Joel H. Peck, Clerk, Virginia State Corporation Commission

Case No.: PUR-2018-00051

Subject: Need to Clearly Quantify and Monetize Greenhouse Gas Emissions in Integrated Resources Plans

The Institute for Policy Integrity respectfully submits these comments on the benefits of requiring the Appalachian Power Company—and, in future proceedings, other utilities—to clearly quantify and monetize the greenhouse gas emissions of plan alternatives under the Integrated Resource Plan (IRP) process.

Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. Policy Integrity regularly engages with state utility commissions on energy policy and regulations, and has submitted comments to the Virginia Department of Environmental Quality, advising the Department on how to best work with the Virginia State Corporation Commission (Commission) to add Virginia electricity generators to the Regional Greenhouse Gas Initiative (*see* https://policyintegrity.org/documents/Institute_for_Policy_Integrity_Comments_to_Virginia_on_joining_RGGI_20180409.pdf). Policy Integrity is based at New York University School of Law; no part of these comments purports to present the views, if any, of New York University.

Upon its review of the recent IRP submission from the Appalachian Power Company, as well as in future IRP proceedings, the Commission should require electric utilities to more transparently quantify the greenhouse gas emissions of plan alternatives, and to monetize the associated climate damages using the Social Cost of Greenhouse Gas metrics. Such analysis is necessary to allow the Commission to rationally identify the most efficient plan option that advances social welfare for Virginia, and to allow ratepayers and citizens to better understand the environmental effects of the portfolios chosen.

Under Virginia Code § 56-599(C), the Commission reviews IRPs to determine if the submission "is reasonable and is in the public interest." The criteria for "reasonable[ness]" and "public interest" are informed by other sections of the Virginia Code. Section 56-598(3) requires IRPs to diversify energy supply choices and demand reduction services to "reduce the risks associated with an over-reliance on any particular fuel . . . and [to] be consistent with the Commonwealth's energy policies as set forth in § 67-102." Not only should the phrase "risks associated with an over-reliance on any particular fuel" be interpreted to include environmental and climate risks, but § 67-102(6) explicitly states that "it shall be the policy of the Commonwealth to . . . promote the generation of electricity through technologies that do not contribute to greenhouse gases and global warming." The policies of § 67-102 were designed "to achieve the objectives enumerated in § 67-101," which include "using energy resources more efficiently" (subsection 6), "facilitating conservation" (subsection 7), selecting energy sources that "are less polluting of the Commonwealth's air and waters" (subsection 9), and researching the "costs and benefits of reducing, avoiding, or sequestering the emissions of greenhouse gases produced in connection with the generation of energy" (subsection 10).

In short, under the Virginia Code, it is clearly in the public interest to efficiently reduce greenhouse gas emissions, to reduce the climate risks associated with over-reliance on fuels that emit greenhouse gases, to protect Virginia's air and waters from the effects of climate change, and to broadly "advance the health, welfare, and safety of the residents of the Commonwealth" (§ 67-101) by facilitating efficient conservation and climate protections.

For the Commission to determine if an IRP reasonably advances the public interest by efficiently reducing greenhouse gas emissions and associated climate risks, the Commission must first know what the greenhouse gas emissions and climate consequences of various plan alternatives are. Importantly, this evaluation is separate from the inquiry into whether the plan cost-effectively complies with environmental regulations. Virginia Code § 56-599(B) distinguishes the requirements for electric utilities to evaluate the "effect of" and "means of complying with" various state and federal environmental regulations (subsections 8 and 9) from other required evaluations, such as "accomplish[ing] policy goals of . . . reduction in emissions; and reduction in carbon intensity" through energy efficiency measures (subsection 11). A utility does not satisfy all of its obligations for environmental analysis just by assessing how best to comply with existing and pending regulations. Even if a plan option is cost-effective at complying with existing and pending regulations, the plan may still fall short of the goal of reasonably advancing the public interest and social welfare by reducing the risks of climate change. A cost-effectiveness analysis of regulatory compliance simply asks what is the cheapest way to achieve a given emissions standard. By comparison, an efficiency or cost-benefit analysis of environmental outcomes asks whether additional pollution reductions will maximize net social welfare. Greenhouse gas reductions beyond the requirements of existing regulations may be efficient, meaning that the benefits of reducing those additional emissions—in terms of reducing climate risks of flooding, agricultural losses, human health consequences, and so forth—may exceed the costs of achieving those additional reductions.

The Appalachian Power Company's IRP submission applies a model that uses various carbon pricing assumptions as a proxy for implementing potential regulations of greenhouse gas emissions (IRP p.83). The model's "low, mid and high band scenarios" add a carbon price beginning in the year 2024, increasing to, at most, about $35 per short ton of carbon dioxide in year 2032 under the high-band scenario (IRP p.86; note that $35 per short ton of CO_2 would equal about $39 per metric ton of CO_2). Putting aside whether this carbon price model accurately identifies for the Appalachian Power Company the most cost-effective option for complying with regulations to reduce greenhouse gas emissions, this model does not reveal the *social costs* of the *actual greenhouse gas emissions* that will be released under various plan options. For starters, the model applies a $0 carbon price before the year 2024, when in fact emissions from the years 2018 through 2023 will cause measurable and decidedly non-zero climate damages. Even when the model does apply a non-zero carbon price, the values fall far short of reflecting the full social welfare losses from climate change. That is because the model's carbon price only reflects the utility's private regulatory compliance costs, meaning what it would cost the utility in terms of technology or generation shifting or other changes to reduce a ton of carbon emissions. By contrast, the social welfare cost of emissions captures how each additional ton of carbon dioxide contributes to global temperature changes and so contributes to flooding, agricultural losses, human health effects, and so forth.

The best available estimates of the social costs of greenhouse gases come from the 2016 report of the federal Interagency Working Group on the Social Cost of Greenhouse Gases, which published updated estimates of the marginal climate damages caused by each additional metric ton of carbon dioxide (*see* https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc_tsd_final_clean_8_26_16.pdf). These estimated derived from a transparent, conservative, and consensus-driven methodology, drawing from peer-reviewed models and inputs. Their methodology and estimates have been endorsed by the National Academies of Science, the U.S. Government Accountability Office, federal courts, and countless experts in economic and climate change (*See, e.g.*, https://policyintegrity.org/files/publications/Science_SCC_Letter.pdf & https://costofcarbon.org/faq/are-the-federal-iwg-numbers-still-the-best#ref-23-a). The social cost of greenhouse gas metrics try to capture as many climate damage categories as possible, from flooding to

agriculture productivity to temperature-related changes in the demand for cooling and heating. Nevertheless, some significant categories of damages, like the risk of catastrophic climate outcomes, cannot currently be accurately modeled, and so the social cost of greenhouse gas metrics are widely recognized as a conservative underestimate of climate damages. Still, even the conservative central estimates from the Interagency Working Group far exceed the carbon price figures used in Appalachian Power Company's model.

For example, while the Company's model prices carbon at $0 in the year 2023, the central estimate of the social cost of carbon for year 2023 emissions is $55 per metric ton (in 2018$); and while the Company's high-band scenario uses a carbon price of about $39 per metric ton in year 2032 (converted from $35 per short ton), the central estimate of the social cost of carbon in year 2032 is $65 (in 2018$). The Interagency Working Group also calculated a "high-impact" estimate of the social cost of carbon, to reflect that many uncertain damages are omitted from the central estimate. The high-impact estimate of the social cost of carbon for year 2032 emissions is $197 (in 2018$)—over five times the highest carbon price that the Appalachian Power Company's model applies.

A number of states have begun to use the social cost of greenhouse gas tool, including the estimates from the federal Interagency Working Group, to measure the consequences of climate change on the public interest as part of IRP proceedings. For example, in August 2018, the Nevada Public Utilities Commission updated its Integrated Resource Plan regulations to require utilities to "calculate[e] the present worth of societal costs for each alternative plan" by "estimat[ing] the level of environmental costs resulting from carbon dioxide emissions for that year and the social cost of carbon" (*see* http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2017-7/32153.pdf). The Nevada IRP regulations specifically require use of the "best available" estimate of "future global economic costs" from climate change, and recommends using estimates "released by the Interagency Working Group on Social Cost of Greenhouse Gases in August 2016." Similarly, in May 2018, the Washington State Utilities and Transportation Commission's approval letters for three Integrated Resource Plans indicated that, in the future, utilities would need to use more robust estimates of the cost of carbon, and recommended use of the Interagency Working Group estimates in particular (*see* https://www.utc.wa.gov/aboutUs/Lists/News/DispForm.aspx?ID=527). In January 2018, the Minnesota Public Utilities Commission finalized its own carbon estimates for utilities to use in their resource planning, drawing on the methodology underlying the Interagency Working Group estimates (*see* https://costofcarbon.org/states/entry/minnesota-puc-requires-scc-use-for-utilities). And in March 2017 the Colorado Public Utility Commission required Xcel Energy to use the social cost of carbon in a sensitivity analysis for its Electric Resource Plan (*see* https://costofcarbon.org/states/entry/colorado-puc-requires-utility-to-use-scc-in-electric-resource-plan). For more details on how these and other states—including California, Illinois, Maine, New Jersey, and New York—have used the social cost of carbon in various electricity policy contexts, and for a guide on how other states can apply the social cost of greenhouse gases to their proceedings, see https://costofcarbon.org.

The states listed above have chosen to use the social cost of greenhouse gas metrics to help rationally guide their policymaking and transparently inform stakeholders of the consequences of decisions. Monetization ensures that environmental effects will be treated on par with the other costs and benefits of electricity resource planning decisions. Note, for instance, that Appalachian Power Company does monetize various compliance costs in the IRP, even though it does not currently monetize environmental costs or benefits (e.g., IRP p.138, table 29). When all costs and benefits are translated into the common metric of money, the tradeoffs inherent in policy choices become apparent, and decisionmakers can more readily and more transparently compare society's preferences for competing

priorities. Monetization therefore minimizes the risk that a decision will lean too heavily on any one factor or succumb to unintended and unknown biases.

If an analysis only qualitatively discusses the externalities of emissions, decisionmakers and the public will both tend to overly discount the significance of the effects (*see* https://policyintegrity.org/files/publications/Quantifying_Regulatory_Benefits.pdf). In general, non-monetized effects are often irrationally treated as worthless. This may be especially true with respect to climate change. As the U.S. Environmental Protection Agency's website explains, "abstract measurements" of so many tons of greenhouse gases can be rather inscrutable for the public, unless "translat[ed] . . . into concrete terms you can understand" (*see* https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator). When compared to global greenhouse gas emissions, the emissions of any one public utility, like Appalachian Power Company, in any one state, like Virginia, may falsely appear trivial. Well-documented mental heuristics like "probability neglect" can cause the public and decisionmakers to irrationally reduce small-yet-significant probability risks entirely down to zero. Monetization contextualizes the significance of the additional tons of emissions. For example, Appalachian Power Company's IRP shows in Figure 35 a difference of perhaps a few million tons of carbon dioxide each year between the Hybrid Plan and the Target (IRP p.136). While decisionmakers and the public can certainly tell that 20 million tons of carbon dioxide emitted in year 2032 is less than 28 million tons of carbon dioxide, the significance of that difference is not readily apparent. Yet by applying the social cost of carbon central estimate of $65 per ton, not only is it clear that the difference represents hundreds of millions of dollars per year in additional climate damages, but these monetized environmental effects can then be more readily compared to compliance cost figures that are monetized in the IRP.

Monetization is clearly the best way to inform rational decisionmaking and public understanding. But at a minimum, the IRP should more clearly present quantitative information on the difference in greenhouse gas emissions of plan alternatives. Figure 35, for example, appears in the online public inspection copy of the IRP as a blurry graph of carbon dioxide emissions comparing the hybrid plan versus the target, with hash-lines drawn against a y-axis that is only labeled at intervals of 10 million tons of carbon dioxide. The result is that it is exceedingly difficult for the public to distinguish, for example, whether the line indicates 21 million tons per year or 22 million tons per year. In fact, that difference is highly meaningful, since it represents a difference of tens or hundreds of millions of dollars in climate damages per year.

(Note also that the arguments presented in these comments on the need to clearly quantify emissions and monetize damages apply as well to emissions of other pollutants besides greenhouse gases, including, for example, particulate matter. See Policy Integrity's report on *Valuing Pollution Reductions* for more information on how states can monetize local air pollutant reductions in their energy resource planning. *See* https://policyintegrity.org/files/publications/Valuing_Pollution_Reductions.pdf.)

IRPs should more clearly quantify the greenhouse gas emissions in each year under plan alternatives, and then should monetize the associated climate damages. Without such information, the Commission cannot determine whether the IRP is reasonable and advances the public interest, under the criteria provided by the Virginia Code; and, without such information, ratepayers, stakeholders, and the general public cannot begin to understand the climate consequences of the resource portfolios chosen. For both this IRP proceeding and in future IRP proceedings, the Commission should require Appalachian Power Company and other utilities to quantify and monetize greenhouse gas emissions, using the best available science and economics.

Sincerely,

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