



November 7, 2018

Virginia State Corporation Commission
1300 East Main Street
Richmond, VA 23219

RE: Case No. PUR-2018-00100

Comments of Virginia Advanced Energy Economy

To the State Corporation Commission:

Virginia Advanced Energy Economy (“Virginia AEE”) respectfully submits written comments for consideration by the State Corporation Commission (“Commission”) in response to Phase One of Dominion Energy Virginia’s (“Dominion”) proposed Grid Transformation Plan.¹ These comments reflect our experience as providers of generation from advanced energy facilities, efficiency, demand response, and other demand-side management (DSM) services, and other advanced energy technologies. They likewise reflect our experience as customers pursuing advanced energy technologies and services to meet our energy needs, including renewable energy, energy storage, energy efficiency, demand response, electric vehicles, and more.

Virginia AEE supports efforts to create a more modernized, flexible, and interactive electricity system that enables greater penetration of customer-sited resources and higher adoption of electric vehicles, better integrates variable generation from large-scale renewable energy, and delivers electricity to customers more affordably and with fewer interruptions. Dominion’s Phase One proposal is an important step to unlock these and other potential benefits. As is discussed below, to realize such a modern, flexible, and interactive electricity system requires not only the deployment of hardware, but as well detailed policies and plans to unlock such benefits. It is our hope, through their engagement, that state regulators can ensure such plans and policies are put in place.

About Virginia AEE

Virginia Advanced Energy Economy (Virginia AEE) is a coalition of businesses that seek to make the Commonwealth’s energy more secure, clean, and affordable, bolstering Virginia’s economy. Virginia AEE aims to drive the development of advanced energy by identifying growth opportunities, removing policy barriers, encouraging market-based

¹ These comments represent the consensus view of Virginia Advanced Energy Economy (<http://www.advancedenergybuyersgroup.org>), but do not necessarily reflect the position of any

policies, establishing partnerships, and serving as the voice of innovative companies in the advanced energy sector.

COMMENTS

Overview

Enactment of the Grid Transformation and Security Act (SB. 966) opened the door for the modernization of Virginia's electric grid. By this Act, Virginia's General Assembly declared the creation of a 21st century energy system to be "in the public interest." Virginia Advanced Energy Economy (Virginia AEE) strongly agrees with this declaration. To actually create a 21st century energy system, however, will require strategic planning and prioritization of potential investments.

"Grid modernization" encompasses a set of technologies, capabilities, and policies that serve to transform the electric grid. Together, these components provide grid operators, consumers, and third party service providers with more data and insights regarding the grid and energy usage, as well as an expanded array of options for the generation, utilization, management, and conservation of energy.

A modernized grid can serve as a platform for a host of capabilities, such as time-variant rates (TVRs), technologies, such as rooftop solar, smart thermostats, energy storage, and electric vehicles (EVs), and services, such as demand response (DR) and behavioral energy efficiency (EE). Taken together, these services, technologies, and capabilities comprise a 21st century energy system able to provide consumers with more reliable, clean, and affordable electricity.

Grid modernization has the potential to unlock a vast array of benefits for Virginia families and businesses. A handful of those benefits are listed below:

- **Improved Resilience & Reliability**
 - Real-time, granular information about grid activity allows grid operators to more quickly identify and repair system outages.
 - Greater automation and information allow operators to efficiently reconfigure the grid, both reducing the scope of outage impacts and better integrating renewable generation.
 - The integration of distributed generation (DG) and storage makes the grid less reliant on vulnerable transmission and distribution (T&D) lines that carry electricity from central station plants.

- **Cost Savings**

- TVRs, coupled with effective communications, help shift consumers away from energy use during peak hours, shrinking system costs by reducing the need for additional peak capacity.
 - Personalized customer insights drawn from granular, real-time data can help businesses and residents change their behavior to save energy.
 - The integration of more distributed energy resources (DERs) reduces / defers the need for additional T&D in congested areas, lowering system costs and delivering additional value through new investment optionality.
- **Expanded Economic Opportunities**
 - Greater insight and engagement can allow consumers to provide new, and greater, value to the utility in the form of generation, capacity, and other attributes / ancillary services.
 - More information and channels for engagement allow consumers to better identify and utilize the technologies and services that best fit their needs and preferences.
 - A modernized grid can serve as a platform for a host of third-party service providers, from solar installers to energy analysts, who bring new high-paying jobs and investments to Virginia's economy.

Some of the benefits above flow directly from the communication, metering, and grid management technology under the umbrella of “modernization”. But most of these benefits do not. As described in greater detail in the sections below, the vast majority come from the services, capabilities, and technologies that are unlocked by this platform.

Because a modernized grid is a platform, and not simply an end in-and-of-itself, it is essential that any modernization proposal is grounded in a clear set of goals – objectives that the public, grid operators, and other stakeholders identify as being in the public interest – and include a detailed plan for how the utility, consumers, and third parties will fully realize the capabilities, technologies, and services that the platform unlocks. Failing to plan for and fully realize as much limits the range of benefits that can flow from modernization. To that end, we would encourage the Commission, in drafting its final order, to draw upon the input of a range of stakeholders in order to clearly define the goals of grid “transformation”.

The balance of benefits to costs is central to the case now before the Commission. As the General Assembly has declared that such grid investments are “in the public interest,” the key question now before regulators is whether the benefits from such investments justify the costs.

This is a significant question. In itself, Phase One of the proposal submitted here by Dominion totals \$813 million in capital expenditures. The full ten-year plan comes to \$3.1 billion. The direct and indirect benefits of such investments ought to be quantified through a set of set of performance metrics, embedded in any “transformation” plan,

before the Commission approves such expenditures. Although Dominion's filing does not indicate how they plan to recover these costs, it seems likely – whether through new fees or “customer credit reinvestment offsets” – that ratepayers will bear a substantial share of the cost. Precisely because ratepayers are likely to bear the cost of such expenditures, clear metrics, which can then be used in a cost-benefit analysis, are essential.

Virginia AEE supports a number of the investments proposed in Dominion's filing. It is our opinion, informed by analysis of grid modernization in other states and the experience of our member companies, that the benefits of grid modernization, when fully realized through new capabilities, services, and technologies, can outweigh the costs. But it is essential that the utility present a detailed plan, with clear metrics to measure performance, for how such capabilities, services, and technologies will be realized. To date, the plan, as articulated in Dominion's filing, is not sufficiently detailed, nor does it contain clear metrics.

Our ask, therefore, is that the Commission approve certain investments in Phase One of Dominion's proposal, but only with specific conditions designed to ensure that the benefits of such modernization investments are fully realized. The sections that follow address various elements of Dominion's filing and the conditions we would ask the Commission to consider.

Smart Meters & Advanced Metering Infrastructure

Advanced metering infrastructure (AMI), on the most elementary level, is comprised of smart meters, a two-way communications network, and a meter data management system (MDMS), which has the potential to transform how utilities, customers, and competitive service providers manage electricity generation, delivery, and use. It is the position of Virginia AEE that AMI is a foundational component of a 21st century electricity system. Forty-seven percent of all meters in the United States are smart meters, but just 16 percent of those within the service territory of Dominion Virginia. As such Virginia AEE supports Dominion's proposal for the timely and rapid deployment of AMI throughout its service territory.

Fundamentally, AMI provides the grid operator and consumers with granular, real-time energy use data. This data can unlock an array of opportunities. For instance, it allows the utility to introduce TVRs, which can shift energy consumption away from peak periods, reducing congestion and demand for peaking capacity. TVRs can unlock new value in DERs – be they smart systems to manage consumption or DG to provide cost-effective generation at key times. In the same vein, granular data regarding the location of energy consumption allows the grid operator and third party service providers to deploy technologies and services to address congestion points.

AMI data can likewise enhance utility customer engagement programs around billing, usage, TVRs, EVs and peak load reductions programs. When coupled with data analytics and artificial intelligence, this data can be transformed into personalized insights, providing consumers with behavioral tips to reduce their energy use across time. The experience of a large southeastern utility provides a compelling illustration of these benefits. The utility employed an advanced energy analytics software company to unlock the value of AMI for their customers. Using artificial intelligence, this firm helped the utility translate AMI data into appliance-level insights, which were in turn used to support a Usage and Billing Alerts program that provided millions of customers with proactive notifications when their billing and usage was trending higher than expected. As a result, the utility saw an 11% rise within the “Billing and Pricing” category of their JD Power customer satisfaction survey.

This data can also give efficiency providers and regulators more precise evaluation, measurement and verification (EM&V) of energy savings. EM&V has always been an important aspect of EE delivery, but data analytics and automated EM&V practices enabled by AMI allow for more precise assessment of EE effectiveness. Using a meter-based approach allows for a consistent and comparable evaluation for how all DERs, including EE, are delivering value to the system and may help market participants guide decisions about DER investments.

These new capabilities, services, and technologies can increase resilience and reliability, unlock new economic opportunities, and save money. Baltimore Gas and Electric’s (BGE) peak time rebate (PTR) program (Smart Energy Rewards) – a DR program facilitated by AMI – is a perfect illustration of this. PTR is estimated to create \$1.25 billion in customer benefits over the 15-year life of the AMI components.² Since program inception in 2013, the program has resulted in over 300 MW of peak demand reduction each year – about the size of an average coal-fired power plant. Benefits from PTR were 50% of the total benefits in the business case for BGE’s AMI deployment.

As the above example illustrates, the benefits from AMI are contingent upon further action by the utility and third party service providers. For AMI investments to be cost-effective, they should be linked with detailed plans that create rate modernization (i.e. TVR), enable EE and DR programs, facilitate DER integration, and provide consumers, regulators, and third party service providers with data and analysis to support effective management of their energy use.

Thus Va. AEE recommends that the SCC approve Dominion’s proposal to deploy AMI *contingent* upon submission and approval of a detailed plan to functionalize this infrastructure so that it can provide a host of grid functionalities such as rate modernization, DER integration (including EE and DR), and actionable data analytics for consumers. Specifically, the utility should be required by regulators to include a detailed

² AEE. *Advanced Metering: Connectivity for the Modern Grid* (A 21st Century Electricity System Issue Brief). July 2018. www.aee.net

roadmap for the widespread deployment and utilization of TVRs. In other cases utility need not provide all of these technologies and services itself, but should articulate in this plan how it will unlock the capabilities of AMI to enable third-party providers.

Essential to unlocking these opportunities for third party providers is data access. With proper privacy and security protections, customer and system data should be made available to third parties. To optimize data access while prioritizing privacy, security, and auditability, we recommend Dominion, at the direction of the Commission, develop and implement data sharing protocols that adhere to the following six principles:

1. **Provide Full Data Sets** - Standardize the availability of a requisite set of usage, billing and location data for historical and ongoing data access.
2. **Provide Synchronous Data** – Once a data request is authorized and authenticated, data should be delivered on-demand
3. **Accept Digital Authorization** - A digital signature (including click through) should be valid for authorizing data sharing
4. **Ensure Instant, Consumer-Centric Authentication** – A third party should not be held to a higher standard than Dominion holds itself
5. **Ensure Seamless Click-through** - A third part may lead the customer to request the types of data and the time frame of sharing. And the customer may approve or reject a request at their sole discretion.
6. **Adopt Strong Security Protocols** – While facilitating access is key, security protocols should ensure unauthorized parties cannot gain access.

Through the “Customer Information Platform” (CIP) Dominion has proposed a means of enhancing communications and providing consumers greater information about their energy use. The CIP will be discussed in greater detail below, but this sort of portal is essential to realizing the benefits of AMI.

Reliability, Resiliency & Grid Hardening

Dominion has placed a wide range of grid investments under the rubric of “Reliability, Resiliency and Grid Hardening”. Among them are Advanced Distribution Management Software (ADMS), Distributed Energy Resources Management Software (DERMS), and Intelligent Grid Devices. ADMS improves visibility around grid configuration and facilitates remote reconfiguration. DERMS aids grid operators in tracking and managing DG in real-time. Intelligent devices provide the data and technical capabilities to support ADMS and DERMS.

In combination, ADMS, DERMS, and these devices can help to more precisely identify the locational value of DERs, integrate these resources into the grid, and increase their resilience and reliability benefits. To fully realize the benefits of this hardware and software (especially DERMS), the grid should have substantial levels of DER

penetration. Lower penetration levels will leave such investments underutilized. To date, levels of DER penetration in Dominion's service territory remain relatively low.

Virginia AEE supports the deployment of systems to enhance the integration and value of DERs. That said, we recommend that, approval of any proposal to deploy ADMS, DERMS, and Intelligent Grid Devices, should be contingent upon the utility producing a detailed roadmap, with clear timelines and performance metrics, that lays out how they will accelerate DER penetration and fully incorporate these resources into future IRPs.

In many instances, DERs can serve as cost-effective substitutes to transmission, distribution, and conventional generation projects, reducing system costs and saving ratepayers money. Using DERs as substitutes will help demonstrate their full value to the grid, and should accelerate adoption. But for DERs to demonstrate such value, they must first be *considered* as viable alternatives. We hope a roadmap to increase DER adoption, produced in parallel with the Grid Transformation plan, will maximize the value of both DERs and the systems to better integrate and make use of these resources.

ADMS, DERMS, and Intelligent Grid Devices comprise only a portion of the total spend proposed under Reliability, Resiliency and Grid Hardening. A significant share of spending in this category (approximately \$232M) for Phase One is devoted to "Grid Hardening". Given our limited insight into the operations and vulnerabilities of Dominion's grid, Virginia AEE is not prepared to provide a recommendation regarding these investments. However we would submit a pair of observations to the Commission:

- A review of the items proposed under grid hardening reveals a number of investments, such as vegetation management, that are not transformational. These investments fall outside the scope of deliberations focused upon modernizing the grid. Were "grid hardening" investments a negligible part of the overall proposal, it might be reasonable to include them for the sake of expediency. Unfortunately, the magnitude of the proposed spending on reliability, resiliency and grid hardening makes this part anything but ancillary. In Phase One, spending in this category comprises roughly 38% of the total. Over the full ten years, this percentage grows, to 61% or \$1.88 billion in dollar terms. Thus, while we are not prepared to provide a recommendation regarding approval or disapproval of these investments, we would recommend that the Commission separate out investments for routine operations and maintenance, such as "grid hardening", and subject them to careful cost-benefit analysis.
- Interveners in this case have raised credible concerns regarding the cost-effectiveness of such hardening investments. As Dr. Caroline Golin notes in her testimony, Dominion's proposed reliability and resilience investments would amount to \$356.5 million over the next 3 years (i.e. Phase One). However this investment would reduce outages by only 1-2 minutes per year, meaning ratepayers would pay an average of \$142 a year for 1-2 minutes of additional

electricity over the next three years.³ Grid operators and regulators should consider not only the cost-effectiveness of such investments on their face, but as well whether the resilience and reliability benefits they seek might be more cost-effectively achieved through the use of services and technologies enabled by grid modernization.

Customer Information Platform (CIP)

A communications portal, such as the CIP, is an essential part of any grid modernization plan. On the most rudimentary level it can provide consumers information about how much energy they have used and help them pay their bills. But such a platform can also provide them with energy insights that lead to more efficient behavior and reduce energy usage at specific times. Such a platform can allow consumers to download their data and share it with third party service providers. It can help them understand and select new rate options based on how they use energy throughout the day. And it can assist them in identifying services and technologies that best fit their economic and sustainability preferences.

In a nutshell, the CIP can serve as the portal through which consumers access the vast array of benefits that grid modernization unlocks. The question for regulators, however, is to what degree does the CIP, as proposed by Dominion, actually provide access to such benefits?

A review of Dominion's testimony suggests the CIP may provide a modest degree of access. The CIP will "provide scalable services that are flexible and adaptable to all customers... [Enable] the Company to offer customers new rate structures and self-service options... [And expand] customer communication channels that will provide customers with a dynamic and personalized experience."⁴

These are important, but fundamental, services for the CIP to provide. To fully unlock a range of benefits from grid modernization for consumers, the CIP should have a variety of additional capabilities and services. Virginia AEE would recommend, therefore, that the Commission make approval of the CIP contingent upon Dominion taking a series of additional steps, as specified below:

- **Rate Modernization** – TVRs are a key capability unlocked by a combination of AMI and customer communications. As discussed above, TVRs provide a host of benefits for the grid, consumers, and the utility. Although Dominion makes brief mention of new rate structures in its filing, they do not articulate a detailed plan for how these rates will be deployed to encourage customer utilization. As we

³ Golin, Caroline. Direct Testimony in Case N. PUR-2018-00100. Submitted by the Southern Environmental Law Center. October 16, 2018.

⁴ Hinkle, Franklin. Direct testimony in Case N. PUR-2018-00100. Submitted on Behalf of Virginia Electric and Power Company. July 24, 2018.

recommended above, the Commission should require Dominion to produce a detailed roadmap for the widespread deployment and utilization of TVRs. This should include customer education necessary to make TVRs a success.

- **Energy Insights & Analysis** – Energy usage data, in and of itself, rarely provides consumers with the information needed to make decisions about behavioral changes to save energy and DER options. Such decisions flow from analysis of, and insights drawn from that data. At a minimum, any design for the CIP should allow the platform to serve as an easy-to-use portal through which customers can access such insights, developed either by Dominion or a third party provider. Given the depth and breadth expertise around data analysis and behavioral efficiency in the advanced energy space, we recommend that Dominion contract with outside firms to provide such insights and analysis as part of a larger DSM program, rather than try to build that from scratch.
- **Data Access** – AMI produces a tremendous amount of granular data regarding both individual customers' energy usage and the grid overall that can be leveraged by consumers and / or third party service providers to conserve energy (via EE and DR), tailor products and services to customers, identify optimal locations and uses of DERs, and reduce costs. These benefits are only realized, however, if customers have convenient access to such data and the ability to securely and seamlessly authorize the use of that data by third party service providers. To facilitate this, the Commission should require that the CIP adhere to the Green Button Standard and allow customers to download in "csv" format their electricity usage. Principles to facilitate data access for third parties are described above.

To fulfill the steps above, Virginia AEE would also recommend that Dominion accelerate its investment in the CIP during Phase One of this proceeding. As proposed, less than half of the total planned investment in CIP (\$82.5 million of a total \$185 million) is scheduled to occur in Phase One. We believe that the CIP should be fully functional, providing consumers with an array of goods and services, as the AMI rollout occurs. By 2022 the majority of Dominion's customers are slated to have a smart meter.

Emerging Technology

Virginia AEE is encouraged by a number of investments proposed under the umbrella of "Emerging Technology". We support Dominion's proposal to develop a streamlined application process for net energy metered (NEM) systems. The process to which applicants are currently subject is unnecessarily cumbersome and a significant bottleneck to the deployment of DG. To encourage use of this streamlined process, the Commission should require that the new NEM Application be integrated into the CIP. Customers should be able to use the CIP as a one-stop shop for energy insights and DER options, including DG.

In its' filing, Dominion also proposes continuing the planning and development of the Locks Microgrid Demonstration Project. We are encouraged that the utility is exploring the benefits of microgrid technology. This advanced energy tech can offer increased resilience and reliability to customers and communities with acute reliability needs often at a lower cost than traditional “poles and wires” solutions. As such, we support the utility’s continuation of this project. We would encourage them to consider similar demonstration projects to see the full range of technologies – such as renewable generation, energy storage, and energy management systems – can be incorporated into and enabled by a microgrid.

We likewise support Dominion’s expressions of interest in EV infrastructure and fleet electrification. Transportation electrification is in the public interest, given the array of economic, health, and environmental benefits it generates. Utility investment can play an important role in facilitating electrification across vehicle classes. We recommend, on a track outside of this proceeding, that the Commission identify specific parts of this emerging industry that are best served by such investments, and promulgate regulations that appropriately incentivize such investments and ensure the full suite of EV benefits can be realized by both the grid operator, ratepayers, and the public writ-large.

Finally, we would note that the emerging technologies discussed above, the CIP, DERMs, ADMS, and intelligent grid devices are all technologies that will require software, computing power, and data management. We encourage the utility to leverage cloud computing to deploy these technologies in a comprehensive and cost-effective manner. Utilizing the cloud will allow Dominion to scale these technologies quickly and affordably to best serve customers with modern applications, services, and tools.

Conclusion

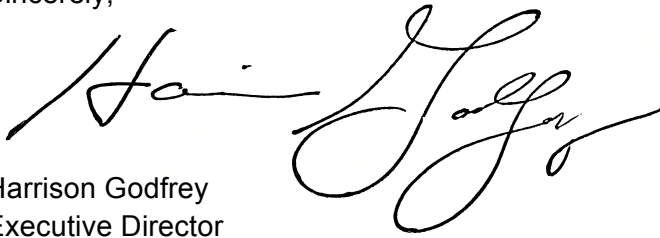
Phase One of Dominion’s Grid Transformation proposal contains a number of components that may serve to transform Virginia’s energy grid, spurring the development of a 21st century energy system and generating a raft of benefits for Virginia families and businesses. However, the hardware and software proposed by Dominion is just one part of a larger process of “modernization”. To unlock the benefits described above – cost savings, economic opportunities, and increased resilience and reliability – these investments must be made to achieve a clear set of goals, and deployed in conjunction with detailed plans to unlock the capabilities, services, and technologies that, ultimately, are the source of many such benefits.

Through the Grid Transformation and Security Act, Virginia’s elected leaders have articulated the overarching aim of these investments – to transform Virginia’s grid. It is now the duty of the Commission to articulate the precise goals therein, drawing upon the input of a wide variety of stakeholders. Furthermore, the Commission should ensure such goals are met through a deliberate process that pairs “modernization” investments

with detailed plans to ensure the fulsome utilization of such investments. Only then can we be certain that the proposed slate of investments are prudent and reasonable.

Virginia AEE appreciates the opportunity to provide the Commission with its perspective on this matter and welcomes any questions the Commission or its staff may have.

Sincerely,

A handwritten signature in black ink, appearing to read "Harrison Godfrey". The signature is fluid and cursive, with the first name "Harrison" written in a slightly larger, more prominent script than the last name "Godfrey".

Harrison Godfrey
Executive Director