND RECOMMENDATIONS FOR ACHIEVING THEM (2006), *available at* http://eetd.lbl.gov/ea/ems/reports/congress-1252d.pdf.

[97] KENT ET AL., *supra* note 81, at 6.

[98] JAMIE HOWLAND ET AL., ENVTL. NE., ENERGY EFFICIENCY: ENGINE OF ECONOMIC GROWTH 5 tbl.ES3 (2009), *available at* http://env-ne.org/public/resources/pdf/ENE_EnergyEfficiencyEngineofEconomicGrowth_FINAL.pdf.

[99] KENT ET AL., *supra* note 81, at 7–8. Most energy efficiency programs reduce energy usage on the margin, when the "peaking" power plants are being dispatched. In many parts of the country, these peaking plants are much "dirtier" than the baseload plants, which are largely unaffected by energy efficiency programs. *See* David Ehrlich, *Powering the Permit Process: A Mixed Review of Article X*, ALB. L. ENVTL. OUTLOOK, Fall 2001, at 19–20.

Implementation Plans under the Clean Air Act.[100] Thus, as federal air quality standards become more stringent, energy efficiency programs may be used by the states to cost-effectively meet these new standards "by acting as a substitute for dirtier electricity sources."[101]

Finally, investments in demand-side resources can produce significant economic benefits. These economic benefits arise from (1) direct spending by utilities (or, in some states, energy program administrators) for energy efficiency programs and staffing requirements, (2) indirect household and commercial spending for energy efficiency-related goods and services, and (3) increased economic activity as the energy bill savings are spent in the wider economy.[102] Energy Efficiency: Engine of Economic Growth ("*ENE Study*"), for example, looked at expanded energy efficiency programs in the six New England states, and assumed $16.8 billion in expenditures by program administrators over a fifteen-year period to capture all "cost-effective" electric efficiency savings.[103] This $16.8 billion in energy efficiency program expenditures was projected to lead to $162 billion in increased economic activity, as consumers spend energy bill savings in the wider economy.[104] Of this increased economic activity, about $99 billion, or 61%, would stay in the region, with $73 billion "returned to workers through increased real household income and employment equivalent to 767,000 job years."[105] According to the *ENE Study*, "[t]he macroeconomic benefits of efficiency derive from changes in the economy that occur as a result of increased spending on efficiency measures and decreased spending on energy," with the majority of the impacts (81–91%) resulting from the energy savings realized by households and businesses.[106] The other benefits are indirect: lower energy costs result in more discretionary income, which leads to other forms of increased consumer spending (such as dining out or discretionary purchases).[107] Moreover, lower energy bills reduce the cost of doing business in the region, which enhances the

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100 COLUMBIA LAW SCH. CTR. FOR CLIMATE CHANGE LAW, PUBLIC UTILITY COMMISSIONS AND ENERGY EFFICIENCY: A HANDBOOK OF LEGAL & REGULATORY TOOLS FOR COMMISSIONERS AND ADVOCATES 7 (2012) [hereinafter COLUMBIA PUC STUDY], *available at* https://www.law.columbia.edu/null/download?&exclusive=filemgr.download&file_id=611933 (citing U.S. ENVTL. PROT. AGENCY, ROADMAP FOR INCORPORATING ENERGY EFFICIENCY/RENEWABLE ENERGY POLICIES AND PROGRAMS INTO STATE AND TRIBAL IMPLEMENTATION PLANS (2012).

101 *Id.* at 7 (citing SARA HAYES & RACHEL YOUNG, ENERGY EFFICIENCY: THE SLIP SWITCH TO A NEW TRACK TOWARD COMPLIANCE WITH FEDERAL AIR REGULATIONS (2012)).

102 KENT ET AL., *supra* note 81, at 6–7.

103 HOWLAND ET AL., *supra* note 98, at 4.

104 *Id*.

105 *Id.* A job year is one full-time job for a period of one year. *Id.*

106 *Id.*

107 *Id*.

global competitiveness of local employers and leads to additional growth.[108] The bottom line of the *ENE Study* is that every dollar spent on energy efficiency program expenditures will lead to $5.90 of increased gross state products ("GSPs") in the region.[109]

B. The Current Lack of Investment in Demand-Side Resources in West Virginia

By any measure, West Virginia has a poor track record of investing in energy efficiency, demand response, and conservation programs. Decision-makers in the state have not adopted any policies recognizing that energy efficiency is a critical resource to be developed in West Virginia. Investor-owned utilities operating in the state are following this lead (or lack thereof), and offer very few energy efficiency programs to their customers in West Virginia. In fact, they offer far fewer programs in West Virginia than in the other states in which they operate.

With respect to policy and program efforts, the *ACEEE Scorecard* is prepared annually and "serves as a benchmark for state efforts on energy efficiency policies and programs."[110] As noted above, the *ACEEE Scorecard* ranks West Virginia 49th out of the fifty states and the District of Columbia; West Virginia ranks ahead of only North Dakota (fiftieth) and Mississippi (fifty-first).[111] Out of fifty possible points in the scoring methodology used in the *ACEEE Scorecard*, West Virginia received six points.[112] In contrast, the number one state, Massachusetts, received 43.5 points.[113] The states surrounding West Virginia fared much better in the ACEEE rankings: Maryland was ranked ninth with 30 points, Pennsylvania twentieth with 21.5 points, Ohio twenty-second with 19.5 points, and Kentucky thirty-sixth with 13.5 points.[114]

There are several reasons why West Virginia fares so poorly in the *ACEEE Scorecard*. First, the state has no enunciated policy endorsing the importance of energy efficiency as a resource. Twenty-four states have adopted an Energy Efficiency Resource Standard ("EERS"), which establishes an energy savings target that utilities must meet through energy efficiency programs.[115] These standards are typically expressed as multi-year savings

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108 *Id.*

109 *Id.* at 4 tbl.ES2.

110 FOSTER ET AL., *supra* note 25, at v.

111 *Id.* at ix.

112 *Id.*

113 *Id.*

114 *Id.*

115 *Id.* at 19.

targets, such as 2% incremental savings per year or 20% cumulative savings by 2020.[116]

It should be noted that among the surrounding states, Ohio,[117] Maryland,[118] and Pennsylvania[119] all have adopted an EERS. In West Virginia, State House Delegate Mike Manypenny sponsored legislation introduced in 2012 that would have established an EERS requiring electric utilities to reduce electricity consumption by 5% from 2010 levels by 2018 and 15% by 2025.[120] The bill also would have provided financial incentives for utilities that meet or exceed their targets.[121] The bill never made it to a vote in the House Judiciary Committee.[122]

Second, the energy efficiency programs offered by the investor-owned utilities operating in West Virginia are woefully deficient. In the case of FirstEnergy's two subsidiaries operating in the state, Monongahela Power

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116 *Id.* According to ACEEE, an EERS has the following attributes: (1) energy savings targets that are quantifiable, which reinforce the idea that energy efficiency is a utility system resource on par with supply-side resources; (2) energy savings targets that are generally set at levels that push efficiency programs to achieve higher savings than they otherwise would have; (3) strict requirements for cost-effectiveness so that efficiency programs are guaranteed to provide overall benefits to customers; and (4) a long-term commitment to energy efficiency as a resource, which builds essential customer engagement as well as the workforce and market infrastructure necessary to sustain the high levels of savings. *Id.* (citing SCIORTINO ET AL., ACEEE, ENERGY EFFICIENCY RESOURCE STANDARDS: A PROGRESS ON STATE EXPERIENCE (2011).

117 Under the EERS adopted in Ohio in May 2008, electric utilities are required to implement energy efficiency and peak demand reduction programs that result in a cumulative electricity savings of 22% by the end of 2025, with specific annual benchmarks. In addition, utilities must reduce peak demand by 1% in 2009, and by 0.75% annually through 2018. OHIO REV. CODE ANN. §4928.66 (LexisNexis 2012).

118 Under the Empower Maryland Efficiency Act adopted in 2008, Maryland set a state goal of achieving a 15% reduction in per capita electricity consumption, and 15% reduction in per capita peak demand by 2015, compared to 2007 levels. The legislation also requires the Maryland Public Service Commission to require that the state's electric utilities achieve a 5% reduction in per capita electricity consumption by 2011 and a 10% reduction by 2015, with the remainder of the overall goal of 15% to be accomplished independently through other means. MD. CODE ANN., PUB. UTIL. COS. § 7211 (LexisNexis 2012).

119 In October 2008, Pennsylvania adopted Act 129, creating energy efficiency and conservation requirements for the state's investor owned utilities with at least 100,000 customers. The standard obligated utilities to develop plans to provide expected electricity savings of 1% by May 31, 2011, and 3% by May 31, 2013, measured against projected electricity consumption for the period from June 2009 to May 2010. The utilities are also required to develop plans that provide for peak demand savings of 4.5% by May 31, 2013, measured against actual peak demand from June 2007 to May 2008. 66 PA. CONS. STAT. ANN. § 2806.1 (West 2008).

120 H.B. 4363, 2012 Leg., Reg. Sess. (W. Va. 2012), http://www.legis.state.wv.us/Bill_Status/bills_text.cfm?billdoc=hb4363%20intr.htm&yr=2012&sesstype=RS&i=4363.

121 *Id*.

122 SCIORTINO ET AL, *supra* note 82, at 51.

Company and The Potomac Edison Company, the PSC on December 30, 2011, approved their "Phase I Plan for Energy and Demand Reduction Efforts."[123] In that Order, the PSC approved two energy efficiency programs: the residential low-income program[124] and the non-residential lighting program.[125] According to the *FE Resource Plan*, the two programs together are designed to reduce energy and peak demand by 0.5% of the two utilities' 2009 West Virginia sales and 0.5% of the two utilities' West Virginia peak demand.[126] These are the only two energy efficiency programs offered by the FirstEnergy affiliates in West Virginia.

Notably, FirstEnergy's other operating companies offer a wide array of energy efficiency programs in the other states in which FirstEnergy operates (Maryland, New Jersey, Ohio and Pennsylvania). In Ohio, Senate Bill 221 (passed by the General Assembly in 2008) requires the Ohio subsidiaries of FirstEnergy (Ohio Edison, The Illuminating Company, and Toledo Edison (collectively, the "Ohio Companies")) to implement energy efficiency programs that, beginning in 2009, achieve energy savings of at least 0.3% of annual sales, with energy savings increasing to more than 22% by the end of 2025.[127] Peak demand reductions of 1% in 2009 and increasing to 7.75% by the end of 2018 are also required.[128] In response to this requirement, the OPUC in March 2011 approved the three-year energy efficiency plan of the Ohio Companies, which included the following elements: appliance turn-in

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[123] Pub. Serv. Comm'n of West Virginia v. Monongahela Power Co., No. 11-0452-E-P-T, at *30 (W. Va. Dec. 30, 2011), *available at* http://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=336129.

[124] The Residential Low-Income Program provides energy efficiency measures to low income residential customers by providing energy efficiency information and education, as well as the installation of select energy efficient technologies. The Program consists of a "home check-up energy audit," during which energy efficiency devices are installed at no cost to the customer, including compact fluorescent light ("CFL") bulbs in primary use lighting, up to three faucet aerators, and one low-flow showerhead. FE RESOURCE PLAN, *supra* note 27, at 28. "In addition, qualifying customers are eligible for the free replacement of their existing refrigerator with an Energy Star-rate refrigerator of like size if the existing refrigerator is ten years old or older or otherwise determined to be inefficient." *Id.*

[125] The non-residential lighting program "offers lighting energy efficiency measures to non-residential retail customers to promote the replacement of older, inefficient lighting technologies, such as incandescent and older fluorescent lighting, with new, high-efficiency lighting." *Id.* at 27. The utilities estimate that 71,500 non-residential customer accounts are eligible to participate in the program. Participating customers are eligible to apply for rebates based on a portion of the customer's incremental cost of installing high-efficiency lighting equipment. *Id.*

[126] *Id.*

[127] S.B. 221, 127th Gen. Assemb., (Ohio 2008), *available at* http://www.legislature.state.oh.us/BillText127/127_SB_221_EN_N.pdf.

[128] *Id.*

program,[129] Community Connections,[130] Comprehensive Residential Retrofit Program,[131] Direct Load Control Program,[132] Efficient New Homes Program,[133] and Energy Efficient Products Program.[134] In Pennsylvania, Act 129 of 2008 required utilities to offer programs that would enable customers to achieve electricity savings of at least 1% by May 31, 2011, and of at least 3% by May 31, 2013, from prior usage levels.[135] The law also required utilities to attain reductions in peak demand for electricity by a minimum of 4.5% by May 31, 2013.[136] In response to these requirements, FirstEnergy's Pennsylvania subsidiaries (Metropolitan Edison, Penelec, Penn Power and West Penn Power) implemented the following energy efficiency programs in Pennsylvania: Walk-Through Energy Audit,[137] Whole House Energy Audit,[138] Energy Efficient

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129 Ohio Pub. Util. Comm'n, No. 09-1947-EL-POR (Ohio Mar. 23, 2011), *available at* http://dis.puc.state.oh.us/TiffToPDf/A1001001A11C23B42010H41713.pdf. This program offers residential customers a monetary incentive and free pick up and disposal service for second refrigerators, freezers and room air conditioners. The incentive was set at $50 initially, with a reduction to $35 six months after the launch of the program. *Appliance Turn-In Program*, JACO ENVTL., https://www.jacoinc.net/weborder/rebatex.aspx?ProgramID=119 (last visited Mar. 11, 2013).

130 This program provides weatherization measures, energy efficient solutions and energy education to low-income customers. *Community Connections*, FIRSTENERGY, https://www.firstenergycorp.com/content/customer/save_energy/save_energy_ohio/for_your_home/community_connections.html (last modified Nov. 29, 2012).

131 This program offers residential customers a comprehensive home energy audit for a discounted fee of $100. Customers who implement eligible energy savings measures as a result of the audit can receive rebates. OFF. OF THE OHIO CONSUMERS' COUNSEL, FIRSTENERGY ENERGY EFFICIENCY PROGRAMS (2011), *available at* http://www.pickocc.org/publications/energy_efficiency/Energy_Efficiency_Programs_FE.pdf.

132 This program offers eligible residential customers a programmable thermostat that allows the utility to curtail air conditioning usage by "setting back" the thermostat by four degrees for up to four hours during a critical peak day. *Id.*

133 This program provides rebates to local builders for achieving energy efficiency targets in new residential construction. *Id.*

134 This program provides rebates to consumers and financial incentives and support to retailers that sell energy efficient products including ENERGY STAR appliances and high efficiency lighting. *Id.*

135 66 PA. CONS. STAT. ANN. § 2806.1(c)(1)–(2) (West 2012).

136 *Id*.

137 During the walk-through energy audit, an auditor will evaluate a home's energy efficiency and make recommendations for improvements to help save energy and money, and the auditor may install energy-saving products worth up to $50, which would help offset the $50 audit fee. *Walk Through Energy Audit Program*, FIRSTENERGY CO., http://energysavepa-home.com/walkthrough/walk-through-audit (last visited Mar. 11, 2013).

138 The Whole House Program helps identify energy efficiency improvements that may qualify for up to $1,200 in total rebates, including up to $300 in rebates for participating in a two-part comprehensive home energy audit and up to $900 in rebates for installing energy-saving improvements such as air sealing, duct sealing, insulation, duct insulation, and windows and

Products Program,[139] Appliance Turn-In Program,[140] CFL Discounts,[141] HVAC Program,[142] Solar Thermal Equipment Rebates,[143] Energy Efficient New Homes,[144] Easy Cool Rewards,[145] and EasyGreen.[146]

Apart from the relatively modest program adopted by FirstEnergy's operating utilities in West Virginia, the *FE Resource Plan* also contains a number of statements expressing that utility's lack of interest in pursuing

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doors. *Whole House Program*, FIRSTENERGY CO., http://energysavepa-home.com/wholehouse/whole-house-program (last visited Mar. 11, 2013).

139 This program allows customers to take advantage of rebates on the purchase of energy-efficient products including: $1 off the purchase of select ENERGY STAR qualified CFL bulbs, up to $75 for appliances such as clothes washers, refrigerator-freezers, freezers, room air conditioners, and dehumidifiers, up to $10 for household products including LED holiday light sets, energy-saving surge protectors and torchiere floor lamps at participating retail stores and FirstEnergy's online store, and up to $300 for heat pump water heaters and electric water heaters. *Energy Efficient Products Program*, FIRSTENERGY CO., http://energysavepa-home.com/appliance (last visited Mar. 11, 2013).

140 Similar to the program offered by the Ohio Companies, customers can receive a check for $50 for turning in an old refrigerator or freezer and $25 for a working air conditioner. *Appliance Turn in Program*, JACO ENVTL., https://www.jacoinc.net/weborder/rebatex.aspx?ProgramID=80 (last visited Mar. 11, 2013).

141 This program provides a rebate of $1 on each ENERGY STAR qualified light bulb purchased. *CFL Discounts*, FIRSTENERGY CO., http://energysavepa-home.com/cfl (last visited Mar. 11, 2013).

142 This program offers rebates on qualified energy-saving heating, ventilation, and air conditioning ("HVAC") solutions, including up to $75 on the tune-up of an existing central air conditioner, up to $300 on the installation of a new high-efficiency central air conditioner, up to $400 on the purchase of an air-to-air heat pump, and up to $217/ton on the installation of an ENERGY STAR qualified geothermal heat pump. *Residential HVAC Program*, FIRSTENERGY CO., http://energysavepa-home.com/hvac/residential-hvac (last visited Mar. 11, 2013).

143 Under this program, customers can receive a $500 rebate for the installation of high-efficiency solar thermal water heating systems. *Residential Solar Thermal Program*, FIRSTENERGY CO., http://energysavepa-home.com/solar/residential-solar-thermal-program (last visited Mar. 11, 2013).

144 As in the program of the same name offered in Ohio, this program provides incentives to local builders for achieving energy efficiency targets in new residential construction. *Pennsylvania Energy Efficient New Homes*, FIRSTENERGY CO., http://www.energysavepa-newhomes.com/ (last visited Mar. 11, 2013).

145 Participants in this program receive "$60 in cash incentives ($40 following the installation of [a] thermostat and an additional $20 after the summer of 2012)" and a professionally-installed Honeywell programmable thermostat (a $250 value) that may reduce heating and cooling costs by up to 15% or an outside cycling switch. *Easy Cool Rewards Program*, FIRSTENERGY CO., http://www.easycoolrewards.com/easy-cool-rewards-program (last visited Mar. 11, 2013).

146 This is an energy management program using smart grid technology to save money for participating customers and reduce the level of energy needed during peak and emergency electrical use periods. Although Metropolitan Edison briefly suspended this program, it was re-instated in July 2012. Liam Migdail-Smnith, *Met-Ed Restarts EasyGreen Energy Program*, READINGEAGLE.COM (July 13, 2012), http://readingeagle.com/article.aspx?id=398677.

energy efficiency as a resource. For example, the *FE Resource Plan* states that "[b]ecause of the significant nature of Mon Power's capacity shortfall, demand side resource options are not a viable solution capable of meeting Mon Power's obligations" and thus "were not considered as a viable, long-term solution to Mon Power's significant capacity and energy needs."[147] Given this conclusion, the *FE Resource Plan* contains no analysis of demand-side options on a consistent and integrated basis with supply-side options, and adopts a "preferred approach" of entering into a transaction whereby Mon Power and Potomac Edison would acquire additional ownership rights in existing coal plants owned by other FirstEnergy subsidiaries.[148]

In addition to foregoing any quantitative analysis of demand-side options, the *FE Resource Plan* rejects in principle the notion of paying customers to acquire energy efficiency savings. According to the *FE Resource Plan*, "[i]f an EE [energy efficiency] resource is cost-effective for the consumer, it stands to reason that the consumer, when faced with an economic decision of whether or not to install the EE resource, would eventually do so regardless of any out-of-market incentive or utility program."[149] Demand response ("DR") programs are similarly rejected as an inadequate solution. The *FE Resource Plan* states that consumer participation in these programs "directly correlates to the subsidies customers receive," and "[t]he cost of interruption to a consumer may be below the benefit achieved through DR participation one year and above the next."[150] Thus, consumers will "move in and out of participation based on their cost-benefit analysis of being interrupted."[151] The *FE Resource Plan* also states, without support, that "[t]here are also performance risks associated with DR resources."[152]

In the case of AEP's two operating companies in West Virginia, Appalachian Power and Wheeling Power, the PSC in 2009 ordered

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[147] FE RESOURCE PLAN, *supra* note 27, at 56. According to the planning document,

> [d]emand-side resources are inherently capacity-only resources and do not address energy shortfalls as significant as the shortfall faced by Mon Power; nor can DR [demand response] programs be developed in sufficient quantity to satisfy Mon Power's capacity deficiency shortfall. DR resources are short-term in nature, and pledged capacity would vary from year to year. Programs to reduce demand simply cannot fulfill the need for to [sic] supply side resources on this scale.

Id.

[148] *Id.* at 54.

[149] *Id.* at 40. The *FE Resource Plan* goes on to state that "EE programs which provide out-of-market incentives expedite the decision and advance the installation of the resource sooner than it would occur naturally." *Id.*

[150] *Id.* at 41.

[151] *Id.*

[152] *Id.* Of course, similar "performance risks"—the expected capacity reductions not materializing when called upon—exist in the case of supply-side resources. Generating plants can fail to perform due to outages, among other things.

Appalachian Power to submit an energy efficiency plan with its 2010 rate case.[153] The final order in 2010 directed the AEP companies to implement approved programs which included low-income weatherization, residential home audit, residential lighting, and commercial/industrial prescriptive incentives.[154] According to the integrated resource plan filed by AEP with the Virginia Corporation Commission, these programs, which were approved in February 2011, were expected to result in 1.1% of installed saving in 2012.[155] The actual results, however, have fallen far short; AEP achieved savings of only 0.4% in West Virginia in 2012.[156] In contrast to the statements in the *FE Resource Plan* diminishing the role of demand-side programs, the *AEP Resource Plan* contains several positive statements about the potential contributions of demand-side programs, and acknowledges that AEP companies have far more aggressive demand-side programs in place in states outside of West Virginia. According to the *AEP Resource Plan*, "[d]emand-side resources will likely play a significant role in satisfying capacity and energy requirements prospectively as *they are the least-cost resource*, even in significant amounts."[157] The *AEP Resource Plan* states that "it is reasonable to assume that there is a fairly large well of latent cost-effective EE available."[158] The *AEP Resource Plan* goes on to state that as costs continue to increase, customer acceptance of demand-side programs will also increase "as they seek ways to reduce costs."[159] While the *AEP Resource Plan* includes only a "measured but systematic approach to building demand-side capability," it states that "even larger amounts should be considered."[160] Rather than including the level of demand-side measures that is cost-competitive with the supply-side counterparts, however, the *AEP Resource Plan* reflects the level of demand-side programs currently required by the states in which AEP operates.

The comparative level of commitment to demand-side resources is instructive. As noted above, AEP estimates that the two-year program approved in West Virginia in February 2011 will result in 1.1% of installed savings in

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153 W. Va. Pub. Serv. Comm'n, Case v. Appalachian Power Co., No. 09-0177-E-GI, at *36 (Sept. 30, 2009), *available at* http://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=280007.

154 SCIORTINO ET AL., *supra* note 82, at 51.

155 AEP RESOURCE PLAN, *supra* note 40, at 64.

156 AEP reported 66 million KWh in savings for 2012. Kasey, *supra* note 53. APCo and Wheeling's West Virginia load was 17,000 GWh in 2011, so 64 million KWh represents about 0.4% of sales. ENERGY INFO. ADM., SALES BY STATE AND UTILITY: ALL SECTORS (2011), *available at* http://www.eia.gov/electricity/sales_revenue_price/pdf/table10.pdf.

157 ENERGY INFO. ADM., *supra* note 155, at 137–38 (emphasis added).

158 *Id.* at 60.

159 *Id.* at 138.

160 *Id.*

2012 (although its actual results fell far short of that, at 0.4% in 2012).[161] In Ohio, the mandated levels of demand reduction and/or energy efficiency attainment will result in installed energy efficiency measures equal to over 20% of all energy otherwise supplied by 2025.[162] Indiana's standard achieves installed energy efficiency reductions of 13.9% by 2020, while Michigan's standard achieves 10.55% in the same year.[163] Virginia, for its part, has a voluntary 10% energy efficiency target by 2020.[164] AEP has ramped up its energy efficiency programs to meet those mandates in the states in which it operates. West Virginia, as noted above, has no comparable statewide mandate. Rather, the PSC has acted on a utility-specific basis, as when it ordered Appalachian Power in its 2010 rate case to file for approval of energy efficiency programs in West Virginia.

One of the items evaluated in the 2012 *ACEEE Scorecard* is the size of annual electric energy efficiency program budgets, which reflects the level of customer-funded (either through utility rates or directly on customer bills through a surcharge) energy efficiency programs. The 2012 *ACEEE Scorecard* reflects a "zero" for West Virginia, presumably because the AEP and First Energy programs were just getting started and not yet reflected in utility rates.[165] Similarly, West Virginia did not fare well in the ranking of net incremental electricity savings for 2010. According to the 2012 *ACEEE Scorecard*, West Virginia saved only 908 MWh, which amounted to less than 0.01% of sales, placing West Virginia last in the rankings.[166] Vermont had the highest percentage of savings in 2010, representing 2.32% of retail sales; Vermont achieved 117,233 MWh of net incremental savings.[167] California recorded the highest level of net incremental savings, 4.617 million MWh, which amounted to 1.79% of retail sales.[168]

Third, the PSC has not adopted any policies that provide any financial incentives for utilities to invest in energy efficiency measures, or even to remove the disincentive for utilities to promote energy efficiency. Policymakers have long recognized that utilities have a disincentive to promote conservation or to invest in energy efficiency programs given that, if successful, the utility will sell less of its product. Utility rates are typically set in a manner that

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161 *Id.* at 64. As noted in note 155, *supra*, AEP's actual results in West Virginia fell far short of this target, achieving only 0.4% in 2012.

162 *Id.* at 25.

163 *Id.*

164 *Id.*

165 FOSTER ET AL., *supra* note 25, at 28. For comparison purposes, Maryland ranked thirteenth with spending of $156.4 million, representing 2.05% of utility revenues. *Id.* at 26.

166 *Id.* at 31.

167 *Id.*

168 *Id.*

assumes a particular level of sales during the period following the rate order.[169] In order for the utility to have a reasonable opportunity to earn the rate of return awarded by the regulator, the utility generally needs to achieve the level of sales assumed when rates were set. If the utility promotes conservation by its customers or invests in energy efficiency programs, however, those programs, if successful, will likely result in a sales volume lower than the assumed level, and the utility will fail to earn its allowed rate of return.[170]

In response to this dynamic, many utility commissions have adopted ratemaking mechanisms designed to hold the utility harmless from the profit impact of the lower volumes that are presumed to result from conservation and energy efficiency. The first, commonly referred to as decoupling (because it removes the link between sales volumes and profits), is a ratemaking mechanism that tracks the "under-recovery" of profit margin attributable to the reduced volumes and allows the utility to increase its rates slightly in a subsequent proceeding to keep it whole from those reduced volumes.[171] A second regulatory mechanism is a lost revenue adjustment, which is a prescriptive approach that typically considers the revenue reduction attributable to specific energy efficiency measures, and then adjusts rates to hold the utility harmless from the lost profit margin from those measures, based on the actual number of measures installed during a particular period. [172]

The *ACEEE Scorecard* states that "regulatory mechanisms that provide incentives and remove disincentives for utilities to pursue energy efficiency (i.e., performance incentives and decoupling/lost revenue adjustment mechanisms) are critical to leveraging energy efficiency funding and encouraging savings over the near and long terms."[173] The PSC in West

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[169] The *ACEEE Scorecard* states the following:

> Under traditional regulatory structures, utilities do not have an economic incentive to help their customers become more energy-efficient. In fact, they typically have a disincentive because falling energy sales from energy efficiency programs reduce utilities' revenues and profits, an effect referred to as 'lost revenues' or 'lost sales.' Since utilities' earnings are usually based on the total amount of capital invested in certain asset categories (such as transmission lines and power plants) and the amount of electricity sold, the financial incentives are very much tilted in favor of increased electricity sales and expanding supply-side systems.

Id. at 20.

[170] *See id.* at 20–21.

[171] "Decoupling—the disassociation of a utility's revenues from its sales—makes the utility indifferent to decreases or increases in sales, removing what is known as the 'throughput incentive.' Although decoupling does not necessarily make the utility more likely to promote efficiency programs, it removes the disincentive for it to do so." *Id.*

[172] "Additional mechanisms for addressing lost revenues include modifications to customers' rates that permit utilities to collect the revenues 'lost' either through a lost revenue adjustment mechanism (LRAM) or other ratemaking approach." *Id.* at 21.

[173] *Id.* at 34.

Virginia has adopted neither decoupling nor a revenue adjustment mechanism, nor has it implemented any sort of performance incentive mechanism related to energy efficiency.[174] West Virginia thus received none of the three points available for this metric in the 2012 *ACEEE Scorecard*.[175]

Fourth, West Virginia has been slow to adopt more stringent energy building codes. Buildings consume more than 40% of total energy in the United States, making them an essential target for energy savings.[176] According to ACEEE, energy codes for buildings could contribute, on average, about 15% of the total savings potential.[177] Although West Virginia's residential and commercial building codes are promulgated on a state level by the West Virginia State Fire Commission, local jurisdictions are not required to adopt them.[178] Currently in West Virginia, residential buildings are required to comply with the 2003 International Energy Conservation Code ("IECC") and the 2003 International Residential Code ("IRC") with amendments.[179]

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174 The West Virginia PSC rejected a proposal from Appalachian Power for a lost revenue recovery mechanism in 2010. Pub. Serv. Comm'n of West Virginia v. Appalachian Power Co., No. 10-0261-E-GI, at *7 (W. Va. Oct. 5, 2010), *available at* http://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=306273. ("The Commission will not include an estimate of net lost revenues in the EE/DR cost recovery mechanism approved herein. The Commission agrees with Staff and WVEUG that any net lost revenues the Companies experience as a result of EE/DR programs will be an appropriate subject for review in future base rate cases of the Companies. The estimation of net lost revenues associated with any program is difficult and subject to many potential unquantifiable variables. A customer installing low energy usage, high efficiency lighting may not have the expected level of energy reduction if the customer feels more comfortable with increased illumination once the new lighting is installed. A customer installing a high efficiency heating unit may have a less than expected decrease in usage because he may choose to increase his comfort level and therefore use a similar level of electricity as he has in the past. In such cases, the expected usage decrease and "net revenue loss" to the serving utility may be non-existent or much less than expected. On the expense side, projecting the level of expense reductions that might be associated with lower customer usage is also a less than precise exercise.") The PSC also rejected a proposal for a shared savings incentive for the utilities' EE/DR programs. *Id.* at *8.

175 FOSTER ET AL., *supra* note 25, at 37.

176 *Id.* at xi.

177 *Id.* at 3. In the 2012 ACEEE Scorecard, ACEEE therefore allocated about 15% of the total points (fifty) to building codes, or seven points. *Id.*

178 *Id.* at 139; SCIORTINO ET AL., *supra* note 82, at 32. In order for the statewide requirements to be enforced by local building officials, they must be adopted by the local jurisdictions. If local jurisdictions do not adopt the statewide standards, the responsibility for complying with the provisions of the codes is left to contractors, builders and architects. DSIRE, *West Virginia Incentives/Policies for Renewables and Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=WV05R&re=0&ee=0 (last visited Apr. 6, 2013).

179 FOSTER ET AL., *supra* note 25, at 139.

Commercial buildings are required to comply with the 2003 IECC with amendments.[180]

In April 2009, the West Virginia Legislature passed bills directing the State Fire Commission to promulgate rules adding the more stringent 2009 IECC and American Society of Heating, Refrigerating and Air-Conditioning Engineers ("ASHRAE") 90.1-2007.[181] However, energy building and sprinkler standards in the 2009 IECC code were removed during West Virginia's legislative review session because of strong opposition from the builders' associations.[182] The expectation is that the State Fire Commission will introduce a rule to bring all residential and commercial building codes into alignment with 2009 IECC standards in the next legislative session.[183]

Out of the seven points possible for building codes (based on the level of stringency of residential and commercial codes and the level of efforts to enforce compliance), West Virginia received three points in the 2012 *ACEEE Scorecard*.[184] Had the 2009 IECC been implemented for the residential and commercial codes and ASHRAE 90.1-2007 for the commercial codes—as authorized in the 2009 legislation—West Virginia would have received an additional point.[185] The "state of the art" in building codes is that residential codes meet or exceed 2012 IECC (or its equivalent) and commercial codes meet or exceed 2012 IECC or ASHRAE 90.1-2010 (or their equivalent).[186] Of the surrounding states, Maryland has adopted the 2012 IECC in its Building Performance Standards for all new and renovated residential and commercial buildings.[187]

That being said, West Virginia has made some progress in the area of building codes. In the case of state-funded construction, the legislature enacted the Green Buildings Act, which requires that construction beginning after July 1, 2012, comply with ASHRAE 90.1-2007 and the IECC adopted by the State Fire Commission.[188] This rule would apply to public schools. In addition, the state will benchmark all state-owned buildings according to state energy plan and will consider adoption of Energy Star guidelines for all new state

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180 *Id.*

181 *Id.* W. VA. CODE ANN. § 29-3-5b(c) (LexisNexis 2008).

182 SCIORTINO ET AL., *supra* note 82, at 52.

183 *Id.*

184 FOSTER ET AL., *supra* note 25, at 56.

185 *Id.* at 54.

186 *Id.*

187 *Id.* at 136. Section 12-503 of the Maryland Code requires the Department of Housing and Community Development to adopt the most recent version of the IECC within twelve months of its being issued. MD. CODE ANN. PUB. SAFETY § 12-503 (LexisNexis 2012). It may also adopt energy conservation requirements that are more stringent than the codes, but not less. *Id.*

188 SCIORTINO ET AL., *supra* note 82, at 52.

government buildings.[189] A Portfolio Manager Program will also continue benchmarking efforts in local governments.[190]

Finally, it should be noted that the absence of commitment to policies promoting energy efficiency and conservation is causing West Virginia to fall further behind the rest of the country and surrounding states. The 2011 *ACEEE Scorecard* had West Virginia ranked 44th, for example, or five places higher than the 2012 *ACEEE Scorecard* ranking.[191] Much of the rest of the nation is recording substantial increases in spending on energy efficiency programs, and is achieving significant increases in the annual savings from customer-funded energy efficiency programs. Nationwide, utility budgets for electric efficiency programs rose 29% over the previous year, amounting to almost $5.9 billion in 2011.[192] Annual savings from customer-funded energy efficiency programs exceeded 18 million MWh in 2010, representing an increase of 40% over a year earlier.[193] This level of expansion in energy efficiency activities nationwide is not being matched in West Virginia, and in large part explains the significant drop (five places) in the *ACEEE Scorecard* rankings for West Virginia between 2011 and 2012.

III. THE CASE FOR AN EFFECTIVE RENEWABLE PORTFOLIO STANDARD

A. Background on Renewable Portfolio Standards

A renewable portfolio standard ("RPS") is a statutory or regulatory mandate requiring utilities to derive a specified percentage of their load from renewable sources of energy by a specific date.[194] Elements of RPS programs include fixed dates by which prescribed percentages must be met, definitions of the energy sources or technologies that are considered to be "renewable," identification of the entities that are regulated under the RPS, penalties for failing to comply with procurement obligations of the RPS, and procedures on how the program will be administered.[195] Utilities are given flexibility in determining how to meet this standard; generally, the utility may produce the renewable energy itself, purchase renewable energy from renewable energy

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[189] *Id*.

[190] *Id.*

[191] FOSTER ET AL., *supra* note 25.

[192] *Id.* at vi.

[193] *Id*.

[194] James M. Van Nostrand & Anne Marie Hirschberger, *Implications of a Federal Renewable Portfolio Standard: Will It Supplement or Supplant Existing State Initiatives*, 41 U. TOL. L. REV. 853, 855 (2010).

[195] *Id.*

projects owned by others, or purchase renewable energy certificates or credits ("RECs") on the market.[196]

While there is currently no federally mandated RPS, the vast majority of states have taken the initiative to establish either an RPS or a similar program geared toward the broadening of that state's energy portfolio. Alternatively, states may opt to have other types of similar energy policies such as renewable energy goals or an Alternative Energy Portfolio Standard ("AEPS"). Renewable energy goals function in much the same way as RPSs except that the standards are not binding. Virginia, Florida, North Dakota, South Dakota, and Utah have renewable energy goals.[197] AEPSs also operate much like RPSs, except that utilities are required to supply a percentage of their load with energy derived from both renewable energy sources and other energy sources defined as "alternative."[198] As discussed further below, the provision in West Virginia is classified as an AEPS as it allows for such "alternative" sources.[199] In addition to West Virginia, the surrounding states of Pennsylvania and Ohio also have AEPSs.[200]

In addition, states may employ individualized strategies to help them meet particular renewable energy objectives. For example, an RPS may require that a certain portion of the overall percentage must be met by a specific energy source.[201] Tiers/classes achieve this through formally designated categories that group various sources together and apply specific percentages to each group.[202] New Hampshire, for example, has an overall standard of 24.8% by 2025, and its RPS goes a step further by creating four different classes to ensure that 16%, 0.3%, 6.5% and 1.0%, respectively, were met by different renewable energy sources as defined by New Hampshire law.[203]

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196 *Id.*

197 *Id.*

198 *Id.*

199 *West Virginia Incentives/Policies for Renewables and Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=WV05R&re=0&ee=0 (last visited Mar. 11, 2013).

200 *Ohio Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=OH14R&re=0&ee=0 (last visited Mar. 11, 2013); *Pennsylvania Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=PA06R&re=0&ee=0 (last visited Mar. 11, 2013). For a compilation of information on the various state RPS, AEPS, and renewable goal policies and targeted years of attainment, see *RPS Policies*, *supra* note 10.

201 Van Nostrand & Hirschberger, *supra* note 193, at 856.

202 *Id.*

203 *New Hampshire Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NH09R&re=0&ee=0 (last visited Mar. 14, 2013).

Carve-outs can be used to achieve similar results. Rather than specifically creating tiers, an RPS can simply specify that a certain percentage must be met by a certain source.[204] New Jersey, for example, has an overall renewable requirement of 20.38% by 2020–2021, with a separate requirement of 4.1% by 2027–2028 that must be procured from solar sources.[205] Multipliers are incentives that promote particular energy sources by allowing more than one REC to be created per MWh.[206] These incentives are also used to promote the development of renewable energy sources within the state.[207] For example, Colorado uses one set of multipliers (1.25/1.5x) to promote in-state generation generally and another (3x) to promote solar generation.[208]

Some states also permit RPS targets to be met by energy efficiency measures.[209] The states of Hawaii, Michigan, North Carolina, Nevada, and West Virginia all allow energy efficiency to count towards a particular regulated entity's RPS obligations as long as it meets that particular state's requirements.[210]

B. West Virginia's Alternative and Renewable Energy Portfolio Standard

West Virginia passed the Alternative and Renewable Energy Portfolio Act in June 2009.[211] The AEPS requires electric utilities to supply 25% of retail electric sales from eligible alternative and renewable energy sources by 2025 and provides for interim targets of 10% by 2015 and 15% by 2020.[212] To qualify, electricity produced by alternative and renewable sources must be generated or purchased from a facility in West Virginia or in the region served by the PJM[213] wholesale market.[214] Furthermore, the standard measures compliance based on tradable credits for electricity produced by alternative and

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[204] Van Nostrand & Hirschberger, *supra* note 193, at 857.

[205] *New Jersey Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NJ05R&re=0&ee=0 (last visited Mar. 14, 2013).

[206] Van Nostrand & Hirschberger, *supra* note 193, at 857.

[207] *Id.*

[208] *Colorado Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CO24R&re=0&ee=0 (last visited Mar. 14, 2013).

[209] Van Nostrand & Hirschberger, *supra* note 193, at 857.

[210] *Id.*

[211] W. VA. CODE ANN. § 24-2F-1 to -12 (LexisNexis 2012).

[212] *Id.* § 24-2F-5.

[213] PJM is the regional transmission organization, or RTO, that coordinates the movement of wholesale electricity in all or parts of thirteen states (including West Virginia) and the District of Columbia. *About PJM*, PJM, http://www.pjm.com/about-pjm.aspx (last visited Mar. 10, 2013).

[214] W. VA. CODE ANN. § 24-2F-4 (LexisNexis 2012).

renewable sources.[215] An individual credit is equal to one MWh of alternative or renewable electricity generation.[216] The program awards credits differently based on whether the electricity is generated from an alternative energy resource facility or a renewable energy resource facility.[217] One credit is awarded for each MWh of alternative energy generation, two credits for renewable energy generation, and three credits for renewable energy generation located on a reclaimed surface mine.[218] The West Virginia PSC is also authorized to award one credit to an electric utility for each ton of CO_2 equivalent reduced or offset by approved projects.[219] Finally, the PSC may award one credit to an electric utility for each MWh of electricity conserved by an approved energy efficiency or demand-side management project.[220]

Utilities were required to submit compliance plans to the PSC by January 1, 2011, and then subsequently submit annual reports outlining their progress towards compliance.[221] The PSC will evaluate compliance after January 1, 2015, and impose non-compliance assessments for failure to meet the standard.[222]

The energy sources classified as "renewable" for purposes of West Virginia's AEPS include solar photovoltaic energy, solar thermal energy, wind power, run of river hydropower, geothermal energy,[223] biomass,[224] biologically derived fuel,[225] fuel cell technology,[226] recycled energy,[227] and any other

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215 *Id.* § 24-2F-5.

216 *Id.* § 24-2F-4.

217 *Id.*

218 *Id.*

219 *Id.*

220 *Id.*

221 *Id.* § 24-2F-6.

222 *Id.* § 24-2F-5(g).

223 Geothermal energy is defined to mean "a technology by which electricity is produced by extracting hot water or steam from geothermal reserves in the earth's crust to power steam turbines that drive generators to produce electricity." *Id.* § 24-2F-3(13)(E).

224 Biomass is defined to mean "a technology by which electricity is produced from a nonhazardous organic material that is available on a renewable or recurring basis, including pulp mill sludge." *Id.* § 24-2F-3(13)(F).

225 This includes methane gas, ethanol or biodiesel fuel. *Id.* § 24-2F-3(13)(G).

226 Fuel cell technology is defined to mean "any electrochemical device that converts chemical energy in a hydrogen-rich fuel directly into electricity, heat and water without combustion." *Id.* § 24-2F-3(13)(H).

227 Recycled energy is defined to mean

> useful thermal, mechanical or electrical energy produced from: (i) Exhaust heat from any commercial or industrial process; (ii) waste gas, waste fuel or other forms of energy that would otherwise be flared, incinerated, disposed of or vented; and (iii) electricity or equivalent mechanical energy extracted

resource, method, project or technology that the PSC certifies as renewable.[228] The resources defined as "renewable" in the West Virginia AEPS are commonly included in the RPS provisions of the thirty states (including the District of Columbia) with RPSs,[229] and thus this aspect of the West Virginia AEPS is unremarkable in its consistency with the policies of other states with respect to treatment of renewable resources.

The West Virginia AEPS, however, also includes an "alternative energy" section in its standard, which consists of numerous fossil fuel-derived sources of energy.[230] Applicable "alternative energy resources" include "advanced coal technology," which is defined as technology that is used in a new or existing energy-generating facility to reduce airborne carbon emissions associated with the combustion or use of coal.[231] This includes carbon capture and sequestration technology, supercritical technology, ultra-supercritical technology, pressurized fluidized bed technology, and any other resource, method, project or technology certified by the PSC as advanced coal technology.[232] Other "alternative energy resources" in the standard include coal bed methane, natural gas, fuel produced by a coal gasification or liquefaction facility, synthetic gas, integrated gasification combined cycle technologies, waste coal,[233] tire-derived fuel, and pumped storage hydroelectric projects.[234]

The treatment of "alternative energy" in the West Virginia AEPS is unusual in that it allows carbon-emitting resources to satisfy the AEPS requirements. No other state, for example, allows clean coal technology (including supercritical technology, ultra-supercritical technology, pressurized fluidized bed technology), or natural gas-fired resources to qualify as "alternative energy."[235] West Virginia is joined by only two other states (Nevada and Rhode Island) to include waste tires (or "tired-derived fuel") as

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> from a pressure drop in any gas, excluding any pressure drop to a condenser that subsequently vents the resulting heat.

Id. § 24-2F-3(13)(I).

228 *Id.* § 24-2F-3(13)(J).

229 For example, solar photovoltaic, wind power, biomass, and biofuels are included as renewable energy technologies in all thirty of the states, and geothermal is included in twenty-four. Fuel cell technology is included in twelve states, and recycled energy in ten states. *RPS and AEPS Eligible Resource Details*, C2ES, http://www.c2es.org/us-states-regions/key-legislation/renewable-energy-portfolios/details (last visited Mar. 21, 2013) [hereinafter ELIGIBLE RESOURCE COMPARISON].

230 W. VA. CODE ANN. § 24-2F-3(3) (LexisNexis 2012).

231 *Id.* § 24-2F-3(1).

232 *Id.*

233 Waste coal is defined to mean "a technology by which electricity is produced by the combustion of the by-product, waste or residue created from processing coal, such as gob." *Id.* § 24-2F-3(15).

234 *Id.* § 24-2F-3(3).

235 ELIGIBLE RESOURCE COMPARISON, *supra* note 229.

"alternative energy,"[236] and only two other states, Michigan and Ohio, in treating carbon capture and sequestration technology as "alternative."[237] Only Pennsylvania joins West Virginia in treating waste coal as "alternative energy."[238]

The West Virginia AEPS is most noteworthy because, unlike most RPSs, West Virginia does not require that a mandatory amount of the state's energy be derived from renewable sources.[239] Because West Virginia's standard does not require a minimum contribution from renewable energy resources, it is possible—and, as discussed below, is in fact reality—that utilities can comply with the standard by using only alternative resources and zero renewable resources.[240] Therefore, the renewable energy portion of the bill functions more like a "non-binding goal"[241] and is classified as a "goal" rather than a standard with respect to any obligation imposed on a utility to procure renewable energy.[242]

The PSC's 2012 Report to the legislature on compliance with the West Virginia AEPS[243] confirms that utilities in West Virginia are able to meet their compliance obligations under the AEPS entirely with "alternative" resources. Massive coal plants, because they use supercritical coal technology, qualify as "alternative energy resource facilities," and thus more than fulfill the procurement obligation imposed by the AEPS, as explained further below. These supercritical coal plants include the John Amos Plant (2900 MW, owned by AEP); the Harrison Power Station (1984 MW, owned by FirstEnergy); the Mountaineer Plant (1300 MW, owned by AEP); the Pleasants Power Station (1300 MW, owned by FirstEnergy); and the Longview Power Plant (695 MW, a merchant plant).[244] A large natural gas-fired plant, the Ceredo facility in

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236 *Id.*

237 *Id.*

238 *Id.* Waste coal, also known as "gob" or "culm," is the low-grade, residual coal left behind after coal mining operations. Press Release, Sierra Club, Randy Francisco, Waste Coal Plants a Bad Deal for Pennsylvania, Sierra Club (Mar. 3, 2009), *available at* http://www.pennsylvania.sierraclub.org/pa_chapter_2008/Press%20Reseases/20090303WasteCoalReportPressRelease_PA.pdf. Piles of waste coal are prevalent in mining states and often pollute nearby streams. *Id.* This refuse, which was originally thrown away during processing because of its low quality, can now be burned due to the development of fluidized bed combustion technology ("FBC").

239 *See RPS Policies*, *supra* note 10.

240 *Id.*

241 *Id.*

242 *Id.*

243 W. VA. PUB. SERV. COMM'N, 2012 ALTERNATIVE AND RENEWABLE ENERGY RESOURCE PLANNING ASSESSMENT (2012) [hereinafter 2012 ASSESSMENT], *available at* http://www.legis.state.wv.us/legisdocs/reports/agency/P09_CY_2012_1579.pdf.

244 *Id.* at 5–6. A "merchant" plant is not owned by an investor-owned utility with an obligation to serve retail customers, but sells its output directly into the wholesale market. Merchant plants

Huntington (523 MW, owned by AEP) also qualifies as an "alternative energy resource facility."[245] Two waste coal plants also qualify: Morgantown Energy Associates (68.9 MW) and Grant Town (80 MW).[246] Finally, the Willow Island facility (187 MW, owned by FirstEnergy) qualifies inasmuch as 10% of its fuel supply is tire-derived.[247]

Collectively, these fossil fuel-fired facilities represent 10,145 MW of capacity.[248] At a 64% capacity factor,[249] this represents about fifty-seven million MWh of electricity generated annually, representing over 70% of the total electricity production in West Virginia, which was 81,024,000 MWh in 2010.[250] Thus, the obligation under the West Virginia AEPS to procure one quarter of the electricity supply from alternative or renewable resources by 2025 could be satisfied[251] almost three times over by alternative sources using existing generating units, with twelve years to spare. Thus the AEPS does virtually nothing to stimulate development of renewable resources within West Virginia. Jeff Herholdt, Director of the West Virginia Division of Energy, confirmed this in a statement at the March 2013 West Virginia Coal Association 40th Annual Mining Symposium, stating that "[w]e're the only state that has an alternative portfolio standard that would be met with 100 percent coal."[252] It should be noted that much of the electricity generated in

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may also be called non-utility generators, or independent power producers. Merchant plants that sell all of their output wholesale must receive authorization from the Federal Energy Regulatory Commission to sell their output at market-based rates. S*ee* BOSSELMAN ET AL., *supra* note 79, at 626.

245 2012 ASSESSMENT, *supra* note 243, at 5.

246 *Id.*

247 *Id.* at 6.

248 The *2012 Assessment* also lists the facilities in West Virginia qualifying as "renewable energy resource facilities." *Id.* at 6–8. These include 583 MW of wind facilities, 462 MW of hydro facilities, 637.32 kW of solar facilities, and 1.9 MW of landfill gas. *Id.* The *2012 Assessment* also includes 140 MW of biomass, based on the Albright facility, which is a coal-fired plant owned by FirstEnergy, being 10% co-fired with biomass. The Albright facility closed in August 2012. *Id.* at 8.

249 "Capacity factor" is a measure of how often an electric generator runs for a specific period of time. It compares how much electricity a generator actually produces with the maximum it could produce at continuous full power operation during the same period. *Frequently Asked Questions*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/tools/faqs/faq.cfm?id=187&t=3 (last visited Mar. 14, 2013). In 2009, the average capacity factor for coal-fired generation was 63.8%. U.S. ENERGY INFO. ADMIN., ELECTRIC POWER ANNUAL 2009 48 (2011), *available at* http://www.eia.gov/electricity/annual/archive/03482009.pdf.

250 ENERGY BLUEPRINT, *supra* note 17, at 15.

251 Assuming that the output of these plants is used to provide electricity service in West Virginia rather than being exported to other states. West Virginia's utilities have historically supplied 60–70% of their generation to utilities in neighboring states. *Id*. at 20.

252 Ken Ward, Jr., *Coal Lobby Wary, but Hopeful of Industry's Future*, CHARLESTON GAZETTE, Mar. 7, 2013, *available at* http://www.wvgazette.com/News/201303070070. Mr.

West Virginia (45,541,000 MWh in 2010) is exported;[253] the amount sold by West Virginia utilities to retail customers in 2010 was 15,373,393 MWh by Appalachian Power and 10,676,292 MWh by Mon Power.[254]

FirstEnergy confirmed in its *FE Resource Plan* that the AEPS will not require it to procure any "renewable" energy to meet its procurement obligations. According to their Compliance Plan filed with the West Virginia PSC, "Mon Power and Potomac Edison anticipate they will generate enough credits based upon currently available resources for the 15-year term that no additional development, purchase or procurement will be necessary."[255] Accordingly, Mon Power plans to acquire additional renewable resources "only to the extent that the costs of this generation is as competitive and useful as conventional generation forms."[256] The Compliance Plan filed for Appalachian Power and Wheeling Power similarly shows that these AEP utilities will have sufficient generation qualifying as "renewable" or "alternative" under the AEPS to produce "credits" in excess of its needs of 37,434 over the fifteen-year compliance period.[257]

As will be discussed further in Part VI of this Article, policymakers in West Virginia should consider revisions to the AEPS to include measures that would encourage the development of the state's renewable energy potential.

IV. THE CASE FOR STIMULATING RENEWABLE ENERGY DEVELOPMENT

Notwithstanding the absence of any binding procurement obligation under the West Virginia AEPS requiring utilities in the state to develop renewable energy resources, there has been some development of the state's considerable renewable resource potential. The current renewable energy resources in West Virginia include six large wind projects with an aggregate

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Herholdt also stated that the State's AEPS "is not bringing in the other energy sources," and "would have very little impact on coal production or use." According to Mr. Herholdt, "[w]e're not incentivizing renewables with this portfolio." *Id*.

253 ENERGY BLUEPRINT, *supra* note 17, at 20.

254 W. VA. PUB. SERV. COMM'N, ANNUAL REPORT STATISTICS 32 (2010), *available at* http://www.psc.state.wv.us/AnnualStatRpts/anstatrpt2010.pdf.

255 ALLEGHENY ENERGY, MONONGAHELA POWER COMPANY & THE POTOMAC EDISON COMPANY'S ALTERNATIVE AND RENEWABLE ENERGY PORTFOLIO STANDARD COMPLIANCE PLAN AND ANNUAL REPORT 2 (2010), *available at* http://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=312051&NotType='WebDocket.

256 FE RESOURCE PLAN, *supra* note 27, at 52.

257 W. VA. PUB. SERV. COMM'N, WEST VIRGINIA ALTERNATIVE AND RENEWABLE ENERGY STANDARD COMPLIANCE PLAN FOR APPALACHIAN POWER COMPANY (APCO) & WHEELING POWER COMPANY (WPCO) exhibit 3 at 5 (2010), *available at* http://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=312071&NotType='WebDocket. Each of these credits represents a gigawatthour (GWh) in excess of the amounts necessary to meet the AEPS requirement. *See id.*

capacity of 583 MW, ten hydro projects totaling 462 MW, and six small solar projects with an aggregate capacity of less than 1 MW, specifically 637.32 kW.[258] Given the structure of the West Virginia AEPS, and the ability of the procurement obligation to be satisfied entirely with "alternative" sources that include traditional fossil fuel-fired generation, it is safe to conclude that these facilities were not developed for purposes of achieving compliance with the West Virginia AEPS. Rather, because surrounding states, and other states within the PJM wholesale market, have operative renewable portfolio standards that actually stimulate the development of renewable resources, projects located in West Virginia can be used to meet the procurement obligations imposed by those RPS provisions.[259]

There is a separate market for renewable energy certificates or credits, or RECs, that provides value for the developers of renewable energy projects in West Virginia, and produces a revenue stream based on the "renewable attributes" of these projects used by utilities to satisfy their procurement obligations under the RPS provisions of surrounding states and other states within the PJM region.[260] So the existing development of renewable resources

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258 2012 ASSESSMENT, *supra* note 243, at 4–5.

259 Pennsylvania's Alternative Energy Portfolio Standard requires 18% of alternative energy resources by compliance year 2020–21. *Pennsylvania Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=PA06R&re=0&ee=0 (last visited Apr. 6, 2013). Ohio's Renewable Portfolio Standard requires 12.5% of renewable energy resources by 2024 and 12.5% of advanced energy resources by 2025. *Ohio Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=OH14R&re=0&ee=0 (last visited Apr. 6, 2013). Maryland's Renewable Portfolio Standard requires electricity suppliers to use renewable energy sources to generate a minimum of 20% of retail sales from Tier 1 resources (solar, wind, qualifying biomass, methane from the anaerobic decomposition of organic materials in a landfill or a waste water treatment plant, geothermal, ocean (including energy from waves, tides, currents and thermal differences), fuel cells powered by methane or biomass, and small hydroelectric plants) in 2022 and beyond, and 2.5% from Tier 2 resources (hydroelectric power other than pump-storage generation, and waste-to-energy facilities) from 2006 through 2018. *Maryland Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=MD05R&re=0&ee=0 (last visited Apr. 6, 2013). Virginia's Voluntary Renewable Energy Portfolio Goal encourages investor-owned utilities to procure 15% of base sales in 2025 from eligible renewable energy sources. *Virginia Incentives/Policies for Renewables & Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=VA10R&re=0&ee=0 (last visited Apr. 6, 2013).

260 A REC represents the property rights to the environmental, social, and other nonpower qualities of renewable electricity generation. A REC, and its associated attributes and benefits, can be sold separately from the underlying physical electricity associated with a renewable-based generation source. *Renewable Energy Certificates (RECs)*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/greenpower/gpmarket/rec.htm (last updated Oct. 16, 2012). Essentially, the electrical output from renewable projects is "unbundled" into two separate commodities: the electrons, which are delivered to the utility grid and transmitted alongside "non-renewable"

within West Virginia cannot be attributed to the state's AEPS. Rather, West Virginia is benefitting from its proximity to states with genuine, tangible incentives promoting renewable energy development. Thus, even though the projects are located within West Virginia, they benefit from the incentivizing policies of nearby states.[261]

Apart from the renewable resources in the form of wind, hydro, and solar, West Virginia has tremendous untapped potential for other renewable resources—biomass and geothermal energy in particular—that distinguish the it from surrounding states and are worthy of focused public policies to stimulate their development, as discussed below.

A. West Virginia's Biomass Potential and the Opportunities for Co-Firing

Biomass, or bioenergy, uses the energy from plants and plant-derived materials. Wood is the largest biomass energy resource; other sources of biomass include food crops, grassy and woody plants, residues from agriculture or forestry, oil-rich algae, and the organic component of municipal and industrial wastes.[262] Biomass can be used for transportation fuels (biodiesel and biofuels), electricity generation, and to make products that would otherwise be made from fossil fuels.[263] Of particular interest in West Virginia is the use of biomass for generation of electricity.[264] Biomass can be used to generate electricity either through direct firing (by burning bioenergy feedstocks directly to produce steam, which in turn drives a turbine that spins a generator to convert the power into electricity) or through co-firing, which involves mixing biomass with fossil fuels in conventional power plants.[265]

According to the U.S. Department of Energy ("DOE"), one of the "most attractive and easily implemented" uses of biomass is co-firing in existing coal-fired boilers.[266] Through co-firing, biomass can substitute for up to 20% of the coal used in the boiler, and the biomass and coal are combusted

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electrons, and the renewable attributes of that electricity, which are represented by the value placed on the RECs. *Id.*

[261] *See supra* note 258.

[262] *Learning About Renewable Energy: Biomass*, NAT'L RENEWABLE ENERGY LAB., http://www.nrel.gov/learning/re_biomass.html (last updated May 30, 2012) [hereinafter *Biomass*].

[263] *Id.*

[264] Next to hydro-power, more electricity is generated from biomass than from any other renewable energy resource in the U.S., OFFICE OF ENERGY EFFICIENCY & RENEWABLE ENERGY, U.S DEP'T OF ENERGY, FEDERAL TECHNOLOGY ALERT: BIOMASS COFIRING IN COAL-FIRED BOILERS, 8 (2004) [hereinafter DOE BIOMASS ALERT], *available at* http://www1.eere.energy.gov/femp/pdfs/fta_biomass_cofiring.pdf.

[265] *Biomass*, *supra* note 262.

[266] DOE BIOMASS ALERT, *supra* note 264, at 1.

simultaneously.[267] Using biomass as a supplemental fuel in an existing coal boiler produces benefits in the form of lower fuel costs, reductions of various air pollutants (sulfur dioxide, nitrogen oxide and greenhouse gases), and avoidance of landfills and associated costs.[268] These benefits will be discussed in further detail below.

A DOE report on the feasibility of using biomass to co-fire at coal-fired plants states that

> the best opportunities for economically attractive cofiring are at coal-fired facilities where all or most of the following conditions apply: (1) coal prices are high; (2) annual coal usage is significant; (3) local or facility-generated supplies of biomass are abundant; (4) local landfill tipping fees are high, which means it is costly to dispose of biomass; and (5) plant staff and management are highly motivated to implement the project successfully.[269]

Most of these conditions are present in West Virginia. First, coal prices are relatively high in the state, given the near doubling in prices over the last decade.[270] Second, West Virginia is the largest coal producer east of the Mississippi River and accounts for more than one-tenth of total U.S. coal production.[271] In 2009, West Virginia produced over 144 million tons of coal,[272] and 94% of the coal consumed in the state was used for the generation of electricity.[273]

The third condition, the abundance of local supplies of biomass, is worthy of further discussion. West Virginia is the third most heavily forested state in the United States.[274] It has a total of twelve million acres of forestland, covering over 78% of the state, with over 260,000 forest landowners.[275] Of the forestlands, 98% are timberlands, or land capable of growing more than twenty cubic feet per acre per year of wood.[276] Among the total timberlands in West Virginia, 79% are privately owned, 9% are forestry owned, 8% are national forest, and 4% are owned by other public entities.[277] The forestry industry is

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267 *Id.*

268 *Id.*

269 *Id.* at 2.

270 Powers, *supra* note 19.

271 ENERGY BLUEPRINT, *supra* note 17, at 9.

272 *Id.* at 10.

273 *Id.* at 11.

274 WANG ET AL., *supra* note 13, at 1.

275 *Id*. at 6.

276 *Id.* at 1.

277 *Id.* at 6.

present throughout the state; it is the only natural resource industry present in all fifty-five West Virginia counties.[278] McDowell and Webster Counties are the most heavily forested counties, with 93% of forest coverage.[279]

West Virginia produces 2.41 million dry tons of wood residue annually, including 1.34 million dry tons of logging residue and 941,868 dry tons of mill residues.[280] Moreover, this level of wood waste is sustainable; the 2005 Forest Inventory and Analysis ("FIA") data for West Virginia showed a net annual growth to removal ratio of 1.08 for all species combined, suggesting that the annual growth is greater than the annual removals of growing stock.[281] These large amounts of wood residue from logging operations and mill waste are currently underutilized in West Virginia and are potentially available for bioenergy production. Even though 68% of mill residues were used in 2006, most of the logging residues, the largest proportion of wood residues, were underutilized.[282]

In addition to the extensive forests in the state, West Virginia has 3.6 million acres of farmland.[283] In West Virginia,

> annual agriculture residue production is 903,826 dry tons including 101,000 dry tons of grass seed residue, 10,618 dry tons of corn stover, 131,440 dry tons of corn silage, 1,585 dry tons of soybean residue, 3,731 dry tons of all wheat straw, 3,838 dry tons of switchgrass, 2,593 dry tons of short rotation woody crop, 662,780 dry tons of animal manure, and 26,241 dry tons of solid wood material from the construction and demolition waste.[284]

Combining the wood and agricultural residue, the total annual biomass production potential is 3.32 million dry tons in West Virginia, which could produce 47.06 trillion BTUs.[285] The forestry sector produces 72.7% of the total residue biomass in the state while the agriculture sector provides the rest, or 27.3%.[286]

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278 *Id.*

279 *Id.*

280 JOSEPH MCNEEL ET AL., WOODY BIOMASS SUSTAINABILITY FOR BIOENERGY PRODUCTION IN WEST VIRGINIA 1 (2008), *available at* http://www.ncfap.org/documents/BEADII/WVUBiomassGChallengeBEADII.pdf.

281 *Id.*

282 *Id.* at 1–2.

283 WANG ET AL., *supra* note 13, at 6.

284 *Id.*

285 *Id.*

286 *Id.*

Given this level of biomass production, one study concluded that "West Virginia has the potential to produce at least 5.4 billion kWh of electricity from biomass, which would be enough to supply power to 543,000 average homes, or 61% of the state's residential needs."[287] Despite this enormous potential, biomass currently accounts for only about 0.5% of energy produced in the entire state; in 2001, West Virginia consumed 1,255 trillion BTUs of energy, among which only 1% was produced from biomass.[288]

The remaining two conditions for co-firing feasibility identified in the *DOE Biomass Alert*—the avoidance of costs for disposing of biomass and highly motivated plant staff and management—are probably not drivers in West Virginia. Tipping fees for disposal of biomass are very much in line with the national average.[289] And in the absence of any public policies that would provide an incentive for the deployment of biomass co-firing in West Virginia, it is not clear that management or plant staff would be highly motivated. Part VI of this Article discusses possible public policies that may provide this incentive, but it does not currently exist in West Virginia.

As noted above, co-firing biomass in existing coal-fired generating facilities can provide a number of benefits. First, if inexpensive biomass fuel sources are available—and the inventory described above suggests that they are in West Virginia—co-firing can produce savings in overall production costs through lower fuel costs.[290] Second, emissions of acid rain precursor gases—sulfur dioxides ("SO_X") and nitrogen oxides ("NO_X")—can be reduced by replacing coal with biomass.[291] Biomass has nearly zero sulfur content, so SO_X reductions occur on a one-to-one basis with the amount of coal offset by the biomass.[292] Third, co-firing results in reduction in greenhouse gas ("GHG") emissions. Sustainably grown biomass is considered a GHG-neutral fuel (*i.e.*, it results in no net carbon dioxide ("CO_2") in the atmosphere).[293] As in the case of SO_X reductions, GHG emissions are reduced on a one-to-one basis with the

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287 JOSEPH MCNEEL ET AL., *supra* note 279, at 8.

288 WANG ET AL., *supra* note 13, at 2.

289 West Virginia's average landfill tipping fee in 2009 was $46.02 per ton. W. VA. SOLID WASTE MGMT. BD., ECONOMIC IMPACT OF MUNICIPAL SOLID WASTE MANAGEMENT IN WEST VIRGINIA 9-3 (2011), *available at* http://www.state.wv.us/swmb/RMDP/2011StatePlan/Chapter9.pdf. The national private landfill tipping fee average in 2008 was about $42.50. *Tipping Fees Vary Across the U.S.*, WASTE & RECYCLING NEWS (July 20, 2012), http://www.wasterecyclingnews.com/article/20120720/NEWS01/120729997/tipping-fees-vary-across-the-u-s.

290 DOE BIOMASS ALERT, *supra* note 264, at 8.

291 *Id.*

292 *Id.* In other words, displacing 10% of the coal supply with biomass will result in a 10% reduction in SO_X emissions.

293 *Id.*

amount of coal offset by the biomass. The American Coal Council, for its part, recognizes that biomass co-firing with coal can be an effective emissions reduction strategy, as it "has the potential to reduce emissions from coal-fueled generation, without substantially increasing costs or infrastructure investments."[294] Fourth, biomass co-firing is more attractive than some other renewable resources (*e.g*., solar, wind, or hydro) because the generating resource is "firm" rather than intermittent or variable. The higher capacity factor of co-fired coal generating facilities means that more power is produced per unit of installed capacity, thereby improving the attractiveness of the capital investment.[295] Fifth—and this is of particular interest in West Virginia, given our heavy reliance on coal-fired generation—the ability to integrate an additional fuel source (biomass) into the coal supply diversifies the fuel mix and provides a hedge against price increases.[296] And biomass can be economically blended in with the existing coal supply; according to the American Coal Council, biomass "can use the pre-existing infrastructure investments for fossil fuels,"[297] and the addition of biomass to a coal-fueled boiler is not likely to have negative impact on generation efficiency (or, at worst, "only a minimal negative impact").[298]

Finally, co-firing in West Virginia could stimulate the development of a locally based fuel supply to complement coal production, thereby producing economic benefits. Linking biomass collection and transportation to economically generate raw material for bioenergy can potentially create new, high-skilled jobs for people specializing in engineering systems, computers, economics, and international trade while providing new opportunities for forest managers, biologists, and engineers.[299] Co-firing could stimulate a very large market for biomass fuel. Co-firing a 1000 MW coal-fired power plant at a 5% rate, for example, would require about 245,000 tons of biomass per year, which in turn would require about 50,000 acres of high-yield production.[300] One study performed by Penn State University calculated that if 5% of the fifty-seven million tons of coal used to generate electricity in Pennsylvania were replaced

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294 *Biomass Co-Firing With Coal as an Emissions Reduction Strategy*, AM. COAL COUNCIL, http://www.americancoalcouncil.org/displaycommon.cfm?an=1&subarticlenbr=162 (last visited Mar. 14, 2013) [hereinafter AM. COAL COUNCIL].

295 DOE BIOMASS ALERT, *supra* note 264, at 8.

296 *Id.*

297 AM. COAL COUNCIL, *supra* note 294.

298 *Id.*

299 Kristiina A. Vogt et al., *Societal Values and Economic Return Added for Forest Owners by Linking Forests to Bioenergy Production*, J. FORESTRY, Jan./Feb. 2005, at 21, 21–27.

300 DANIEL CIOLKOSZ, PENN STATE UNIV., RENEWABLE AND ALTERNATIVE ENERGY FACT SHEET, CO-FIRING BIOMASS WITH COAL (2010), *available at* http://pubs.cas.psu.edu/freepubs/pdfs/ub044.pdf.

with biomass, it would require production of 4.4 million tons of biomass per year, nearly tripling the current rate of biomass use for energy in that state.[301]

B. West Virginia's Geothermal Potential

A number of technologies have been developed to take advantage of geothermal energy—the heat from the earth. According to the national Renewable Energy Laboratory,

> This heat can be drawn from several sources: hot water or steam reservoirs deep in the earth that are accessed by drilling; geothermal reservoirs located near the earth's surface, mostly located in the western U.S., Alaska, and Hawaii; and the shallow ground near the Earth's surface that maintains a relatively constant temperature of 50°–60°F.[302]

This variety of geothermal resources allows them to be used on both large and small scales. Generally speaking, at acceptable drilling depth, the geothermal fluid with a temperature higher than 150°C can be used for electricity generation, and that with a temperature lower than 150°C can be used for district heating.[303] "The attractive features of low-temperature geothermal utilization include, but are not limited to, its stable, baseload energy output, low environmental impact, and the renewability of the resource."[304]

With respect to the use of geothermal resources for electricity production, a recent Southern Methodist University study ("*SMU Study*") has identified significant geothermal potential in West Virginia that could be tapped as a new source of electricity generation.[305] The *SMU Study* concludes that West Virginia sits atop several hot patches of earth, some as warm as 200˚C and as shallow as five kilometers.[306] The *SMU Study*, funded by Google.org, included measurements from more than 1,450 oil and gas wells in the state.[307] The warm spots were found at depths of three to eight kilometers

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301 *Id.*

302 *Learning About Renewable Energy: Geothermal Energy Basics*, NAT'L RENEWABLE ENERGY LAB., http://www.nrel.gov/learning/re_geothermal.html (last visited Mar. 21, 2013).

303 Berkan Erdogmus et al., *Economic Assessment of Geothermal District Heating System: A Case Study of Balcova-Narlidere, Turkey*, 38 ENERGY & BUILDINGS 1053, 1053–59 (2006), *available at* http://www.sciencedirect.com/science/article/pii/S0378778806000041.

304 XIAONING HE & BRIAN ANDERSON, LOW-TEMPERATURE GEOTHERMAL RESOURCES FOR DISTRICT HEATING: AN ENERGY-ECONOMIC MODEL OF WEST VIRGINIA UNIVERSITY CASE STUDY1 (2012), *available at* https://pangea.stanford.edu/ERE/pdf/IGAstandard/SGW/2012/He.pdf.

305 *See* Blackwell, Frone, & Richards, *supra* note 14.

306 *Id.*

307 *Id.*

over an 18,700-square-kilometer area.[308] "The high heat flow values are primarily located in the counties of Tucker, Randolph, Pocahontas, and Greenbrier."[309] According to the *SMU Study*, "temperatures high enough for electrical power generation occur at depths greater than 4 to 5 km in large areas of eastern West Virginia."[310]

It appears from the *SMU Study* that West Virginia has a much higher thermal profile than previously estimated.[311] Moreover, the quantities and temperatures are great enough to support commercial geothermal energy production.[312] "As a result of the new data, [the authors revised upward] the previous estimate of West Virginia's geothermal resources between depths of three to ten km is revised to 113,300 EJ,[313] a 78% increase from the" previous estimates from 2006.[314] At a recovery factor of 2%, this suggests a geothermal potential from this stored energy of 18,800 MWe.[315] For comparison purposes, the total installed electric capacity in West Virginia was 18,302 MW in 2011.[316]

The *SMU Study* concludes that "the temperatures are high enough to make this the most attractive area for geothermal energy development in the eastern 1/3 of the country," and thus potentially opening the "possibility of geothermal energy production near the heavily populated Eastern seaboard."[317]

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308 Eli Kintisch, *West Virginia is a Geothermal Hot Spot*, SCIENCENOW (Oct. 4, 2010, 5:02 PM), http://news.sciencemag.org/sciencenow/2010/10/west-virginia-is-a-geothermal-ho.html. "By comparison, geothermal hot spots in Nevada reach 200˚C at 2 kilometers below the surface, and steam produced from them runs turbines to create electricity. Iceland, meanwhile, has 200˚C temperatures just below the surface and uses warm water to heat buildings and showers throughout Reykjavik and elsewhere." *Id.*

309 Blackwell, Frone, & Richards, *supra* note 14.

310 *Id.*

311 *Id*.

312 *Id.*

313 A joule represents the work required to produce one watt of power for one second, or one watt second ("Ws"). An exajoule ("EJ") is equal to 1018 joules. Energy consumption in the United States in 2011 was 97.262 quadrillion BTUs, or just over 92 EJ. *International Energy Statistics*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=44&pid=44&aid=2 (last visited Mar. 14, 2013). One gigajoule (10^9) equals 1.05506 MMBtus. *Energy Equivalent Conversions*, ENERGY INFO. ADMIN., http://www.eia.gov/cfapps/ipdbproject/docs/units.cfm (last visited Mar. 14, 2013).

314 Blackwell, Frone, & Richards, *supra* note 14. The 2006 estimate was reported in J. W. TESTER ET AL., MASS. INST. OF TECH., THE FUTURE OF GEOTHERMAL ENERGY: IMPACT OF ENHANCED GEOTHERMAL SYSTEMS (EGS) ON THE UNITED STATES IN THE 21ST CENTURY (Mass. Inst. Tech. 2006), *available at* http://www1.eere.energy.gov/geothermal/pdfs/future_geo_energy.pdf.

315 Blackwell, Frone, & Richards, *supra* note 14.

316 *Electricity: Detailed State Data, 2011 West Virginia Total Electric Power Industry*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/electricity/data/state/ (last visited Mar. 14, 2013).

317 Blackwell, Frone, & Richards, *supra* note 14.

According to the *SMU Study*, "the presence of a large, baseload, carbon neutral, and sustainable energy resource in West Virginia could make an important contribution to enhancing the U.S. energy security and for decreasing CO_2 emissions."[318]

Apart from using higher temperature geothermal for electricity generation, low-temperature geothermal can, as noted above, be used for district heating. One possible application of this resource in West Virginia is at West Virginia University, which "has an extensive district heating system that supplies the campus buildings at the 30,000-student university with steam for both heating in the winter and steam for a distributed system of absorption chillers for cooling in the summer."[319] The *SMU Study* found that "the hotter region [in the state] extends from north central WV, in Monongalia County, where WVU is located, to southeast WV, in Greenbrier County."[320] At West Virginia University, researchers conducted an analysis ("*WVU Case Study*") of local geothermal resources, using the findings of the *SMU Study* as the starting point. The authors of the *WVU Case Study* calculated a temperature gradient near WVU and then proceeded to conduct a feasibility study of replacing the steam system on the Evansdale campus with geothermal hot water.[321] It should be noted that the campus is currently served with steam from a high pressure pipeline from the waste coal facility operated by Morgantown Energy Associates, located on the Monongahela River.[322]

The *WVU Case Study* included six different scenarios to calculate the levelized cost of the steam supply under different temperatures and flow rates of geothermal hot water.[323] As compared with the current cost of energy for the system at $12/MMBtu, the feasibility study showed a range of costs between $9.96 and $21.68/MMBtu.[324] Thus, under some assumptions, "it may be possible to use geothermal energy [more cheaply] than the steam if it is properly treated."[325] Apart from the possible economic advantages of using geothermal energy, there are the sustainability benefits associated with displacing steam provided by a waste coal-fired generating station.[326]

Notwithstanding the biomass and geothermal potential in West Virginia, there is nothing in the current AEPS that would stimulate the

318 *Id.*

319 HE & ANDERSON, *supra* note 304, at 1.

320 *Id.* at 2.

321 *See id.* at 1–9.

322 *Id.* at 2.

323 *See id.* at 5.

324 *Id.* at 6.

325 *Id.* at 6.

326 *See id.* at 2.

development of these untapped renewable resources. Part VI of this Article includes recommendations to address this issue.

V. THE CASE FOR STIMULATING DEMAND FOR NATURAL GAS

As a result of the success of shale gas development and advancing technology that continues to reduce the costs of extracting natural gas from shale, natural gas prices have declined to levels that jeopardize the continued expansion of the domestic natural gas industry, potentially denying, and at least slowing, the economic benefits to the region of developing the Marcellus Shale.[327] In the face of low domestic prices, producers are moving forward with plans to build several LNG export facilities to take advantage of higher global prices for natural gas.[328] Given these circumstances, policymakers in West Virginia should consider the policies that look beyond natural gas exports to consider those that would stimulate the domestic demand for natural gas and stabilize domestic prices at sustainable levels. In addition to stabilizing natural gas prices, these policies could produce other benefits in the form of (1) lower energy costs for industry, (2) substantial reductions in transportation costs, and (3) environmental benefits through reduced air emissions.

This Article will focus in particular on two possible initiatives for stimulating natural gas demand: (1) incentives to encourage development of the infrastructure to support the use of NGVs, using either CNG or LNG for transportation; and (2) promoting natural gas-fired CHP, or cogeneration, for commercial and industrial customers of electric utilities.[329]

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327 The "rapid drilling program" in the Marcellus Shale has been responsible for a supply glut that drove down spot natural gas prices to as low as $2 per mmBtu. More recently, natural gas prices have recovered to the $3.75 range per mmBtu. Peter Kelly-Detwiler, *Driven by Oil Shale Economics, Natural Gas Prices Primed for Slow and Steady Rise*, FORBES (Dec. 3, 2012), http://www.forbes.com/sites/peterdetwiler/2012/12/03/driven-by-oil-shale-economics-natural-gas-prices-primed-for-slow-and-steady-rise/. In response to lower market prices for natural gas, producers are moving rigs south and west to the more lucrative oil shales. The Baker Hughes rig count for Pennsylvania dropped from 111 rigs in October 2011 to sixty-three in November 2012. *Id.*

328 As of March 2013, seventeen applications for LNG export facilities are under review by DOE. Mike Obel, *Potential Surge of US LNG Exports from Shale Natural Gas Boom Splits Corporate America; One Side Gets Allied with Environmentalists*, INT'L BUS. TIMES (Mar. 1, 2013, 9:31 PM), http://www.ibtimes.com/potential-surge-us-lng-exports-shale-natural-gas-boom-splits-corporate-america-one-side-gets-allied.

329 Other measures to stimulate natural gas demand are also worth considering. These include promoting natural gas as the heating fuel of choice for residences and commercial businesses, by providing incentives for conversion of existing heating equipment in homes and businesses to burn natural gas, which is cheaper and cleaner than using fuel oil or electricity; leveraging the value of natural gas-fired electric generation as a firming resource for renewable generation, such as wind and solar; and taking advantage of the lower energy costs to stimulate a renaissance of the State's chemical industry.

A. NGV Infrastructure

Natural gas has long been considered an alternative fuel for the transportation sector. But the use has been fairly limited. "[T]here are currently 150,000 [NGVs] on the road in the United States today, and . . . the transportation sector accounts for 3 percent of all natural gas used in the United States."[330] "Most natural gas vehicles operate using [CNG, which] . . . is stored in similar fashion to a car's gasoline tank, attached to the rear, top, or undercarriage of the vehicle in a tube shaped storage tank."[331] "A CNG tank can be filled in a similar manner, and in a similar amount of time, to a gasoline tank."[332] In addition to using CNG, larger NGVs commonly are fueled by LNG, given the weight and range advantages of LNG when used on heavy-duty trucks.[333]

While the focus of this Article is on the impact of NGV vehicles on stimulating demand for natural gas, increased deployment of NGVs would also produce other significant economic and environmental advantages. Natural gas currently holds a significant price advantage over gasoline, and use of NGVs can therefore deliver immediate cost benefits. Compared to traditional fuel sources, for example, fleet operators reportedly achieve consistent fuel savings of 30–40% in their NGV operations.[334] NGVs also produce environmental benefits in the form of lower emissions and GHG reductions. "Replacing a typical older in-use vehicle with a new NGV provides . . . reductions in exhaust emissions of carbon monoxide ("CO") by 70–90%, non-methane organic gas ("NMOG") by 50–75%, nitrogen oxides ("NO_X") by 75–95%, [and] carbon dioxide ("CO_2") by 20–30%."[335] As an illustration of the economic and environmental benefits associated with NGV deployment, the Pennsylvania Clean Transportation Corridor proposal estimates that an investment of $98–$208 million in NGV infrastructure will have a direct impact on 1350 jobs in Pennsylvania; displace 9.2 million gallons of diesel fuel with 1.4 billion cubic

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330 *Natural Gas in the Transportation Sector*, NATURALGAS.ORG, http://www.naturalgas.org/overview/uses_transportation.asp (last visited Mar. 13, 2013) [hereinafter *Natural Gas*]. "[V]ehicular natural gas nearly doubled between 2003 and 2009." *About NGVs*, NGVAM., http://www.ngvc.org/about_ngv/index.html (last visited Mar. 13, 2013) [hereinafter NGVAM.]. "According [to] NGV Global, the number of NGVs in use worldwide by the end of 2011 had grown to 15.2 million. Global NGV sales—according to Pike Research—are expected to rise at a compound annual growth rate (CAGR) of 7.9% to reach 19.9 million vehicles by 2016." *Id.*

331 *Natural Gas*, *supra* note 330.

332 *Id.*

333 *See* GLADSTEIN, NEANDROSS & ASSOCS., NGV ROADMAP FOR PENNSYLVANIA JOBS, ENERGY SECURITY AND CLEAN AIR 21 (2011), *available at* http://marcelluscoalition.org/wp-content/uploads/2011/04/MSC_NGV_Report_FINAL.pdf.

334 *Id.* at 12.

335 NGVAM., *supra* note 330.

feet of Pennsylvania-produced natural gas; save Pennsylvania fleet operators $9.2 million in fuel costs annually; and result in the annual reduction of 720 tons of NO_X emissions, nearly 14.5 tons of diesel particulate matter ("PM"), and 21,000 tons of GHG emissions.[336]

With respect to public policy promoting the deployment of NGVs, policymakers are often faced with a "chicken v. egg" situation: incentives can be directed at the end users of NGVs, with the hope that stimulating the retail demand will increase the number of NGVs and the necessary supporting infrastructure will follow to serve this increased demand; or incentives can be directed at encouraging the infrastructure to support NGVs, with the belief that widespread penetration of NGVs will not occur without the necessary infrastructure being in place.[337] In West Virginia, a number of measures are currently in place, directed at both the infrastructure development and the end user. For example, West Virginia offers a tax credit of up to $7,500 for the purchase of an alternative fuel vehicle ("AFV"), which is defined to include vehicles operating on natural gas.[338] To encourage development of infrastructure, West Virginia also offers a tax credit of up to $250,000 to cover 50% of the costs associated with construction or purchase and installation of equipment for alternative fueling infrastructure.[339] If the infrastructure is accessible to the public, the credit allowed is multiplied by 1.25, thereby raising the maximum amount to $312,500.[340] On a smaller scale, there is a similar 50% tax credit for home fueling infrastructure, up to $10,000.[341]

To promote the use of NGV for school bus fleets, the West Virginia Department of Education offers a 10% reimbursement to help offset the cost of maintenance, operation, and other costs incurred from using alternatively fueled school buses.[342] The legislature also authorized the West Virginia Department of Administration to require that up to 75% of the vehicles purchased each fiscal year consist of AFVs.[343] The Department has not taken

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336 GLADSTEIN, NEANDROSS & ASSOCS., *supra* note 333, at 14–15.

337 Larry Bell, *Tough Trucking for Natural Gas Vehicles: Can They Make It in the Long Haul*, FORBES (Nov. 27, 2012, 1:25 PM), http://www.forbes.com/sites/larrybell/2012/11/27/tough-trucking-for-natural-gas-vehicles-can-they-make-it-in-the-long-haul/# ("Right now, the largest impediment is a 'chicken v. egg' conundrum. Market demand for the vehicles will hinge upon creating a satisfactory refueling infrastructure, which, in turn, must be justified by market demand.").

338 W. VA. CODE ANN. §§ 11-6D-2, -3, -5(a) (LexisNexis 2012).

339 *Id.* § 11-6D-6(a).

340 *Id.*

341 *Id.* § 11-6D-6(d).

342 W. VA. CODE ANN. § 18-9A-7 (LexisNexis 2012).

343 W. VA. CODE ANN. § 5A-2A-2(e) (LexisNexis 2010).

any action pursuant to this authorization, however.[344] Moreover, the requirement may be waived if an agency's vehicles are operating in an area where the agency cannot reasonably establish a central alternative fueling station or the lifetime cost of the vehicle or fueling infrastructure is significantly higher as compared to conventional vehicles or fuel.[345]

West Virginia has also embarked on a number of initiatives to promote NGV use within the state. On June 19, 2012, Governor Earl Ray Tomblin signed Executive Order No. 10-12, which created a Natural Gas Vehicle Task Force.[346] Among other things, the Task Force is charged with analyzing the cost savings that government entities could realize by converting to NGVs; performing a cost-benefit analysis for converting the state's vehicles versus purchasing new NGVs; researching the potential for the state to operate pilot public access natural gas fueling stations; exploring interest in partnerships with natural gas producers, infrastructure developers, vehicle manufacturers, and other industry leaders to expand infrastructure; and developing a communications strategy to educate West Virginians about the economic, environmental, and safety benefits of NGVs.[347]

West Virginia needs to accelerate its efforts to promote NGVs to match the accomplishments of surrounding states and other natural gas-producing states. In reviewing the concentration of CNG fueling stations in the U.S., CleanEnergyFuels shows West Virginia as having fewer than ten natural gas stations.[348] California is identified as the leading state with respect to natural gas infrastructure with its "incentives for converting to alternative fuel vehicles and infrastructure construction."[349] New York is ranked second nationally, and Utah is third; 9% of the CNG vehicles (11,000) in the U.S. are located within the state of Utah.[350] Other states identified as "strongly promoting" infrastructure investments are Colorado, Oklahoma, Pennsylvania, and Texas which, coincidentally, are other states with significant shale "plays."[351]

Three measures in place in Oklahoma are worth mentioning. First, Oklahoma offers a more generous (75%) tax credit than West Virginia towards

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[344] W. VA. DEP'T OF ADMIN. PURCHASING DIV., 2012 FISCAL YEAR ANNUAL REPORT (2012), *available at* http://www.state.wv.us/admin/purchase/Annualreport/Annual12.pdf.

[345] W. VA. CODE ANN. § 5A-2A-2(h)(1)–(2).

[346] W. VA. EXEC. DEP'T, EXECUTIVE ORDER NO. 10-12 (2012), *available at* http://www.governor.wv.gov/media/pressreleases/2012/Documents/EO%2010-12.pdf.

[347] *Id.* at 4.

[348] FC BUS. INTELLIGENCE, NGV INFRASTRUCTURE, UNITED STATES MARKET REVIEW 3 (2012–2013), *available at* http://www.ngvevent.com/markets-report/pdf/NGV-infrastructure-United-States-market-review.PDF.

[349] *Id.*

[350] *Id.*

[351] *Id.*

the cost of alternative fueling infrastructure.[352] Second, the Oklahoma Legislature committed to increasing the amount of CNG fueling infrastructure in the state, with the overall goal of having one public fueling station located every one hundred miles along the interstate highway system by 2015, and one public fueling station every fifty miles by 2025.[353] The Department of Central Services Fleet Management Division is authorized to take steps to reach this goal by collaborating with private entities to build CNG fueling infrastructure.[354] Third, Oklahoma offers a zero interest loan program to help government fleets convert vehicles to operate on alternative fuels, construct AFV fueling infrastructure, and to pay the incremental cost associated with the purchase of an original equipment manufacturer AFV.[355] The program takes a creative approach to loan repayment by taking advantage of the savings in fuel costs.[356] Utah also offers grants and loans to assist business and government entities in the cost of AFV infrastructure.[357] Texas, for its part, offers infrastructure grants as part of its Emissions Reduction Plan, and is geared towards infrastructure in air quality non-attainment areas of the state.[358] Under its Alternative Fueling Facilities Program, the Texas Commission on Environmental Quality provides grants for 50% of eligible costs, up to $500,000.[359] Another Texas program worth note is its Clean Transportation Triangle Program, which awards grants geared toward developing a network of natural gas fueling stations along the interstate highways connecting Houston, San Antonio, Dallas, and Fort Worth.[360] Under the program, grants may be awarded for up to $100,000 for a CNG station, $250,000 for an LNG station, or $400,000 for a station providing both forms of natural gas.[361] Funded stations must be accessible to the public and located within three miles of an interstate highway system.[362]

A shortcoming of the programs described above is their fiscal impact. States offering tax credits to encourage the development of NGV infrastructure will bear reductions in tax revenues as a result. Similarly, grant programs, such

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352 OKLA. STAT. ANN. tit. 68, § 2357.22 (West 2012).

353 *Id.* tit. 74, § 78f.

354 *Id.*

355 *Id.* §§ 130.4 to .5.

356 *See id.* Repayment is collected through a surcharge on alternative fuel the borrower purchased in the amount equivalent to the per gallon fuel cost savings from using an alternative fuel.

357 UTAH CODE ANN. §§ 19-1-401 to -405 (LexisNexis 2012).

358 *See* TEX. HEALTH & SAFETY CODE ANN. § 386 (West 2011).

359 *Id.* § 393 (West 2012).

360 *Id.* § 393.010 (West 2011).

361 *Id.*

362 *Id.*

as those offered in Pennsylvania, Texas, and Oklahoma, have a direct fiscal impact through government funding of the grants and loans. In light of West Virginia's current fiscal situation, policymakers should give serious consideration to those incentives and regulatory measures that do not involve government spending and/or revenue erosion through tax credits.

One such approach is to engage the participation of West Virginia's local gas distribution companies ("LDCs") in the infrastructure effort. West Virginia is served by seventeen privately owned natural gas LDCs. The rates and practices of LDCs in West Virginia are regulated by the PSC, which has broad authority to regulate these entities "in the public interest."[363] This regulatory authority can be used to involve the LDCs in the efforts to develop a natural gas infrastructure to support NGVs in the state. Such an effort has precedent.

In 1992, four LDCs (Hope Gas, Inc., Mountaineer Gas Company, Equitable Gas Company, and West Virginia Power Gas Service) were authorized by the PSC to receive preferential rate treatment for expenditures they incurred for infrastructure development to support NGVs.[364] Under the order, the LDCs were authorized to use accelerated depreciation on approximately $11.2 million for infrastructure development, and to make annual rate filings to reflect this investment in rates on an expedited basis.[365] Recoverable capital costs included costs of converting conventionally fueled vehicles to natural gas, "incremental costs associated with the purchase of new NGVs, and construction costs for NGV service facilities."[366] According to the PSC's order approving the proposal, "[d]evelopment of an NGV infrastructure in West Virginia will take advantage of a new demonstration technology and contribute to reducing dependence on foreign oil, expand the state's natural gas industry, improve efficiency of the natural gas supply network, improve air quality, and provide benefits to rate payers through the creation of a new year-round market for natural gas."[367] The proposal was approved pursuant to

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[363] W. VA. CODE ANN. § 24-2-1(a) (LexisNexis 2008) ("The jurisdiction of the commission shall extend to all public utilities in this state and shall include any utility engaged in . . . supplying water, gas or electricity, by municipalities or others . . . ."); *Id.* § 24-1-1(b) ("The Public Service Commission is charged with the responsibility for appraising and balancing the interests of current and future utility service customers, the general interests of the State's economy and the interests of the utilities subject to its jurisdiction in its deliberations and decisions.").

[364] *See* Pub. Serv. Comm'n of W. Va., No. 91-071-G-PC, at *3–4 (W. Va. Mar. 13, 1992) (on file with author).

[365] *Id.* at 3.

[366] *Id.* at 4.

[367] *Id.* at 6–7.

legislation enacted in 1991 that encouraged the use of alternative fuel in new demonstration technologies.[368]

As discussed in Part VI of this Article, the LDCs operating in West Virginia should be given economic incentives to support the development of an infrastructure to support NGVs.

B. Natural Gas-Fired CHP Facilities

Over one quarter of the natural gas consumed in the United States is in the industrial sector, which includes industries such as chemicals, metals, minerals, oil refining, paper, and food.[369] In total, the U.S. industrial sector used natural gas for 30.4% of its direct energy use (for combustion and non-combustion) in 2010.[370] Of the natural gas consumed in the manufacturing sector, 14% was devoted to CHP and other power systems.[371] CHP systems capture and use the heat that would otherwise be wasted from the production of electricity.[372] In other words, rather than two separate facilities—an electric generating unit (from which the waste heat is discharged into the atmosphere) and a stand-alone boiler at the industrial site to generate heat—a CHP unit at the industrial site would generate electricity and capture the waste heat for heating and/or cooling.[373] As a result, CHP requires less fuel than equivalent separate heat and power systems to produce the same amount of energy.[374] By

[368] *Id.* at 7. Section § 24-2D-1 of the West Virginia Code authorizes the PSC to "develop and implement programs designed to encourage the use of West Virginia alternative fuels as vehicle fuels and in other new demonstration technologies." W. VA. CODE ANN. § 24-2D-1 (LexisNexis 2012).

[369] Natural gas usage in the industrial sector was 8.14 quadrillion Btus in 2010, or 27% of natural gas consumed in the U.S. CTR. FOR CLIMATE & ENERGY SOLUTIONS, NATURAL GAS IN THE INDUSTRIAL SECTOR 2 (2012) [hereinafter CCES], *available at* http://www.c2es.org/docUploads/natural-gas-industrial-sector.pdf.

[370] *Id.*

[371] *Id.* Natural gas dominates the fuel used for CHP; 63% of the fuels consumed for CHP was natural gas, followed by 32% for coal and 5% other fuels. *Id.* at 3. The five industry sectors with the most CHP potential are chemicals, refining, pulp and paper, food processing, and primary metals manufacturing. *See* JAMES BRADBURY ET AL., WORLD RES. INST., MIDWEST MANUFACTURING SNAPSHOT: ENERGY USE AND EFFICIENCY POLICIES 7, 18, 24, 45 (2012), *available at* http://pdf.wri.org/working_papers/midwest_manufacturing_snapshot.pdf.

[372] *Environmental Benefits*, U.S. ENVTL. PROT. AGENCY, http://www.epa.gov/chp/basic/environmental.html (last updated Dec. 6, 2012).

[373] "Instead of purchasing electricity from the local utility and burning fuel in an on-site furnace or boiler to produce needed thermal energy, an industrial or commercial user can use CHP to provide both energy services in one energy-efficient step." *Guide to the Successful Implementation of State Combined Heat and Power Policies*, STATE & LOCAL EFFICIENCY ACTION NETWORK ix (March 2013), *available at* http://www1.eere.energy.gov/seeaction/pdfs/see_action_chp_policies_guide.pdf.

[374] *Id.*

generating heat and power together, CHP can achieve combined thermal efficiency of up to 80%, versus 45% for generating heat and power separately.[375]

Currently, West Virginia has 382 MW of installed CHP capacity, with almost a third of that capacity (32%) coming from a single installation at a chemical plant.[376] A 2008 Oak Ridge National Laboratory report estimated that West Virginia has the technical potential for an additional 1 to 3 gigawatts ("GW").[377] A 2012 report from ACEEE estimated 1.7 GW of remaining technical potential within West Virginia, mainly in the chemicals and paper industries.[378] ACEEE further estimated that 588 MW would be economical to develop if utilities were provided incentives to support the development of CHP.[379] In the absence of economic incentives, only 71 MW would be economical to develop.[380] Electric utilities have a significant role to play in helping or hindering the deployment of distributed generation. ACEEE concluded that "West Virginia could meet 32 percent of its high-end range of coal retirements with cost-effective CHP, provided that utilities in the state were incentivized to make CHP investments."[381] Unfortunately, according to ACEEE, "[t]hey currently are not."[382] The ACEEE report observes that "[t]he state has few supportive CHP policies in place and has substantial room for improvement."[383] Among other things missing in West Virginia are financial assistance, financial incentives, or output-based emissions regulations that affect CHP systems.[384]

Stimulating investment in CHP is receiving considerable attention at the federal level. On August 30, 2012, President Barack Obama signed Executive Order No. 13624, which adopts a national goal of "deploying 40

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375 ANNA CHITTUM & NATE KAUFMAN, CHALLENGES FACING COMBINED HEAT AND POWER TODAY: A STATE-BY-STATE ASSESSMENT, ACEEE 3 (2011), *available at* http://www.aceee.org/sites/default/files/publications/researchreports/ie111.pdf.

376 The chemical plant at Natrium operated by PPG Industries, Inc. has a capacity of 123 MW. *Database of Combined Heat and Power Units Located in West Virginia*, DOE/ICF INT'L, http://www.eea-inc.com/chpdata/States/WV.html (last visited Mar. 21, 2013).

377 ANNA SHIPLEY ET AL., OAK RIDGE NAT'L LAB., COMBINED HEAT AND POWER: EFFECTIVE ENERGY SOLUTIONS FOR A SUSTAINABLE FUTURE 17 (2008), *available at* http://www1.eere.energy.gov/manufacturing/distributedenergy/pdfs/chp_report_12-08.pdf.

378 ANNA CHITTUM & TERRY SULLIVAN, COAL RETIREMENTS AND THE CHP INVESTMENT OPPORTUNITY, ACEEE 53 (2012), *available at* http://www.aceee.org/sites/default/files/publications/researchreports/ie123.pdf.

379 *Id.*

380 *Id.* at 14.

381 *Id.* at 52.

382 *Id.*

383 *Id.* at 54.

384 *Id.* at 55.

gigawatts ("GWs") of new, cost-effective industrial CHP in the [United States] by the end of 2020."[385] In order to achieve this objective, the Executive Order directs federal agencies to, among other things, "provide technical assistance to states and manufacturers to encourage investment in industrial energy efficiency and CHP," and to "identify, develop and encourage the adoption of investment models and state best practice policies for industrial energy efficiency and CHP."[386] As noted in the Order, potential emission reduction benefits of CHP (and other industrial energy efficiency policies) can be reflected when states develop their State Implementation Plans ("SIPs") under the Clean Air Act to achieve national ambient air quality standards.[387] In addition, emissions allowance trading programs can include set-asides for the deployment of CHP and other types of clean energy to provide incentives.[388]

Expanded deployment of CHP in West Virginia could provide numerous benefits. First, as noted above, the vast majority of CHP systems are fired with natural gas, so it serves the purpose of stimulating demand for natural gas to stabilize prices at sustainable levels. According to the *Energy Outlook*, CHP generation is expected to rapidly increase by 235% between 2012 and 2035.[389] Second, CHP facilities substantially improve the cost-competitiveness of industrial operations by using energy much more efficiently and managing costs.[390] By capturing heat that is normally wasted, CHP saves fuel and energy costs and achieves up to two to three times the useful energy products from the fuel.[391] That can help the financial performance of West

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385 Office of the Press Sec'y, *Executive Order— Accelerating Investment in Industrial Energy Efficiency*, THE WHITE HOUSE (Aug. 30, 2012), http://www.whitehouse.gov/the-press-office/2012/08/30/executive-order-accelerating-investment-industrial-energy-efficiency [hereinafter *Executive Order*].

386 *Id.*

387 *Id.* The Executive Order encourages investment in industrial energy and CHP by "providing assistance to States on accounting for the potential emission reduction benefits of CHP and other energy efficiency policies when developing State Implementation Plans (SIPs) to achieve national ambient air quality standards." *Id.* Under the Clean Air Act, the Environmental Protection Agency establishes National Ambient Air Quality Standards ("NAAQS") for the criteria pollutants. 42 U.S.C. § 7409 (2006). Each state is charged with developing a State Implementation Plan designed to achieve the NAAQS within such state. 42 U.S.C. § 7410.

388 *Executive Order*, *supra* note 385.

389 CCES, *supra* note 369, at 4 ("CHP generation is projected to rapidly increase by 235 percent over the period" (citing *Annual Energy Outlook 2012 Early Release*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/oiaf/aeo/tablebrowser/#release=EARLY2012&subject=0-EARLY2012&table=6- (last visited Mar. 21, 2013)).

390 Energy Efficiency & Renewable Energy, *Industrial Distributed Energy: Benefits of Combined Heat and Power*, U.S. DEP'T OF ENERGY, http://www1.eere.energy.gov/manufacturing/distributedenergy/chp_benefits.html (last visited Mar. 21, 2013) [hereinafter EERE].

391 *Economic Benefits*, U.S. CLEAN HEAT & POWER ASS'N, http://www.uschpa.org/i4a/pages/index.cfm?pageid=3378 (last visited Mar. 21, 2013).

Virginia industrial facilities, and the economic benefits become even more compelling as electricity prices continue to rise.[392]

Third, CHP provides substantial environmental benefits through emissions reductions. A 2008 Oak Ridge National Laboratory ("ORNL") study analyzed the total U.S. energy system and calculated that increasing CHP's share of total U.S. electricity generation capacity from 9% in 2008 to 20% by 2030 would lower U.S. GHG emissions by 800 million metric tons of CO_2 compared to business as usual.[393] Another study, by McKinsey & Company in 2009, estimated that the potential exists in the United States for an additional 50.4 GW of CHP capacity by 2020, which would avoid an estimated 100 million metric tons of CO_2 emissions per year compared to business as usual.[394] McKinsey found that 70% of the potential cost-effective incremental CHP capacity was through large-scale industrial CHP systems greater than 50 MW.[395] Because less fuel is consumed, criteria air pollutants like NO_X and SO_2 are also reduced.[396]

Fourth, CHP can enhance the reliability of the electricity grid and defer the need for transmission and distribution system investments. Distributed generation sources such as CHP can provide both reactive power and voltage support, which are especially useful on heavily loaded lines.[397] Electricity grids with more distributed resources are more reliable than those that rely on fewer centralized sources.[398] Moreover, by placing generation closer to load, distributed generation systems can take pressure off congested transmission and

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392 A benefit of CHP for the nation is that it "[i]mproves U.S. manufacturing competitiveness through increased efficiencies and reducing energy costs." *Guide to the Successful Implementation of State Combined Heat and Power Policies*, STATE & LOCAL EFFICIENCY ACTION NETWORK 1 (Mar. 2013), *available at* http://www1.eere.energy.gov/seeaction/pdfs/see_action_chp_policies_guide.pdf.

393 SHIPLEY ET AL., *supra* note 377, at 4. DOE estimates that if 20% of electricity generation capacity, or about 240 GW of power, were provided by CHP, the annual energy consumption would be reduced by 5,300 trillion BTUs, CO_2 would be reduced by 848 million metric tons, 189 million acres of forest would be saved, $234 billion in additional private investment would be leveraged, and one million new jobs would be created. EERE, *supra* note 390.

394 HANNAH CHOI GRANADE ET AL., MCKINSEY CO., UNLOCKING ENERGY EFFICIENCY IN THE U.S. ECONOMY: FULL REPORT 86 (2009), *available at* http://www.mckinsey.com/client_service/electric_power_and_natural_gas/latest_thinking/unlocking_energy_efficiency_in_the_us_economy.

395 *Id.*

396 *Environmental Benefits*, *supra* note 372.

397 G. PEPERMANS ET AL., KATHOLIEKE UNIVERSITEIT LEUVEN, DISTRIBUTED GENERATION: DEFINITION, BENEFITS AND ISSUES 6 (2003), *available at* http://www.econ.kuleuven.ac.be/ew/academic/energmil/downloads/ete-wp-2003-08.pdf.

398 U.S. DEP'T OF ENERGY, THE POTENTIAL BENEFITS OF DISTRIBUTED GENERATION AND RATE-RELATED ISSUES THAT MAY IMPEDE THEIR EXPANSION: A STUDY PURSUANT TO SECTION 1817 OF THE ENERGY POLICY ACT OF 2005 2–12 (2007), *available at* http://www.ferc.gov/legal/fed-sta/exp-study.pdf.

distribution systems and thereby avoid or defer the need to increase capacity on those lines.[399] This is potentially a significant benefit, inasmuch as 60% (or nearly $50 billion per year) of forecast investments in the utility sector over the next twenty years are expected to be in the transmission and distribution system.[400]

As discussed in Part VI of this Article, a number of tools are available to policymakers in West Virginia to stimulate deployment of CHP within the state.

VI. RECOMMENDATIONS

Based on the preceding discussion, this Part includes a number of recommendations regarding the major policy issues discussed in this Article: the need for integrated resource planning and increased investment in energy efficiency, tapping West Virginia's renewable resource potential, and stimulating demand for natural gas in order to achieve economic growth and sustainability benefits for the state.

A. Integrated Resource Planning

West Virginia should begin requiring integrated resource planning that, at a minimum, requires the evaluation of demand- and supply-side resource on an integrated and consistent basis. Following the consensus of actions in other states, West Virginia should also prescribe a long-term planning horizon of fifteen to twenty years, and require the IRPs to be prepared no less frequently than every three years. On the issue of "least cost" or "lowest system cost," the legislature may want to consider a more flexible approach that recognizes the broader economic implications of particular resource choices. In the case of West Virginia, strict adherence to a "least cost" requirement may suggest movement away from heavy reliance on coal-fired generation, which could have broader economic impacts through loss of jobs, reduced severance tax revenue and declining economic activity. Utilities should be given the flexibility to address these economic impacts in justifying their resource acquisition decisions.[401] The IRP process would provide the framework for this

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[399] Michael Zimmer, *Distributed Generation Offers T&D Cost Management*, ELECTRIC LIGHT & POWER (Feb. 1, 2000), http://www.elp.com/articles/print/volume-78/issue-2/features/utility-of-the-month/distributed-generation-offers-td-cost-management.html.

[400] CHRIS NEME & RICH SEDANO, U.S. EXPERIENCE WITH EFFICIENCY AS A TRANSMISSION AND DISTRIBUTION RESOURCE i (2012), *available at* http://www.raponline.org/search/site/?q=US%20experience%20with%20efficiency%20as%20a%20transmission%20and%20distribution%20resource.

[401] The legislation could make it clear, for example, that in determining a reasonable resource portfolio, the PSC may take into account any economic benefits to West Virginia associated with particular demand-side and supply-side resources.

analysis to be presented, and the utilities would have the burden to justify how these broader "public interest" factors may warrant a departure from a strict "least cost" path.

The requirement of an integrated resource planning process in West Virginia preferably would be imposed by statute, through the action of the State Legislature. Three reasons support this approach. First, ratemaking is by nature a legislative function.[402] Legislatures delegate to state public utility commissions the authority to set utility rates, typically through a fairly broad grant of authority providing for general oversight of the utility industry and regulation of that industry in the public interest.[403] Other grants of legislative authority in the utility industry include the imposition of an obligation to serve;[404] the requirement to obtain a certificate of necessity and convenience before rendering utility service;[405] a rate-setting standard to set rates that are fair, just, reasonable, and sufficient;[406] and service quality standards requiring safe, adequate and reliable utility service.[407] Requiring utilities to engage in integrated resource planning arguably is a similarly vital function that should be expressly required by an act of the legislature.

Second, the decision to require integrated resource planning, with the fundamental requirement that demand-side resources be treated on the same footing as generating resources, may be seen as a significant policy choice that uniquely belongs to the legislature. West Virginia has traditionally not treated demand-side options as "resources" in the same sense as generating plants that produce electrons. And the jurisdictional utilities in the state, AEP and FirstEnergy, are operating consistently with that practice. If a change in practice represents a fundamental shift in policy, then the popularly elected members of the legislature should be enunciating that policy choice through enactment of a statute, rather than appointed members of an administrative agency acting through rule or order.

Finally, a statute provides the durability that evinces a commitment to a different way of doing things. The West Virginia PSC likely possesses the necessary authority, through its general ratemaking powers, to impose a requirement that electric utilities engage in integrated resource planning.[408] This

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[402] Knoxville v. Knoxville Water Co., 212 U.S. 1 (1909).

[403] *See* W. VA. CODE ANN. § 24-2-2 (LexisNexis 2008).

[404] *See id.* § 24-2-1.

[405] W. VA. CODE ANN. § 24-2-11 (LexisNexis Supp. 2012).

[406] W. VA. CODE ANN. § 24-2-3 (LexisNexis 2008).

[407] *Id.* § 24-3-1.

[408] *See id.* § 24-2-2(a) ("The commission is hereby given power to investigate all rates, methods and practices of public utilities subject to the provisions of this chapter; to require them to conform to the laws of this State and to all rules, regulations and orders of the commission not contrary to law . . . ."). Numerous states have adopted integrated resource planning requirements

authority could be exercised either through enactment of a rule (following a rulemaking proceeding), or through an administrative order in a docketed proceeding, just as numerous other PUCs throughout the United States have done. That the IRP process has been in existence in the United States for over twenty-five years—and been a matter of Federal law for twenty years—and yet that the PSC has failed to take such action suggests that the agency cannot be expected to adopt this policy measure. Irrespective of the relative likelihood of this administrative action, however, enactment through rule or order lacks the certainty and durability of a statute. An order can be changed upon a change in the personnel of the PUC commissioners (following the development of an appropriate record, of course), and a rule can similarly be modified or repealed following a rulemaking process. A legislative enactment, on the other hand, sends a strong signal that "business as usual" on the important issue of utility resource acquisitions is no longer acceptable.

B. Energy Efficiency

West Virginia must aggressively move to ramp up its commitment to energy efficiency and conservation programs. In the face of ever-increasing electric utility rates, the citizens of this state need some effective tools to help manage their energy bills. While ratepayers have no control over the *rates* that utilities charge, they can have some control over their energy *bills*, if armed with resources to do so in the form of energy efficiency program offerings from the investor-owned electric utilities operating in West Virginia. The current program offerings are strikingly meager, however, as measured against (1) the programs offered by these very same utilities in the other states in which they operate and (2) the commitment to energy efficiency adopted by virtually every other state in the United States. As noted in Part II of this Article, West Virginia ranks forty-ninth in the 2012 *ACEEE Scorecard*, and stands to fall further behind given the increasing rate at which other states are committing to this valuable energy resource.

Policymakers in West Virginia should give serious consideration to adoption of an EERS, which would impose an enforceable obligation on the utilities operating in West Virginia to achieve prescribed energy savings targets. The EERS proposed by Delegate Manypenny in February 2012 would be a good start; it would require electric utilities to reduce electricity consumption by 5% from 2010 levels by 2018 and 15% by 2025. As compared to the targets adopted in the surrounding states of Ohio, Pennsylvania and Maryland, the EERS proposed by Delegate Manypenny is fairly modest. Irrespective of the level at which the targets are set, however, adoption of an EERS would evince a firm commitment to energy efficiency programs, and

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by rule or order, pursuant to broad grants of ratemaking authority, rather than through express authorization by the legislature. WILSON & PETERSON, *supra* note 20, at 17–19.

could be scaled up in the future in the event actual performance shows that higher targets could be achieved.

As in the case of the IRP requirement, it is recommended that the EERS be adopted through legislative action for many of the same reasons. The West Virginia PSC currently possesses the authority, through the ratemaking process, to require AEP and FirstEnergy to offer far more than they do. But the PSC, for whatever reason, is giving the utilities a "pass" on requiring energy efficiency programs in this state,[409] and so both AEP and FirstEnergy are offering a small slice of the programs in West Virginia than they offer to their customers in the other states in which they operate. In West Virginia, FirstEnergy is proposing to achieve savings of 0.5% over five years, while AEP achieved savings of only 0.4% in 2012, a dismal performance compared to the targets these same utilities are required to achieve in the surrounding states. So West Virginia ratepayers do not have the tools they need to manage their energy costs, and the state is deprived of the other economic and environmental benefits associated with investments in energy efficiency. Given the inexplicable failure of the PSC to require more of AEP and FirstEnergy with respect to energy efficiency programs in West Virginia, to the detriment of the state's ratepayers, it is up to the legislature to express the clear and binding commitment to energy efficiency through adoption of an EERS.

At the same time, policymakers need to acknowledge that utilities should not be expected to act against their economic interests—successfully promoting energy efficiency and conservation can lead to an erosion of the profit margins that the utilities are constitutionally entitled to earn. So adoption of an EERS should be accompanied by directing the PSC to implement a

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[409] AEP, for its part, explains its lack of investment in energy efficiency programs due to an absence of "headroom" (i.e., the ability of ratepayers to absorb the cost increases). Pam Kasey, *Could Better Efficiency Prevent a Whole Power Plant?*, WV STATE J. (Jan. 24, 2013), http://www.statejournal.com/story/20672823/could-better-efficiency-prevent-a-whole-power-plant. Energy efficiency programs cost money and, according to AEP, there are "more pressing spending priorities," such as paying off the fuel cost from a spike in coal prices several years ago and investment in equipment needs to meet environmental standards for the utility's coal plants. *Id*. This position, of course, is refuted by AEP's own *2012 Resource Plan*, which acknowledges that demand-side resources are "the least-cost resource." 2012 RESOURCE PLAN, *supra* note 40 at 137. Under AEP's view, ratepayers don't have the financial resources (i.e., "headroom") to pay for energy efficiency—which is cheaper—because of AEP's more expensive "higher priorities"—more expensive supply-side options in the form of coal-fired generating units. Appalachian Power currently has a filing pending before the West Virginia PSC to purchase ownership of two-thirds of the Amos coal plant and one-half of the Mitchell coal plant, representing a combined capacity of 1647 MW, at a cost in excess of $1.2 billion. Petition for the Commission's Consent and Approval of Appalachian Power Company Consummating an Arrangement for the Transfer to It of 1647 MW of Generating Capacity Presently Owned by Ohio Power Company, an Affiliate, Pub. Serv. Comm'n of W. Va. v. Appalachian Power Co., No. 12-1655-E-PC (W. Va. Dec. 18, 2012), *available at* http://www.psc.state.wv.us/scripts/WebDocket/ViewDocument.cfm?CaseActivityID=359034&NotType=%27WebDocket.

mechanism that will hold the utilities financially harmless from the earnings impact of reduced consumption by their customers. Such a mechanism can take the form of either a decoupling or a lost revenue adjustment mechanism, as determined by the PSC. But we cannot expect utilities to embrace energy efficiency and other demand-side options as "resources" if they suffer economically for doing so. It is essential that any increased commitment to energy efficiency in West Virginia be accompanied by adoption of ratemaking measures that spare utilities from the financial harms that would otherwise flow from fulfilling this commitment.

C. Alternative and Renewable Energy Portfolio Standard and the Development of Renewable Resources in West Virginia

West Virginia's Alternative and Renewable Energy Portfolio Standard must be revisited and substantially revised. Unlike virtually every other portfolio standard adopted in the thirty-nine other states, West Virginia's AEPS does absolutely nothing to stimulate the development of renewable energy resources. Perhaps that was the intention when the AEPS was adopted; if so, the objective was achieved. By defining "alternative" energy in a manner that would include thousands of megawatts of existing coal-fired generation in the state and by allowing the procurement obligation imposed on utilities to be completely satisfied with "alternative" energy sources to the possible exclusion of any "renewable" resources, the measure is of virtually no value as a policy tool to stimulate development of renewable resources in the state. The utilities' compliance assessments, filed with the PSC annually, confirm that they have to do absolutely nothing to meet the obligations imposed on them by the AEPS; the existing "alternative" generation capacity within the state is nearly three times greater than the required 25% by 2025.

Apart from the ignominy of having a legislative measure that on its face is meaningless, the current AEPS deprives the state of the economic and environmental benefits that could be captured if the AEPS actually operated to stimulate the development of the state's considerable renewable resource potential. As noted in Part IV of this Article, West Virginia has vast quantities of biomass available that could be harvested cost-effectively and used to co-fire in the state's existing coal-fired electric generating plants. Developing a biomass industry in the state would produce economic benefits, diversify the state's economy and, if co-fired with coal, could play a valuable role in maintaining the viability of the State's coal industry through improving the environmental footprint of existing coal-fired generation as a result of the reduced emissions associated with biomass. Policymakers should consider revising the state's AEPS to create a specific "carve-out" of the procurement obligation geared toward co-firing biomass with coal. For example, as a subset of the existing procurement obligation of 25% of alternative and renewable energy by 2025, the AEPS could be amended to require that some small percentage—say 2% or 3%—of the state's electricity supply be generated with co-fired coal and biomass generation, with "co-fired" defined to require no less than 10% biomass content. That would create a separate procurement obligation on the utilities to obtain a portion of their electricity supply from biomass co-fired generation, which would effectively stimulate the development of a durable biomass market.

Similarly, the state's considerable geothermal potential could be realized through a carve-out directed at electricity generated from geothermal resources. The economic case is less clear for geothermal, however, given the fairly remote location of the geothermal resources in the state and the likely need to build new transmission facilities to integrate the power generated at such remote locations. The advantage of biomass is that it takes advantage of the existing coal handling facilities at the generating plants, thereby allowing biomass to be blended in relatively easily without incurring substantial additional infrastructure costs. Modifying the AEPS to include a biomass carve-out would be a modest first step toward encouraging the development of renewable resources in the state, with an indirect benefit in the form of technology that could help existing coal-fired generation comply with increasingly stringent emissions requirements.

D. Stimulating Demand for Natural Gas

West Virginia has tremendous opportunities to take advantage of the shale gas revolution to lower energy costs in the state, achieve economic and environmental benefits through greater use of natural gas for electricity production and transportation, and revitalize its industrial base. To take full advantage of the benefits that shale gas can offer, however, policymakers should consider a number of measures that can stimulate demand for natural gas and achieve price stability for natural gas at sustainable levels.

Promoting NGVs within the state offers one such opportunity, and policymakers have already adopted a number of incentives to encourage the development of the infrastructure necessary to support NGVs. Most of these incentives have fiscal impacts, however, and enriching them to match the incentives offered by many of the other shale "play" states is likely not feasible in the current fiscal climate in West Virginia. Other tools are available, however, and one such tool is enlisting the participation of the local distribution companies, or LDCs, in the state to build this infrastructure. As in 1992, the LDCs should be encouraged to come forward with a proposal for incentive rate treatment for costs they incur to support the development of the natural gas infrastructure in West Virginia. Although there are seventeen LDCs in West Virginia, the vast majority of the gas service in the state is provided by seven companies (Mountaineer Gas Company, Dominion Hope Gas, Inc., Equitable Gas Company, Consumers Gas Utility, Southern Public Service Company, Union Oil & Gas, Inc., and Bluefield Gas Company), which collectively serves over 98% of the market.[410] As the PSC approved in 1992, the participating LDCs could receive preferential rate treatment for certain categories of investment that are associated with NGV infrastructure.

Apart from the model provided by the 1992 PSC decision, the PSC has other tools available to it under its broad grant of ratemaking authority that could be used to support the NGV infrastructure effort. For example, the PSC could allow a slightly higher return on equity for NGV infrastructure-related investments. This action could be taken without express statutory authorization from the Legislature, under the PSC's broad authority to regulate in the public interest, or pursuant to the same statute relied upon in 1992.[411] In addition, with statutory authorization, a number of states have deregulated the price of compressed natural gas when used as a transportation fuel, or have granted their utility commissions with the authority to deregulate such sales.[412] Utah has gone a step further by allowing LDCs to set a natural gas vehicle fuel rate that is less than full cost of service, and to recover the remaining costs by spreading them to other customers of the LDC.[413]

With or without legislative action, LDCs in West Virginia should be integrated into the effort to develop the NGV infrastructure. They have the ability to access the capital necessary to pay for these investments, and to recover the costs through utility rates. That avoids the fiscal impacts associated with tax credits and government grants and rebates. Although these measures would have some impact on LDCs' revenue requirements when utility rates are set, the declining cost of natural gas provides some cushion within which LDCs could raise rates slightly to recover these modest costs and still allow decreases in retail utility rates for natural gas service.

Another measure that would stimulate demand for natural gas in West Virginia is encouraging natural gas-fired CHP facilities at commercial and industrial sites in the state. In addition to potentially consuming large quantities of natural gas, CHP offers vast benefits in the form of reduced energy costs—which should assist the competitiveness of West Virginia's industry—environmental benefits through reduced emissions, potentially lower utility costs through avoided transmission and distribution infrastructure investment, and improved reliability and resiliency of the electric grid. As in the case of encouraging the development of NGV infrastructure, the state's energy utilities can play a significant role in promoting CHP deployment at commercial and industrial facilities in the state. LDCs serving industrial customers, for

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410 W. VA. PUB. SERV. COMM'N, ANNUAL STATISTICAL REPORT 40 (Dec. 31, 2011), *available at* http://www.psc.state.wv.us/AnnualStatRpts/anstatrpt2011.pdf.

411 *See* W. VA. CODE ANN. § 24-2D-1 (LexisNexis 2008).

412 *See, e.g.*, KY. REV. STAT. ANN. § 278.508 (West 2012); LA. REV. STAT. ANN. § 45:1163 (2012); Massachusetts (MASS. GEN. LAWS ANN. ch. 164, § 941/2 (a) (West 2012); MISS. CODE ANN. § 77-3-3, -11 (2012).

413 UTAH CODE ANN. § 54-4-13.1 (LexisNexis 2012).

example, should be aggressively pursuing the installation of CHP facilities at those locations where the necessary electrical and thermal load are present. The PSC could institute a proceeding to explore the possible approaches, and invite the LDCs to propose incentive mechanisms designed to stimulate increased penetration of CHP facilities in the state. Among other things, the PSC could offer rate incentives to provide financial rewards to LDCs that are successful in achieving customer installation of CHP facilities.

The state's investor-owned electric utilities should also be enlisted in the effort. These utilities are quite familiar with their large industrial and commercial customers, including familiarity with thermal and electrical loads that would make a CHP facility an attractive economic investment. The PSC could provide financial incentives to the electric utilities that would reward them for facilitating the installation of CHP facilities on their customers' sites. A similar program offered in Connecticut in 2008–2009 was very successful in achieving more widespread deployment of CHP facilities.[414]

Another possibility is amendment of the AEPS to include a specific carve-out for CHP generation, which would impose on electric utilities a procurement obligation to secure a certain portion of their electricity supply from customer-sited CHP facilities. A number of states have RPS measures that include CHP among the qualifying technologies, and a few have a carve-out directed specifically at CHP.[415] A better solution is for West Virginia to adopt an EERS, as recommended above, and expressly include CHP as a measure that can be included to achieve the required levels of energy efficiency. The *ACEEE Scorecard* includes the following as a key recommendation for states to improve energy efficiency: "[t]reat combined heat and power as an energy efficiency resource equivalent to other forms of energy efficiency in an Energy

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[414] "Connecticut has added more than 300 MW [of CHP capacity] in three years, with an incentive program offering $400–$450/kW . . . to companies and institutions that install CHP and a $200/kW incentive to utilities. The state also has paid the standby rates for qualified CHP installations." *Prospects for CHP in North America: States Are Still the Biggest CHP Boosters*, COGENERATION & ON-SITE POWER PROD. (Jan. 7, 2009), http://www.cospp.com/articles/print/volume-10/issue-4/features/prospects-for-chp-in-north-america-states-are-still-the-biggest-chp-boosters.html.

[415] Connecticut's RPS includes CHP as a "Class III resource," a category that is required to provide 4% of each utility's retail load by 2020. *Connecticut Incentives/Policies for Renewables and Efficiency*, U.S. DEP'T OF ENERGY, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=CT04R (last visited Mar. 13, 2013). Of the states with some form of portfolio standards, "26—Arizona, Connecticut, Delaware, Colorado, Hawaii, Illinois, Indiana, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, and West Virginia—specifically call out CHP and/or waste heat-to-power . . . as eligible under their RPS, EERS, or APS program guidelines." Combined Heat & Power Partnership, *Portfolio Standards*, ENVTL. PROT. AGENCY, http://www.epa.gov/chp/policies/standards.html (last updated Mar. 8, 2013).

Efficiency Resource Standard."[416] Senate Bill 315 in Ohio is a good example of a recent state enactment that expressly includes major forms of CHP as a means of meeting the requirements of the state's EERS.[417]

In the absence of a legislative amendment to the AEPS or adoption of an EERS, the PSC could implement a "standard offer" program that would streamline the terms and conditions under which the state's electric utilities would purchase the electrical output from customer-sited CHP facilities.[418] The utilities would recover the costs of any incentives from ratepayers, as part of their cost of service, in rate proceedings. While these incentives would lead to slight upward rate pressures, the broader benefits of CHP deployment more than offset these higher costs.

In the case of electric utilities, promotion of CHP at their industrial and commercial customers' locations can be counter to their economic interests, similar to the effect of successfully promoting energy efficiency. Given that electric rates are set on the basis of a projected level of "throughput" retail sales to commercial and industrial customers, any reduction in the actual level of sales due to customer on-site generation through CHP facilities will cause the utility to fall short of the allowed return, set by the PSC, to which they are entitled under the constitution. Thus, any measure by the PSC to require the participation of electric utilities in the "building" of CHP load must be accompanied by implementation of a decoupling or lost revenue adjustment mechanism to hold them harmless from the financial impact of reduced sales to the participating customers.

VII. CONCLUSION

These are tumultuous times in the energy industry in West Virginia. The role of coal in the generation of electricity is declining, while the lower natural gas prices resulting from the shale gas revolution provide an opportunity to lower energy costs in the state and stimulate broad economic benefits. West Virginia is fortunate in that it has vast resources of both coal and natural gas, as well as renewable resources that have been tapped (wind, solar, and hydro) and resources that remain largely untapped (energy efficiency, biomass and geothermal). In these challenging times, there is no more "business as usual" for policymakers in West Virginia when it comes to decisions affecting the state's energy future. West Virginia is embarking on an

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416 FOSTER ET AL., *supra* note 25, at xii.

417 *Id.* at 66.

418 Delmarva and PEPCO in Maryland, for example, have jointly issued an RFQ for CHP projects, with an upfront incentive of $250/kW and a production incentive of 7 cents/kWh for the first eighteen months of project operation. *Delmarva Power Launches Combined Heat and Power Program*, DELMARVA POWER (June 29, 2012), http://www.delmarva.com/welcome/news/releases/archives/2012/article.aspx?cid=2045.

energy future that will be—and needs to be—far different from its past. This Article has provided a blueprint, or a roadmap, for a sustainable energy future for West Virginia, and is intended to stimulate the thoughtful discussions that are necessary to place the state on a foundation that is sustainable, not only from the perspective of a "cleaner" energy supply but also in the resilience of a more diversified economic base that is better positioned for the future.