BEFORE THE VIRGINIA STATE CORPORATION COMMISSION

CLEAN COALITION COMMENTS ON VIRGINIA ELECTRIC AND POWER COMPANY'S 2017 INTEGRATED RESOURCE PLAN

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I. INTRODUCTION

On May 1, 2017, Virginia Electric and Power Company, operating in Virginia as the Dominion Load Serving Entity ("Dominion"), filed its 2017 Integrated Resource Plan ("IRP").

The IRP processes exists to ensure future "customer needs are met at the lowest reasonable cost while maintaining reliability and flexibility"[1]. To achieve this, Dominion recognizes that it must consider emerging policy, market, or technical developments that could impact the utility's operations, and therefore, its customers.

Policy, market, and technical developments are indeed changing the nature of electricity generation, management, and delivery. Dominion's IRP acknowledges as much, noting that the utility "must take steps to plan for the modernization of its electric power grid, at both the distribution and transmission levels, to create a more dynamic system that is better able to respond to the growth of utility-scale solar facilities, as well as the proliferation of smaller, widely-dispersed solar generation facilities. That preparation includes a plan to create a more flexible electric power grid that will accommodate the highly variable output associated with solar PV and other intermittent forms of generation, while still maintaining reliability."[2]

The Clean Coalition fully agrees with Dominion that "it is not unreasonable to expect that the Company or its customers will continue to install solar or other at their homes, businesses, or other locations along the Company's distribution network."[3] It is because we concur with Dominion's assessment that the company will see continued, and increasingly rapid, deployment of distributed energy resources[4] ("DER") at points throughout its Virginia distribution network that we respectfully recommend the State Corporation Commission ("the Commission") request, or require if necessary, that Dominion initiate a robust, comprehensive, and proven approach to distribution grid

[1] Virginia Electric and Power Company's Report of Its Integrated Resource Plan, Case No. PUR-2017-00051, Docket No. E-100, Sub 147, filed May 1, 2017, page 4.
[2] Virginia Electric and Power Company's Report of Its Integrated Resource Plan, Case No. PUR-2017-00051, Docket No. E-100, Sub 147, filed May 1, 2017, page 3.
[3] Virginia Electric and Power Company's Report of Its Integrated Resource Plan, Case No. PUR-2017-00051, Docket No. E-100, Sub 147, filed May 1, 2017, page 82.
[4] Distributed energy resources ("DER") refers to distributed generation, energy storage, energy efficiency, demand response and electric vehicles.

planning. These comments are intended to provide the Commission with details on the key elements of established distribution grid planning processes, based on leading efforts by other U.S. electric utilities and regulators.

II. DESCRIPTION OF PARTY

The Clean Coalition is a nonprofit organization whose mission is to accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise. The Clean Coalition drives policy innovation to remove barriers to procurement and interconnection of DER—such as local renewables, advanced inverters, demand response, and energy storage—and we establish market mechanisms that realize the full potential of integrating these solutions. The Clean Coalition also collaborates with utilities and municipalities to create near-term deployment opportunities that prove the technical and financial viability of local renewables and other DER. The Clean Coalition was heavily involved in the creation of California's Distribution Resources Planning ("DRP") process and worked closely with staff at the California Public Utilities Commission and at the state's largest utilities to ensure an effective and efficient distribution grid planning process.

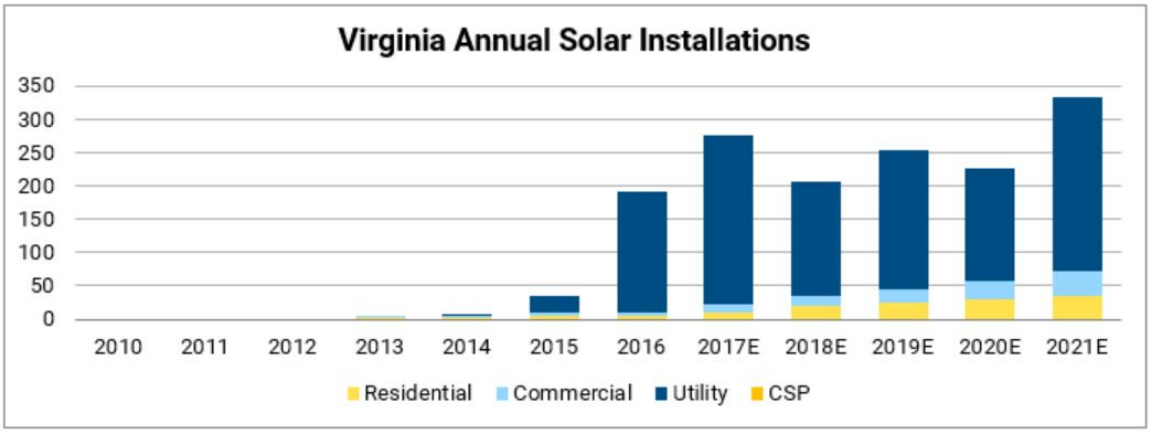
III. COMMENTS

a. The need for distribution grid planning

The grid is at a strategic inflection point. Significant cost reductions and evolving customer preferences are driving the deployment of DER within utility distribution grids across the county, including Virginia. This is a trend that industry experts predict will only accelerate in the coming years. For example, Virginia had 49 megawatts (MW) of cumulative installed solar capacity through 2015. Between 2016 and 2021, that number is

projected to grow by 3,800% to more than 1,900 MW of installed solar capacity[5], as shown in Figure 1 below.

Figure 1. Historic and projected installed solar capacity in Virginia



Source: Solar Energy Industries Association

Where this solar is located will impact the value its provides to the grid, the utility, and customers. For example, if some of this solar capacity were to be sited in a section of Dominion's distribution grid that is has local capacity needs, it might be able to defer or avoid costly transmission and distribution upgrades—saving ratepayers significant money. Strategic siting of DER optimizes the value for ratepayers by driving the right resources to the right location within a utility's distribution grid. This was the case in Long Island, New York, where Long Island Power Authority determined that siting 40 MW of distributed solar within a constrained section of its grid would enable the utility to avoid spending more than $80 million on new transmission lines and grid equipment.[6] Conversely, siting new solar capacity on a highly saturated distribution feeder will likely provide fewer benefits to the grid and customers, while also increasing the project development costs through more difficult and expensive interconnection requirements.

[5] Solar Energy Industries Association, "Fact on the Virginia Solar Industry", available at http://www.seia.org/state-solar-policy/virginia-solar.
[6] Inside Climate News, "Why Are Some Utilities Embracing Small-Scale Solar Power", September 12, 2013, available at https://insideclimatenews.org/news/20130912/why-are-some-big-utilities-embracing-small-scale-solar-power.

When it comes to the siting of DER like distributed solar generation, there is little debate that location impacts the value. However, Dominion's 2017 IRP does not clearly articulate a process to evaluate the locational value of these resources. Nor does it provide sufficient insight into how the utility compares the cost-effectiveness of transmission-side investments compared to distribution-side investments to meet existing and projected grid needs. For this IRP process to achieve its intent of ensuring "customer needs are met at the lowest reasonable cost"[7], the Clean Coalition respectfully encourages the Commission to establish a framework for Dominion to initiate a robust, comprehensive, and proven approach to distribution grid planning that will inform and strengthen future IRPs.

b. An overview of distribution grid planning

Distribution grid planning is fundamentally a planning process to bring transparency and public input into the development of resources within the distribution system, and to better enable the Commission to evaluate proposed utility investments based on cost-effectiveness for Virginia's electricity consumers. This process provides the foundation for guiding smart and cost-effective grid modernization investments, and regulators in numerous states, including New York, Rhode Island, Minnesota, Colorado, California, and Hawaii, have all proceedings focused on distribution grid planning underway. Nancy Lange. Chair of Minnesota's Public Utilities Commission, clearly articulated the rationale for initiating distribution grid planning in her state. Specifically, through this effort, the Minnesota Public Utilities Commission seeks to:

- Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies;
- Ensure optimized utilization of electricity grid assets and resources to minimize total system costs;
- Increase transparency of utility investments and grid needs;

[7] Virginia Electric and Power Company's Report of Its Integrated Resource Plan, Case No. PUR-2017-00051, Docket No. E-100, Sub 147, filed May 1, 2017, page 4.

- Ensure distribution investments will achieve a flexible, resilient grid and meet customer needs under a range of futures;
- Evaluate cost efficient non-wires alternatives to proposed investments, including DER provided services;
- And improve inputs for utility Integrated Resources Plans.[8]

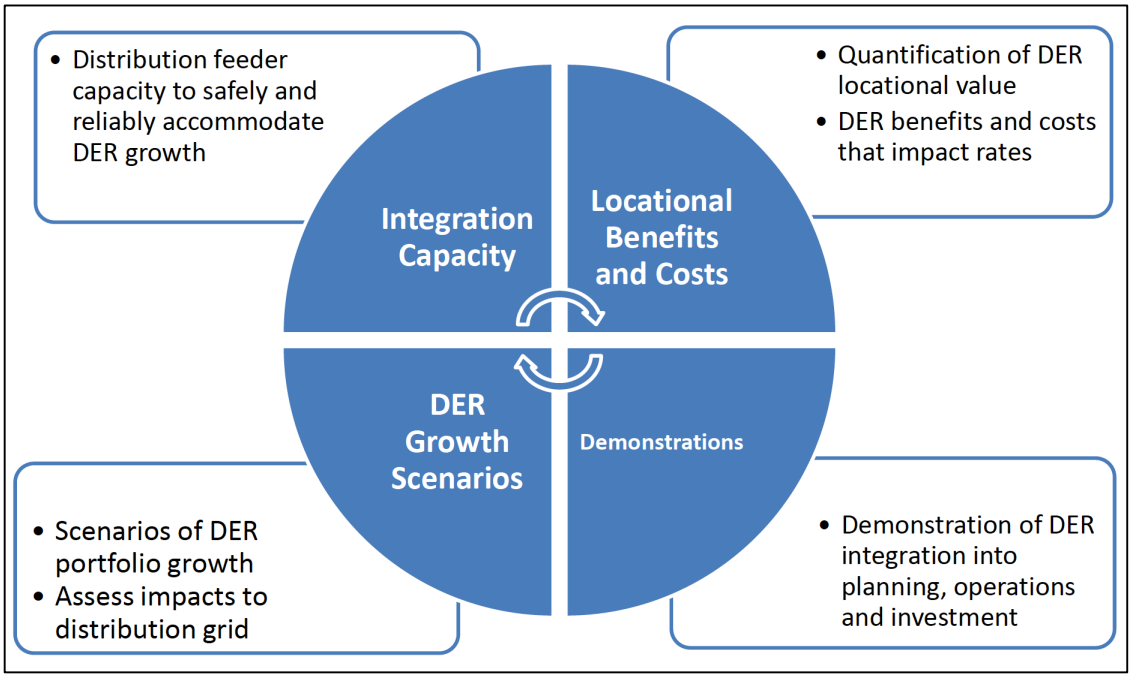
All of the objectives underscore the critical importance of distribution grid planning; improving IRP inputs is of particular timeliness and relevance in this current proceeding. As such, the Clean Coalition recommends that the Commission initiate a distribution grid planning processes, based on the following key elements, which Dominion should implement immediately to inform all future IRPs—beginning in 2018.

c. The key elements of distribution grid planning

There are four key elements of an effective distribution grid planning process. They are: 1) conducting an Integration Capacity Analysis; 2) developing a methodology to value the locational benefits and costs of DER; 3) deploying substation level demonstration projects; and 4) forecasting DER growth scenarios to assess potential impacts on future utility planning and investment. These four components are illustrated below in Figure 2.

[8] "Minnesota's Actions to Advance Distribution System Planning," a presentation by Nancy Lange on the Advanced Energy Economy's August 30, 2017 webinar titled *Getting Out in Front: Distribution System Planning for a Modern Grid*, available at https://info.aee.net/distribution-system-planning-for-a-modern-grid-webinar.

Figure 2. The four key elements of distribution grid planning



Source: Pacific Gas & Electric[9]

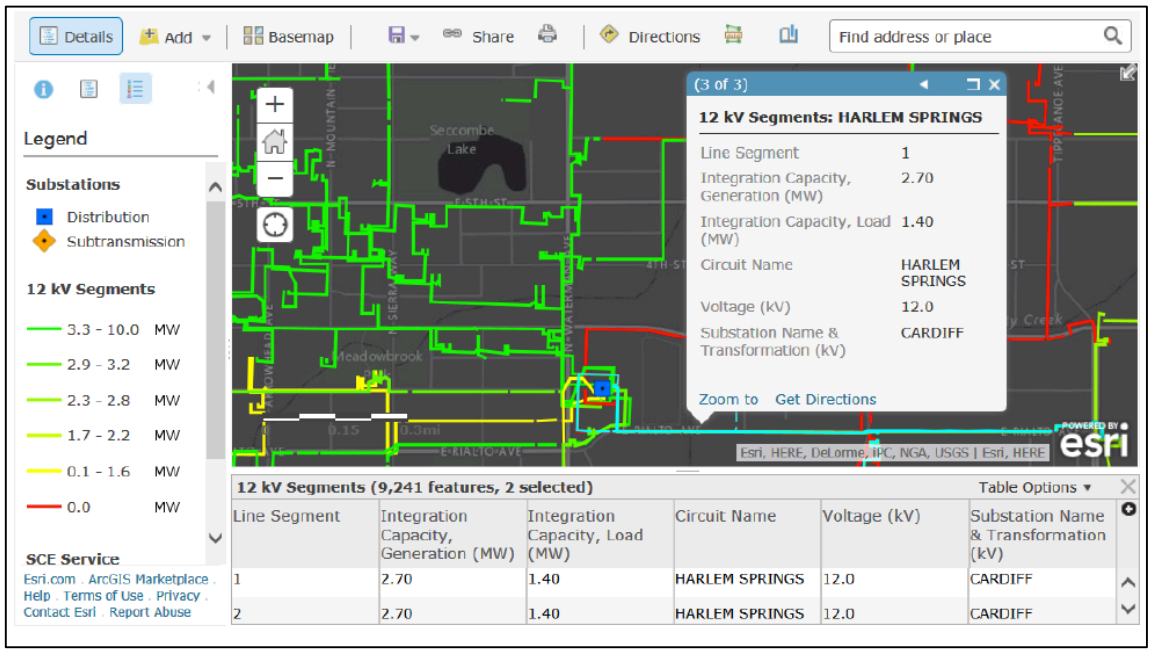
1. Integration Capacity Analysis ("ICA"): The ICA is an analysis of the existing distribution grid to understand where there is ability to accommodate new local generation, like distributed solar, as well as identifying where the grid is full and additional DER should not be sited. The ICA details to how much more power the distribution grid could absorb at a given point and still function at a high level. This is fundamental piece of information because it highlights where DER can interconnect and not cause congestion, safety, or reliability issues.

Figure 3, below, shows the ICA results for a small section of Southern California Edison's distribution grid, with details on a specific line segment and its ability to handle new generation. The color-coding illustrates what areas can accommodate additional generation (shown in green) and those areas that cannot accommodate any additional generation (shown in red). As part of California's Distribution Resources Planning proceeding, the state's largest investor-owned utilities—Pacific Gas & Electric, Southern

[9] Pacific Gas & Electric, "PG&E's Distribution Resources Plan", presented on November 16, 2015, available at http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=9876.

California Edison, and San Diego Gas & Electric—have completed a ICA for their distribution grids and made the results publicly available online.

Figure 3. A snapshot from Southern California Edison's online ICA map



Source: Southern California Edison

2. Methodology to value DER: As part of the distribution grid planning process, utilities, regulators, and other key stakeholders work together to establish a methodology to fully and accurately values the benefits and costs DER. Figure 3, below, provides an overview, but not exhaustive list, of values which should be considered in this methodology.

Figure 3. Potential values for inclusion in a methodology to value DER

	Value Component	Definition
Distribution	Subtransmission, Substation & Feeder Capacity	Reduced need for local distribution system upgrades
	Distribution Losses	Value of energy due to losses between wholesale transaction and distribution points of delivery
	Distribution Power Quality + Reactive Power	Improved transient & steady-state voltage, reactive power optimization and harmonics
	Distribution Reliability + Resiliency+ Security	Reduced frequency and duration of individual outages & withstand and quickly recover from large external natural, physical and cyber threats
	Distribution Safety	Improved public safety and reduced potential for property damage
Customer, Societal & Environmental	Customer Choice	Customer & societal value from robust market for customer alternatives
	CO2 Emissions	Reductions in federal and/or state CO2 emissions based on cap-and-trade allowance revenue or cost savings or compliance costs
	Criteria Pollutants	Reduction in local emissions in specific census tracts
	Health Impacts	Reduction in societal health costs associated with GHG emissions
	Energy Security	Reduced risks derived from greater supply diversity
	Water Use	Synergies between DER and water management (electric-water nexus)
	Land Use	Environmental benefits & avoided property value decreases from DER deployment instead of large generation projects
	Economic Impact	State or local net economic impact (e.g., jobs, GDP, tax income)

Source: Newport Consulting Group

Some values will be customer-specific, while others more broadly applicable, like reduced CO_2 emissions, local economic benefits, and energy security benefits through greater supply diversity. For some values in the methodology, location will matter. Well-sited DER can reduce the need for local distribution upgrades; improve power quality and reactive power provisioning; and enhance the reliability and resilience of the grid. Importantly, DER can also reduce the need for new transmission-related investments. A methodology that evaluates and quantifies these benefits will serve as a key tool to help the Commission conduct a more refined evaluation of the cost-effectiveness of proposed utility investments.

3. Substation-level demonstration project: These demonstration projects validate hosting capacity assessments and the methodology to value DER. Furthermore, these projects are designed to show how DER can be incorporated into utility grid operations and be utilized to avoid costlier, and more conventional, grid infrastructure investments. These demonstration projects can be designed to achieve an appropriate variety of scenarios and approaches, including various sourcing mechanisms.

4. Forecast future growth of DER and potential impacts: The grid is ever evolving. As part of a distribution grid planning process, three various scenarios for DER growth should be analyzed, based on various assumptions about DER growth rates and their expected locations, to understand how grid needs may change in the coming years and guide future investments accordingly.

IV. CONCLUSION

The Clean Coalition firmly believes that distribution grid planning is essential for a comprehensive and effective IRP process. Instituting distribution grid planning will improve the ability of the Commission, Dominion, and other Virginia stakeholders navigate rapid technological developments and protect ratepayers by guiding optimal investments into grid modernization.

The Clean Coalition appreciates this opportunity to comment on Dominion's 2017 IRP and is happy to provide additional information.

Respectfully submitted,

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