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STATE CORPORATION COMMISSION

October 14, 2014

The Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Proposed Clean Power Plan (EPA-HQ-OAR-2013-0602)

Dear Ms. McCarthy:

Please find enclosed the comments of the Staff of the Virginia State Corporation Commission ("Virginia SCC Staff") on the Environmental Protection Agency's Proposed Clean Power Plan. The Virginia SCC Staff appreciates your consideration of these comments.

Sincerely,

William H. Chambliss
General Counsel
Office of General Counsel
Virginia SCC

cc: William F. Stephens, Director, Energy Regulation Division
Susan D. Larsen, Director, Utility Accounting & Finance

COMMENTS

OF THE

STAFF OF THE VIRGINIA STATE CORPORATION COMMISSION

ON THE PROPOSED CLEAN POWER PLAN

U.S. Environmental Protection Agency
Docket ID No. EPA-HQ-OAR-2013-0602

October 14, 2014

The Staff of the State Corporation Commission of Virginia ("Virginia SCC") hereby submits these comments on the proposed Clean Power Plan ("Proposed Regulation") issued by the United States Environmental Protection Agency ("EPA"). Because EPA's Proposed Regulation, if approved, is likely to increase substantially the bills and rates Virginians pay for their electricity, and could impact significantly the reliability of the electrical service they receive, the Staff of the Virginia SCC ("Virginia SCC Staff") respectfully submits these comments and requests changes to the Proposed Regulation.[1]

I. EXECUTIVE SUMMARY

The Virginia SCC Staff takes no position on the broad policy questions involving carbon emission reductions on a national level, the best methods or deadlines for achieving such reductions on a national level, or whether the United States should have a national "Clean Power Plan" such as the Proposed Regulation. Those are important policy issues for policymakers in the federal legislative and executive branches to decide. The Virginia SCC Staff focuses its comments on how the specific draft of EPA's Proposed Regulation would impact the rates and costs for electric service paid by Virginians, including residential consumers and businesses, and the impact of the Proposed Regulation on the reliability of electric service in Virginia. Oversight of electric costs and reliability has been one of the Virginia SCC's core responsibilities for more than a century.

To achieve the carbon emission reductions required by the Proposed Regulation, customers in Virginia will likely pay significantly more for their electricity. This is so for

[1] The comments and analyses included herein are solely those of the Virginia SCC Staff and should not be construed as representing the views of the Commissioners of the Virginia SCC, who may be called upon to consider and issue rulings regarding compliance plan components.

several reasons, the most obvious being that the Proposed Regulation will require a substantial portion of today's electricity production to be replaced in part with new and higher cost production and in part with higher cost programs intended to decrease consumption. *Those higher costs will be reflected in the electric bills paid by customers in Virginia.*

Based on the substantial acceleration of emission reductions called for in the current draft of the Proposed Regulation, EPA's own model predicts that Virginia will experience significant retirements of power plants. These retirements are of grave concern because the power plants involved are used today to ensure reliable service to Virginia customers, have years of useful life remaining, and cannot be replaced overnight or without regard for impacts on the electric system. To meet the demands of the Proposed Regulation will require the rapid development of significant, costly new infrastructure that will need to be appropriately sized and located to ensure that customers continue to receive the same level of reliable service they currently enjoy, and which federal reliability laws require. It will be a challenge to meet federal reliability requirements during such a transition.

To be clear, these comments take no position on the broad policy issues regarding how reliability risks and compliance costs caused by the Proposed Regulation compare to the environmental benefits asserted by the EPA. However, any Clean Power Plan should only be undertaken after full consideration of the impacts to the people and businesses that will bear its compliance costs and reliability risks. The Proposed Regulation, as currently drafted, presents many cost, reliability, and legal concerns, some of which are summarized below:

The Proposed Regulation, if approved, is likely to raise substantially both the electric rates and bills Virginians pay in several different ways.

- Virginia SCC Staff analyses of utility planning data indicate that, using conservative assumptions, the incremental cost of compliance for one utility alone (Dominion Virginia Power) would likely be **between $5.5 billion and $6.0 billion** on a net present value basis. Compliance costs will increase the cost of providing electric service, which must be paid for by residents and businesses in Virginia.

- In addition to new investment, Virginia residents and businesses will also be responsible for paying remaining costs for useful existing facilities forced to retire prematurely by the Proposed Regulation. The Proposed Regulation places at risk **several billions of dollars** of recent investments in existing coal-fired facilities in Virginia and West Virginia that Virginia ratepayers have only begun to pay off. Much of this investment has been constructed to comply with EPA consent decrees on which the ink is hardly dry. The federal government has, in essence, required Virginia residents and businesses to build a house, take out an expensive mortgage on it, and then directed that house be torn down. The expensive mortgage must still be paid off.

- Another rate impact to Virginia customers will be the wholesale prices for energy purchased by Virginia utilities and passed through to the Virginia retail customers that use it. Higher wholesale prices resulting from the Proposed Regulation will be compounded by federally approved locational marginal pricing employed by the regional transmission organization that operates the wholesale power system in Virginia.

- In sum, Virginia's compliance with the Proposed Regulation, as currently drafted, will be expensive and will be paid for by Virginia residents and businesses. Contrary to the claim that "rates will go up, but bills will go down", experience and costs in Virginia make it extremely unlikely that either electric rates or bills in Virginia will go down as a result of the Proposed Regulation.

The Proposed Regulation, if approved, raises significant reliability concerns.

- The carbon emission rate that EPA proposes for Virginia will require the retirement of a significant amount of fossil-fuel generation in a timeframe that compromises reliability.

- EPA's modeling shows 2,851 megawatts of dispatchable fossil-fuel generation in Virginia being retired and replaced, before 2020, with 351 megawatts of non-dispatchable onshore wind. This raises alarming regional reliability concerns.

- Additional near-term generator retirements caused by the Proposed Regulation will compound existing, unresolved reliability concerns in the Commonwealth.

As currently drafted, the carbon emission rates that EPA proposes for Virginia are arbitrary, capricious, and unlawful.

- The Proposed Regulation applies an unprecedented and unsupportable legal interpretation that the "best system of emissions reduction" for existing sources can include, among other things, homeowners and retail customers that do not generate any power or produce any emissions.

- The Proposed Regulation imposes substantially more stringent emission requirements for affected, existing generating units in Virginia than the standard for new units, yet to be built.

- The Proposed Regulation fails to recognize substantial, recent investments that have significantly reduced carbon dioxide and other emissions in Virginia.

- The Proposed Regulation fails to recognize Virginia's significant investment in and utilization of nuclear generation and, in fact, effectively penalizes Virginia for this zero-carbon generation.

- The Proposed Regulation incorporates generic and unsupported expectations of levels of renewable generation and energy efficiency that, when applied to Virginia, are extremely ambitious, almost certainly unachievable, and uneconomic under traditional standards.

The Proposed Regulation fails to address many important interstate implications.

- As confirmed by the federal regulators responsible for wholesale electric markets and transmission reliability, it is unclear how EPA's requirements can be integrated into existing market and reliability structures.

- Virginia would have little, if any, input regarding the compliance obligations for a substantial amount of out-of-state generation currently used to maintain reliable electric service at just and reasonable rates for Virginia customers.

As summarized above, and detailed below, Virginia SCC Staff's has numerous, serious concerns with the Proposed Regulation, as currently drafted. A more rationally established compliance horizon and carbon emission rate for Virginia – recognizing, for example, the particular circumstances of Virginia and the limitations on the EPA's authority – would provide flexibility for the Commonwealth to meet the EPA's goals of reducing carbon output while imposing more reasonable costs on customers.

II. INTRODUCTION

The citizens, businesses, and government of Virginia depend on reliable electric service at reasonable rates. For more than 110 years, the Virginia SCC has been the regulatory agency in the Commonwealth with the constitutional and statutory duty to ensure that Virginians receive a reliable supply of electricity at just and reasonable rates.[2]

The United States Congress has expressly identified the importance of electric reliability and reasonable electric costs by, among other things, requiring their consideration as part of EPA's determination in this matter.[3] Additionally, less than a decade ago, Congress placed an increasing emphasis on electric reliability by requiring

[2] The Constitution of Virginia establishes that the Virginia SCC "shall have the power and be charged with the duty of regulating the rates, charges, and services and … the facilities of … electric companies." Va. Const. art. IX, § 2. Under its constitutional authority and the laws enacted by the Virginia General Assembly, the Virginia SCC establishes retail rates paid by electric customers and is responsible for enforcing statutory requirements that such rates be "just and reasonable." *See, e.g.*, Code §§ 56-35, 56-234, 56-235; *Old Dominion Power Co. v. State Corp. Comm'n*, 228 Va. 528, 532, 323 S.E.2d 123, 125 (1984). Additionally, the Virginia SCC is responsible for authorizing the construction and operation of generation and transmission infrastructure in Virginia that is needed to provide reliable electric service to customers and is otherwise consistent with Virginia law. *See, e.g.*, Va. Code §§ 56-265.1 *et seq.*

[3] *See, e.g.*, 42 U.S.C. § 7411(a) (requiring the EPA to "take into account", among other things, "the cost of achieving such reduction" and "energy requirements").

mandatory and enforceable reliability standards for the bulk power system.[4] Those reliability standards are evaluated and approved by the Federal Energy Regulatory Commission ("FERC"), which also must, under federal law, ensure just and reasonable rates for electric transmission and the sales of wholesale electricity subject to federal jurisdiction.[5]

The well-established state and federal requirements for reliable electric service at a reasonable cost to customers, however, cannot be reconciled with the carbon emission rates that the Proposed Regulation requires for Virginia. *The proposed emission rates for Virginia are too low to provide the Commonwealth with meaningful options for compliance. Given the limited options afforded Virginia, compliance can only be achieved at a cost to Virginia that would be significant.* Analyses of utility planning data, for example, indicate that, using conservative assumptions, the incremental cost of compliance for one utility operating in Virginia would conservatively be $5.5 to 6.0 billion on a net present value basis.

In addition to the cost of significant new infrastructure, the Proposed Regulation will, if approved, require the retirement of useful existing infrastructure that has been constructed in compliance with all environmental requirements and, in some cases, has been constructed to comply with EPA consent decrees on which the ink is hardly dry. The remaining useful life of expensive infrastructure modifications undertaken to comply with other requirements imposed by EPA can and should be recognized in this rulemaking. Utility and customer investments required by the government to effect these

[4] *See* Energy Policy Act of 2005, Pub. L. No. 109-58, § 1211(b), 119 Stat. 594, 942.

[5] *See, e.g.*, 16 U.S.C. §§ 824d, e.

environmental remediations should not be confiscated by operation of a subsequent requirement.

The magnitude of what the Proposed Regulation requires Virginia (and the nation) to achieve by 2020 also raises obvious reliability concerns. Nationwide, EPA projects that the Proposed Regulation will, if not amended, cause 65,000 MW of fossil-fuel generation to retire by 2020.[6] The effect on the national power systems of adding and removing significant infrastructure in a short period of time, as the Proposed Regulation would require in Virginia and throughout the nation, must be taken seriously. Indeed, Virginia does not yet have in place the infrastructure necessary to permit generation retirements soon required by other EPA rules issued years before the Proposed Regulation.[7] *Additional near-term generator retirements caused by the Proposed Regulation will compound the existing, unresolved reliability concerns in the Commonwealth.*

For these reasons, and those discussed in greater detail below, the Virginia SCC Staff is compelled to provide comments identifying aspects of the Proposed Regulation that, as currently drafted, are arbitrary, capricious, unsupported, and unlawful. The Virginia SCC Staff shares EPA's concern that "state plans for emission reductions … must be consistent with a vibrant and growing economy and supply of reliable, affordable

[6] Technical Support Document, Regulatory Impact Analysis at 3-32; Resource Adequacy and Reliability Analysis at 3, 5.

[7] A critical transmission line project approved by the Virginia SCC cannot move forward without approval by the United States Army Corps of Engineers, which remains pending. *See, e.g., Application of Virginia Electric and Power Company, For approval and certification of electric facilities: Surry-Skiffes Creek 500 kV Transmission Line, Skiffes Creek-Whealton 230 kV Transmission Line, and Skiffes Creek 500 kV-230 kV-115 kV Switching Station*, Case No. PUE-2012-00029, 2013 S.C.C. Ann. Rep. 240, Order (Nov. 26, 2013) (approving a transmission line project to address reliability violations caused by generator retirements to comply with the Mercury Air Toxics Standards).

electricity to support that economy."[8] For this important and necessary goal to be achievable in Virginia, however, any carbon emission rate limit imposed on Virginia must be higher than what has been proposed. *A more rationally established compliance horizon and carbon emission rate for Virginia – recognizing, for example, the particular circumstances of Virginia and the limitations on the EPA's authority – would provide flexibility for the Commonwealth to meet the EPA's goals of reducing carbon output while imposing only reasonable costs on customers.*

III. VIRGINIA SCC STAFF'S COMMENTS ON EPA'S MANDATORY GOALS FOR VIRGINIA

The EPA proposes two mandatory emission rate goals for affected fossil-fuel generation units located in the Commonwealth of Virginia (collectively, "Mandatory Goals"). Affected Virginia units – that is, those that are already producing power or are under construction by 2014 – must first achieve an interim goal of 884 pounds of CO_2/MWh, beginning in 2020 ("Mandatory Interim Goal").[9] Then, beginning in 2030, affected Virginia units must achieve a final goal of 810 pounds of CO_2/MWh ("Mandatory Final Goal").

EPA asserts that the Mandatory Goals for Virginia are a lawful "standard of performance," which the Clean Air Act defines as follows:

> a standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact

[8] 79 Fed. Reg. 34,837. *See also* 79 Fed. Reg. 34,844 ("The U.S. economy depends on [the electric] sector for a reliable supply of power at a reasonable cost.").

[9] The proposed capacity and output thresholds for inclusion as an "affected [Electric Generator Unit]" identified in the Proposed Regulation. 79 Fed. Reg. 34,954.

and energy requirements) the Administrator determines has been adequately demonstrated.[10]

However, the Mandatory Goals for Virginia cannot be considered a valid "standard of performance" under this statutory provision for many reasons. Among other things, the Proposed Regulation establishes Mandatory Goals for Virginia that:

(A) impose more stringent requirements – in fact, substantially more stringent – for affected, *existing* generating units than the standard for *new* units, yet to be built;

(B) will require the retirement of a significant level of base load generation that must be replaced at a cost that is unreasonable and in a timeframe that compromises reliability;

(C) fail to recognize significant and recent investments that (1) have substantially reduced carbon dioxide and other emissions in Virginia; and (2) if stranded, will also contribute to higher costs and higher bills for Virginia residents and businesses;

(D) fail to recognize Virginia's significant investment in and utilization of zero-carbon nuclear generation and, in fact, effectively penalize Virginia by including "at risk" nuclear generation in the calculation of Virginia's goals;

(E) incorporate generic and unsupported expectations of levels of renewable generation and energy efficiency that, when applied to Virginia, are extremely ambitious, almost certainly unachievable, and uneconomic under traditional standards; and

(F) are based on an unprecedented and unsupportable legal interpretation that the "best system of emissions reduction" for existing sources can include homeowners and other retail customers that do not generate any power or produce any emissions.

These six legal deficiencies of the Mandatory Goals for Virginia are discussed below.

[10] 42 U.S.C. § 7411(a)(1).

(A) The Proposed Regulation Arbitrarily, Capriciously, and Unlawfully Imposes a Standard for Affected, *Existing* Generating Units That Is More Stringent Than the Standard for *New* Units.

The Proposed Regulation requires existing fossil fuel units located in Virginia to achieve a carbon emission rate that is as much as 26% lower than the carbon emission rate that the EPA recently determined can be achieved by new units using *the best available control technology*. Compared to Virginia's Mandatory Goals of 884 and 810 pounds of CO_2/MWh,[11] the new source performance standard for a new coal unit is 1,000 to 1,050, and for a new gas unit is 1,100.[12] Thus, a new fossil unit in Virginia – which can only be constructed using the absolute best control technology and without physical and other engineering limitations attendant to existing infrastructure – faces a far less stringent compliance requirement than existing units.

Such a topsy-turvy result for Virginia could seem a mere oddity to the general public when considered in the context of electric generation units. However, it would be hard to imagine the EPA advancing such a proposal in areas that are more familiar to everyday life. Would it be rational to require the current owners of automobiles or lawnmowers throughout Virginia, for example, to meet an emission standard that is 26% more stringent than required for the production of new cars or lawnmowers that must use the best available technology? Turning regulation on its head in this way – requiring older, but still useful equipment to meet a standard that the EPA admits cannot be achieved even by entirely new equipment – is a recipe for stranding prior investments and

[11] 79 Fed. Reg. 34,895.

[12] 79 Fed. Reg. 1,430.

requiring significant additional investment,[13] both of which will likely be paid for in large part, if not entirely, by consumers.

In finalizing its Proposed Regulation, the EPA should correct this irrational and inequitable result, consistent with the logic found elsewhere in the Proposed Regulation. When considering carbon capture and sequestration, for example, the Proposed Regulation recognizes that modifications of existing units "entail additional considerations beyond those at issue for new units" – including the expectation that such costs "would be expected to be substantial," and that "some existing EGUs might have space limitations and thus might not be able to accommodate … expansion."[14] Existing generating units cannot rationally be expected to achieve more than new units of the same type.

There is no legal or rational basis to set Virginia's Mandatory Goals for existing units below the standards required for new units. This is arbitrary and capricious regulation at its plainest.

To address this flaw, any carbon emission rate adopted for Virginia must be higher than what is required for new units. Virginia SCC Staff notes, for example, that EPA provides an alternative carbon emission rate of 1,216 pounds of CO_2/MWh for Virginia, which is calculated "before the introduction of nuclear, renewable, and [energy efficiency] into the denominator" of EPA's calculation.[15] A carbon emission rate of 1,216 would be a substantial reduction for existing fossil-fuel units in Virginia, as it is more

[13] See Sections III.B, C.

[14] 79 Fed. Reg. 34,857. References in these comments to the "Proposed Regulation" are, depending on the context, inclusive of the Preamble and Technical Support Documents issued contemporaneously with EPA's proposed regulation.

[15] Technical Support Document, Goal Computation, Appendix 4 at 23-24.

than 16% lower than Virginia's rate in 2012,[16] and more than 40% lower than Virginia's rate in 2005.[17] However, this alternative rate, along with a more reasonable compliance horizon, would address most of the cost and reliability concerns identified herein. Certainly, the final carbon emission rate should be no lower than the 1,100 pounds of CO_2/MWh the EPA has set for new gas generation using the best available control technology.[18] Of course, because of the Commonwealth's substantial investment in and production from zero-carbon nuclear generation, Virginia's entire generation fleet would, in reality, emit carbon at a rate far lower than the EPA contemplates for either new or existing fossil-fired generation in Virginia.[19]

(B) That Virginia's Mandatory Goals Cannot Be Achieved Even if All Coal-Fired Generation Located in Virginia Is Replaced With the Best Available Natural Gas-Fired Generation Presents Obvious Reliability Concerns and Significant Compliance Costs.

The Proposed Regulation also proposes a carbon emission rate for Virginia that is lower than achieved by every existing fossil-fuel unit in Virginia. No fossil-fueled generation facility in Virginia currently meets the carbon emission rate proposed for Virginia, because, as discussed above, that rate is lower than the emission rate of a new combined cycle natural gas facility. *This means that, even assuming it could be accomplished, a compliance strategy of replacing all coal-fired generation facilities in Virginia with comparable amounts of state-of-the-art natural gas combined cycle*

[16] Technical Support Document, Goal Computation at 27 (identifying a "2012 fossil rate" of 1,438 lbs/MWh).

[17] U.S. Department of Energy, State Electricity Profiles 2005 at 233, 234 (Mar. 6, 2007) (reporting Virginia electric industry carbon emissions of 105 billion pounds and Virginia net generation from carbon emitting sources of 49 million megawatt-hours).

[18] The best available control technology for coal—carbon capture and sequestration—has not been commercially demonstrated at base load plant size deployments.

[19] See Section III.D.

facilities would not satisfy EPA's Mandatory Goals proposed for Virginia. Given the role that the Proposed Regulation acknowledges natural gas must play in lowering carbon emissions, this is a sobering prospect indeed.

The rapid transformation of the generation fleet serving Virginia that the Proposed Regulation appears to envision raises obvious concerns about cost impacts, resource adequacy, and reliability in Virginia. To evaluate potential impacts of the low carbon emission rates for Virginia, Virginia SCC Staff first analyzed technical data provided by EPA contemporaneous with the Proposed Regulation.[20] Virginia SCC Staff also analyzed recent Integrated Resource Plan ("IRP") data[21] from the Commonwealth's largest investor-owned utility, Dominion Virginia Power ("Dominion"), which owns fossil-fuel generation impacted by the Proposed Regulation.[22]

Virginia SCC Staff's analysis of EPA's data and Dominion's IRP data both indicate that the Mandatory Goals for Virginia, as proposed, would require a substantial amount of unplanned new generation and unplanned retirements of existing generation. The timing and magnitude of these transitions on Virginia raise resource adequacy and reliability concerns.

1. <u>EPA Data</u>

[20] EPA's 2012 data helps estimate the magnitude of supply-side impacts after 2012 that are necessary to achieve compliance with Virginia's Mandatory Goals. However, because this data does not capture supply and demand changes expected to occur after 2012 in any event (*i.e.*, even if the Proposed Regulation were not promulgated), Virginia SCC Staff also analyzed the IRP data discussed herein.

[21] *Commonwealth of Virginia ex rel. State Corporation Commission, In re: Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to § 56-597 et seq. of the Code of Virginia*, Virginia SCC Case No. PUE-2013-00088, Doc. Con. Cen. No. 140830097, Final Order (Aug. 27, 2014).

[22] This projected IRP data provides a more dynamic estimate of supply-side impacts necessary to achieve compliance with Virginia's Mandatory Goals by recognizing that, without the Proposed Regulation, supply and demand changes would nonetheless occur after 2012; however, because this IRP data is specific to one utility, it does not capture the impacts associated with all existing generation in the Commonwealth.

The data provided by EPA raises obvious concerns about resource adequacy and reliability. EPA's Integrated Planning Model ("IPM") modeling results indicate, for example, that the Proposed Regulation will cause 2,851 MW of generation retirements in the Dominion transmission zone before 2020.[23] EPA's 2012 data and calculation of the proposed State emissions rates also indicate that Virginia would need to eliminate and replace approximately 9 million annual megawatt hours of coal-fired generation with new zero-carbon resources by 2020.[24]

Losing dispatchable generation of this magnitude would be a challenge whether it is 2,851 MW of capacity, 9 million megawatt hours, or a comparable amount of capacity or energy. Replacing such a large amount of energy production and generating capacity will require the immense addition of base load generation and transmission infrastructure – all appropriately located, including necessary access to a compliant fuel supply, and expeditiously sited and constructed – to maintain reliable electric service to customers.

Yet, EPA's modeling replaces the *2,851 MW of fossil-fuel generation* it projects will retire in the Dominion transmission zone by 2020 with only *351 MW of intermittent onshore wind*.[25] It is not clear how EPA concludes (if indeed it has) that reliability could be maintained in the Dominion transmission zone given this significant net reduction in capacity that the model EPA relied on to develop its Proposed Regulation. Even without

[23] Proposed Clean Power Plan_Option 1 State_overview file.xlsx (Retired(MW) tab); Option 1 State – April 2014 Draft SupplyResourceUtilization.xlsx (PJM_Dom tab). The 2,851 MW that EPA's modeling indicates will retire before 2020 represents more than 11% of the 2012 capacity that EPA identifies for this zone.

[24] The calculation of this reduction utilizes an approach that mirrors the manner in which EPA used its "building blocks" to develop Virginia's Mandatory Goals.

[25] Proposed Clean Power Plan_Option 1 State_overview file.xlsx (UnplannedBuild tab); Option 1 State – April 2014 Draft SupplyResourceUtilization.xlsx (PJM_Dom tab). Since wind is an intermittent resource, EPA's spreadsheet shows that only 72 MWs of additional 351 MW of wind capacity would be considered available for meeting reliability obligations. *Id.*

the Proposed Regulation, other factors, including the Mercury Air Toxics Standard and moderate natural gas prices, are causing a historic amount of fossil-fuel generation retirements across the country during the next two years. Requiring a second wave of substantial retirements before the country has ridden out the first is disquieting. To conclude that the Dominion transmission zone can replace 2,851 MW of dispatchable, fossil-fuel generation with 351 MW of intermittent wind, at a time of unprecedented retirements throughout the country, reveals a troubling lack of consideration for, if not threat to, maintaining a reliable electrical system for Virginia businesses and residents.

The amount of new, zero-carbon energy production that EPA's data indicates Virginia would require to meet the Mandatory Interim Goal by 2020 is daunting. Virginia would need to add the equivalent of approximately 1,140MW of nuclear generation at the 90% "average utilization rate for U.S. nuclear units" (which EPA indicates is "consistent with long-term average annual utilization rates observed across the nuclear fleet") in order to achieve the emission reductions inherent in EPA's calculation of Virginia's proposed emissions rate.[26]

Of course, the construction of 1,140 MW of additional nuclear capacity by 2020 is utterly unrealistic for Virginia or anywhere else in the nation. Currently, one nuclear project is under consideration in Virginia, though its need and cost have not yet been submitted to or reviewed by the Virginia SCC, as required by Virginia law. This project remains in the early stages of development, with an array of regulatory approvals needing to be sought and received should the project move forward. In fact, this project has been under review by the federal Nuclear Regulatory Commission for more than a decade.

[26] 79 Fed. Reg. 34,871.

Virginia's Mandatory Goals, when coupled with the Proposed Regulation's compliance timeframe, are simply incompatible with the development and construction cycle for new nuclear generation facilities. Public information available on the approximately 2,200 MW of nuclear capacity under construction at Plant Vogtle in Georgia indicates that these new nuclear units are estimated to cost more than $14 billion, with construction *after all permitting* spanning at least seven years.

With regard to wind or solar, even if the operational concerns associated with replacing dispatchable, fossil-fuel generation with the variable, intermittent, and nondispatchable production from these renewable resources could be managed, there is still zero probability that wind and solar resources can be developed in the time and on the scale necessary to accommodate the zero-carbon generation levels needed to meet the Mandatory Interim Goal in 2020. Using a 31% capacity factor that the Department of Energy ("DOE") indicates was the national average for wind turbines in 2012,[27] Virginia would need to add 3,300 MW of wind generation by 2020. Arbitrarily increasing the historic 31% capacity factor for wind, which DOE indicates has not improved since 2000,[28] to 50% would still require Virginia to add 2,050 MW of wind generation by 2020.[29]

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[27] U.S. Department of Energy, Energy Efficiency and Renewable Energy Division, 2012 Wind Technologies Market Report at 42 (Aug. 2013). EPA's IPM Model appears to have assumed a comparable 30.9% capacity factor for new onshore wind in Dominion's transmission zone. *See* Copy of Option 1 State – April 2014 Draft RegionalSummary.xlsx.

[28] U.S. Department of Energy, Energy Efficiency and Renewable Energy Division, 2012 Wind Technologies Market Report at 42 (Aug. 2013). This Department of Energy study attributes what it characterizes as a "listless" trend in wind capacity factors, in part, to "a build-out of lower quality wind resource sites." *Id.* at 45.

[29] In 2007, the Virginia SCC approved a certificate of public convenience and necessity for the construction and operation of a 40 MW wind generation facility in Highland County, Virginia. *Application of Highland New Wind Development, LLC, For Approval to Construct, Own and Operate an Electric Generation Facility in Highland County, Virginia pursuant to §§ 56-46.1 and 56-580 D of the Code of Virginia*, Case

Nor can solar, with capacity factors lower than wind generation, realistically bridge the resource gap that would be created in Virginia by the Proposed Regulation. Assuming an ambitious 25% capacity factor for Virginia solar, the Commonwealth would need to add 4,100 MW of solar generation by 2020. A combination of solar and wind of the magnitude needed to meet the Mandatory Interim Goal (adding, for example, 1,650 MW of wind and 2,050 MW of solar in Virginia) would be no less daunting.

Significantly, all the nuclear, wind, and solar capacity calculations[30] above assume that, by 2020, coal-fired energy production in Virginia is reduced by two-thirds from 2012 levels.[31] Maintaining coal-fired generation in Virginia that is greater than one-third of 2012 levels – including production from plants with significant investments which if retired, as discussed below, would result in stranded costs to Virginia residents and businesses[32] – would require even *more* new zero-carbon generation than the amounts identified above. Similarly, if the Mandatory Interim Goal is not attained beginning in 2020, even *further* coal-fired generation cuts and *greater* zero-carbon capacity additions than the amounts identified above would be required in subsequent years to achieve compliance over the 2020-2029 period averaged for compliance with the Mandatory Interim Goal.

No. PUE-2005-00101, 2007 SCC Ann. Rept. 295, Final Order (Dec. 20, 2007). *Seven years* after approval by the Virginia SCC, construction of that wind facility has not begun. To assume that 51 to 82 times the generating capacity of the Highland facility can be sited, built, and interconnected *within six years* in Virginia is as unrealistic as the construction of 1,140 MW of nuclear in that same abbreviated period.

[30] The "capacity calculations" referenced in this sentence do not include the IPM Model capacity figures also identified in this section, which were simply taken directly from the posted EPA files noted above.

[31] EPA identified 13.6 million megawatt hours of coal-fired generation in Virginia during 2012. Technical Support Document: Goal Computation, Appendices 1 and 2.

[32] See Section III.C.

What then is left for Virginia to achieve the Mandatory Interim Goal? The Proposed Regulation, which repeatedly references flexibility for States, should not leave Virginia with the sole, risky option of retiring all its coal-fired power plants, at a significant stranded cost,[33] replaced by new natural gas infrastructure (for which there is not currently pipeline capacity to supply the necessary fuel) and energy efficiency goals that are overly ambitious and beyond the scope of the Clean Air Act.[34] Moreover, as discussed above, a compliance strategy of replacing all coal-fired generation facilities in Virginia with comparable amounts of state-of-the-art natural gas combined cycle facilities – at a substantial cost to Virginia – would not satisfy EPA's Mandatory Goals proposed for Virginia. Aside from the questionable legality of the Proposed Rule, the Mandatory Interim Goal should be established at a more reasonable level for Virginia, certainly not less than the new source performance standard, and a more reasonable compliance date, beyond 2020, should be established.

2. Conservative Indicative Cost Analysis Using Dominion IRP Data

Moving beyond the near-term reliability and stranded cost concerns presented by the Mandatory Interim Goal, the Virginia SCC Staff has also evaluated IRP data for Dominion to estimate the incremental cost associated with achieving the Proposed Regulation's Mandatory Final Goal. This indicative cost analysis, discussed in greater detail in the Appendix attached to these comments, is summarized below.[35]

[33] See Section III.C.

[34] See Sections III.E, F.

[35] The Appendix discusses the methodology, major assumptions, and methodological bias reflected in this compliance cost analysis.

The indicative cost analysis conducted by Virginia SCC Staff is conservative in that it does not fully capture the compliance cost impacts that will ultimately be borne by Virginia residents and businesses.[36] It should also be stressed that Virginia SCC Staff's indicative cost analysis is limited to Dominion, and, as such, does not represent the overall impact of the Mandatory Final Goal on Virginia. However, this analysis is largely indicative of compliance costs for generation units throughout the Commonwealth because Dominion owns or controls most of the electric generation in Virginia.

In conducting this analysis, the Virginia SCC Staff examined CO_2 emissions data for various planning scenarios recently conducted by Dominion. Virginia SCC Staff endeavored to determine which, if any, of those scenarios would meet the proposed emission rates for Virginia and to develop estimates for the cost of complying with those Mandatory Goals. The following alternative plans were examined:

IRP Plans Evaluated	**Plan Design**
Base Plan	to meet future requirements through an optimized mix of generating unit additions and energy efficiency
Fuel Diversity Plan	to promote a diverse fuel mix with less reliance on natural gas and greater reliance on nuclear power
Renewable Plan	to meet Dominion's voluntary Virginia renewable portfolio standard ("RPS") goals and North Carolina's mandatory RPS goals through the construction of new renewable generation
Climate Action Plan	to meet assumed potential CO_2 regulations
Offshore Wind Plan	to incorporate a significant amount of offshore wind

The above plans were all designed by Dominion to meet its anticipated load growth, future reliability requirements, varying expectations of future CO_2 emissions

[36] For example, this analysis is limited to the geographic boundaries of Virginia, and does not attempt to estimate costs associated with compliance by generation facilities that are owned by Virginia utilities but are located in other states. Compliance costs for these out-of-state facilities will ultimately be shared by Virginia's citizens.

limits, and other (*i.e.*, non-CO_2) anticipated environmental standards. All the plans reflect significantly increased amounts of energy efficiency and, with the exception of the Renewable Plan, will meet Virginia's voluntary and North Carolina's mandatory RPS goals through a combination of the construction of new renewable generation and the purchase of renewable energy credits. The Renewable Plan would satisfy these RPS standards entirely through the construction of new renewable generating facilities.

The above plans also all reflect significant levels of retired coal-fired capacity in anticipation of ongoing changes in environmental regulations. The Climate Action Plan anticipates a significantly greater level of coal-fired generating unit retirements as compared to the other plans.

While the Base Plan reflects some level of future CO_2 emissions limits, the indicative cost analysis considers the Base Plan as a reference point for estimating the incremental costs of meeting the proposed emissions limits for Virginia. The Base Plan, it should be noted, is itself expected to produce significant reductions in the expected CO_2 emissions rates for Dominion's EGUs. In fact, the expected average Base Plan emissions rate reflects a 28% reduction compared to the 2012 baseline emissions rate used in the EPA's development of Virginia's Mandatory Goals. *The emissions rate resulting from the Base Plan would effectively meet the carbon emission rates that EPA proposes for 24 other states. Despite this significant reduction and the significant net present value incremental cost of the Base Plan, this plan would fall well short of meeting the Mandatory Goals assigned to Virginia.*

The Fuel Diversity Plan assumes the addition of a 1,450 MW (zero-carbon) nuclear unit and is expected to meet the Mandatory Final Goal for Virginia but would fail

to satisfy the Mandatory Interim Goal because of the long lead time associated with constructing a nuclear facility. As such, the Mandatory Interim Goal would require additional retirements of coal-fired generation and increased levels of renewable capacity. To achieve the Mandatory Goals, Virginia SCC Staff modified the Fuel Diversity Plan to include 69 MWs of onshore renewable wind generation.[37] Virginia SCC Staff's indicative cost analysis estimates the cost changes of revising the Fuel Diversity Plan to satisfy the Mandatory Interim Goal and then compares the net present value cost of the modified plan to the comparable cost of the Base Plan to estimate the cost of complying with the Mandatory Goals for Virginia. *This produces an estimated net present value compliance cost of $5.5 billion.*

The Climate Action Plan assumes the retirement of all coal-fired generation with heat rates exceeding 10,000 BTUs/kWh and limits the amount of natural gas-fired generation that can be added. The resulting expansion plan features significant levels of renewable, nuclear, and natural gas-fired capacity additions. The Climate Action Plan would appear to over-comply with the Mandatory Goals for Virginia, albeit at a substantial cost. Consequently, Virginia SCC Staff's indicative cost analysis estimates the cost changes associated with modifying the Climate Action Plan to increase the expected emissions rates to a level that approximates the Mandatory Goals for Virginia. It then compares the net present value cost of the modified plan to the comparable cost of the Base Plan to estimate the cost of complying with the Mandatory Goals for Virginia. To avoid over-compliance (and eliminate the costs associated with over-compliance), Virginia SCC Staff modified the Climate Action Plan by reducing the levels of wind and solar capacity added in the Climate Action Plan and increasing coal-fired generation from

[37] Conservatively, this level of wind generation would have a footprint of approximately 5 square miles.

existing units. *This produces an estimated net present value compliance cost of $6.0 billion.*

The Renewable and Off-Shore Wind plans produce emissions rates that exceed that of the Fuel Diversity case and are expected to be substantially more expensive. As such, these plans were not considered to be viable candidates for compliance in Virginia SCC Staff's indicative cost analysis. The estimated compliance costs associated with these two plans would likely be above the compliance cost range produced by the modified Fuel Diversity and Climate Action plans.

In summary, the Virginia SCC Staff's indicative cost analysis indicates that, although Dominion's current, least-cost resource plan will produce a 28% reduction in the average CO_2 emissions rate for Virginia generation facilities, the Mandatory Goals for Virginia would impose an additional net present value cost of $5.5 to $6.0 billion.

To be clear, this net present value cost range does not reflect the full cost of lowering CO_2 emissions in Virginia from current levels to the levels required by the Mandatory Goals. In addition to other conservative assumptions identified above and in the Appendix, it is important to understand that the Base Plan which Virginia SCC Staff used as the baseline for its indicative cost analysis is already expected to achieve CO_2 reductions at a substantial cost. Accordingly, the $5.5 to $6.0 billion net present value cost range calculated by the Virginia SCC Staff only estimates the incremental cost of achieving the CO_2 reductions required by the Mandatory Goals for Virginia to the extent that those goals are more restrictive than previously anticipated. Put another way, the $5.5 to $6.0 billion range indicates the net present value cost of decreasing Dominion's carbon emissions from the 28% reduction planned by the Company to the unlawfully and

arbitrarily determined 38% and 43% reductions required by the Mandatory Interim Goal and the Mandatory Final Goal, respectively.[38]

(C) The Proposed Regulation fails to recognize significant and recent investments that have substantially reduced carbon dioxide and other emissions in Virginia, which, if stranded, will contribute to higher rates and higher bills for customers.

From 2005 to 2012, carbon emissions from Virginia generation facilities were reduced by approximately 40%.[39] Nuclear uprates, heat rate improvements, unit retirements, energy efficiency, and the addition of significant new natural gas facilities, for example, have significantly lowered carbon emissions in the Commonwealth. During the next few years, carbon intensity of Virginia generation facilities will be further improved with the planned retirement and fuel conversion of additional coal-fired generation facilities and the construction of additional natural gas facilities.

The Virginia SCC has approved many of the expenditures resulting in the recent and expected carbon reductions in Virginia.[40] In doing so, the Virginia SCC has always been mindful that Virginia retail customers ultimately fund reasonable and prudent infrastructure improvements, which must satisfy energy requirements and environmental laws and regulations.

EPA appears to recognize that the Proposed Regulation is likely to result in "stranded costs," but fails to offer any quantification of such costs. Instead, the Proposed

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[38] These percentages are all based on the 2012 baseline emissions rate used in EPA's development of Virginia's Mandatory Goals. The 28% reduction from *2012* emissions planned by Dominion and the further reductions required by the Proposed Regulation are all far beyond the 30% reduction from *2005* emissions that EPA announced as a nationwide goal of the Proposed Regulation.

[39] *See, e.g.*, http://epa.gov/statelocalclimate/resources/state_energyco2inv.html.

[40] This occurs primarily in retail rate proceedings and certificate of public convenience and necessity proceedings.

Regulation asserts that the States can "minimize stranded assets," by using what the EPA describes as flexible compliance options provided by the Proposed Regulation. Unfortunately, the EPA's goal of providing States with flexibility to minimize stranded costs directly conflicts with carbon emission rates that, for Virginia, are set so low that compliance options are extremely limited, as discussed above. Mandatory Goals of 810 and 884 pounds of CO_2/MWh do not – as the Proposed Regulation asserts – provide Virginia with "the flexibility to make exactly the kind of judgments necessary to avoid requirements that would result in stranded assets."[41]

In regulated States like Virginia, costs of such stranded investments or "stranded assets," as EPA characterizes them, are often ultimately borne by customers. The Proposed Regulation fails to recognize this basic concept by inexplicably asserting that impacts on electricity prices "would likely be less" if a State were to implement new resources "on a more aggressive time-frame."[42] A more aggressive displacement of existing resources will increase stranded costs, which is almost certain to contribute to increased, not decreased, electricity prices in regulated States.[43]

If, as discussed above, a compliance strategy of replacing all coal-fired generation facilities in Virginia with comparable amounts of state-of-the-art natural gas combined cycle facilities would not satisfy EPA's Mandatory Goals for Virginia, many *recent*

[41] 79 Fed. Reg. 34,926.

[42] 79 Fed. Reg. 34,934.

[43] This is the case unless these stranded costs can be offset by the avoided operating costs associated with new resources necessitated by the Proposed Regulation. This is very unlikely for Virginia. In fact, a recent analysis conducted by the U.S. Energy Information Administration ("EIA") compared the levelized cost of electricity with the levelized avoided cost of new generating technologies. This comparison shows that the levelized costs of new resources exceeded the avoided costs for each resource considered with only one exception, geothermal resources. EIA, Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2014 at page 9, Table 4 (April 2014), available at http://www.eia.gov/forecasts/aeo/pdf/electricity_generation.pdf.

investments in power plants, including significant expenditures for environmental controls, are at risk of being stranded. Investments in the coal-fired fleet located in Virginia, which is used to provide Virginians with reliable service at just and reasonable rates, include:

- Virginia City Hybrid Energy Center ("VCHEC"), placed in-service in 2012, at an initial capital cost of $1.8 billion;

- Chesterfield Power Station scrubbers placed in-service in 2011 and 2008, at an initial capital cost of $275 million; and

- The Clover Power Station constructed and placed in-service in 1995 and1996, at an initial capital cost of $1.2 billion, and with a planned service life of over 50 years.

The Virginia SCC Staff also recognizes that the Virginia ratepayers served by Appalachian Power Company, whose generation facilities are located primarily in West Virginia, face stranded costs associated with the carbon emission rates that the EPA proposes for West Virginia. Virginia and West Virginia ratepayers have only recently begun paying for more than $2 billion in environmental controls necessary for Appalachian Power Company to comply with a 2007 EPA Consent Decree. These recent environmental compliance projects include flue gas desulfurization ("FGD") systems, for all four units at the Amos and Mountaineer Power Stations, which were placed into service between 2007 and 2011. Other recent environmental investments for West Virginia facilities funded by Virginia ratepayers include scrubbers and FGD systems at Dominion's Mount Storm generating facility.

Virginia is unable to take advantage of the 10-year averaging allowed by the Proposed Regulation to meet the Interim Mandatory Goal, which may provide some flexibility for States with coal-fired fleets expected to retire "after 2020 but before

2029."[44] Only one coal-fired unit at the plants identified in the above discussion of stranded costs – VCHEC, Chesterfield, Clover, Amos, or Mountaineer – has an estimated retirement date before 2030, and none before 2020.[45] *Thus, a Mandatory Interim Goal of 884 pounds/MWh beginning in 2020, and a Mandatory Final Goal of 810 pounds/MWh beginning in 2030, means that billions of dollars of useful plant in Virginia (and West Virginia) are likely to be stranded, with a cost to Virginia residents and businesses that is not accounted for by the Proposed Regulation*. For this reason, the Virginia SCC urges the EPA to reconsider its proposal "that the remaining useful life of affected EGUs, and the other facility-specific factors identified in the existing implementing regulations, should not be considered as a basis for adjusting a state emission performance goal…."[46]

2. Aggregate Customer Bills Are Unlikely to be Reduced by the Proposed Regulation.

EPA recognizes that electric *rates* will go up as a result of the Proposed Regulation. However, the Proposed Regulation also asserts that, based on EPA's estimated levels of increased energy efficiency, overall *bills* paid by customers will go down.[47]

The Proposed Regulation's claim that overall customer bills will go down is contrary to experience implementing energy efficiency programs in Virginia. In fact, this

[44] 79 Fed. Reg. 34,897.

[45] The estimated retirement dates in the relevant depreciation studies approved most recently by the Virginia SCC for the coal-fired units at Chesterfield, Clover, Amos, and Mountaineer are: 2022, 2030, 2034, and 2034 (Chesterfield); 2050 and 2051 (Clover); 2033 (Amos); and 2040 (Mountaineer), respectively. As discussed above, VCHEC only began operation in 2012.

[46] 79 Fed. Reg. 34,926.

[47] *See, e.g.*, 40 Fed. Reg. 34,874 ("These factors indicate that the cost of CO2 reductions achieved through implementation of demand-side energy efficiency at the levels reflected in the best practices scenario are likely to be very reasonable, *typically resulting in reductions in average electricity bills across all end-use sectors*.") (emphasis added).

claim could only be accurate if the costs of reducing CO_2 emissions through energy efficiency programs are less than the variable operating costs (primarily dispatch costs) that would be avoided by the compliance action since compliance requires the displacement of existing generation.[48] This expectation is not reasonable in Virginia or perhaps anywhere else. The Virginia SCC Staff is unaware of any electric energy efficiency resource deployable in Virginia that both: 1) has a cost less than its associated avoided variable operating costs, and 2) is scalable to a level that would meet the Proposed Regulation. While energy efficiency may possibly be a least cost measure for addressing some portion of the Proposed Regulation, it is extremely unlikely that energy efficiency can both reduce aggregate bills and produce compliance given the Mandatory Goals proposed for Virginia.

Moreover, the "lower bill" talking point seems to ignore the reality that costs (and lost revenues) associated with investments that continue to exist but not operate do not simply disappear. If not paid by customers, as apparently envisioned by the EPA, these costs will simply be shifted to other entities, most likely electric energy providers and taxpayers, as apparently not considered by the proponents of this talking point. For instance, energy efficiency may allow the avoidance of incremental resource requirements; however, it will also reduce revenues that are necessary to support existing investments. In many instances, these investments (*i.e.*, transmission and distribution investments) continue to be used and useful. In other instances, these investments may be associated with utility assets (*i.e.*, coal generating facilities) that are being prematurely

[48] Using energy efficiency to displace existing generation actually reduces the avoided costs associated with energy efficiency in comparison to a more traditional view where energy efficiency is viewed as a replacement for new generation that would otherwise be needed to meet load growth. In fact, if maximum achievable levels of energy efficiency are needed to achieve compliance, energy efficiency would no longer be an effective resource for meeting future load growth.

retired as a result of the Proposed Regulations. The costs associated with these otherwise used and useful investments are very real, will continue to be borne by Virginia citizens and businesses, and simply cannot be ignored.

As discussed above, the costs of energy efficiency programs of any appreciable scale are likely to exceed avoided variable operating costs. However, under the unlikely scenario that variable operating costs do exceed energy efficiency costs, there are two possible outcomes: 1) aggregate bills are lower and the resource provider receives reduced compensation, or 2) rates are adjusted and aggregate bills are increased. If aggregate bills are reduced without a corresponding price adjustment, the net cost of compliance is simply borne by the energy efficiency resource provider, it is not avoided. When prices are adjusted, aggregate bills are increased and net compliance costs are borne by consumers. In either of these two events, the cost of compliance is real – it is simply borne by different people and businesses.

(D) The Proposed Regulation fails to recognize Virginia's significant investment in and utilization of zero-carbon nuclear generation and instead arbitrarily and capriciously penalizes Virginia by including "at risk" nuclear generation in the calculation of Virginia's Mandatory Goals.

More than 3,500 MW of nuclear capacity is located in Virginia and supported by Virginia ratepayers. Through capacity uprates, approximately 150 MW of nuclear capacity has been added since 2010, at a cumulative initial capital cost of approximately $500 million dollars.

As a result of Virginia's historic and continuing investment in this nuclear fleet, a significant amount of the electric generation that provides reliable electric service in Virginia is zero-carbon nuclear generation. For example, 40% of the electricity generated

in Virginia was provided from nuclear facilities in the 2012 base year used by the Proposed Regulation to calculate Virginia's Mandatory Goals.[49]

Yet, the Proposed Regulation does not recognize this significant investment in the nuclear fleet or the substantial resulting zero-carbon energy production in Virginia that has historically lowered Virginia's carbon footprint. To the contrary, the Proposed Regulation illogically *penalizes* Virginia for its nuclear fleet by including "at risk" nuclear production in the denominator of its mathematical formula and basing the Mandatory Goals on 2012 generation levels.[50] Including an "at risk" nuclear component in the formula for Virginia – along with other unlawful components of the formula discussed below[51] – has the effect of driving the Proposed Regulation's emission rates for Virginia unreasonably and unlawfully low.[52]

Including higher than normal zero-carbon energy production in EPA's formula drives down the emission rates that Virginia and other States must achieve, making compliance more difficult to achieve. This is because the Mandatory Goals are calculated by adjusting a basic ratio of:

carbon emissions / megawatt hours of production

Adding into this formula production from resources that have no carbon emissions only increases the denominator of the ratio, and has no effect on the numerator.

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[49] U.S. Department of Energy, State Electricity Profiles 2012 at Tables 3.6 and 3.12 (Dec. 2013).

[50] 79 Fed. Reg. 34,870.

[51] See Sections III.E, F.

[52] Virginia's weighted average nuclear capacity factors were higher than average in 2012. Consequently, the calculation of the Mandatory Goals effectively penalizes Virginia by using a year when emissions from generators were lower than normal as a result of higher than normal nuclear generation and increasing the denominator of EPA's formula by overstating "at risk" generation.

So each megawatt hour of zero-carbon production added by EPA for "at risk" nuclear and renewable resources, as well as the energy efficiency added in by EPA, lowers the Mandatory Goals and requires deeper carbon emission reductions.

Penalizing Virginia for its zero-carbon generation in this way is flatly inconsistent with the Proposed Regulation's purported goal of reducing carbon emissions (much less doing so without compromising reliability or reasonable costs). Continued use of existing (in addition to new) nuclear generation capacity, which provide reliable base load generation that is carbon-free, should be allowed to count for compliance with the Proposed Regulation.[53] The 3,500 MW of zero-carbon nuclear capacity in Virginia dispatches ahead of fossil-fuel facilities, thereby massively reducing the carbon emissions associated with providing reliable electric service. A rule intended to reduce carbon emissions should reward – not penalize – Virginia customers for their significant investment in this carbon-free nuclear generation.

(E) The Proposed Regulation uses generic and unsupported expectations of levels of renewable generation and energy efficiency that, when applied to Virginia, are extremely ambitious, almost certainly unachievable, and uneconomic under traditional standards.

Another reason the Proposed Regulation's emission rates for Virginia are set unreasonably and unlawfully low is EPA's inclusion of significant amounts of new renewable generation and energy efficiency in the denominator of its mathematic formula. Although the Proposed Regulation sets state-specific Mandatory Goals, the calculation of Virginia's Mandatory Goals disregards real world considerations specific to Virginia. In this regard, the Proposed Regulation arbitrarily and capriciously extrapolates

[53] This would be consistent with the Proposed Regulation's proposal to allow States "to include in their plans other measures that reduce CO_2 emissions at affected EGUs but that are not included in the building blocks." 79 Fed. Reg. 34,897.

renewable and energy efficiency policy requirements of other States that have not been achieved. There is no analysis as to how these aspirational levels of renewable generation and energy efficiency, derived from other states that have their own particular geographies, existing infrastructures, and political considerations, could reasonably be achieved in Virginia or whether such levels can be achieved in a cost effective manner given Virginia's particular circumstances. Although the Proposed Regulation purportedly recognizes that "states differ in important ways,"[54] EPA's generic approach to this aspect of its calculation ignores geographic differences that cannot be reasonably ignored. Again, the end-result of this unrealistic approach is that it deprives Virginia of the flexibility needed to achieve carbon reductions at a reasonable cost while still maintaining reliable service.

Renewable Generation in Building Block 3

Virginia's Mandatory Goals are calculated based on, among other things, a 16% regional renewable generation "target level" that the Proposed Regulation asserts is achievable. To create the 16% regional target applied to Virginia, EPA lumps eight States into an "East Central" region and then uses state RPS requirements established by six States other than Virginia.[55] Both this calculation and the asserted rationale for its extrapolation to Virginia are significantly flawed.

The Proposed Regulation asserts that the 16% regional renewable calculation applied to Virginia is achievable because "in establishing the [RPS] requirements, States

[54] 79 Fed. Reg. 34,836.

[55] 79 Fed. Reg. 34,867; Technical Support Document, GHG Abatement Measures at 4-11, 4-12, 4-15, and 4-16. For simplicity, the District of Columbia is referred to herein as a State.

have already had the opportunity to assess those requirements against a range of policy objectives including both feasibility and costs."[56] The Proposed Regulation then calculates the 16% renewable generation "achievable" in Virginia based on a simple average of "2020 Effective RE Levels" that EPA derived from the future RPS requirements of District of Columbia ("D.C."), Delaware, Maryland, New Jersey, Ohio, and Pennsylvania (*i.e.*, 96%/6 = 16%). The fact that Virginia does not have a mandatory RPS requirement is not considered at all in EPA's calculation or the extrapolation of other States' RPS requirement on Virginia.

The basis relied upon by EPA for assuming future RPS requirements are achievable targets – that States have already assessed feasibility and costs – cannot lawfully be applied, much less in the haphazard manner proposed by the Proposed Regulation. The Proposed Regulation incorrectly assumes that the States that have enacted mandatory RPS requirements – and only those States – have assessed the feasibility and costs of RPS requirements. If, as EPA assumes, the legislature of one state can speak to what is achievable in another, which it cannot in this context, that assumption would have to work both ways. There are many reasons, including geographic and economic, why States have approached renewable generation differently. And, just as Virginia's legislative decision not to impose RPS requirements in Virginia was not intended to, and cannot, speak to what is achievable or unachievable in other States, the decisions of other States to impose RPS requirements were not intended to, and cannot, demonstrate what is achievable in Virginia. To foist in-state decisions upon other States, and to do so while ignoring the contrary decisions of other States, is arbitrary, capricious, and unlawful.

[56] 79 Fed. Reg. 34,866.

Another fundamental problem with EPA's addition of *future* renewable generation into the calculation for Virginia's Mandatory Goals is that it does not establish what has been *adequately demonstrated* in Virginia, as required by the plain text of the Clean Air Act. For the eight States in the "East Central" region in which EPA places Virginia, EPA's data shows that the renewable generation in 2012 ranged between 1 to 3%, with Virginia at 3% for that year.[57] This is the level of renewable generation that has been adequately demonstrated in Virginia. That other States have future legislative requirements – and no assurance that they will be met – does not change the reality in Virginia.

Even if the legislative process of one state could establish a level of renewable generation that has been demonstrated in Virginia, that would not justify giving less weight – indeed, no weight at all – to Virginia's legislative determination to not impose RPS requirements. EPA's math is wrong. By using a simple average of the six States with mandatory RPS goals to calculate the East Central regional target, EPA treats six States proportional to each other and ignores the other two States (Virginia and West Virginia). For purposes of determining what is achievable in Virginia, Delaware's legislative determinations regarding achievable RPS levels and load counts as much as those of Pennsylvania or Ohio, which have much larger in-state generation fleets and loads, and more than those of West Virginia and Virginia (which, as discussed above, is disregarded).

[57] 79 Fed. Reg. 34,868. The limited levels of renewable generation within the Eastern Central region also call into question the Proposed Regulation's reliance on historic price impacts to draw conclusions about the cost of significantly expanding renewable generation within the region. 79 Fed. Reg. 34,869.

EPA's own data demonstrates why a simple average for calculating a regional target is wrong. The States in EPA's "East Central" region that have higher future RPS requirements are those with relatively little generation compared to the others in this region. Delaware, D.C., Maryland, and New Jersey generated approximately *111 million MWh* in 2012 and are assigned "2020 Effective RE Levels" *between 19 to 22%*.[58] In contrast, Pennsylvania, Ohio, Virginia, and West Virginia generated approximately *500 million MWh* in 2012 and are either ignored in the calculation or assigned a "2020 Effective RE Level" *no greater than 9%*.[59] There is no rational basis – legally or mathematically – for giving such undue and unintended influence to certain legislatures at the expense of others, including Virginia.[60]

The results of EPA's renewable calculations bring full-circle the irrational basis discussed above for calculating a regional target. As its final step, EPA converts the regional target into a growth rate, which is then used to calculate renewable generation levels for each state. Virginia is assigned 12% and 16% interim and final renewable levels that, when plugged into EPA's formula, significantly lower the carbon emission rates in the Mandatory Interim Goal and Mandatory Final Goal, respectively. The renewable levels assigned to Virginia are the highest in the East Central region.[61] Thus, even though EPA relies on the legislative determinations of States with renewable

[58] Technical Support Document, GHG Abatement Measures, Data File: Proposed Renewable Energy (RE) Approach (XLS) at Input –EIA 2012 Generation Data; Technical Support Document, GHG Abatement Measures at 4-11, 4-12.

[59] *Id.*

[60] EPA's entirely unsupported assertion that "the RPS requirements developed by the state necessarily reflect consideration of the states' own respective regional contexts" does not justify or correct the significant factual (including mathematical) and legal errors identified herein. 79 Fed. Reg. 34,866.

[61] 79 Fed. Reg. 34,868.

requirements to determine what is achievable across a region, the final result of EPA's calculation is that States with such requirements are actually expected to achieve less than Virginia, which has no renewable requirement. In fact, for the States with renewable requirements, EPA's formula sets renewable levels for those States that are lower than the figures built into the regional target that was then applied to Virginia.[62] The results of EPA's formula are illogical: Virginia is expected to achieve renewable levels that are calculated based on other States' renewable requirements that the EPA's formula does not ultimately expect those States to achieve.[63]

Energy Efficiency in Building Block 4

The Proposed Regulation's generic assumptions about the level of energy efficiency achievable in Virginia are also arbitrary and capricious. For this reason, and because EPA's legal argument regarding energy efficiency is also without merit,[64] the unsupported assumptions about energy efficiency in Virginia cannot reasonably be used to lower a carbon emission rate assigned to the Commonwealth.

The Proposed Regulation concludes that a 1.5% annual incremental savings rate is "a reasonable estimate of the energy efficiency policy performance that is already *achieved or required by leading states* and that *can be achieved at reasonable costs by all states* given adequate time."[65] Again, the Proposed Regulation selectively considers the

[62] *Compare* Technical Support Document, GHG Abatement Measures at 4-11, 4-12 *with* 79 Fed. Reg. 34,868.

[63] The 2029 proposed renewable generation goals calculated by the EPA are lower than the "2020 Effective RE Level" RPS requirements calculated by EPA for Delaware, D.C., Maryland, and New Jersey. *Id.*

[64] See Section III.F.

[65] 79 Fed. Reg. 34,872 (emphasis added).

policies of some States over those of Virginia and other States. That Virginia has an energy efficiency goal, rather than a requirement, is disregarded and, in effect, "vetoed" by the different policies of other States – States with demographics, climates, load and generation profiles different from those of Virginia. This approach to setting Virginia's carbon emission rate is arbitrary and capricious and does not establish what is achievable, much less what has been adequately demonstrated, in Virginia.

The end result of incorporating the Proposed Regulation's unsupported extrapolation of a 1.5% annual "energy efficiency policy performance" onto Virginia is that the Proposed Regulation forces 1.2% and 9.3% "savings targets" into the denominator of the formula that calculates Virginia's Mandatory Goals, arbitrarily and capriciously driving down the carbon emission rates assigned to Virginia.[66]

(F) The Proposed Regulation is based on an unprecedented and unsupportable legal interpretation that the "best system of emissions reduction" for existing sources can include homeowners and retail customers that neither generate any power nor produce emissions.

The Proposed Regulation asserts that statutory provisions for the regulation of *existing generation facilities that are sources of emissions* can apply more broadly to, and make subject to federal enforcement, other entities, citizens, and activities.[67] For example, homeowners' installation of more efficient windows or light bulbs, which are common energy efficiency measures, would be subject to federal enforcement under EPA's proposal. This stretches the Clean Air Act beyond recognition and forces the carbon emission rates proposed for Virginia so low that, as discussed above, the rate for

[66] 79 Fed. Reg. 34,874. Because EPA classifies Virginia as a "net importer of electricity," the Proposed Regulation adjusts these savings targets using a ratio calculated by the EPA.

[67] 79 Fed. Reg. 34,901.

existing sources is far more stringent than the rate for new sources using the best available control technology.

The Proposed Regulation loses sight of the fact that the Clean Air Act provisions under which the EPA purports to act provide for the establishment of "a standard for emissions of air pollutants" from existing sources of emissions.[68] The bounds of the Clean Air Act cannot be exceeded simply because there is a relationship between customer load and the level of generation needed to serve that load. Indeed, because of basic engineering principles that require generation and load to be constantly balanced, a relationship between the two has necessarily existed since the first electric current flowed through a power system.

Including energy efficiency as part of a "best system of emission reduction" also changes the "standard for emissions of air pollutants" for existing sources of emissions from a measurable standard for which accountability can be ensured to a compliance requirement based on layer upon layer of assumptions and estimates. The Proposed Regulation and supporting documents recognize that "many states with energy efficiency programs use different input values and assumptions" to estimate energy savings from such programs.[69] This is because estimates of energy savings from these programs are just that – estimates. To use such estimates – which require many assumptions about, among other things, how retail customers would have acted but for such energy efficiency programs – to calculate an emission standard for existing sources of pollutants

[68] 42 U.S.C. § 7411(a)(1).

[69] Technical Support Document, State Plan Considerations at 42.

moves an emission standard from science to, at best, a realm of art where there are many different schools of thought.

At the accountability stage, the inclusion of demand-side energy efficiency programs becomes even more problematic and unsupported by the Clean Air Act. What if the retail customers and homeowners integral to these programs do not act the way they are assumed or expected to?[70] Under the Clean Air Act, how can either these homeowners (who are not within the scope of 111(d)) or the existing carbon emitters (who are within the scope of 111(d), but are not responsible for the actions of homeowners) be held accountable? Indeed, most aspects of a homeowner's everyday life that affect his or her electricity consumption are not matters of interstate commerce, much less the regulatory construct of the Clean Air Act.

The Proposed Regulation's proposal for the States to resolve this dilemma and to assume accountability for enforcing activity beyond the bounds of the Clean Air Act is unlawful.[71] Far from cooperative federalism, the Proposed Regulation unlawfully expands coverage of the Clean Air Act and commandeers significant state resources.[72] Shortly after the Proposed Regulation was issued, the Supreme Court of the United States overturned an aspect of the EPA's Tailoring Rule for reasons that apply no less to the Proposed Regulation. In *Utility Air Regulatory Group*, the Court stated, among other things, that:

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[70] *See, e.g.*, The Breakthrough Institute, Energy Emergence: Rebound & Backfire as Emergent Phenomena (Feb. 2011).

[71] *See, e.g.*, 79 Fed. Reg. 34,901, 34,902.

[72] The Supreme Court of the United State has found less onerous federal requirements on state officials to be unconstitutional for activities that actually are in interstate commerce. *Printz v. United States*, 521 U.S. 898 (1997).

> The fact that EPA's greenhouse-gas-inclusive interpretation of the PSD and Title V triggers would place plainly excessive demands on limited governmental resources is alone a good reason for rejecting it; but that is not the only reason. EPA's interpretation is also unreasonable because it would bring about an enormous and transformative expansion in EPA's regulatory authority without clear congressional authorization. When an agency claims to discover in a long-extant statute an unheralded power to regulate "a significant portion of the American economy," we typically greet its announcement with a measure of skepticism. We expect Congress to speak clearly if it wishes to assign to an agency decisions of vast "economic and political significance."[73]

Similarly, the Proposed Regulation would place plainly excessive demands on state governmental resources for the foreseeable future. Additionally, the Proposed Regulation would transform EPA's regulatory authority by expanding it beyond the fence line of existing power plants (and other actual emitters) and into, among other things, the homes of citizens.

In light of intervening guidance of the Supreme Court in its *Utility Air Regulatory Group* decision, the EPA need not, and should not, wait until a subsequent court decision –as proposed in the Proposed Regulation[74] – to sever the energy efficiency building block. Although legitimate state and federal initiatives can be undertaken to encourage energy efficiency, the EPA's proposal to subject such consumer activity to regulation enforceable under the Clean Air Act is *ultra vires* and unworkable.

[73] *Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427, 2444, Slip Opinion at 19 (June 23, 2014).

[74] 79 Fed. Reg. 34,892.

IV. VIRGINIA SCC STAFF'S COMMENTS ON INTERSTATE IMPLICATIONS OF THE PROPOSED REGULATION

As discussed above, a more rationally established compliance horizon and carbon emission rate for Virginia – recognizing, for example, the particular circumstances of Virginia and the limitations on the EPA's authority – would provide flexibility for the Commonwealth to meet the EPA's goals of 1) reducing carbon output and 2) imposing only reasonable costs on customers. However, EPA's proposal to assign disparate carbon emission rates to States whose utilities are engaged in interstate operations and markets presents further concerns and complications. The different State requirements create difficulties for interstate electrical facilities and markets that, even if workable, could force fundamental changes to an industry that serves as the backbone for our national economy. Although such changes have the potential to compromise reliable electric service at just and reasonable rates for customers, the Proposed Regulation fails to provide meaningful guidance on how to reconcile disparate carbon emission rates with the interstate nature of the electric industry. Some of the interstate complications are identified below.

A. Treating States Differently Creates the Potential for Additional Stranded Costs Associated With Multi-State Operations.

Electric utilities whose operations traverse state boundaries are often obligated under state franchises and laws to serve retail customers in multiple States. Such multi-state obligations necessitate the construction and operation of facilities located in and across more than a single State. For example, Appalachian Power Company serves retail customers in Virginia and West Virginia using facilities constructed in those States as well as in Ohio. Dominion serves retail customers in Virginia and North Carolina

using facilities constructed in those States as well as in West Virginia.

Thus, in addition to Virginia's Mandatory Goals, Virginia may be affected by the carbon emission rates set in, for example, West Virginia, Ohio, and North Carolina. If, like Virginia, those States are not provided with reasonable emission rates and flexibility for achieving compliance, Virginia residents and businesses may face additional stranded costs and additional costs for the construction and operation of new generation needed to replace affected generation located outside of Virginia.

Moreover, the Proposed Regulation requires States to make substantial carbon reductions to *in-state* generation fleets that often include units *that serve only other States*. Appalachian Power Company owns and operates the Dresden combined cycle generating facility in Ohio and Dominion owns and operates the coal-fired Mount Storm generating facility in West Virginia. Because those two generation facilities do not serve retail customers in the States where they are located, Virginia SCC Staff is concerned that the Proposed Regulation potentially places those facilities at a disadvantage compared to in-state facilities that are used to serve in-state customers.[75]

Like the facilities located in Virginia that are specifically identified above,[76] Dresden and Mount Storm help maintain reliable electric service at just and reasonable retail rates to Virginia customers and have useful remaining lives beyond 2030.[77]

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[75] However, Virginia SCC Staff notes that the Clean Air Act does not authorize state action that would be inconsistent with the dormant Commerce Clause of the United States Constitution. *See Wyoming v. Oklahoma*, 502 U.S. 437 (1992); *GMC v. Tracy* 519 U.S. 278, 299 (1997) ("[T]he dormant Commerce Clause's fundamental objective [is] preserving a national market for competition undisturbed by preferential advantages conferred by a State upon its residents or resident competitors.").

[76] Section III.C.

[77] The Dresden facility began operations in 2012. The estimated retirement dates in Dominion's most recent depreciation study approved by the Virginia SCC for the three coal-fired units at Mount Storm are between 2035 and 2043.

Accordingly, any substantial impact from the Proposed Regulation on these facilities – which are largely beyond the Commonwealth's control – could create substantial additional stranded costs for Virginia. As discussed above, the low carbon emission rates assigned to Virginia do not provide the Commonwealth with reasonable flexibility to minimize stranded costs associated with affected generation units *located in Virginia*.[78] For affected units that are located *outside of Virginia* but funded by Virginia ratepayers, stranded costs are largely beyond the control of Virginia, which has no little to no say regarding the compliance obligations of those units.

B. The Proposed Regulation Fails To Address its Tension With FERC-Regulated Electric Markets Used To Establish Just and Reasonable Rates.

For many years, the federal government has been actively encouraging, and in some instances requiring, the regional and inter-regional coordination of electric industry construction, operation, and markets. FERC has aggressively encouraged the creation and membership in regional transmission organizations ("RTOs").[79] FERC has also recently required all transmission owning utilities to participate in regional transmission planning similar to that which occurs in RTOs.[80]

The tension between FERC's regional accomplishments and EPA's Proposed Regulation, including that regulation's disparate treatment of States, is undeniable. The Proposed Regulation challenges the regional economic dispatch currently employed by

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[78] Section III.C.

[79] *See, e.g, Promoting Transmission Investment through Pricing Reform*, Order No. 679, 71 Fed. Reg. 43,294 (2006), *order on reh'g*, Order No. 679-A, 72 Fed. Reg. 1152 (2007), *order denying reh'g*, 119 FERC ¶61,062 (2007).

[80] *See Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities*, Order No. 1000, 76 Fed. Reg. 49,842 (2011), *order on reh'g*, Order No. 1000-A, 139 FERC ¶61,132 (2012), *order on reh'g*, Order No. 1000-B, 141 FERC ¶61,044 (2012).

PJM. Under the Proposed Regulation, CO_2 dispatch considerations may vary from State to State. Additionally, States must make significant decisions about whether fossil-fuel units will be forced to retire or operate under substantial environmental constraints, both of which can detrimentally affect reliability and customer rates regulated by FERC.

Another potential tension point between FERC and EPA on the Proposed Regulation is found in the federal statute invoked to require the membership of Appalachian Power Company's parent, American Electric Power Corporation, in PJM.[81] That federal statute allows FERC to exempt electric utilities from State laws that prevent voluntary coordination among utilities, including the use of central dispatch.[82] However, FERC cannot use this law to preempt State laws, rules, or regulations designed to protect the environment.[83]

Accordingly, if States (or utilities) are not provided sufficient assurance that environmental compliance can work in a regional market, much of FERC's progress building those markets will be undermined. Yet, as discussed below, the Proposed Regulation fails to provide the States with meaningful guidance on how to reconcile the federal environmental requirements of the Proposed Regulation that conflict with federally approved markets, ratemaking standards, and reliability requirements implemented under the Federal Power Act.

1. Regional Unit Dispatch May Be Forced To Occur on an Environmental Basis Rather Than on an Economic Basis.

[81] 16 U.S.C. §824a-1.

[82] 16 U.S.C. § 824a-1(a).

[83] 16 U.S.C. § 824a-1(a)(1),(2).

In the PJM region where Virginia is located, the foundation of energy markets is economic dispatch. The objective of economic dispatch, which Virginia utilities used long before RTO integration, is to optimize the electric system for the purpose of minimizing costs to customers.[84]

Although some environmental constraints on generating units exist in PJM's markets, those constraints are limited and therefore do not support the reach of the Proposed Regulation. The Proposed Regulation makes the following general assertion:

> Since the enactment and implementation of Title IV of the CAA Amendments of 1990, in regions where EGUs are subject to market-based programs to limit emissions of pollutants such as SO_2 and NOx, the costs of emission allowances have been factored directly into those EGUs' variable costs, like the variable costs of operating pollution control devices, and have thereby been accounted for in least-cost economic dispatch decisions by grid operators. Similarly, operators of EGUs subject to CO_2 emissions limits in [the Regional Greenhouse Gas Initiative ("RGGI")] now include the cost of RGGI CO_2 allowances in those EGUs' variable costs, creating economic incentives to replace generation at higher-emitting EGUs with generation from lower-emitting sources to reduce CO_2 emissions at the former through the process of least-cost economic dispatch. [85]

However, Commissioner Tony Clark of FERC has accurately explained how PJM's current treatment of SO_2, NO_x, or RGGI emission allowance costs does not justify, or demonstrate the feasibility of, more extensive – and non-economic – changes to economic dispatch: "[FERC] has allowed RTOs to acknowledge the operating limits of certain plants. Also [FERC] allows generators to recognize various governmentally

[84] For purposes of directing a 2005 study, Congress defined economic dispatch as "the operation of generation facilities to produce energy at the lowest cost to reliably serve consumers, recognizing any operational limits of generation and transmission facilities." 42 U.S.C. §16,432.

[85] 79 Fed. Reg. 34,862. RGGI is a CO_2 emission reduction program established in 2009 involving Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.

imposed costs like taxes and cap-and-trade schemes, but this is simply a matter of allowing generators to bid-in costs they have legally incurred."[86] In the PJM region, less than 1% of the load-weighted location marginal price ("LMP") energy price during 2013 was the result of the cost of emission allowances.[87]

Limits to the operation of fossil-fuel units due to changes to environmental permits are also expected to result from the Proposed Regulation.[88] Substantial permit limitations may force environmental dispatch, rather than the economic dispatch long used in Virginia and most other parts of the country. This would be a significant change of course for most of the industry. As explained by FERC Commissioner Clark, "[t]o go beyond [the past practice of allowing incurred costs to be included in economic bids] by changing the fundamental market dispatch algorithms in the ways some have suggested would be a major change, to say the least."[89] FERC Commissioner Philip Moeller echoed the significance of such a shift, recognizing that "markets would need to be fundamentally altered and redesigned to implement EPA's proposal to accommodate environmental dispatch….Changing from economic dispatch to environmental dispatch is truly a fundamental change that would require a complete redesign of markets to include essentially a carbon fee on any resources that emit carbon dioxide."[90]

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[86] Written Statement of the Honorable Tony Clark, FERC Commissioner, to the U.S. House Committee on Energy and Commerce at 3 (July 29, 2014).

[87] Monitoring Analytics, LLC, 2013 State of the Market Report for PJM at 15, 104-05. This report is cited by the Proposed Regulation. 79 Fed. Reg. 34,862.

[88] 79 Fed. Reg. 34,862.

[89] Written Statement of the Honorable Tony Clark, FERC Commissioner, to the U.S. House Committee on Energy and Commerce at 3 (July 29, 2014).

[90] Written Statement of the Honorable Philip Moeller, FERC Commissioner, to the U.S. House Committee on Energy and Commerce at 3 (July 29, 2014).

If the Proposed Regulation requires a change in the objective of regional unit commitment and dispatch from cost minimization to environmental policies, economic dispatch would be supplanted by environmental dispatch. The complexity of re-dispatching a system that has been constructed and operated under a different regulatory and market paradigm is substantial. Given all the operational complexities, and the 2020 date when compliance obligations begin, it is difficult to envision how the Proposed Regulation can accommodate economic dispatch. Similarly perplexed is FERC Commissioner Moeller, whose agency has oversight over the markets that currently are based on economic dispatch. Commissioner Moeller has succinctly stated: "[i]t is not clear … how State compliance plans could be implemented in electricity markets."[91]

2. CO_2 Dispatch Considerations May Have To Vary From State to State.

Each State must determine for itself how to comply with the Proposed Regulation, which, as discussed above, may require significant dispatch constraints. The nature and magnitude of operational constraints pursued are likely to vary from State to State since each State's generation facilities and carbon emission rates are different.

The effect of environmental dispatch or permit limits on the operation of generating units that emit carbon would extend well beyond those units. To replace a unit's economic energy during restricted periods, other supply resources would have to be able and available to increase energy production (during peak and non-peak periods). For example, this dynamic, if feasible in an area, could occur through re-dispatch of additional natural gas to replace coal, as contemplated by the Proposed Regulation.

And, as is almost always the case, location is critical for maintaining a reliable system for customers. For the energy from non-economic generation units able and

[91] *Id.*

available to increase production necessary to meet customer demand during times when the operation of other units is restricted, the unrestricted (or less restricted) units must be properly located.

How this can be accomplished under the Federal Power Act is unclear. The Proposed Regulation asserts that States "would have authority to impose measures such as … dispatch limits."[92] However, for States in RTO regions, as Virginia is, dispatch is coordinated not by the States, but by the RTO.[93] FERC Commissioner Clark has stated that "States do not have authority to unilaterally compel dispatch of a unit in a FERC jurisdictional wholesale market."[94] And FERC Commissioner Moeller has stated that it is not clear "how an RTO could prioritize various State Implementation Plans over its own market dispatch."[95] Thus, the States face significant jurisdictional uncertainty about their ability to achieve compliance through environmental permit limitations and the re-dispatch necessary to operate within such limitations.

3. LMP Pricing Will Compound the Effect of Re-dispatching Non-Economic Units.

Then – assuming non-economic units (1) are properly located; (2) are dispatchable resources; and (3) are otherwise able to replace the energy production from restricted economic units – there is still the matter of price. Under LMP pricing used in the PJM region where Virginia is situated, the clearing price for marginal generation units

[92] 79 Fed. Reg. 34,888.

[93] *Id.* ("On the regional level, ISO/RTOs control dispatch and are responsible for reliable operation of the bulk power system.").

[94] Written Statement of the Honorable Tony Clark, FERC Commissioner, to the U.S. House Committee on Energy and Commerce at 4 (July 29, 2014).

[95] Written Statement of the Honorable Philip Moeller, FERC Commissioner, to the U.S. House Committee on Energy and Commerce at 4 (July 29, 2014).

is paid to all generators located in a geographic area. So if, for example, the output of an economic unit is restricted and replaced by a more expensive natural gas unit, the higher incremental cost of a non-economic unit will be reflected in LMP pricing that is charged to load-serving entities that, in turn, pass those costs onto their customers. *The higher payments by customers could also be received by the economic unit if its output is not lowered to zero during a restricted period.* The Proposed Regulation fails to address the compounding impact of LMP pricing.

4. Regional CO_2 Markets Will Be Difficult to Establish Because of the Unlawful and Disparate State Targets.

Parts of the Proposed Regulation encourage the States to band together to achieve compliance on a regional scale. However, the inequity of the disparate carbon emission rates and the uncertainty regarding compliance make it difficult to envision how this will happen. By assigning disparate State emission rates, the Proposed Regulation tilts the playing field against States that, like Virginia, are assigned excessively low carbon emission rates for existing units below the emission rates required of new units. That the Proposed Regulation seeks to aggressively and unlawfully expand the scope of the Clean Air Act beyond resources that generate power and emit pollutants further complicates attempts at regional compliance through cooperation. Those aspects of the Proposed Regulation in particular appear to invite litigation rather than cooperation.

V. CONCLUSION

For the foregoing reasons, the Virginia SCC Staff respectfully requests that, if a Clean Power Plan is to be pursued, a more rationally established compliance horizon and carbon emission rate should be provided for Virginia to allow flexibility for the Commonwealth to meet the EPA's goals of reducing carbon output while imposing only reasonable costs on customers. The alternative carbon emission rate of 1,216 that EPA presents for Virginia, for example, would achieve a substantial carbon emission reduction for existing fossil-fuel units in Virginia without compromising reliable and affordable electric service to Virginia's citizens and businesses. Certainly, the final carbon emission rate should be no lower than the 1,100 rate that the EPA has set for new gas generation using the best available control technology.

APPENDIX

Description of the Virginia SCC Staff's Indicative Cost Analysis

General Approach

The Virginia SCC Staff's estimated costs of meeting the proposed Mandatory Goals were developed based on data developed by the Virginia Electric and Power Company d/b/a Dominion Virginia Power ("Dominion") in its Integrated Resource Plan ("IRP") filed with the Virginia State Corporation Commission in Case No. PUE-2013-00088.[1] This data was used to calculate CO_2 emission rates for the various resource plans and to compare the associated costs of the various plans to Dominion's Base Case, i.e., least cost expansion plan. The plan cost differentials from the Base Case were then considered to represent the costs associated with achieving the corresponding change in the CO_2 emission rates. Individual plan costs were then adjusted to reflect assumed changes in the plans that would produce plan emissions rates that approximate the proposed Mandatory Goals.[2]

The IRP plans examined in this analysis were:

IRP Plans Evaluated	**Plan Design**
Base Plan	to meet future requirements through an optimized mix of generating unit additions and energy efficiency
Fuel Diversity Plan	to promote a diverse fuel mix with less reliance on natural gas and greater reliance on nuclear power
Renewable Plan	to meet Dominion's voluntary Virginia renewable portfolio standard ("RPS") goals and North Carolina's mandatory RPS goals through the construction of new renewable generation
Climate Action Plan	to meet assumed potential CO_2 regulations
Offshore Wind Plan	to incorporate a significant amount of offshore wind

Emissions Rate Calculation

The proposed regulations do not set forth a specific approach for assessing compliance for affected Electric Generating Units ("EGUs"), consequently the Virginia SCC Staff was forced to make certain assumptions regarding how emissions rates will be calculated for determining compliance. These assumptions mirror the Virginia SCC Staff's understanding of how the

[1] *Commonwealth of Virginia ex rel. State Corporation Commission, In re: Virginia Electric and Power Company's Integrated Resource Plan filing pursuant to § 56-597 et seq. of the Code of Virginia*, Virginia SCC Case No. PUE-2013-00088, Doc. Con. Cen. No. 140830097, Final Order (Aug. 27, 2014).

[2] Many of the underlying assumptions developed in Dominion's IRP filing and analysis were labelled privileged and confidential in that proceeding. Consequently, this Appendix describes the methodology used in the development of the Virginia SCC Staff's cost analysis without providing the specific calculations.

EPA's building blocks were developed. Emissions rates for each of the IRP plans examined in this indicative cost analysis were developed by first identifying Virginia EGUs and the associated year by year tons of CO_2 emitted. These tons were then further adjusted to include any additional emissions from new natural gas fired combined generation added in the respective IRP plan. The resulting adjusted annual emissions were used as the numerator in the calculation of annual emissions rates.

The annual tons of CO_2 emitted were then divided by the sum of the MWHs produced by the EGUs, new natural gas fired combined generation, new renewable generating resources, and 6% of the generation from existing nuclear generating units, plus a proportion of expected additions of energy efficiency. The inclusion of 6% of generation from existing nuclear generating facilities is consistent with the EPA's inclusion of "at risk" generation in the determination of the proposed Mandatory Goals. Similarly, the avoided generation associated with new energy efficiency measures were adjusted downward based on the ratio of Dominion's in-state generation to its load to reflect the net import of power into Virginia. This treatment of energy efficiency is consistent with the EPA's application of the building blocks for Virginia.

Base Plan Description and Emissions Rates

Dominion's Base Plan (or least cost expansion base case) includes the addition of 2,750 MWs of gas fired combined cycle and 1,371 MW of combustion turbine capacity. The Base Plan also reflects the retirement of 920 MW of existing coal fired capacity and additional energy efficiency savings exceeding 3,000 GWhs per year. The Base Plan represents the least cost expansion plan to meet forecasted resource needs under Dominion's forecast assumptions. While these assumptions anticipate some level of expected CO_2 limitations, those limitations are far less stringent than Virginia's Mandatory Goals. Although the Base Plan assumes some level of carbon restrictions, the Virginia SCC Staff's cost analysis considers the Base Plan as a business as usual or no CO_2 limitation starting point for estimating compliance costs associated with the proposed regulations. This produces a result that is conservative with respect to estimating the costs associated with Virginia's Mandatory Goals in that it understates the actual costs associated with limiting CO_2 emissions.

Utilization of the methodology described above for calculating emissions rates, the base case would have an average emissions rate of 1,033 lbs/MWh for the 2020-2029 timeframe and a rate of 994 lbs/MWh in 2029. The average rate of 1,033 lbs/MWh represents a 28% reduction as compared to the actual 2012 rate for existing Virginia EGUs used in the development of Virginia's Mandatory Goals. Despite this substantial reduction, the Base Plan would fall far short of the proposed targets for Virginia.

Fuel Diversity Plan Description and Emissions Rates

Dominion's Fuel Diversity Plan includes the addition of 1,453 MWs of nuclear capacity, 247 MWs of onshore wind capacity, 12 MW of off-shore wind capacity, 220 MW of solar capacity and 1,375 MWs of gas fired combined cycle and 1,371 MW of combustion turbine capacity. The Fuel Diversity Plan also reflects the retirement of 920 MW of existing coal fired capacity and additional energy efficiency savings exceeding 3,000 GWhs per year. The Fuel Diversity case is expected to have an average emissions rate of 913 lbs/MWh for the 2020-2029 timeframe and a rate of 788 lbs/MWh in 2029. As such, the Fuel Diversity Plan would be expected to meet the proposed final goal but fall short of the interim goal for Virginia.

The Fuel Diversity Plan is expected to impose a cost that is approximately $5.3 billion in excess of the Base Plan on a net present value basis. As such, the Fuel Diversity Case would impose substantial additional cost on Virginians and include significant additions of zero CO_2 emission generation but yet would not produce a result that would satisfy Virginia's Mandatory Goal.

The Virginia SCC Staff developed an estimate of the additional costs associated with bringing the Fuel Diversity Case into compliance by calculating the tons of CO_2 that must be displaced in order to meet the Virginia's Mandatory Interim Goal and assuming that the needed reductions would be achieved by retiring the worse emitting EGUs or by reducing generation from those EGUs. This analysis indicates that an additional 100 MWs of coal fired capacity would need to be retired and that coal based generation would have to be reduced from another coal-fired unit in order to meet the Mandatory Interim Goal.[3]

The levelized annual costs of new renewable capacity and of energy efficiency were then examined to determine the likely resource to be added in lieu of the displaced coal generation. Additional energy efficiency did not appear to be a likely candidate for displacing the coal generation due to its expected cost and the fact that EPA's building block approach seems to require that energy efficiency additions be partially discounted as a result of Virginia's net import status. On-shore wind capacity seems to be a better candidate than solar resources for replacing the displaced coal generation due to superior cost and capacity factor characteristics. Consequently, the Virginia SCC Staff calculated the additional amount wind capacity required for compliance by dividing the displaced coal generation in MWhs by 8,760 (the number of hours in a typical year) and then by the expected capacity factor of a wind generating facility. This produced a requirement for an additional 69 MWs (nameplate) of wind capacity.

The Virginia SCC Staff considers this estimate of the required additional renewable capacity to be conservative in several respects. The capacity factor used in the estimate of required additional on-shore wind resources was based on the best performing wind alternative considered

[3] Development of additional renewable generation and inclusion of the resulting generation in the denominator of the emissions rate calculation produces a result where 1 GWh of coal generation can be displaced by a slightly smaller amount of renewable generation. The Virginia SCC Staff's analysis used an iterative approach to capture this positive effect.

in Dominion's IRP alternatives. In reality, it is doubtful that approximately 320 MWs of wind capacity can be sited in Virginia or that such a capacity factor can be achieved on an average basis in Virginia. This estimate further assumes that there are no timing differences between the additional wind generation and the displaced coal-fired generation. Again, a more realistic assumption would recognize that the additional wind generation may not occur at the exact time that the displaced coal units would have dispatched and the additional wind generation would more likely displace other generation with lower emissions rates at times. As such, the Virginia SCC Staff believes that this estimate is very conservative with respect to the amount of additional renewable capacity that would be required to achieve compliance with the proposed Mandatory Goals.

The retirement of an additional 100 MWs of dispatchable coal capacity and the corresponding replacement with 69 MWs of wind capacity reflects a net reduction in Dominion's ability to meet its reserve obligations. This shortfall is further compounded by the intermittent nature of wind based generation and the fact that only a portion of the wind capacity would be considered reliable from a reserve margin perspective. Consequently, the Virginia SCC Staff discounted the nameplate capacity of the additional wind capacity based on the expected capacity factor for wind and compared that to the 100 MWs of coal capacity retired to calculate a resulting capacity shortfall of 82 MWs. This shortfall would likely be satisfied through the construction of the lowest cost capacity considered in Dominion's IRP, gas fired combustion turbines.

Finally, the Virginia SCC Staff used levelized annual cost assumptions consistent with those used in Dominion's IRP to develop compliance cost adjustments for each of the above adjustments. Specifically, the cost analysis increases compliance costs to reflect the construction of additional renewable and combustion turbine capacity and decreased compliance costs to reflect the avoided dispatch costs associated with the displaced goal generation needed to achieve compliance. In calculating these cost adjustments, the Virginia SCC Staff limited the inclusion of additional costs to the period 2020-2029 and ignored the fact that these costs would actually continue beyond 2029. This further increases the conservative nature of the Virginia SCC Staff's estimate of the compliance costs imposed by the proposed Mandatory Goals in Virginia. The resulting net adjustment to estimated compliance costs is an increase of approximately $194 million on a net present value basis. When added to the original differential cost of the Fuel Diversity Plan, these adjustments produce an estimated cost of compliance of approximately $5.5 billion on a net present value basis.

Renewable Plan Description and Emissions Rates

Dominion's Renewable Plan includes the addition of 100 MWs of biomass capacity, 247 MWs capacity of onshore wind capacity, 1,612 MWs of off-shore wind capacity, 220 MWs of solar capacity, 2,750 MWs of gas fired combined cycle and 1,371 MWs of combustion turbine capacity. The plan also reflects the retirement of 920 MWs of existing coal-fired capacity and additional energy efficiency savings exceeding 3,000 GWhs per year. The Renewable Plan is

expected to have an average emissions rate of 951 lbs/MWh for the 2020-2029 timeframe and a rate of 882 lbs/MWh in 2029. As such, neither Mandatory Goal is attained. The expected cost differential for this plan is expected to be approximately $8.7 billion. Given this substantial cost differential and expected emissions rate, the Virginia SCC Staff did not consider the Renewable Plan a viable approach for meeting the Mandatory Goals or calculating estimated compliance costs.

Climate Action Plan Description and Emissions Rates

Dominion's Climate Action Plan includes the addition of 1,453 MWs of nuclear capacity, 247 MWs capacity of onshore wind capacity, 12 MWs of off-shore wind capacity, 220 MWs of solar capacity, 2,750 MWs of gas fired combined cycle and 1,371 MWs of combustion turbine capacity. The Climate Action Plan also reflects the retirement of 2,599 MWs of existing coal-fired capacity and additional energy efficiency savings exceeding 3,000 GWhs per year. The Climate Action Plan is expected to have an average emissions rate of 767 lbs/MWh for the 2020-2029 timeframe and a rate of 677 lbs/MWh in 2029. As such, the Climate Action Plan would substantially over-comply with the proposed standards.

The Climate Action Plan is expected to impose a cost that is approximately $7.4 billion in excess of the Base Plan on a net present value basis.

The Virginia SCC Staff developed an estimate of the cost of a modified Climate Action Plan that is intended to decrease the plans over-compliance by eliminating unneeded renewable capacity additions, eliminating certain coal unit retirements and increasing coal-fired generation. Specifically, the Virginia SCC Staff calculated that 200 MWs of solar capacity and 231 MWs of on-shore wind capacity could be eliminated and that approximately 2,500 GWhs of coal-fired generation could be added while achieving compliance.

The resulting net adjustment to estimated compliance costs is a decrease of approximately $1.4 billion on a net present value basis. When deducted from the original differential cost of the Climate Action Plan, these adjustments produce an estimated cost of compliance of approximately $6 billion on a net present value basis.

Offshore Wind Plan Description and Emissions Rates

Dominion's Offshore Wind Plan includes the addition of 1,612 MWs of off-shore wind capacity, 1,375 MWs of gas fired combined cycle and 1,828 MWs of combustion turbine capacity. The plan also reflects the retirement of 920 MWs of existing coal-fired capacity and additional energy efficiency savings exceeding 3,000 GWhs per year. The Offshore Wind Plan is expected to have an average emissions rate of 978 lbs/MWh for the 2020-2029 timeframe and a rate of 904 lbs/MWh in 2029. The expected cost differential for this plan is expected to be approximately $7.2 billion. Given this substantial cost differential and expected emissions rate,

the Virginia SCC Staff did not consider the Renewable Plan a viable approach for meeting the Mandatory Goals or calculating estimated compliance costs.

Conclusion

As described above, the Virginia SCC Staff's indicative cost analysis indicates that, although Dominion's current Base Plan will produce a 28% reduction in the average CO_2 emissions rate for Virginia generation facilities, the Mandatory Goals for Virginia would impose an additional net present value cost of $5.5 to $6.0 billion.

It should be noted that this cost analysis is conservative in a number of respects. A number of assumptions utilized in this analysis are conservative in nature in that they would understate the actual cost of compliance. Additionally, the analysis does not fully capture the compliance cost impacts that will ultimately be borne by Virginia ratepayers, since it is limited to the geographic boundaries of Virginia, and does not attempt to estimate costs associated with compliance by generation facilities that are owned by Virginia utilities but are located in other states. Compliance costs for these out-of-state facilities will ultimately be shared by Virginia's citizens.

It should also be stressed that Virginia SCC Staff's indicative cost analysis is limited to Dominion, and, as such, does not represent the overall impact of the Mandatory Final Goal on Virginia. However, this analysis is largely indicative of compliance costs for generation units throughout the Commonwealth because Dominion owns or controls most of the electric generation in Virginia.

Finally, because the Base Plan which Virginia SCC Staff used as the baseline for its indicative cost analysis is already expected to achieve CO_2 reductions at a substantial cost, the $5.5 to $6.0 billion net present value cost range calculated by the Virginia SCC Staff only estimates the incremental cost of achieving the CO_2 reductions required by the Mandatory Goals for Virginia to the extent that those goals are more restrictive than previously anticipated.