Virginia Solar Energy Development and Energy Storage Authority

2018 Annual Report

Virginia Solar Energy Development and Energy Storage Authority
c/o Virginia Department of Mines, Minerals and Energy
Washington Building
1100 Bank Street/8th Floor
Richmond, Virginia 23219
804-692-3200

Table of Contents

Appendices

I. Overview of the Authority

In 2015, the Virginia General Assembly created the Virginia Solar Energy Development Authority (the Authority) for the purposes of facilitating, coordinating, and supporting the development, either by the Authority or by other qualified entities, of the solar energy industry and solar energy projects. The Authority seeks to accomplish this by developing programs that increase the availability of financing for solar energy projects; facilitating the increase of solar energy generation systems on public and private sector facilities in the Commonwealth; promoting the growth of the Virginia solar industry; and providing a hub for collaboration between entities, both public and private, to partner on solar energy projects. The enabling legislation for the Authority is included in **Appendix A**.

The Authority, as originally created, was composed of 11 non-legislative citizen members: six members appointed by the Governor, three members by the Speaker of the House of Delegates, and two members by the Senate Committee on Rules.

In the 2017 legislative session, Code § 67-1500 was amended to include energy storage as a key activity for the Authority to study, and the Authority was renamed the Virginia *Solar Energy Development and Energy Storage Authority*. The legislation expanded the purposes of the authority to include positioning the Commonwealth as a leader in research, development, commercialization, manufacturing, and deployment of energy storage technology. The powers of the Authority were expanded to include (i) promoting collaborative efforts among Virginia's public and private institutions of higher education in research, development, and commercialization efforts related to energy storage; (ii) monitoring relevant developments nationally and globally; and (iii) identifying and working with the Commonwealth's industries and nonprofit partners. Four additional members were added: 2 appointed by the Governor and 1 each from the House and Senate. A listing of the appointed Authority members is included in **Appendix B.**

II. Status of Solar Energy and Energy Storage in Virginia

According to the Solar Energy Industries Association, in Q4 2018, the U.S. market installed 4.2 GW_{dc} of solar PV, a 4% year-over-year increase and a 139% quarter-over-quarter increase.[1]

In Virginia, solar energy deployment, and projects in various stages of development, grew significantly from the previous year.

[1] https://www.seia.org/research-resources/solar-market-insight-report-2018-year-review

The rapid growth of the utility-scale solar industry in Virginia has the potential to bring significant benefits to the Commonwealth. Continued engagement and support among all stakeholders is essential to ensure that Virginia develops its solar energy resource in a sustainable manner. Concerns about land use, the loss farm of land, changes to the tax base and loss of tax revenues are all issues that have been raised. Continuing to inform and educate local government officials on tax, land use, and other issues related to solar energy, especially utility-scale solar, will continue to be important going forward. Providing fact-based information to land use planners on the pros and cons of utility-scale solar can help reduce the spread of misinformation that is taking place in neighboring states where the rapid growth of solar has triggered instances of local backlash based on lack of information, and sometimes intentional misinformation, including the spread of unfounded public health fears.

With respect to energy storage, Virginia is home to the world's most powerful hydroelectric pumped storage generation facility. The Bath County Pumped Storage Station located in the Allegheny Mountains along the central western border of Virginia began commercial operations in 1985. The Station has a net generating capacity of 3,003 megawatts and is capable of powering 750,000 homes.

As a result of 2017 enabling state legislation, Dominion Energy is exploring the potential for building a new hydro-electric pumped storage facility in Southwest Virginia.

The Virginia General Assembly has also taken steps to enable the development of battery storage technology in Virginia. The Grid Transformation and Security Act enacted in 2018 directs the Virginia State Corporation Commission to establish battery storage pilot programs under which utilities in Virginia are to deploy batteries for specific use cases under five year pilots.

Virginia energy storage activities are discussed in more detail in Section II.E.

The following sections represent a status update of solar energy deployment and energy storage at the time of this report.

Solar energy development in Virginia falls into four broad categories:

- **Distributed Solar**: the generation facilities are located, and the energy is largely consumed, on the retail customer's premises.

- **Utility-administered Community Solar:** the generation facility is located in the respective utility service territory and is owned by third-party solar developers or acquired by the utility via asset purchase with the generated electricity purchased by participating retail customers via general customer subscriptions.

- **Large Customer Solar Arrangements**: the generation facility is owned by the utility or a third-party and the energy and/or the renewable attributes are purchased via bilateral contract.

- **Utility Solar**: the solar generation is included as part of a utility's overall generation mix.

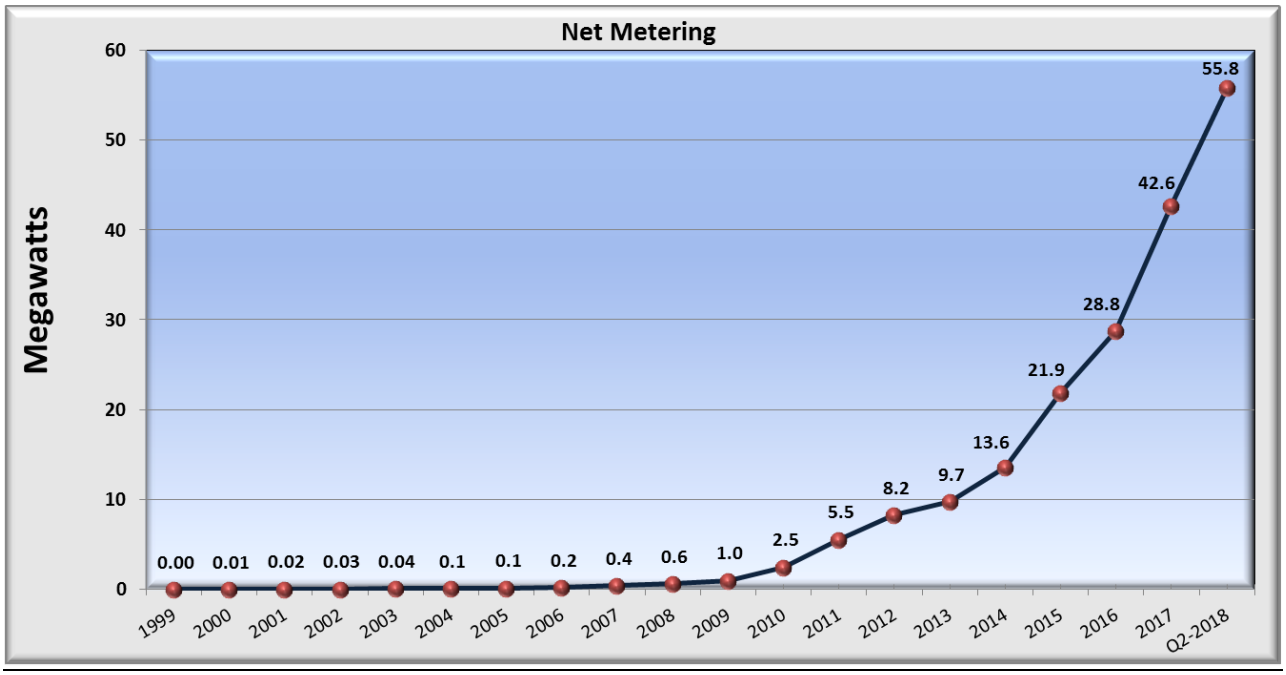
A. Distributed solar generation.

Distributed generation, which generally includes systems acquired and owned by individuals and businesses with energy produced and consumed at the point of generation, as well as small systems deployed under third-party ownership agreements, continued to increase steadily, growing from approximately 4,540 installations totaling 38.5 megawatts at the time of the 2017 Annual Report, to 6,486 installations totaling 55.8 megawatts.

All customers in Virginia may own solar generation facilities located on their premises that generate energy solely for consumption by that customer. Due to the barrier imposed by the up-front capital costs imposed by this model, there are several options under Virginia law to help customers finance these up-front capital costs: net metering, retail customer purchased power agreements, and retail customer self-generation agreements.

1. Net Metering.

Net metering, which is implemented pursuant to Va. Code Section 56-594, involves utility purchases of excess power produced by renewable generation facilities located on an eligible customer's premises and sized to meet the needs of the customer. The chart below illustrates the considerable growth in net metering facilities in recent years in Virginia.



Growth in Net Metered Solar Generation

It should be noted, however, that the actual amount of distributed, net metered solar is likely higher than reported above. State Corporation Commission data for solar interconnections at several of the coops remains suspiciously low, showing zero increase since as far back as 2009. Staff has reached out to the Virginia, Maryland & Delaware Association of Electric Cooperatives to address this issue and was told that they will coordinate reporting of coop net metering figures to the SCC and ensure their accuracy.

The 2019 Legislature made several changes to the existing net metering law as it applies to Virginia's electric cooperatives.

HB 2547 establishes requirements for net metering by electric cooperatives effective July 1, 2019, or on the date of implementing regulations by the State Corporation Commission, whichever comes first. The bill includes several requirements that differ from existing law, including (i) changing the cap on the capacity of generating facilities from one percent to two percent of system peak for residential customers, and not-for-profit and nonjurisdictional customers; (ii) authorizing electric cooperatives to raise these caps up to a cumulative total of seven percent of its system peak; (iii) legalizing third-party power purchase agreements for those retail customers and tax-exempt nonjurisdictional customers; and (iv) establishing registration requirements for third-party power purchase agreements, including a self-certification system under which a provider is required to affirm certain information to the SCC, under penalty of revocation of its registration. The bill authorizes electric cooperatives to adjust their rates, terms, conditions, and rate schedules governing net energy metering without approval from the SCC. It also prohibits a cooperative after the date of such an adjustment from

collecting stand-by charges, but instead allows them to adopt demand charges based upon a net metering customer's noncoincident peak demand. HB 2547 also authorizes Dominion Energy to petition the SCC to make their community solar pilot program permanent (and also Appalachian Power were they to develop a similar pilot), and requires Dominion Energy to (a) convene a stakeholder process, using an independent facilitator, to make recommendations to the utility concerning issues related to the implementation of advanced metering technology and related investments in customer information systems; (b) submit to the Commission retail rate schedules designed to offer time-varying pricing; and (c) submit to the Commission an incentive program for the installation of solar equipment for customers served under time-varying retail rate schedules that have advanced-metering technology equipment.

2. Retail Customer Power Purchase Agreements.

Retail customer power purchase agreements, which are commonly known as PPAs, allow electric ratepayers to have solar energy at their facility without the need to purchase and maintain the solar generating equipment. Instead, the customer signs a long-term contract to purchase the output from a system that a third-party developer installs, owns and maintains on the customer's premises. Typical PPAs are guaranteed to be revenue neutral over the life of the project and may result in a net savings or net cost over what the customer would normally pay their utility over the life of the PPA agreement, depending on the pricing structure of the PPA and any changes in utility rates over the life of the agreement.

Currently PPAs are expressly permitted under a pilot program in the service territories of Dominion Energy and Appalachian Power under parameters set forth in Chapter 803 of the Acts of Assembly of 2017, an uncodified enactment. The pilot limits projects to no smaller than 50 kilowatts, with an exception for tax-exempt entities in accordance with § 501(c) of the Internal Revenue Code, and no larger than one megawatt (1 MW). The aggregated capacity of all third-party renewable generating facilities in Dominion Energy territory is capped at 50 MW. The aggregated capacity in Appalachian Power service territory is capped at 7 MW and is limited to nonprofit, private institutions of higher education as defined in § 23.1-100 of the Code of Virginia.

In addition to the pilot programs described above, House Bill 2192 and Senate Bill 1331 provides for the modernization of public school buildings and the use of solar. The bills states that it is the legislative intent that public school buildings and facilities be designed, constructed, maintained, and operated to generate more electricity than consumed, and allows local school boards to enter into leases with private entities to achieve that goal if the school board owns or operates a school building or facility that has been properly modernized, generates energy derived from sunlight, and if the solar generating facility is properly interconnected. The bill also provides that private entities that contract with local school

boards to modernize public school buildings and facilities may receive financing from the Virginia Small Business Financing Authority.

Solar projects financed through retail customer PPAs more than doubled since the last Annual Report, increasing from 1.7 MW to 4.6 MW.

3. Retail Customer Self-Generation Agreements.

Solar self-generation agreements are an alternative method of financing developed by Staunton-based Secure Futures that allow third-party financing for solar generation.

According to Secure Futures' website, the Solar Self-generation Agreement allows customers to go solar with no initial investment requirements and to self-generate their own electricity. Secure Futures finances the project, owns and installs the system, guaranteeing its performance based on equipment specifications.

In December 2017, construction of a 1.3 megawatt single axis tracking solar array was completed at Carilion New River Medical Center in Christiansburg. The project is the most recent that is financed through a Secure Futures Solar Self-Generation Agreement. Carilion leaders say the system is expected to generate 17 percent of the hospital's energy each year and will save them $1.5 million dollars over 20 years while reducing their carbon footprint.

This project is the largest solar array for a hospital in Virginia and the only one utilizing a tracking system for increased output. The project also represents a proof of concept for a "nanogrid" and includes 60 KW of battery storage that enables Carilion to shave a portion of its peak demand in the early morning and late afternoon hours.

B. Utility-Administered Community Solar.

1. Investor Owned Utility Solar Subscription Programs

Senate Bill 1393 approved by the General Assembly in the 2017 legislative session requires Dominion Energy and Appalachian Power to conduct what has been characterized as "community solar" pilot programs administered by the utilities in which their retail customers voluntarily subscribe to purchase output from a project owned by a third-party solar developer or acquired by the utility via asset purchase. It should be noted that these programs are administered by utilities whereas some community solar models involve administration by a third-party entity. This utility model should not be confused with the more widely recognized "community model in which the solar facilities are owned and operated by communities. Under the pilot program, participating customers purchase the solar energy by subscribing to a voluntary companion rate schedule. Eligible generation facilities include solar facilities that (i)

exclusively use energy derived from sunlight; (ii) were placed in service on or after July 1, 2017; (iii) are not constructed by the utility but are acquired by the utility through an asset purchase agreement or subject to a power purchase agreement under which the utility purchases the facility's output from a third party; and (iv) have a generating capacity not exceeding two megawatts each, subject to an exception. The pilot programs will have three-year durations unless renewed or made permanent by appropriate legislation. The measure requires the investor-owned utilities to select eligible generating facilities through an RFP process. The minimum aggregate generating capacity of the eligible generating facilities in Appalachian Power's pilot program is 0.5 MW and in Dominion Energy's pilot program is 10 MW. The maximum aggregate generating capacity of the eligible generating facilities in Appalachian Power's pilot program is 10 MW and in Dominion's pilot program it is 40 MW. Appalachian Power's community solar pilot programs are still in the development phase. Dominion Energy's community solar pilot program was approved on September 11, 2018 and is currently open for pre-enrollment on the company website.[2] Consistent with the requirements of Senate Bill 1393, the Dominion Energy collaborated with relevant governmental, non-profit, and for-profit entities to solicit input concerning options for the Pilot Program that would facilitate low-income customers' participation, while adhering to the requirement that Pilot Program costs are not recoverable from non-participants. Dominion Energy's RFP seeking solar generation facilities to serve the Pilot Program included "Virginia Economic Development/Low-Income Benefits" and "Community Access" as two of the evaluation criteria and gave consideration to any projects that would provide benefits to economically distressed areas in the Commonwealth or facilitate participation by, or access or benefits to, low-income customers.

Dominion Energy's residential and commercial customers under 500 kW will have the option to subscribe to the program at an amount that matches up to 100% of their monthly electricity use. Non-residential customers over 500 KW are limited to ten blocks (1,000 kWh). The additional cost of the program for customers, at least initially, will be 2.01 cents per kilowatt-hour. For a customer who uses an average of 1,000 kWh monthly and wants to use only solar, that would add up to a premium of $20.10 per month.

2. Cooperative Utilities Solar Subscription Programs

Senate Bill 1393 from 2017 General Assembly session also allows for, but does not require, electric cooperatives to conduct similar customer subscription pilot programs and gives them flexibility in designing their program and voluntary companion rate schedules.

In July 2018, the SCC approved three-year community solar pilot programs for four distribution co-ops served by the Old Dominion Electric Cooperative ("ODEC"). These include A&N, Mecklenburg, Northern Neck and Rappahannock Electric cooperatives. Applications by two

[2] https://www.dominionenergy.com/home-and-small-business/renewable-energy-programs/community-solar

other distribution co-ops also served by ODEC — Shenandoah Valley and Southside — are pending before the SCC.

After Hecate Energy developed a 10 MW solar facility located in White Post in Clarke County and the 20 MW Cherrydale solar facility located in Eastville in Northampton County, an affiliate of Dominion Energy acquired both projects. ODEC then entered into a long-term power purchase agreements for both projects and will be the sole off-taker of the electricity from these facilities. ODEC will resell the solar generation to its member distribution coops, who in turn sell the retail power in 50 kWh blocks to retail customers who are members of the distribution coops, allowing them to cover a portion or all of their electricity usage without the expense of owning and maintaining their own solar energy systems.

Central Virginia Electric Cooperative, who is not an ODEC member, is buying the output from two 5 MW solar facilities - the Palmer Solar Center and the Martin Solar Center - both in Fluvanna County - under a 25-year power purchase agreement with Coronal Energy.

C. Solar Generation Dedicated to Large Customers

Dominion Energy currently has 476 MW in operation as of Q2 of 2019, with an additional 400 MW under development. Much of this solar development is being driven by demand from owners of large data centers with corporate renewable energy goals. These are often described as "ring-fenced" models in which any additional costs associated with the solar generation is assigned to one or more specific customers that have entered into contracts with Dominion Energy regarding particular solar generation projects.

1. Energy and Renewable Attributes Dedicated to Specific Large Customers

One model utilized by Dominion Energy involves sales of energy and renewable attributes from a particular facility being split between different customers. An example of this approach is the 20 MW Remington project in Fauquier County, where Dominion Energy partnered with Microsoft and the Commonwealth of Virginia. Pursuant to this arrangement, the Commonwealth purchases the energy produced for use by state government facilities while Microsoft purchases the renewable attributes associated with the energy. Another model involves a single customer purchasing both the energy and renewable energy attributes from a particular facility. An example of this approach is the 18 MW solar energy facility at Naval Air Station Oceana in Virginia Beach, where Dominion Energy partnered with the Commonwealth of Virginia to purchase both the energy and the renewable attributes. In exchange for hosting the solar facility, the Navy will received an alternative electrical feed, which will increase resiliency on the base.

2. Renewable Attributes Dedicated to Specific Large Customers

A second model utilized by Dominion Energy allows eligible customers to promote the development of new renewable energy facilities by enhancing their cost effectiveness for all customers in exchange for the environmental attributes of up to 100% of the facility. Eligible non-residential customers may participate in this offering by subscribing to a voluntary companion rate schedule called Schedule RF.[3] Facebook has committed to subscribing to Schedule RF to meet its renewable energy goals connected to its proposed data center complex in Henrico County. Pursuant to this approach, Facebook purchases the renewable attributes from the facility while the energy is assigned to Dominion Energy's overall customer load. The VA SCC has approved construction of two solar facilities totaling 240 MW currently under development, which will provide environmental attributes to Facebook under Schedule RF. The two projects, Colonial Trail West (142 MW) Spring Grove 1 (98 MW), are under development in Surry County and will become operational in late 2019 and late 2020 respectively.

D. Utility Solar

1. Rooftop Solar

Dominion Energy has installed 7.7 MWs of distributed solar across 11 projects located on property owned by non-residential customers through its *Solar Partnership Program.*[4] The electricity from these 11 facilities is used to serve regulated electric customers in Dominion Energy's Virginia and North Carolina electric service territories. Dominion Energy is authorized to construct and operate up to 30 MWs of company-owned solar facilities on leased rooftops or on the grounds of commercial businesses and public properties throughout their service area.

2. Large Scale Solar

Dominion Energy has 18 solar facilities currently operational in Virginia totaling 476 MWs in their service area. Of these:

- **Six facilities (260 MW)** are dedicated to providing renewable energy to Amazon Web Services;
- **Four facilities (76 MW)**[5] serve Dominion Energy regulated electric customers in Virginia and North Carolina;

[3] https://www.dominionenergy.com/library/domcom/media/home-and-small-business/rates-and-regulation/residential-business-rates-shared/virginia/schedule-rf.pdf?la=en&modified=20180601150242
[4] https://www.dominionenergy.com/large-business/renewable-energy-programs/solar-partnership-program
[5] Includes Essex Solar Facility (20 MW) in Essex County, Virginia not owned by Dominion Energy but under power purchase contract with the company.

- **Three facilities (50 MW)** are helping meet the renewable energy goals of the Commonwealth (32 MW to UVA and 18 MW to all other Commonwealth agencies);

- **Two facilities (40 MW)** are dedicated to providing renewable energy to Facebook;

- **Two facilities (30 MW)** provides renewable energy for Old Dominion Electric Cooperative's members coops; and

- **The 20 MW Remington solar facility** providing commodity electricity to the Commonwealth, with the environmental attributes helping Microsoft meet their renewable energy goals.

Dominion Energy has four additional solar facilities under development in Virginia totaling 400 MW. Of these:

- **One facility (80MW)**[6] will serve Dominion Energy regulated electric customers in Virginia and North Carolina;

- **Two facilities (240 MW)** will serve Dominion Energy regulated electric customers in Virginia and North Carolina with renewable energy attributes dedicated to Facebook; and

- **One facility (80 MW)** dedicated to providing renewable energy to Facebook.

In addition to the considerable activity by investor owned utilities and by electric cooperative utilities, two municipal utilities have completed multi-megawatt solar projects.

The Town of Bedford contracted with North Carolina-based O2 emc to construct, own and operate a 3 MW installation adjacent to a closed land fill to supplement their municipal customers' electricity. The project was completed in December 2017, and the Town of Bedford is purchasing the electrical output from O2 emc under a long-term Power Purchase Agreement.

The City of Danville had the ribbon cutting for the six MW Kentuck Solar project in May of 2018. The City of Danville Department of Utilities is purchasing the energy from project owner WGL Energy at an agreed upon rate for 25 years. Danville Utilities expects to save money over the life of the project because the solar will reduce transmission congestion charges the city currently pays.

[6] Water Strider Solar Facility (80 MW) under development in Halifax County, Virginia not owned by Dominion Energy but under power purchase contract with the company.

E. Projects Installed or Under Development

Typically, electric generation construction projects must be approved by the Virginia State Corporation Commission. In order to streamline the process for smaller scale renewable generation projects, Virginia Code § 56-580 D and Virginia Code § 10.1-1197.6 created the Permit by Rule ("PBR") process, which was developed and is overseen by the Virginia Department of Environmental Quality

The solar PBR became effective in 2012. The number of projects permitted under the program has grown significantly, beginning with one PBR in 2015, six in 2016, ten in 2017, and 14 issued in 2018. This represents over 800 MW that has been permitted under this program. In addition to the permitted projects, over 60 projects in the PBR queue have provided notice of their intention to construct and operate a solar project representing an additional 3,000 MW. In addition to the rapid growth of the program, the 2017 legislative modification to increase the size of projects eligible for a PBR from 100 MW to 150 MW has resulted in much larger projects seeking permits and applications that are more complex. Regulatory action is necessary in order to clarify the requirements for applicants, operators and permitted facilities; improve permitting procedures; streamline the regulations for ease of use while still protecting natural resources and human health; and conduct a periodic review of the regulation.

A detailed list of known solar projects installed or under development as of Q2 2019 is included in **Appendix C**. These projects include net metered projects, utility projects that have been announced, completed or are under construction, and projects by independent developers who have submitted Notices of Intent to apply for a Permit by Rule from the Department of Environmental Quality.

An additional list of projects may be found in **Appendix D**, which includes solar energy projects listed in the generation interconnection queue for PJM Interconnection (PJM), the regional transmission organization in which Virginia participates. As the Authority's mission has been expanded to now include energy storage, **Appendix E** also includes energy storage projects included in the PJM interconnection queue.

Solar and other generators at transmission level voltages, including energy storage facilities, that request interconnection with PJM and want to participate in PJM's wholesale power markets, must execute an Interconnection Service Agreement. Generators at local distribution or sub-transmission voltage levels may also request to participate in PJM's wholesale power market. However, they may not be under Federal Energy Regulatory Commission jurisdiction regarding the nature of their interconnection request. If not jurisdictional, each such generator must sign a Wholesale Market Participation Agreement instead of an Interconnection Service Agreement upon completion of all required reliability studies. A Wholesale Market Participation Agreement defines the terms and conditions under which PJM wholesale power market participation will be conducted. It also contains a milestone for the generator to execute,

separately, an interconnection agreement with the local electric distribution company in accordance with the respective state's own established process.

It should be noted that a number of projects included in **Appendix D** may also be included in **Appendix C** under the projects' commercial project name versus a substation name as in the PJM queue. The commercial name in the PJM queue becomes public only after the System Impact Study is issued. Even then, not all developers have a commercial name once the System Impact Study is posted and there is no tariff requirement for them to have one. As such, it's difficult to cross reference the data in **Appendix C** and **D**. **Appendix D** should only be taken as an indication of the recent and significant solar development activity focused in Virginia.

It would not be an understatement to say that navigating the PJM interconnection queue to the point of receiving an Interconnection Service Agreement or Wholesale Market Participation Agreement is a lengthy and expensive endeavor. Projects may be withdrawn at multiple points for not meeting specific milestones, or they may be withdrawn at the request of the project developer when the required studies determine system upgrade costs will be too expensive for the developer to bear. **Appendix D** also includes solar energy projects withdrawn from the PJM interconnection queue.

F. Energy Storage

With respect to energy storage, Virginia is home to the world's most powerful hydroelectric pumped storage generation facility. The Bath County Pumped Storage Station, located in the Allegheny Mountains along the central western border of Virginia, began commercial operations in 1985. The Station, jointly owned by Dominion Energy, Bath County Energy LLC, and Allegheny Power Systems, has a net generating capacity of 3,003 megawatts and is capable of powering 750,000 homes. Hydroelectric pumped storage technology has existed for decades and provides a cost-effective way to store electricity at scale. Pumped storage facilities store energy electromechanically. During times of low energy demand, water is pumped to an upper reservoir using lower-cost electricity from the grid. When demand for energy is high, water is released to a lower reservoir through tunnels, turning the turbines which generate electricity.

As a result of 2017 enabling state legislation sponsored by Senator Ben Chafin and Delegates Terry Kilgore and Todd Pillion, Dominion Energy is exploring the potential for building a new hydro-electric pumped storage facility in Southwest Virginia. As directed by the legislation, at least part of the electricity that would be used to power the new facility would be generated by renewable resources. Development of the project is still in early stages and the project's final size and scope have not been determined. Before moving forward with the project, Dominion Energy would need to secure numerous local, state and federal permits and approvals.

The Virginia General Assembly has also taken steps to enable the development of battery storage technology in Virginia. The Grid Transformation and Security Act enacted in 2018 directs the Virginia State Corporation Commission to establish battery storage five-year pilot

programs under which Dominion Energy Virginia and Appalachian Power Company each deploy an aggregate of up to 30 MW and 10 MW of battery storage respectively. The legislation details specific goals to be accomplished by battery storage projects implemented under the pilot programs. The Virginia SCC adopted guidelines for the battery storage pilot programs in November 2018.

Battery storage in Virginia is still in its infancy. This may begin to change as battery storage costs continue to drop and as policy makers and utility regulators begin to understand the potential value that storage can have for both end-users with behind-the-meter storage and entire electric grids.

Energy storage applications in Virginia may include the following:

- Grid resiliency and disaster preparedness by making communities more resilient to and help them recover more quickly from natural disasters.
- The potential for demand charge reduction during peak periods, resulting in cost savings on utility bills.
- The potential to serve as a tool for demand response, as well as larger scale grid balancing.
- The ability to provide ancillary services to the grid such as frequency response and frequency regulation faster and more effectively than traditional generators.
- The ability to provide peaking capacity.
- The ability to serve as an alternative to traditional substation or line upgrades, as it can be sited nearly anywhere and can be implemented much more quickly than conventional system upgrades.
- The ability to help integrate renewable energy by balancing fluctuations in generation, as well as allowing for the dispatch of renewably-generated electricity to other times of the day than when it's actually generated.

The inability to store surplus power (beyond the capacity of conventional storage technologies such as pumped hydro systems in Bath County and at Smith Mountain Lake) is becoming a more pressing problem in areas with the greater penetration of renewable energy deployment. Solar output, while relatively predictable, dips in cloudy conditions and is absent at night, while local wind speeds are hard to predict with confidence more than a few days into the future. Energy storage can provide grid operators, like PJM, a way to keep power supplies stable when renewable sources are not available. In providing grid ancillary services (voltage support, black start, VAR provision), batteries have the advantage of being quickly dispatchable or rampable (often in seconds) and, unlike traditional generation can be more easily built and sited in keys areas of the grid.

Given that the U.S. Department of Defense has prioritized developing resilient solutions for its naval infrastructure in Norfolk and the Hampton Roads region, and given the increased sense of urgency to protect the grid and create more resilient infrastructure that can overcome severe weather events, it would make sense for Virginia to explore ways to partner with the federal government on deployment of nanogrids and microgrids for regional emergency shelters and mission-critical facilities throughout the state.

In regards to actual deployment of non-pumped-hydro energy storage facilities in Virginia, little is known at this time. The PJM Interconnection New Services Queue shows energy storage interconnection requests have more than tripled since the 2017 Annual Report, increasing from three projects totaling 172 MW to ten projects totaling 735 MW. It should be pointed out, however, that all three of the projects in the PJM queue shown in the 2017 Annual Report have withdrawn their queue positions. As such, the 735 MW shown in **Appendix E** are all new projects initiated within the past year.

III. Update on Authority Activities

The Authority held five meetings since the last Annual Report continuing to explore actual and perceived barriers to increased solar energy deployment and energy storage in Virginia. These include, but are not limited to, the lack of robust third-party ownership programs; Virginia's voluntary renewable portfolio standard; an absence of state tax credits like those that greatly support solar development in neighboring states; perceived threats to net metering; prohibitions on non-utility community solar programs; soft costs (such as consumer acquisition and other non-equipment costs); a lack of standardized guidelines for zoning, permitting, etc., between localities; and relatively low electric rates compared to neighboring states and regional averages.

Given that utility-scale solar deployment has taken off on its own in recent years, the Authority continues to explore other areas where it can help enable and accelerate solar energy and energy storage deployment.

One notable activity was the issuance of a Request for Proposals (RFP) to secure a consultant to undertake an energy storage study.

In 2018, an amendment to the Governor's Budget bill included an allocation of $50,000 in both Fiscal Year 2019 and 2020 to undertake an energy storage study. Specifically, the budget language stated:

"Out of this appropriation, $50,000 the first year and $50,000 the second year from the general fund shall be used for the Virginia Solar Development Authority working with the Department of Mines, Minerals and Energy to conduct a study to determine whether or not future legislation in the form of regulatory reforms and incentives will prove fruitful in encouraging emerging energy storage capacity in the Commonwealth."

To this end, the Authority and DMME developed and issued the RFP on September 21, 2018. Eight proposals were received and Strategen Consulting of Berkeley, California was awarded the contract to perform the study.

The Authority's goal in issuing this RFP is to develop strategies for Virginia which target the development of the energy storage sector. The final deliverables will align the Commonwealth's competitive advantages with energy storage industry needs, placing emphasis on those that would accelerate industry emergence and growth. Part of the deliverables will provide recommendations that can be advanced through actions of the Governor, the General Assembly, and industry stakeholders. Specifically, the RFP asked the consultant to:

1. Complete a comprehensive and quantitative benefit-cost analysis of energy storage in the Commonwealth of Virginia. Quantitatively model the benefits of various levels of energy storage adoption across the generation, transmission and distribution systems, to include in front of and behind the meter energy storage at large electricity users (commercial and industrial customers), and residential customers to the extent feasible.

2. Provide five- and ten-year outlooks for benefits and costs associated with energy storage (2024 and 2029), clearly stating the storage applications and use cases that will be examined (e.g. peaking plant replacement, renewable integration, energy time shifting, ancillary services, T&D upgrade deferral, reliability, energy cost management for customers, etc.).

3. Identify and analyze any Federal and State regulatory barriers (e.g. residential/ commercial, utility-scale ownership/operation, and/or aggregator/developer ownership/operation, market participation) that could prevent energy storage from full participation in electricity markets in Virginia and/or providing the full range of benefits it is capable of providing to the energy system of Virginia, and suggest measures to remove those barriers and potential regulatory changes or incentives that could encourage or quicken the adoption of energy storage in Virginia.

4. Clearly articulate what the Authority, the General Assembly, and the Governor of Virginia can do to attract energy storage activity to the Commonwealth, including necessary changes to regulations, introduction of new or modification of existing interconnection processes, and the creation of or changing of incentives that could lead to desired outcomes. These could include (but are not limited to):

    a. Innovative ownership models for storage (e.g. utility, 3rd party, direct, etc.)

    b. Utility rate structures that could encourage the adoption of storage or storage co-located with solar PV

    c. How utility, local, and regional *planning* processes can be improved to remove barriers to adopting storage

d. Changes to interconnection processes to reduce queue duration and automate screening

e. Current best practices in other states that have enabled adoption of energy storage

f. Others as applicable.

5. Identify and analyze any existing Federal and/or State regulations directly supporting adoption of energy storage. Specifically include analysis of the impact of FERC Order 841 (intended to remove barriers to the participation of electric storage resources in the capacity, energy, and ancillary service markets operated by Regional Transmission Organizations and Independent System Operators) on the adoption of energy storage within the Commonwealth.

6. Identify and quantify economic benefits of energy storage unique to Virginia that are separate from direct grid and electricity consumer benefits. Specifically:

    a. Survey of jobs created by energy storage development and related works (engineering, construction and manufacturing related to the development, deployment and design of energy storage projects in Virginia)

    b. Survey of companies located in Virginia participating in part of the value chain of energy storage

    c. Other benefits that energy storage could provide to Virginia

7. Discuss safety as energy storage is adopted at scale at the utility level and behind the meter, including current best practices that enable storage adoption while maintaining the highest standards of safety.

8. Participate in a one-day stakeholder engagement workshop after the publication of the interim report, and incorporating feedback into the final report.

Final deliverables will include:

a. An interim draft and final study, including summary and analysis of study results, modeling procedures, and methods used in the estimation of energy storage benefits and costs, including specific recommendations on how to move forward.

b. A slide deck of approximately 20-30 slides summarizing the results to be presented at an Authority and a stakeholder workshop in Virginia in April/May 2019.

c. Being available for questions from legislators, stakeholders, and members of the Authority, on the study and providing information sources for the study as required.

The final energy storage study will be completed no later than September 30, 2019.

IV. Future Goals and Activities

In addition to the completion and release for the aforementioned energy storage study, the Authority will:

1. Continue to engage with the current administration and help educate them on the economic and environmental value solar energy and energy storage can bring to the Commonwealth.
2. Continue to engage with stakeholders to identify avenues for increased solar deployment to meet the recommendations from the Virginia Energy Plan to:
    a. Facilitate partnerships between Virginia's electric utilities, government and private generation developers to install 15 MWs of solar energy generation at state and local government facilities.
    b. Facilitate the installation of an additional 15 MWs of distributed solar energy generation at commercial, industrial, and residential facilities.
3. Continue to identify ways to remove barriers to the use of Power Purchase Agreements for deployment of solar or energy storage at state facilities, and to the use of state land for third-party solar or energy storage development.
4. Support outreach to local officials to assist them in addressing land use or other issues that affect the development of solar while also protecting the interests of the locality.
5. Continue to investigate, analyze, and raise awareness about perceived barriers to expanding solar energy and energy storage in Virginia, and explore possible remedies.
6. Provide recommendations to Virginia investor-owned utilities, municipalities, cooperatives and large energy consumers on how to remove barriers to evaluating solar energy and energy storage on a level playing field with other resources.
7. Evaluate programs that can expand access to solar energy and energy storage for all customers in Virginia.
8. Continue to explore and facilitate the use of creative financing mechanisms that can expedite and expand solar and energy storage deployment.
9. Support ways to recapitalize the VirginiaSAVES program.

10. Develop, maintain and update a Virginia Solar Energy and Energy Storage Authority website to include regular updates of information on installed solar energy and energy storage capacity and other consumer information.
11. Provide technical support to state and local economic development entities and identify financial incentives that may be available to help support solar energy and energy storage development to create Virginia jobs.
12. Support the expanded use of partnerships, such as public-private partnerships, between state agencies, utilities, and third parties including helping meet the Virginia Energy Plan's 16% renewable energy goal for state government operations by the end of 2022. This target would facilitate the construction of an additional 110 MW of utility-scale and distributed renewable energy resources.
13. Support exploration of public private partnerships to create microgrids to increase resilience for mission critical infrastructure and regional emergency shelters.
14. Explore additional community-based solar ownership models.
15. Explore opportunities to enhance tracking the amount of solar energy and energy storage deployed in the Commonwealth by utilities and others.

It should be noted that the Virginia Air Pollution Control Board approved a final CO_2 Cap and Trade Rule, (9 VAC 5-140-6045) that includes a provision that Virginia join and participate in the Regional Greenhouse Gas Initiative, or RGGI, a market-based program from Maryland into the northeast designed to reduce power sector CO_2 emissions. RGGI is composed of individual CO_2 Budget Trading Programs in each participating state. Through independent regulations, based on the RGGI Model Rule, each state's CO_2 Budget Trading Program limits emissions of CO_2 from electric power plants, issues CO_2 allowances and establishes participation in regional CO_2 allowance auctions. Virginia's rules would reduce CO2 emissions by 30% by 2030.

However, language was inserted by legislators into the 2018-2020 biennial budget bill prohibiting Virginia from participating in RGGI without the General Assembly's approval, essentially halting implementation of the Rule. The specific budget language states:

> "a. Notwithstanding any other provision of the Code of Virginia, no expenditures from the general, special, or other non-general fund sources from any appropriation by the General Assembly shall be used to support membership or participation in the Regional Greenhouse Gas Initiative (RGGI) until such time as the General Assembly has approved such membership as evidenced by language authorizing such action in the Appropriation Act, with the exception of any expenditures required pursuant to any contract signed prior to the passage of this act by the General Assembly, nor shall any RGGI auction proceeds be used to supplement any appropriation in this act without express General Assembly approval."

The Rule specifies that 5% of the conditional allowances be allocated to DMME and upon auctioning, the funds be used "…for the abatement and control of air pollution, specifically CO2, by the implementation of programs that lower base and peak electricity demand…" This may have included opportunities to advance solar energy across the Commonwealth.

APPENDIX A

Enabling Legislation (Amended 2017)

§ 67-1501. (Expires July 1, 2025) Authority created; purpose.

The Virginia Solar Energy Development and Energy Storage Authority is continued as the Virginia Solar Energy Development and Energy Storage Authority. The Authority constitutes a body corporate and a political subdivision of the Commonwealth and as such shall have, and is vested with, all of the politic and corporate powers as are set forth in this chapter. The Authority is established for the purposes of (i) facilitating, coordinating, and supporting the development, either by the Authority or by other qualified entities, of the solar energy and energy storage industries and solar energy and energy storage projects by developing programs that increase the availability of financing for solar energy projects and energy storage projects; (ii) facilitating the increase of solar energy generation systems and energy storage projects on public and private sector facilities in the Commonwealth; (iii) promoting the growth of the Virginia solar and energy storage industries; (iv) providing a hub for collaboration between entities, both public and private, to partner on solar energy projects and energy storage projects; and (v) positioning the Commonwealth as a leader in research, development, commercialization, manufacturing, and deployment of energy storage technology. The Authority may also consult with research institutions, businesses, nonprofit organizations, and stakeholders as the Authority deems appropriate. The Authority shall have only those powers enumerated in this chapter.

§ 67-1502. (Expires July 1, 2025) Membership; terms; vacancies; expenses.

A. The Authority shall be composed of 15 nonlegislative citizen members appointed as follows: Eight members shall be appointed by the Governor; four members shall be appointed by the Speaker of the House of Delegates; and three members shall be appointed by the Senate Committee on Rules. All members of the Authority shall reside in the Commonwealth. Members may include representatives of solar businesses, solar customers, renewable energy financiers, state and local government solar customers, institutions of higher education who have expertise in energy technology, and solar research academics.

B. Except as otherwise provided herein, all appointments shall be for terms of four years each. No member shall be eligible to serve more than two successive four-year terms. After expiration of an initial term of three years or less, two additional four-year terms may be served

by such member if appointed thereto. Appointments to fill vacancies, other than by expiration of a term, shall be made for the unexpired terms. Any appointment to fill a vacancy shall be made in the same manner as the original appointment. The remainder of any term to which a member is appointed to fill a vacancy shall not constitute a term in determining the member's eligibility for reappointment.

C. The initial appointments of members by the Governor made pursuant to Chapters 90 and 398 of the Acts of Assembly of 2015 shall be as follows: two members shall be appointed for terms of four years, two members shall be appointed for terms of three years, and two members shall be appointed for terms of two years. The initial appointments of members by the Speaker of the House of Delegates made pursuant to Chapters 90 and 398 of the Acts of Assembly of 2015 shall be as follows: one member shall be appointed for a term of four years, one member shall be appointed for a term of three years, and one member shall be appointed for a term of two years. The initial appointments of members by the Senate Committee on Rules made pursuant to Chapters 90 and 398 of the Acts of Assembly of 2015 shall be as follows: one member shall be appointed for a term of four years, and one member shall be appointed for a term of three years. Thereafter all appointments shall be for terms of four years.

D. The Authority shall appoint from its membership a chairman and a vice-chairman, both of whom shall serve in such capacities at the pleasure of the Authority. The chairman, or in his absence the vice-chairman, shall preside at all meetings of the Authority. The meetings of the Authority shall be held on the call of the chairman or whenever a majority of the members so request. A majority of members of the Authority serving at any one time shall constitute a quorum for the transaction of business.

E. Members shall serve without compensation. However, all members may be reimbursed for all reasonable and necessary expenses incurred in the performance of their duties as provided in §§ 2.2-2813 and 2.2-2825. Such expenses shall be paid from such funds as may be appropriated to the Authority by the General Assembly.

F. Members of the Authority shall be subject to the standards of conduct set forth in the State and Local Government Conflict of Interests Act (§ 2.2-3100 et seq.) and may be removed from office for misfeasance, malfeasance, nonfeasance, neglect of duty, or misconduct in the manner set forth therein.

G. Except as otherwise provided in this chapter, members of the Authority shall be subject to the provisions of the Virginia Freedom of Information Act (§ 2.2-3700 et seq.).

§ 67-1503. (Expires July 1, 2025) Partnerships.

A. The Authority may establish public-private partnerships with entities pursuant to the Public-Private Education Facilities and Infrastructure Act of 2002 (§ 56-575.1 et seq.) to increase the number of solar energy generation systems on or located adjacent to public and private facilities in the Commonwealth. Any partnership established pursuant to this section shall stipulate that the Authority and the developers shall share the costs of the installation and operation of solar energy facilities and equipment.

B. The Authority may provide a central hub for appropriate entities, both public and private, to enter into partnerships that result in solar energy generation projects being developed in the Commonwealth. The Authority may act as a good faith broker in these matters to facilitate appropriate partnerships, including public-private partnerships.

§ 67-1504. (Expires July 1, 2025) Federal loan guarantees.

A. The Authority, on behalf of the Commonwealth, may apply to the U.S. Department of Energy for federal loan guarantees authorized or made available pursuant to Title XVII of the Energy Policy Act of 2005, 42 U.S.C. § 16511 et seq., the American Recovery and Reinvestment Act of 2009, P.L. 111-5, or other similar federal legislation, to facilitate the development of solar energy projects.

B. Upon obtaining federal loan guarantees for solar energy projects pursuant to subsection A, the Authority, subject to any restrictions imposed by federal law, may allocate or assign all or portions thereof to qualified third parties, on such terms and conditions as the Authority finds are appropriate. Actions of the Authority relating to the allocation and assignment of such loan guarantees shall be exempt from the provisions of the Administrative Process Act (§ 2.2-4000 et seq.) pursuant to subdivision B 4 of § 2.2-4002. Decisions of the Authority shall be final and not subject to review or appeal.

§ 67-1505. (Expires July 1, 2025) Powers and duties of the Authority.

In addition to such other powers and duties established under this chapter, the Authority shall have the power and duty to:

1. Adopt, use, and alter at will an official seal;

2. Make bylaws for the management and regulation of its affairs;

3. Maintain an office at such place or places within the Commonwealth as it may designate;

4. Accept, hold, and administer moneys, grants, securities, or other property transferred, given, or bequeathed to the Authority, absolutely or in trust, from any source, public or private, for the purposes for which the Authority is created;

5. Make and execute contracts and all other instruments and agreements necessary or convenient for the exercise of its powers and functions;

6. Employ, in its discretion, consultants, attorneys, architects, engineers, accountants, financial experts, investment bankers, superintendents, managers, and such other employees and agents as may be necessary and fix their compensation to be payable from funds made available to the Authority;

7. Invest its funds as permitted by applicable law;

8. Receive and accept from any federal or private agency, foundation, corporation, association, or person grants, donations of money, or real or personal property for the benefit of the Authority, and receive and accept from the Commonwealth or any state, and from any municipality, county, or other political subdivision thereof and any other source, aid or contributions of either money, property, or other things of value, to be held, used, and applied for the purposes for which such grants and contributions may be made;

9. Enter into agreements with any department, agency, or instrumentality of the United States or of the Commonwealth and with lenders and enter into loans with contracting parties for the purpose of planning, regulating, and providing for the financing or assisting in the financing of any project;

10. Do any lawful act necessary or appropriate to carry out the powers herein granted or reasonably implied;

11. Identify and take steps to mitigate existing state and regulatory or administrative barriers to the development of the solar energy and energy storage industries, including facilitating any permitting processes;

12. Enter into interstate partnerships to develop the solar energy industry, solar energy projects, and energy storage projects;

13. Collaborate with entities, including institutions of higher education, to increase the training and development of the workforce needed by the solar and energy storage industries in the Commonwealth, including industry-recognized credentials and certifications;

14. Conduct any other activities as may seem appropriate to increase solar energy generation in the Commonwealth and the associated jobs and economic development and competitiveness

benefits, including assisting investor-owned utilities in the planned deployment of at least 400 megawatts of solar energy projects in the Commonwealth by 2020 through entering into agreements in its discretion in any manner provided by law for the purpose of planning and providing for the financing or assisting in the financing of the construction or purchase of such solar energy projects authorized pursuant to § 56-585.1;

15. Promote collaborative efforts among Virginia's public and private institutions of higher education in research, development, and commercialization efforts related to energy storage;

16. Monitor relevant developments in energy storage technology and deployment nationally and globally and disseminate relevant information and research results; and

17. Identify and work with the Commonwealth's industries and nonprofit partners in advancing efforts related to the development and commercialization of energy storage.

§ 67-1506. (Expires July 1, 2025) Director; staff; counsel to the Authority.

A. The Director of the Department of Mines, Minerals and Energy shall serve as Director of the Authority and shall administer the affairs and business of the Authority in accordance with the provisions of this chapter and subject to the policies, control, and direction of the Authority. The Director may obtain non-state-funded support to carry out any duties assigned to the Director. Funding for this support may be provided by any source, public or private, for the purposes for which the Authority is created. The Director shall maintain, and be custodian of, all books, documents, and papers of or filed with the Authority. The Director may cause copies to be made of all minutes and other records and documents of the Authority and may give certificates under seal of the Authority to the effect that such copies are true copies, and all persons dealing with the Authority may rely on such certificates. The Director also shall perform such other duties as prescribed by the Authority in carrying out the purposes of this chapter.

B. The Department of Mines, Minerals and Energy shall serve as staff to the Authority.

C. The Office of the Attorney General shall provide counsel to the Authority.

§ 67-1507. (Expires July 1, 2025) Annual report.

On or before October 15 of each year, beginning in 2016, the Authority shall submit an annual summary of its activities and recommendations to the Governor and the Chairmen of the House Appropriations Committee, the Senate Finance Committee, and the House and Senate Commerce and Labor Committees.

§ 67-1508. (Expires July 1, 2025) Confidentiality of information.

A. The Authority shall hold in confidence the personal and financial information supplied to it, or maintained by it, concerning the siting and development of solar energy projects and energy storage projects.

B. Nothing in this section shall prohibit the Authority, in its discretion, from releasing any information that has been transformed into a statistical or aggregate form that does not allow the identification of the person who supplied particular information.

C. Information supplied by or maintained on persons or entities applying for or receiving allocations of federal loan guarantees, as well as specific information relating to the amount and identity of recipients of such distributions, shall be subject to disclosure in accordance with the Virginia Freedom of Information Act (§ 2.2-3700 et seq.).

§ 67-1509. (Expires July 1, 2025) Declaration of public purpose; exemption from taxation.

A. The exercise of the powers granted by this chapter shall be in all respects for the benefit of the citizens of the Commonwealth and for the promotion of their welfare, convenience, and prosperity.

B. The Authority shall be performing an essential governmental function in the exercise of the powers conferred upon it by this chapter, and the property of the Authority and its income and operations shall be exempt from taxation or assessments upon any property acquired or used by the Authority under the provisions of this chapter.

APPENDIX B

Virginia Solar Energy Development and Energy Storage Authority Members

Virginia Solar Energy Development and Energy Storage Authority Members

Member/Organization	Area Represented	Appointed By	Term Expires
Paul Duncan GSD Energy Consultants	Non legislative Citizen	Governor	6/30/21
Michael *Barrett* Hardiman Senior Manager of Government Relations Genworth	Non legislative Citizen	Governor	6/30/19
Damian Pitt Associate Professor, VCU	Non legislative Citizen	Governor	6/30/22
Careth *Cody* Apperson Nystrom Managing Director, SJF Ventures	Non legislative Citizen	Governor	6/30/18
Cliona Mary Robb Partner, Christian & Barton, LLP	Non legislative Citizen	Governor	6/30/19
Hayes Framme Ørsted	Non legislative Citizen	Governor	6/30/21
Colleen A. Lueken, PhD AES Energy Storage, Director of Market Analytics	Non legislative Citizen	Governor	6/30/20
Will Gathright Tumalow, Inc., Founder	Non legislative Citizen	Governor	6/30/21
Jon F. Hillis CEO, SolUnesco	Non legislative Citizen	Speaker of the House	6/30/19
John H. Rust, Jr. Commissioner CoA-FFX	Non legislative Citizen	Speaker of the House	6/30/18
Ryan L. Dunn Executive Vice President of Corporate and Government Affairs Virginia Chamber of Commerce	Non legislative Citizen	Speaker of the House	6/30/21
Brian M. Gordon Vice President of Government Affairs Apartment and Office Building Association of Metropolitan Washington	Non legislative Citizen	Speaker of the House	6/30/21
Kenneth G. Hutcheson Director of Government Affairs Williams Mullen	Non legislative Citizen	Senate Committee on Rules	6/30/18
Katharine Bond Director of Public Policy Dominion Energy	Non legislative Citizen	Senate Committee on Rules	6/30/19
Andrew T. Lamar Principal, Lamar Consulting, LLC	Non legislative Citizen	Senate Committee on Rules	6/30/20

APPENDIX C

Current Solar Projects in Virginia

Solar Energy Projects and Capacity
Installed or Under Development in Virginia.

Distributed (Net Metered) Solar

System Owner	Location	Capacity (MW)
5,486 Distributed Individual Utility Customers	Distributed Across State	
	Total	**55.8**

Behind-the-Meter - Not Net Metered

System Owner	Location	Capacity (MW)
Norfolk Naval "Monkey Bottom"	Norfolk Naval Base	2
Dept. Military Affairs	Ft. Pickett	0.55
	Total	**2.6**

Dominion Energy Large-Scale Solar -Complete

Facility	Location	Capacity (MW)
Amazon Solar - Accomack	Accomack	80
Amazon Solar - Buckingham	Buckingham	20
Amazon Solar - New Kent	New Kent	20
Amazon Solar - Scott	Powhatan	20
Amazon Solar - Sappony	Sussex	20
Amazon Solar - Southampton	Southampton	100
Clarke	Clarke	10
Cherrydale	Kendall Grove	20
Remington	Fauquier	20
Oceana	Virginia Beach	18
Whitehouse	Louisa	20
Woodland	Isle of Wight	19
Scott	Powhatan	17
UVA Hollyfield	King William	17
UVA Puller	Middlesex	15
Essex	Essex	20
Montross	Westmoreland	20

Gloucester	Gloucester	20
	Total:	**476**

Dominion Energy Large-Scale Solar – Under Development

System Owner	Location	Capacity (MW)
Spring Grove 1	Surry	98
Colonial Trail West	Surry	142
Water Strider	Halifax	80
Grasshopper	Mecklenburg	80
	Total	**400**

Permit by Rule – Permits Issued (*Project Complete)

Developer/Project Name	Location	Capacity (MW)
Amazon Solar Farm US East*	Accomack	80
Amazon Solar Farm – Buckingham*	Buckingham	20
Amazon Solar Farm - New Kent*	New Kent	20
Amazon Solar Farm – Powhatan*	Powhatan	20
Amazon Solar Farm – Sussex*	Sussex	20
Amazon Solar Farm – Southampton*	Southampton	100
Hecate Energy/Cherrydale LLC*	Northampton	20
Hecate Energy/Clarke County LLC*	Clarke County	10
Coronal Development Essex Solar Center*	Essex	20
VA Solar/Hollyfield Solar LLC*	King William	17
Dominion Energy/Puller Solar *	Middlesex	15
Dominion Energy Montross Solar	Westmorland	20
Strata/Gloucester Solar, LLC	Gloucester	20
Virginia Solar/Belcher Solar LLC	Louisa	88
Sun Energy 1/Mechanicsville Solar LLC	Hanover	20
Twittys Creek Solar LLC	Charlotte	15
Carolina Solar /Bluestone Farm Solar, LLC	Mecklenburg	50
VA Solar/Hollyfield Solar II LLC	King William	13

New Energy Ventures/Pamplin Solar LLC	Appomattox	16
Church view Solar, LLC	Middlesex	20
VA Solar/Mt. Jackson Solar I, LLC	Shenandoah	16
Urban Grid/Briel Farm Solar, LLC	Henrico	20
Tradewind Energy/Myrtle Solar LLC	Suffolk	15
Buckingham II Solar LLC	Buckingham	20
Urban Grid/Gardy's Mill Solar, LLC	Westmoreland	14
	Total:	**689**

Permit by Rule – Notices of Intent to Apply Submitted

Developer/Project Name	Location	Capacity (MW)
VA Solar/Mt. Jackson Solar II, LLC	Shenandoah	19
Carolina Solar /Sunnybrook Farm, LLC	Halifax	51
Urban Grid/Spring Grove Solar I, LLC	Surry	19
Mt. Jackson Solar III, LLC	Shenandoah	16
Pleasant Hill Solar, LLC	Suffolk	20
VSF Solar 2 LLC	Westmoreland	11
Mt. Jackson Solar II, LLC	Shenandoah	19
Caden Energix Spout Spring LLC	Appomattox	60
Foxhound Solar, LLC	Halifax	91
Children of Chesterfield Solar Power	Chesterfield	20
Westmoreland Solar Project, LLC	Westmorland	20
Greensville Solar Project, LLC	Greensville	80
Greenwood Solar I, LLC	Culpepper	100
SolarGen of Virginia, LLC / Ho-Fel Solar	Isle of Wight	39
Bedford Solar Center LLC	Chesapeake	70
Dragonfly Solar LLC	Campbell	80
Depot Solar Center	Campbell	15
Loblolly Solar, LLC	Surry	150
Piney Creek Solar, LLC	Halifax	80
VSF Solar 1 LLC	Westmorland	20
Danville Solar Farm	Pittsylvania	12
Hickory Solar	Chesapeake	32
Waverly Solar, LLC	Sussex	118
Sol Madison Solar, LLC	Orange	63
Chesapeake Solar Project, LLC	Chesapeake	150

Sol Leatherwood Solar, LLC	Henry (Axton)	26
Fort Powhatan Solar LLC	Prince George	150
TPE Pamplin2 Solar	Prince William	16
SunPower Corporation	Southampton	91
Endless Caverns Solar LLC	Rockingham	32
Urban Grid/Spring Grove Solar II, LLC	Surry	150
GEENEX/Grasshopper Solar LLC	Mecklenburg	115
Cypress Creek/Bumblebee Solar. LLC	Campbell	15
VA Solar/Culpeper North Solar LLC	Culpeper	20
VA Solar/Turner Solar LLC	Henrico	20
Cypress Creek/Water Strider Solar, LLC	Halifax	80
Cypress Creek/Ladybug Solar, LLC	Mecklenburg	65
Cypress Creek/SB Solar, LLC	Halifax	10
Powhatan Solar I	Powhatan	18
Powhatan Solar II	Powhatan	15
Winterpock Solar I	Chesterfield	20
Urban Grid/Crystal Hill Solar, LLC	Halifax	150
Urban Grid/Alton Post Office Solar, LLC	Halifax	150
Hexagon Energy/Stagecoach Solar LC	Halifax	15
Open Road Renewables/Walnut Solar I	King and Queen	110
Open Road Renewables /Maplewood Solar I	Pittsylvania	120
Open Road Renewables /Greenwood Solar I	Culpepper	100
Open Road Renewables /Sycamore Solar I	Pittsylvania	42
VA Solar/Nokesville Solar LLC	Prince William	20
Brookfield Renewables/Otter Creek Solar	Mecklenburg	60
Brookfield Renewable/Meherrin Solar LLC	Greenville	60
Community Energy/Port Conway Solar LLC	King George	20
Eco Cap/Westmoreland Solar LLC	Westmorland	20
Core Solar SPV XIII, LLC	Chesapeake	150
Sigora Solar Wythe Solar	Wythe	40
OneEnergy/Solidago, LLC	Isle of Wight	20
OneEnergy/Sweetspire, LLC	Hanover	20
Carolina Solar Energy/Powell's Farm Solar	Halifax	50
First Solar Development, LLC	Montgomery	20
Halifax Solar LLC	Halifax	15
New Energy Ventures/Rives Road Solar LLC	Prince George	20
North Ridge Resources/Spout Springs Solar	Appomattox	20
Sydnor Solar Farm, LLC	Mecklenburg	9
Colonial Trail W Solar, LLC	Surry	142

BM&D Ltd.	Pulaski	40
SunPower Corporation	James City	35
SolUnesco	Caroline	15
SolUnesco	Orange	62
SolUnesco	Albemarle Co.	11
SolUnesco	Henry	20
TurningPoint Energy	Pittsylvania	6
Tradewind Energy/Chesapeake Solar LLC	Chesapeake	20
Tradewind Energy/Centerville Pike Solar	Chesapeake	15
Ecoplexus	Isle of Wight	14
SunTech Solar Solutions	Accomack	20
	Total:	**3827**

Cooperative Utility Projects

Cooperative	Location	Capacity (MW)
Central Virginia Electric Cooperative	Goochland County	5
Central Virginia Electric Cooperative	Fluvanna County	5
BARC Electric Cooperative	Fauquier County	0.55
	Total	**10.6**

Municipal Utility Projects

Municipality	Capacity (MW)
Town of Bedford	3
Town of Front Royal	3
City of Danville	6
TOTAL:	**12.0**

Dominion Energy Solar Partnership Projects

Project Site	Location	Capacity (MW)
Canon	Gloucester County	0.5
Old Dominion University	Norfolk	0.1
Capital One	Chesterfield County	0.5
Virginia Union University	Richmond	0.1
Prologis Concorde Center	Loudoun County	0.7
Randolph-Macon College	Ashland	0.1
Philip Morris Park 500	Chesterfield County	2.0
Western Branch High School	Chesapeake	0.8
Merck	Rockingham County	1.5
University of Virginia	Charlottesville	0.4

Canon	Newport News	1
	Total:	**7.7**

Power Purchase Agreements

Project	County/Town	MW AC
Eastern Mennonite University	Harrisonburg	0.09
Washington and Lee University	Lexington	0.39
University of Richmond	Richmond	0.19
Albemarle High School	Charlottesville	0.11
Baker-Butler Elementary	Charlottesville	0.20
Brownsville Elementary	Albemarle County	0.11
Monticello High School	Charlottesville	0.22
Sutherland Middle School	Charlottesville	0.22
Greer Elementary	Charlottesville	0.06
Carilion Medical Center	Montgomery County	1.00
Thrifty Gift and Thrift	Harrisonburg	0.06
Ruckersville Solar	Green County	0.23
Lylburn Downing Middle School	Lexington	0.08
Collegiate School - Centennial Hall	Richmond	0.01
Collegiate School - Robins Campus	Richmond	0.07
Collegiate School - Sharp Commons	Richmond	0.02
Carysbrook Solar	Fluvanna County	0.85
	Total:	**3.9**

Third Party Power Purchase Agreements under Development

Project	Location	MW AC
Cumberland Solar	Prince Edward County	1.5
Rappahannock Solar	Lancaster County	1.5
Southern Current - Twelve Oaks Solar	Nottoway County	1.5
Southern Current - Ten Oaks Solar	Nottoway County	1.5
Southern Current - Cow Solar	Mecklenburg County	1.5
Augusta Co PS_Cassell ES	Augusta County	0.30
Augusta Co PS_Fort Defiance HS	Augusta County	0.47
Augusta Co PS_Riverheads ES	Augusta County	0.29
Augusta Co PS_Riverheads HS	Augusta County	0.11
Augusta Co PS_Wilson ES	Augusta County	0.37
Augusta Co PS_Wilson MS	Augusta County	0.32

Daniels Run Peace Church	Fairfax	0.01
Eastern Mennonite University II	Harrisonburg	0.07
InterChange_Black Ice	Harrisonburg	0.53
InterChange_Blue Stripe	Harrisonburg	0.72
InterChange_C Pad 2	Rockingham County	0.11
InterChange_Port Services	Warren County	0.28
Richmond PS_Broad Rock ES	Richmond	0.18
Richmond PS_GH Reid ES	Richmond	0.15
Richmond PS_Huguenot HS	Richmond	0.63
Richmond PS_JB Fisher ES	Richmond	0.14
Richmond PS_JH Blackwell ES	Richmond	0.18
Richmond PS_L Holton ES	Richmond	0.17
Richmond PS_LM Brown MS	Richmond	0.29
Richmond PS_MJ Jones ES	Richmond	0.15
Richmond PS_ML King Jr. MS	Richmond	0.54
Richmond PS_Oak Grove ES	Richmond	0.18
Shenandoah Uni. - Athletic Bldg	Winchester	0.34
Shenandoah Uni. - Library	Winchester	0.04
Shenandoah Uni. - Theater	Winchester	0.08
S-Power	Spotsylvania	500
	Total:	**514.1**

Megawatts Installed:	**529**
Megawatts Under Development:	**4,661**
TOTAL:	**5,190**

APPENDIX D

Active and Withdrawn Solar Energy Projects in the PJM Generation Interconnection Queue

Solar Energy Projects in the PJM Generation Interconnection Queue

Project Name	Capacity (MW)	Location	Transmission Owner	Feasibility Study Status	System Impact Study Status	Facilities Study Status	Projected In Service Date
Old Church 34.5 KV	20	Hanover	Dominion	Complete			11/30/2018
Kings Fork 34.5 kV	15	Suffolk	Dominion	Complete	Complete	NA	12/1/2019
Poe 34.5 kV	19.7	Prince George	Dominion	Complete	Complete	NA	12/31/2020
South Creek 34.5 kV	15	Appomattox	Dominion	Complete	Complete	NA	6/30/2021
Grassfield 34.5kV	20	Chesapeake	Dominion	Complete	NA	NA	12/31/2020
Twittys Creek 34.5kV	15	Charlotte	Dominion	Complete	Complete	NA	12/31/2019
Mount Eagle 34.5kV	12.5	Albemarle	Dominion	Complete	Complete	NA	3/31/2019
Stockton 34.5kV	20	Henry	AEP	Complete	Complete	NA	12/31/2019
Westmoreland 34.5kV	20	Westmoreland	Dominion	Complete	Complete	NA	2/15/2019
Old Church 34.5kV	13	King William	Dominion	Complete	Complete	NA	12/31/2021
Buckingham 35kV	20	Buckingham	Dominion	Complete	Complete	NA	12/31/2021
Nokesville 35kV	20	Prince William	Dominion	Complete	Complete	NA	12/31/2021
Harmony Village 35kV	20	Middlesex	Dominion	Complete	Complete	NA	12/31/2021
Mt. Jackson 35kV	15.7	Shenandoah	Dominion	Complete	Complete	NA	12/31/2021
Klockner 34.5 kV	18.2	Wythe	AEP	Complete	Complete	NA	12/31/2019
Elko 34.5kV	18.8	Henrico	Dominion	Complete	Complete	NA	12/30/2019
Double Tollgate 34.5kV	10	Clarke	APS	Complete	Complete	NA	12/31/2019
Fentress 34.5kV	16.7	Chesapeake	Dominion	Complete	Complete	NA	11/15/2019
Turner 34.5 kV	20	Henrico	Dominion	Complete	Complete	NA	12/31/2022
Harmony Village 34.5 kV	15	Middlesex	Dominion	Complete	Complete	NA	12/1/2018
Brink 115kV	80	Greensville	Dominion	Complete	Complete	Complete	3/31/2020
Chase City 115kV	49.9	Mecklenburg	Dominion	Complete	Complete	Complete	9/1/2020
Chase City-Lunenburg 115kV	80	Mecklenburg	Dominion	Complete	Complete	Complete	5/15/2020
Buggs Island-Chase City 115kV	20	Mecklenburg	Dominion	Complete	Complete	Complete	12/15/2020
Buggs Island-Chase City 115kV	20	Mecklenburg	Dominion	Complete	Complete	Complete	12/15/2020
Buggs Island-Chase City 115kV	20	Mecklenburg	Dominion	Complete	Complete	Complete	12/15/2020
Hopewell-Surry 230kV	142.4	Surry	Dominion	Complete	Complete	Complete	12/1/2019
Louisa-South Anna 230kV	88.2	Louisa	Dominion	Complete	Complete	Complete	12/1/2020
North Shenandoah-Stanley 34.5 kV	20	Page	APS	Complete	Complete	NA	12/31/2020

Franklin 115kV	91	Southampton	Dominion	Complete	Complete	In Progress	12/31/2018
Brink-Trego 115kV	59.6	Greensville	Dominion	Complete	Complete	In Progress	3/31/2018
Beechwood 115kV	20	Mecklenburg	Dominion	Complete	Complete	In Progress	6/12/2018
Clubhouse-Lakeview 230kV	100	Greensville	Dominion	Complete	Complete	In Progress	12/1/2019
Reams 115kV	80	Dinwiddie	Dominion	Complete	Complete	In Progress	6/1/2019
Waverly #2 DP 115kV	50	Sussex	Dominion	Complete	Complete	In Progress	6/1/2019
Emporia-Trego 115kV	80	Greensville	Dominion	Complete	Complete	In Progress	12/15/2018
Hopewell-Surry 230kV	240	Prince George	Dominion	Complete	Complete	In Progress	6/3/2017
Altavista-Mt. Airy 69kV	42	Pittsylvania	Dominion	Complete	Complete	In Progress	10/1/2019
Mountain Run-Mitchell 115 kV	100	Culpeper	Dominion	Complete	Complete	In Progress	10/1/2019
Harmony Village-Shackleford 115kV	50	King & Queen	Dominion	Complete	Complete	In Progress	10/1/2019
Jacksonville-Renaker 138kV II	60	Halifax	Dominion	Complete	Complete	In Progress	6/1/2019
Locust Grove-Paytes 115kV	62.5	Orange	Dominion	Complete	Complete	In Progress	4/30/2018
Perth-Hickory Grove 115kV	20	Halifax	Dominion	Complete	Complete	In Progress	6/1/2019
Smith Mountain-Bearskin 138kV	100	Pittsylvania	AEP	Complete	Complete	In Progress	10/21/2017
Halifax-Mt. Laurel 115kV	51	Halifax	Dominion	Complete	Complete	In Progress	7/31/2018
Mitchell-Mountain Run 115kV	60	Culpeper	Dominion	Complete	Complete	In Progress	6/1/2019
Mitchell-Mountain Run 115kV	20	Culpeper	Dominion	Complete	Complete	In Progress	6/1/2019
Smith Mtn.-Candler's Mt. 138kV	60	Campbell	AEP	Complete	Complete	In Progress	6/1/2019
Smith Mtn.-Candler's Mtn. 138kV	20	Campbell	AEP	Complete	Complete	In Progress	6/1/2019
Brandy-Remington 115kV	60	Culpeper	Dominion	Complete	Complete	In Progress	6/30/2018
Gretna DP 69kV	50	Pittsylvania	Dominion	Complete	Complete	In Progress	12/1/2018
Spotsylvania 500kV	500	Spotsylvania	Dominion	Complete	Complete	In Progress	10/1/2019
Septa 500kV	240	Isle of Wight	Dominion	Complete	Complete	In Progress	10/1/2019
Briery-Clover 230kV	240	Prince Edward	Dominion	Complete	Complete	In Progress	10/1/2019
Chickahominy 230kV	320	Charles City	Dominion	Complete	Complete	In Progress	10/1/2019
Elmont 115kV	80	Hanover	Dominion	Complete	Complete	In Progress	12/31/2020
Hopewell-Surry 230kV	97.9	Surry	Dominion	Complete	Complete	In Progress	9/30/2019
Halifax-Person 230kV	29.2	Halifax	Dominion	Complete	Complete	In Progress	9/30/2018
Crystal Hill-Halifax 115kV	44.7	Halifax	Dominion	Complete	Complete	In Progress	9/30/2018
Grassfield-Great Bridge 115kV	150	Chesapeake	Dominion	Complete	Complete	In Progress	12/31/2019
Disputanta-Waverly 115kV	60	Prince George	Dominion	Complete	Complete	In Progress	12/31/2019
Ivor-Oakridge 115kV	85	Isle of Wight	Dominion	Complete	Complete	In Progress	12/31/2019
Halifax-Person 230kV	50	Halifax	Dominion	Complete	Complete	In Progress	3/7/2019
Mitchell DP 115kV	80	Culpeper	Dominion	Complete	Complete	In Progress	6/30/2019

Perth 115kV	100	Halifax	Dominion	Complete	Complete	In Progress	10/1/2019
Harmony Village-Shackleford 115kV	70	King & Queen	Dominion	Complete	Complete	In Progress	10/1/2019
Stuarts Draft-Waynesboro 115kV	150	Augusta	Dominion	Complete	Complete	In Progress	10/31/2018
Jacksons Ferry 138kV	75	Wythe	AEP	Complete	Complete	In Progress	12/31/2021
Septa 500kV	240	Isle of Wight	Dominion	Complete	Complete	In Progress	10/1/2019
Bremo-Powhatan 230kV	99.9	Powhatan	Dominion	Complete	Complete	In Progress	10/1/2019
Page-Bethel 138 kV	100	Page	APS	Complete	Complete		12/31/2019
Meadow Brook-Strasburg 138 kV	75	Frederick	APS	Complete	Complete		12/31/2020
Arnold's Corner 34.5kV	18	King George	Dominion	Complete	In Progress		9/15/2017
Smith Mountain-Bearskin 138 kV	120	Pittsylvania	AEP	Complete	In Progress		10/1/2019
Hopewell-Surry 230 kV	150	Surry	Dominion	Complete	In Progress		9/30/2019
Fentress-Landstown 230 kV	70	Chesapeake	Dominion	Complete	In Progress		12/31/2020
Harmony Village-Shackleford 115 kV	50	Gloucester	Dominion	Complete	In Progress		12/23/2019
Oak Grove 34.5 kV I	20	Westmoreland	Dominion	Complete	In Progress		12/1/2018
Oak Grove 34.5 kV II	20	Westmoreland	Dominion	Complete	In Progress		12/1/2018
Oak Grove 34.5 kV III	11.2	Westmoreland	Dominion	Complete	In Progress		12/1/2018
Brink 115 kV	80	Greensville	Dominion	Complete	In Progress		12/1/2018
Beechwood-Palmer Springs 115 kV	45	Mecklenburg	Dominion	Complete	In Progress		12/1/2019
Crystal Hill-Halifax 115 kV	64.7	Halifax	Dominion	Complete	In Progress		1/31/2019
Halifax-Person 230 kV	75.1	Halifax	Dominion	Complete	In Progress		9/30/2018
Paytes 115 kV	20	Orange	Dominion	Complete	In Progress		1/31/2019
Bakers Pond-Ivor 11 5kV	68	Sussex	Dominion	Complete	In Progress		12/31/2019
Clover-Sedge Hill 230 kV	71	Halifax	Dominion	Complete	In Progress		9/2/2019
Biery-Clover 230 kV	110.5	Mecklenburg	Dominion	Complete	In Progress		9/2/2019
Kings Dominion DP 115 kV	77	King William	Dominion	Complete	In Progress		12/31/2019
Mountain Run-Mitchell 115 kV	150	Culpeper	Dominion	Complete	In Progress		10/2/2019
Sedge Hill-Person 230 kV	70	Halifax	Dominion	Complete	In Progress		3/7/2020
Hopewell-Surry 230 kV	150	Surry	Dominion	Complete	In Progress		12/31/2020
Clover-Sedge Hill 230 kV	80	Halifax	Dominion	Complete	In Progress		12/31/2020
Pamplin 34.5 kV	15.7	Appomattox	Dominion	Complete	In Progress		12/31/2018
Stonewall-Long Mountain 69 kV	55	Appomattox	AEP	Complete	In Progress		12/31/2020
Hopewell-Surry 230 kV	7.6	Surry	Dominion	Complete	In Progress		11/1/2019
Hopewell-Surry 230 kV	52.1	Surry	Dominion	Complete	In Progress		9/30/2019
Elko 34.5 kV	20	Henrico	Dominion	Complete	In Progress		12/30/2019
Wan 34.5 kV	19.8	Gloucester	Dominion	Complete	In Progress		10/1/2018

Chase City-Gary 115 kV	130	Lunenburg	Dominion	Complete	In Progress		10/31/2020
Harmony Village-Shackleford 115 kV	90	King & Queen	Dominion	Complete	In Progress		10/1/2019
Crystal Hill 115 kV	65.5	Halifax	Dominion	Complete	In Progress		1/31/2019
Northern Neck 34.5 kV	14	Westmoreland	Dominion	Complete	In Progress		12/30/2019
Boydton DP-Kerr Dam 115 kV	80	Mecklenburg	Dominion	Complete	In Progress		6/1/2021
Sanders DP 230 kV	19.9	Westmoreland	Dominion	Complete	In Progress		12/15/2019
Garner DP-Lancaster 115 kV	86	Lancaster	Dominion	Complete	In Progress		11/30/2021
Myrtle-Windsor DP 115kV	51	Isle of Wight	Dominion	Complete	In Progress		11/30/2021
Handsome-Southampton 115kV	70	Southampton	Dominion	Complete	In Progress		12/31/2020
Kings Fork 34.5 kV	15	Suffolk	Dominion	Complete	In Progress		12/15/2019
Central-Chase City 115kV	150	Charlotte	Dominion	Complete			3/31/2021
Pamplin 34.5kV	15	Prince Edward	Dominion	Complete			9/30/2019
Clover-Sedge Hill 230kV	96	Halifax	Dominion	Complete			9/2/2019
Lynbrook 12 kV	10	Campbell	AEP	In Progress			12/31/2019
East Danville-Roxborough 230 kV	96	Pittsylvania	AEP	In Progress			6/1/2020
E. Danville-Roxborough 230 kV	54	Pittsylvania	AEP	In Progress			6/1/2020
Brink-Carolina 115 kV	100	Greensville	Dominion	In Progress			9/30/2020
Wurno 138kV	120	Pulaski	AEP	In Progress			6/1/2021
Morgans Cut-Glen Lyn 138kV	100	Pulaski	AEP	In Progress			11/1/2020
Hickman-Riverbend 69kV	50	Pulaski	AEP	In Progress			5/3/2021
Harmony Village-Shackleford 115kV	110	King & Queen	Dominion	In Progress			10/1/2019
Bremo-Cunningham DP 115kV	20	Fluvanna	Dominion	In Progress			3/31/2020
Peak Creek-Draper 34.5kV	20	Pulaski	AEP	In Progress			6/1/2020
Peak Creek-Memoria Drive	5	Pulaski	AEP	In Progress			6/1/2020
Hickory 34.5kV	20	Chesapeake	Dominion	In Progress			12/31/2019
Hickory 34.5kV	12	Chesapeake	Dominion	In Progress			12/31/2019
Morrisville 230kV	200	Fauquier	Dominion	In Progress			11/2/2020
Red House-South Creek 115kV	60	Appomattox	Dominion	In Progress			12/15/2020
Brandy DP 115kV	5	Culpeper	Dominion	In Progress			12/1/2019
Rockcastle 138kV	120.1	Bedford	AEP	In Progress			5/3/2021
Carson-Rogers Road 500kV	500	Greensville	Dominion	In Progress			12/1/2021
Carson-Rogers Road 500kV	400	Greensville	Dominion	In Progress			12/1/2021
Bremo-Kidds Store 115kV	75	Fluvanna	Dominion	In Progress			12/1/2021
Winterpock 34.5kV	20	Chesterfield	Dominion	In Progress			11/16/2020
Powhatan 34.5kV	18	Powhatan	Dominion	In Progress			7/31/2020

Barterbrook-Stuarts Draft 115 kV	125	Augusta	Dominion	In Progress			11/13/2020
Bakers Pond-Bell Ave 115kV	87	Sussex	Dominion	In Progress			6/1/2022
Endless Caverns 34.5kV	15.7	Rockingham	Dominion	In Progress			9/3/2020
Endless Caverns 34.kV	15.7	Rockingham	Dominion	In Progress			9/3/2020
Axton 138kV	66	Henry	AEP	In Progress			12/15/2021
Union Camp 115 kV	50	Isle of Wight	Dominion	In Progress			4/1/2021
Bremo-Scottsville 138 kV	180	Buckingham	AEP	In Progress			8/31/2021
Baker Pont-Ivor 115kV	85	Southampton	Dominion	In Progress			12/1/2022
Oak Grove 34.5 kV	20	Westmoreland	Dominion	In Progress			10/1/2020
Mt. Jackson 34.5 kV	18.9	Shenandoah	Dominion	In Progress			11/20/2020
Meads 138 kV	97	Bedford	AEP	In Progress			11/30/2020
Clubhouse 230 kV	200	Greensville	Dominion	In Progress			6/30/2019
Wallops Island 69 kV	20	Accomack	ODEC	In Progress			12/1/2020
Kerr Dam-Ridge Rd 115 kV	90	Mecklenburg	Dominion	In Progress			12/1/2021
Disputanta-Poe 115kV	100	Prince George	Dominion	In Progress			12/1/2021
Curdsville-Willis Mountain 115kV	100	Buckingham	Dominion	In Progress			12/1/2021
Remington-Gordonsville 230kV	149	Culpeper	Dominion	In Progress			10/23/2020
Louisa-South Anna 230kV	105.2	Louisa	Dominion	In Progress			10/30/2020
Garner-Northern Neck 115kV	149	Richmond	Dominion	In Progress			10/23/2020
Ladysmith CT-St. Johns 230kV	120	Carolina	Dominion	In Progress			12/1/2021
Ladysmith CT-St. Johns 230kV	120	Carolina	Dominion	In Progress			12/1/2021
Fredericksburg-Pinewood 115kV	120	Carolina	Dominion	In Progress			12/1/2021
Smithfield 34.5kV	20	Isle of Wight	Dominion	In Progress			9/30/2020
Old Chapel 115kV	40	Clarke	APS	In Progress			12/30/2021
Wattsville 12kV	11.1	Accomack	DPL	In Progress			6/25/2021
Victoria-Martin 115kV	150	Nottoway	Dominion	In Progress			9/1/2021
Carson-Suffolk 500kV	800	Sussex	Dominion	In Progress			12/31/2021
Light Foot 34.5kV	19.9	James City	Dominion	In Progress			10/23/2020
Culpepper DP 15kV	20	Culpeper	Dominion	In Progress			9/30/2020
Harmony Village-Shackleford 115 kV	20	Gloucester	Dominion	In Progress			12/21/2020
Harmony Village-Shackleford 115 kV	80	Gloucester	Dominion	In Progress			12/21/2020
Belle Haven-Tasley 69kV	70	Accomack	ODEC	In Progress			11/30/2021
Four Rivers 230kV	300	Hanover	Dominion	In Progress			12/31/2022
Colleen-Clifford 138kV	100	Nelson	AEP	In Progress			6/1/2022
Chatham-Climax 69kV	20	Pittsylvania	Dominion	In Progress			7/31/2020

Bell Avenue 115kV	150	Southampton	Dominion	In Progress			9/30/2021
Reams 115kV	70	Dinwiddie	Dominion	In Progress			12/31/2021
Smith Mountain-E. Danville 138kV	150	Pittsylvania	AEP	In Progress			9/30/2021
Harmony Village-Shackleford 115kV	130	King & Queen	Dominion	In Progress			10/1/2019
Total Megawatts:	**14,100.60**						

Solar Energy Projects Withdrawn from the PJM Generation Interconnection Queue

Name	Capacity (MW)	Location	Transmission Owner	Feasibility Study Status	System Impact Study Status	Facilities Study Status	Queue Entry Date	Withdrawal Date
Hopewell-Surry 230kV	80	Prince George	Dominion	Complete	Complete	Complete	4/30/2015	10/13/2017
Unionville 115kV	20	Orange	Dominion	Complete	Complete	Complete	3/30/2016	8/24/2018
Hickory 34.5kV	20	Chesapeake	Dominion	Complete	Complete	Complete	4/30/2015	9/29/2016
Westmoreland 34.5kV	20	Westmoreland	Dominion	Complete	Complete	Complete	7/22/2015	5/25/2017
Chickahominy 34.5kV	20	Unknown	Dominion	Complete	Complete	Complete	10/30/2015	6/7/2017
Chase City 34.5kV	36	Mecklenburg	Dominion	Complete	Complete	Complete	4/25/2016	8/31/2018
Boykins 34.5kV	8.5	Southampton	Dominion	Complete	Complete	NA	4/30/2014	1/25/2018
Boykins 34.5kV	13	Southampton	Dominion	Complete	Complete	NA	3/31/2015	1/25/2018
King's Fork 34.5kV	15	Suffolk	Dominion	Complete	Complete	NA	8/31/2016	6/22/2018
Fentress 34.5kV	15	Chesapeake	Dominion	Complete	Complete	NA	8/31/2016	10/20/2017
Hickory 34.5kV	20	Chesapeake	Dominion	Complete	Complete	NA	8/31/2016	10/20/2017
Culpeper 35kV	20	Culpeper	Dominion	Complete	Complete	NA	3/17/2017	10/8/2018
Smithfield 34.5kV	20	Isle of Wight	Dominion	Complete	Complete	NA	3/29/2017	9/5/2018
Old Church 34.5kV	20	Hanover	Dominion	Complete	Complete	NA	3/29/2017	9/10/2018
Bayview	20	Northampton	ODEC	Complete	Complete	NA	7/31/2009	9/12/2011
Bayview	20	Northampton	ODEC	Complete	Complete	NA	10/30/2009	11/27/2012
Tasley-Kellam 69kV	20	Accomack	ODEC	Complete	Complete	NA	1/26/2010	12/11/2013
Tasley-Kellam 69kV	20	Accomack	ODEC	Complete	Complete	NA	2/4/2010	8/29/2014

Culpeper 34.5kV	15	Unknown	Dominion	Complete	Complete	NA	10/30/2015	3/27/2017
Tasley 69kV	10	Accomack	ODEC	Complete	Complete		2/22/2016	3/20/2018
Double Toll Gate 138kV	20	Clarke	APS	Complete	Complete		12/30/2009	11/28/2012
Tasley 69kV	20	Accomack	DPL	Complete	Complete		6/15/2016	3/29/2018
Stuarts Draft 23kV	20	Augusta	Dominion	Complete	Complete		9/26/2016	12/15/2017
St. Johns 115kV	14.9	Carolina	Dominion	Complete	Complete		10/27/2016	12/29/2017
Clubhouse 230kV	85	Greensville	Dominion	Complete	Complete		10/31/2016	1/18/2018
Remington-Gainesville 230kV	85	Fauquier	Dominion	Complete	Complete		2/28/2017	6/5/2018
Boykins 115kV	60	Southampton	Dominion	Complete	Complete		8/24/2015	12/13/2016
Clubhouse-Freeman 115kV	40	Greensville	Dominion	Complete	Complete		4/29/2016	7/11/2017
Myrtle-Windsor 115kV	50	Isle of Wight	Dominion	Complete	Complete		4/29/2016	7/21/2017
Clubhouse-Freeman 115kV	40	Greensville	Dominion	Complete	Complete		4/29/2016	7/11/2017
Handsome 115kV	75	Southampton	Dominion	Complete	Complete		4/29/2016	7/18/2017
Bakers Pond-Ivor 115kV	85	Southampton	Dominion	Complete	Complete		2/29/2016	7/7/2017
Emmitsburg–Taneytown 34.5 kV	13.8	Frederick	APS	Complete	Complete		4/29/2016	11/9/2016
Culpeper 34.5kV	20	Culpeper	Dominion	Complete			3/16/2016	3/27/2017
Culpeper 34.5kV	20	Culpeper	Dominion	Complete			3/17/2016	3/27/2017
Tasley 69kV	9	Accomack	ODEC	Complete			8/31/2016	3/20/2018
Culpeper 34.5 kV	20	Culpeper	Dominion	Complete			8/3/2017	9/11/2018
Standardsville-Pratts 34.5 kV	17	Greene	APS	Complete			9/1/2017	4/25/2018
Welco 34.5 kV	10	Halifax	Dominion	Complete			9/28/2017	6/6/2018
Oak Hall	20	Accomack	DPL	Complete			2/4/2010	8/23/2010
Tasley-Kellam 69kV	20	Accomack	ODEC	Complete			2/4/2010	8/23/2010
Watkins Corner 34.5kV	20	Southampton	Dominion	Complete			4/30/2015	10/2/2015
Handsome-Southampton 115kV	130	Southampton	Dominion	Complete			10/31/2016	7/18/2017
East Lima-South Kenton 138kV	20	Unknown	DPL	Complete			2/26/2010	1/3/2011
Boykins 34.5kV	20	Southampton	Dominion	Complete			3/31/2015	10/5/2015
Gordonsville-Remington 230kV	100	Culpeper	Dominion	Complete			1/25/2017	11/1/2017
Ridgeway-Dan River 69kV	20	Pittsylvania	AEP	Complete			2/16/2017	10/4/2017
Louisa-North Anna 230kV	99.9	Louisa	Dominion	Complete			3/6/2017	10/30/2017

Gordonsville-Remington 230kV	150	Culpeper	Dominion	Complete			3/23/2017	11/2/2017
Sapony 230 kV	74.9	Sussex	Dominion	Complete			7/26/2017	3/16/2018
Endless Caverns 34.5 kV	20	Rockingham	Dominion	Complete			9/1/2017	4/24/2018
Banister 34.5kV	20	Pittsylvania	Dominion	Complete			3/20/2018	9/13/2018
Briery-Clover 230 kV	144	Mecklenburg	Dominion	Complete			3/30/2018	10/16/2018
Old Church 34.5kV	5	Hanover	Dominion	Complete			8/31/2015	3/31/2016
Harrisonburg-Stauton 115kV	20	Rockingham	Dominion	Complete			10/7/2015	4/26/2016
Wakefield 34.5kV	10	Surry	Dominion	Complete			10/30/2015	5/3/2016
Wattsville-Wallops Island 69kV	20	Accomack	ODEC	Complete			4/29/2016	9/26/2016
Tasley-Oak Hall 69kV I	20	Accomack	ODEC	Complete			4/29/2016	9/26/2016
Tasley-Oak Hall 69kV II	20	Accomack	ODEC	Complete			4/29/2016	9/26/2016
Crittenden 34.5kV	10	Isle of Wight	Dominion	Complete			5/31/2016	4/11/2017
Chase City 115kV	49.9	Mecklenburg	Dominion	Complete			10/26/2016	4/10/2017
Garner-Lancaster 115kV	100	Lancaster	Dominion	Complete			10/28/2016	6/12/2017
Chatham 69kV	15	Pittsylvania	Dominion	Complete			10/31/2016	5/8/2017
Chase-City-Twittys Creek 115kV	100	Mecklenburg	Dominion	Complete			10/31/2016	6/21/2017
Buckhorn-Lonesome Pine 138kV	100	Tazewell	AEP	Complete			3/9/2017	8/30/2017
Unionville 12.5kV	10	Orange	Dominion	Complete			8/31/2015	4/4/2016
Smithfield-Surry 230kV	160	Isle of Wight	Dominion	Complete			2/29/2016	10/11/2016
Chase City-Kerr Dam 115kV	49	Mecklenburg	Dominion	Complete			3/31/2016	10/11/2016
Clubhouse-Lakeville 230 kV	72.3	Greensville	Dominion	Complete			3/30/2018	4/6/2018
Wurno I 34.5KV	20	Pulaski	AEP				3/9/2017	1/10/2018
Wurno II 34.5kV	20	Pulaski	AEP				3/9/2017	1/10/2018
Boykins 34.5kV	20	Southampton	Dominion				7/27/2015	8/14/2015
Hickory 34.5 kV	20	Chesapeake	Dominion				9/30/2017	10/6/2017
Hickory 34.5 kV	12	Chesapeake	Dominion				9/30/2017	10/6/2017
Morrisville 230 kV	150	Accomack	Dominion				12/15/2017	1/5/2018
Charles City	20	Henrico	Dominion				2/13/2018	3/7/2018
Bremo-Kidds Store 115 kV	75	Fluvanna	Dominion				3/28/2018	4/2/2018
Hickory 34.5 kV	20	Chesapeake	Dominion				3/29/2018	4/6/2018

Hickory 34.5 kV	12	Chesapeake	Dominion				3/29/2018	4/6/2018
Morrisville 230 kV	200	Fauquier	Dominion				3/30/2018	4/6/2018
Spotsylvania 500 kV	556	Spotsylvania	Dominion				3/30/2018	4/6/2018
Carson-Rodgers Road 500 kV	500	Greensville	Dominion				3/30/2018	4/9/2018
South Creek 115 kV	62	Appomattox	Dominion				3/30/2018	4/6/2018
Clubhouse-Freeman DP 115 kV	250	Greensville	Dominion				3/30/2018	4/4/2018
Suffolk-Poe 115 kV	100	Isle of Wight	Dominion				3/30/2018	4/4/2018
Boykins 115 kV	100	Portsmouth	Dominion				3/30/2018	4/5/2018
Axton 138 kV	68	Henry	AEP				3/30/2018	4/3/2018
Morrisville 230kV	200	Fauquier	Dominion				5/25/2018	6/21/2018
Spotsylvania 500kV	800	Spotsylvania	Dominion				7/11/2018	10/12/2018
Louisa-South Anna 230kV	80	Louisa	Dominion				9/25/2018	10/1/2018
Harrowgate-Locks 115kV	120	Chesterfield	Dominion				9/28/2018	10/1/2018
Carson-Clover 500kV	180	Dinwiddie	Dominion				9/28/2018	10/1/2018
Clover	7	Halifax	Dominion				11/2/2010	1/20/2011
Boykin 115kV	20	Unknown	Dominion				4/30/2014	5/9/2014
Emporia-Trego 115kV	80	Greensville	Dominion				9/10/2015	9/28/2015
Wakefield 34.5kV	10	Surry	Dominion				10/30/2015	11/16/2015
Culpeper 34.5kV	15	Culpeper	Dominion				2/4/2016	3/30/2016
Saddler 115kV	100	Southampton	Dominion				3/13/2017	3/29/2017
Double Toll Gate 34.5kV	20	Clarke	APS				3/27/2017	6/20/2017
Harmony Village-Dunnsville 34.5kV	17.5	Middlesex	Dominion				3/29/2017	3/30/2017
Boykins-Murphy 115kV	50	Southampton	Dominion				3/30/2017	6/20/2017
Mount Eagle 34.5 kV	11	Albemarle	Dominion				7/31/2017	8/10/2017
Louisa 34.5kV	20	Louisa	Dominion				4/30/2015	5/21/2015
Wakefield 12.5kV	20	Sussex	Dominion				4/30/2015	5/21/2015
Grassfield 13.2kV	20	Chesapeake	Dominion				4/18/2016	5/5/2016
Catoctin 138kV	20	Frederick	APS				4/29/2016	6/2/2016
Indian River-Nelson 138kV	80	Sussex	DPL				4/29/2016	5/20/2016

Mt. Airy 34.5kV	50	Wythe	AEP				10/31/2016	11/22/2016
Morgan's Cut 34.5kV	60	Pulaski	AEP				10/31/2016	11/22/2016
Battle Town 115kV	100	Clarke	APS				2/28/2017	3/24/2017
Total Megawatts Withdrawn:	**7042.7**							

APPENDIX E

Active and Withdrawn Energy Storage Projects in the PJM Generation Interconnection Queue

Energy Storage Projects in the PJM Generation Interconnection Queue

Name	Capacity (MW)	Location	Transmission Owner	Fuel	Feasibility Study Status	System Impact Study Status	Projected In Service Date
Newport News 23kV	20	Newport News	Dominion	Storage	Complete	In Progress	4/1/2019
Byllesby 69 kV	4	Carroll	AEP	Storage	In Progress		4/25/2018
Locust Grove-Paytes 115kV	95.5	Orange	Dominion	Storage	In Progress		9/30/2021
Clubhouse 230 kV	200	Greensville	Dominion	Solar; Storage	In Progress		6/30/2019
Wallops Island 69 kV	20	Accomack	ODEC	Solar; Storage	In Progress		12/1/2020
Light Foot 34.5kV	5	James City	Dominion	Storage	In Progress		10/23/2020
Chatham-Climax 69kV	20	Pittsylvania	Dominion	Solar; Storage	In Progress		7/31/2020
Bell Avenue 115kV	150	Southampton	Dominion	Solar; Storage	In Progress		9/30/2021
Reams 115kV	70	Dinwiddie	Dominion	Solar; Storage	In Progress		12/31/2021
Smith Mountain-E. Danville 138kV	150	Pittsylvania	AEP	Solar; Storage	In Progress		9/30/2021
TOTAL STORAGE (MW)	**734.5**						

Energy Storage Projects Withdrawn from the PJM Generation Interconnection Queue

Name	Capacity (MW)	Location	Transmission Owner	Fuel	Feasibility Study Status	System Impact Study Status
Kellam - Bayview 69kV	20	Northampton	ODEC	Storage	Complete	
Glen Lyn	10	Giles	AEP	Storage	Complete	Complete
New Church 138kV	20	Accomack	DPL	Storage	NA	Complete
Columbia 115kV	2	Louisa	Dominion	Storage	Complete	NA
Tasley 25kV	4	Accomack	DPL	Storage	Complete	Complete
Clubhouse 230kV	85	Greensville	Dominion	Solar; Storage	Complete	Complete
Stuarts Draft-Waynesboro 115 kV	150	Augusta	Dominion	Storage	Complete	
Gosport 34.5kV	21.5	Portsmouth	Dominion	Natural Gas; Diesel; Other; Storage		
Total Storage Withdrawn:	**312.5**					

APPENDIX E

Virginia Solar Energy Development and Energy Storage Authority Bylaws

Virginia Solar Energy Development and Energy Storage Authority Bylaws

ARTICLE I. APPLICABILITY

Section 1. General.

The provisions of these Bylaws are applicable to all proceedings of the Virginia Solar Energy Development and Energy Storage Authority (the Authority) to the extent that the same are not inconsistent with the Code of Virginia (Code) or Executive Orders applicable to these proceedings. Whenever the provisions of these Bylaws are in conflict with the provisions of the Code or an applicable Executive Order, the latter shall control.

Section 2. Authority and Limitations.

The Authority is constituted under § 67-1500 of the Code as a body corporate and a political subdivision of the Commonwealth of Virginia. The Authority is specifically charged with the duties and responsibilities set forth in Title 67, Chapter 15, of the Code, primarily for the purpose of facilitating, coordinating, and supporting the development, either by the Authority or by other qualified entities, of the solar energy and energy storage industry, solar energy and energy storage projects, and associated supply chain vendors, among other such duties.

ARTICLE II. AUTHORITY OBJECTIVES

Section 1. General.

The Virginia Solar Energy Development and Energy Storage Authority is created to facilitate, coordinate, and support the development of the solar energy industry and solar-powered electric energy facilities in the Commonwealth. The Authority is directed to do so by developing programs to increase the availability of financing for solar energy projects, facilitate the increase of solar energy generation systems on public and private sector facilities in the Commonwealth, promote the growth of the Virginia solar industry, and provide a hub for collaboration between entities to partner on solar energy projects.

The Authority is charged with, among other tasks (i) facilitating, coordinating, and supporting the development, either by the Authority or by other qualified entities, of the solar energy and energy storage industries and solar energy and energy storage projects by developing programs that increase the availability of financing for solar energy projects and energy storage projects; (ii) facilitating the increase of solar energy generation systems and energy storage projects on public and private sector facilities in the Commonwealth; (iii) promoting the growth of the Virginia solar and energy storage industries; (iv) providing a hub for collaboration between entities, both public and private, to partner on solar energy projects and energy storage projects; and (v) positioning the Commonwealth as a leader in research, development, commercialization, manufacturing, and deployment of energy storage technology.

ARTICLE III. MEMBERS AND STAFF

Section 1. Appointment of Members and Terms

All appointments shall be in accordance with § 67-1502, of the Code. Any appointment to fill a vacancy shall be made in the same manner as the original appointment. The remainder of any term to which a member is appointed to fill a vacancy shall not constitute a term in determining the member's eligibility for reappointment.

Section 2. Election of Chair and Vice-Chair.

The Authority shall appoint from its membership a chairman and a vice-chairman, both of whom shall serve in such capacities at the pleasure of the Authority.

Vacancies in the position of Chair or Vice-Chair shall be filled for the remainder of the term by voice vote or roll call vote of the Authority at the next meeting following the occurrence of the vacancy.

Section 3. Authority Staff and Requests for Staff Assistance

The Department of Mines, Minerals and Energy (DMME) shall serve as staff to the Authority. The Director of the DMME shall serve as Director of the Authority and shall administer the affairs and business of the Authority in accordance with the provisions of § 67-1500.

The Director shall perform such other duties as prescribed by the Authority in carrying out the purposes of this chapter.

Any Authority member may request assistance from staff provided the request has been coordinated through the Chair or Vice-Chair of the Authority.

ARTICLE IV. MEETINGS

Section 1. Regular Meetings.

The meetings of the Authority shall be held on the call of the Chairman or whenever a majority of the members so request, at such time and place as the Authority may determine. All meetings consisting of more than two members to discuss business of the Authority, whether in-person, telephonically, or by other electronic communication, shall be open to the public and shall be preceded by the notice requirements set forth in the Virginia Freedom of Information Act, § 2.2-3707 of the Code. Authority members who wish to share or request information related to Authority business to or from more than one other member should do so through Authority staff.

A majority of members of the Authority serving at any one time shall constitute a quorum for the transaction of business. No business requiring a vote or final decision of the Authority may be conducted in the absence of a quorum, as defined in Section 6 below.

Section 2. Annual Meetings.

The last regular meeting of the calendar year shall be designated as an annual meeting. Elections of officers shall be held at the Annual Meeting.

Section 3. Committee Meetings.

The Authority may establish committees from time to time as needed to carry out the work of the Authority; provided, however, that all meetings of a committee consisting of more than two members of the Authority are open to the public and be preceded by the notice requirements set forth in the Virginia Freedom of Information Act, § 2.2-3707 of the Code.

Section 4. Special Meetings.

The Chair or any three members of the Authority may call a special meeting for a specific purpose or purposes. No business shall be transacted at such special meeting except that expressly sent out in the notice of the special meeting. Special meetings consisting of more than two members of the Authority shall be open to the public and be preceded by the notice requirements set forth in the Virginia Freedom of Information Act, § 2.2-3707 of the Code.

Section 5. Notice of Meetings.

In all cases, the public shall be notified of regular and special meetings of the Authority at a time and in a manner consistent with the requirements of the Virginia Freedom of Information Act, § 2.2-3707 of the Code.

Section 6. Quorum.

For any meeting of the Authority, a simple majority of the members of the Authority shall constitute a quorum. If a quorum has not been achieved, the meeting of the Authority may proceed; provided, however, that voting on matters before the Authority shall be postponed until a meeting of the Authority at which a quorum is present.

Section 7. Conduct of Meetings.

The Chair of the Authority shall conduct the meetings of the Authority and shall rule on the interpretation and application of the Code and these bylaws.

The Vice-Chair of the Authority shall preside over meetings of the Authority in the absence of the Chair. In the event that neither the Chair nor the Vice-Chair of the Authority shall be in attendance at a meeting where a quorum is nonetheless present, any member of the Authority may call the meeting to order, and the members present shall elect a Chair pro tempore to preside over the meeting. Where a quorum is not present, a vote of the majority of those members present shall determine the Chair pro tempore.

All actions and decisions of the Authority shall be made upon the motion of a member, duly seconded by another member and approved by a majority of the members who are present and voting.

The Chair shall put the question submitted to the Authority for a voice vote and shall call for a vote only after determining that there are no more Authority members who wish to speak, or upon approval of a motion to close debate.

Any member who may not participate in the Authority's consideration of a matter under the Va. Conflicts of Interest Act must comply with the disclosure requirements of the Act and not participate in the discussion or vote on the matter.

If it appears to the Chair, upon the voice vote being taken, that the members of the Authority are divided on any question, the Chair shall determine the vote of the members by roll call. A tie vote on any matter defeats the motion or issue upon which the vote is taken. At the conclusion of the vote on the motion, the Chair shall announce whether the motion has been adopted or defeated.

Section 8. Agenda.

The proposed agenda for any meeting shall be determined by the Chair in consultation with staff. In addition, any members of the Authority may suggest items to be included on the agenda.

The agenda for regular meetings of the Authority will normally include the following: (1) review and approval of the last minutes of the Authority; (2) a status report on the work plan and action items agreed to by the Authority; (3) a status report on federal agency actions that may affect solar energy and energy storage development in Virginia; and (4) other information of interest to the Authority.

An opportunity shall be provided at each meeting of the Authority for public comment. Any person who desires to speak will be asked to provide his or her name and the matter to be addressed prior to each meeting at which the public is able to comment.

Section 9. Amendments.

The bylaws of the Authority may be amended at any regular meeting of the Authority at which a quorum is present by a majority vote.

Section 10. Rules of Order

Informal rules of order shall govern all matters of procedure unless objected to by any Authority member. If such an objection occurs, then “Robert’s Rules of Order, Newly Revised” shall be the parliamentary authority for all matters of procedure not specifically covered by these bylaws.