# Virginia Solar Energy Development and Energy Storage Authority

## Annual Report

November 28, 2017

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


**I.** Overview of the Authority……1

**II.** Status of Solar Energy and Energy Storage in Virginia ……1

**III.** Update on Authority Activities……12

**IV.** Future Goals and Activities……14


## Appendices


**A.** Enabling Legislation

**B.** Authority Members

**C.** Status of Solar and Energy Storage Projects in Virginia

**D.** Dominion Energy's Large-Scale Solar Projects located in Virginia

**E.** Active and Withdrawn Solar and Energy Storage Projects in the PJM Generation Interconnection Queue

**F.** Bylaws

## 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 aims 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 can be found 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 were appointed by the Senate Committee on Rules.

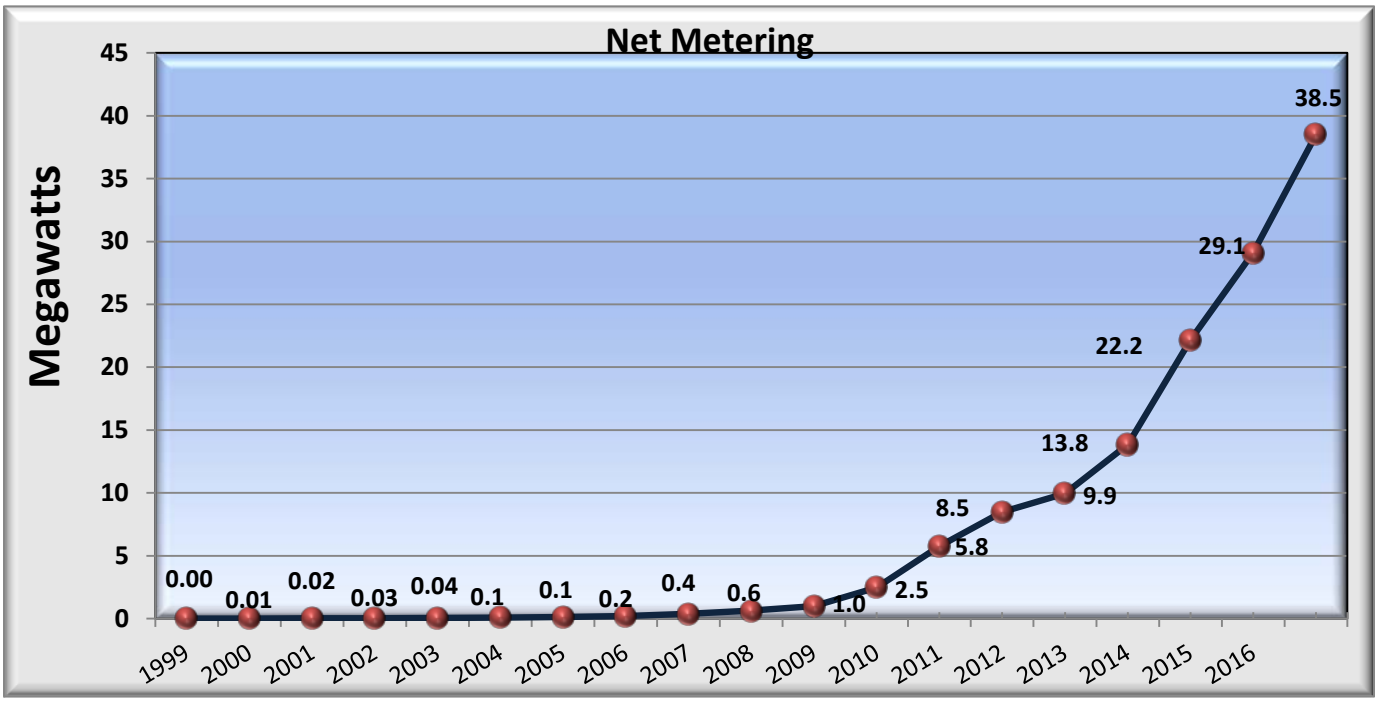
In the 2017 legislative session, Code § 67-1500 was amended to include energy storage as a key activity for the Authority to study and the Authority was renamed the Virginia *Solar Energy Development and Energy Storage Authority*. The legislation expanded the purposes of the authority to include positioning 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 can be found in **Appendix B.**

## II. Status of Solar Energy and Energy Storage in Virginia

2016 into 2017 was a year of significant growth for solar development in the Commonwealth of Virginia. It should be noted that according to the Solar Foundation, distributed solar generation accounts for 84% of Virginia's solar jobs.

**Distributed solar generation,** which generally includes systems acquired and owned by individuals and business with energy produced and consumed at or very near the point of generation, as well as systems deployed under third-party ownership agreements, continued to increase steadily, growing from approximately 3,767 installations totaling 29.1 megawatts at

the beginning of 2017, to 4,540 installations totaling 38.5 megawatts at the end of September of 2017.




**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 has remained suspiciously low, showing zero increase since as far back as 2009. Authority staff contacted A&N Electric Cooperative, who serve Virginia's Eastern Shore and was told that, in fact, the SCC reported figure for their Coop was off by a large amount—54 systems versus two reported by the commission. An effort will therefore be made to reach out to the other coops with questionable data to reconcile the data.

**Power Purchase Agreements** showed a noticeable uptick this past year. Power Purchase Agreements, or PPAs, allow electric ratepayers to have solar energy at their facility without the need to purchase and maintain the solar generating equipment. Instead, a third-party solar developer installs, owns and maintains the solar energy on the customer's premises and the customer signs a long term contract to purchase the output from the system. Typical PPAs are guaranteed to be revenue neutral over the life of the project and can even result in a net savings over what they would normally pay their utility. Currently PPAs are only allowed under a pilot program in the service territories of Dominion Energy and Appalachian Power. 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. 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. Of note is emergence of five projects in four Virginia utility service territories employing an alternative to PPAs, a solar Self Generation Agreement (Solar SGA), that enables customers to enjoy the benefits of affordable solar under a third party owned (TPO) service agreement in utility service areas where solar PPAs are opposed by utility companies.

While it is difficult to track PPAs within the private sector, there has been some activity in the public sector.

- In the autumn of 2016 Albemarle County Public Schools (ACPS) became the first public school district in Virginia to have solar energy systems installed under a PPA at six of the district's schools. The one megawatt solar photovoltaic system uses over 3,000 panels to meet 22% of the six schools' annual electricity requirements. Secure Futures owns and operates the project through its subsidiary, Albemarle Solar LLC, and sells the electricity to ACPS. The school district signed a 20-year Power Purchase Agreement with Albemarle Solar LLC in May 2015 and the system was completed in the autumn of 2016. The system is expected to save ACPS $80,000 over the life of the service agreement.

- In April 2017 the Arlington School Board voted unanimously to create the authority to enter into solar power purchase agreements so long as the procurement meets the requirements of Virginia's Public-Private Educational Facilities and Infrastructure Act of 2002.

- On July 31, 2017 Middlesex County issued a Request for Proposals (RFP) for Solar Power Purchase Agreement Services for Middlesex County Public Schools. The contract was awarded to SunTribe Solar from Charlottesville. The project is 1.1 MWs and serves both St. Clare Walker Middle School and Middlesex Elementary School for a term of 25 years. The project is unique in that the system will meet 100% of the school's energy needs after they complete a scheduled LED lighting upgrade. The school system is projected to save over $3 million over the 25-year PPA term. Sun Tribe was able to offer a low PPA price, without an annual escalator, because they are capturing the entire value chain, providing development, engineering, construction, tax equity, financing, and O&M all under one roof. Typically, multiple parties have played these roles, all of whom add cost. By vertically integrating, Sun Tribe was able to blend all those margins down and pass that value on to clients.

- On October 17, 2017, Thrifty Solar LLC placed a 67 KW system in service for Gift & Thrift, a non-profit in Harrisonburg, VA. While this project is very small by today's commercial solar standards, it received U.S. Department of Energy grant funding as an innovative first instance of a commercial solar barn-raising, whereby over 30 community volunteers installed the array in one day, under the leadership of Secure Futures, LLC. The project was executed as a Solar SGA (see note below on Carilion solar project below).

- On October 25, 2017 The Community Foundation Serving Richmond and Central Virginia (TCF) announced its partnership with solar power company Secure Futures to support local governments and K-12 public school systems seeking to transition to solar energy. TCF donors established the RVA Solar Fund out of their common interest in advancing solar energy in the Richmond metro region. The $200,000 fund will provide grants of up to $100,000 to support administrative costs, education and training, and related sustainability initiatives for public entities going solar. Each grant recipient will engage in a solar power purchase agreement with Secure Futures to finance, install, own, and operate an estimated 15,000 solar panels at their sites, for a total private capital investment of approximately $12 million. The public entities will pay no capital or maintenance costs for the equipment and will enjoy reduced total electricity costs by using the power generated by the panels. Together, this initiative represents an innovative public-private collaboration to build five megawatts of clean solar power – enough to power 700 homes — and avoid the equivalent CO2 emissions from burning 5 million pounds of coal per year.

- Effective October 30, 2017 the Commonwealth of Pennsylvania closed its borders to Virginia solar generators as a market for selling Solar Renewable Energy Credits (SRECs). This market was made possible in Pennsylvania through its mandatory Renewable Portfolio Standard (RPS), and, prior to October 2017, its open borders, that had allowed Virginia solar generators to finance a portion of their investment in solar with the sale of SRECs.

- By mid-December 2017, Carillion New River Medical Center in Christiansburg, VA will be generating its own solar electricity from a 1.3 MW ground-mounted solar tracker array with battery storage under a 20 year solar Self Generation Agreement (Solar SGA) with Secure Futures, LLC. This project is noteworthy for three reasons: 1) It is the largest Solar SGA project in Virginia, and the first in APCo territory. The Solar SGA represents an innovation by Secure Futures to enable it to provide solar services, not electricity, in utility territories that disallow solar Power Purchase Agreements. Secure Futures has completed solar SGA projects in other VA solar utility service territories, including Dominion Energy, Rappahannock Electric Coop, and Harrisonburg Electric Commission. 2) It is the largest solar array for a hospital, and the first solar tracking array for a

hospital in Virginia. 3) The project represents a proof of concept for a "nanogrid" solar storage, at 60 KW storage, which will enable Carilion to shave a portion of its peak demand in early morning and late afternoon hours. The project will save Carilion an estimated $9 million in avoided energy costs over its 35 year service life.

**A community solar pilot program** was approved by the General Assembly in the 2017 legislative session. Senate Bill 1393 requires Dominion Energy and Appalachian Power to conduct what has been characterized as "community solar" pilot programs in which their retail customers voluntarily subscribe to a project owned and administered by the utility. It should be noted that these programs are 100% owned and operated by utilities and 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. The pilot program authorizes both utilities to sell electric power to subscribing customers under a voluntary companion rate schedule, and the utility will generate or purchase the electric power from eligible solar generation facilities selected for inclusion in the pilot program. 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 a 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'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. To date Dominion Energy's and Appalachian Power's pilot PPA programs are still in the development phase. Solar advocates are encouraged that Dominion has indicated it will propose to accommodate participation by low income customers as part of its program and is considering aggregating small projects to allow the potential for smaller installers to participate.

The measure allows, but does not require electric cooperatives to conduct similar pilot programs and gives them flexibility in designing their program and voluntary companion rate schedules. In fact, A&N Electric Cooperative, along with four other electric cooperatives are in the process of establishing a community solar project. The Cooperatives will file with the State Corporation Commission for a three-year pilot program to implement cooperative-administered, third-party-constructed community solar for their member-owners. The four other regional cooperatives at this time include Central Virginia Electric Cooperative, Mecklenburg Electric Cooperative, Northern Neck Electric Cooperative and Rappahannock

Electric Cooperative. Additional applications from other electric cooperatives may come in 2018.

These programs, if approved by the Commission, will provide customers the electricity generated by the 10-megawatt Clarke County Solar farm in White Post, Virginia and the 20-megawatt Cherrydale solar facility located Eastville in Northampton County. Old Dominion Electric Cooperative has entered into a power purchase agreement with Dominion Energy to buy the output of these facilities upon their completion. Some solar advocates view this as an incrementally positive step forward but note that this program is even further from what is typically considered community solar, because the utility scale projects are already built. These advocates are concerned that these types of programs are hijacking the term "community solar" with a "green tariff" program that subscribes out already built projects (with a 40% premium) and with no options for community members to develop and own their own projects.

The community solar project would allow cooperative members to purchase solar power in 50 kWh "blocks" to cover a portion or all of their electricity usage without the expense of owning and maintaining their own solar energy systems.

While utility-scale solar (discussed below) has the greatest potential for rapidly growing solar capacity, smaller distributed solar installations at homes, farms and businesses offer higher relative benefits in terms of job creation, resiliency, and local autonomy of energy decisions and will continue to be an important market segment to support sustainable growth for the overall solar energy industry in Virginia. According to a recent Solar Foundation study, 84% of Virginia's solar workers are employed in the distributed 'rooftop' sector. As costs decline, solar installations paired with batteries offer scalable, reliable power options in the case of weather-related disasters. Smaller, distributed installations by their nature can be developed, owned, and controlled by local stakeholders or jurisdictions re-directing decision-making power and benefits back to the local level. Robust net metering and implementation of what is more typically considered "community solar", and systems enabled through third-party power purchase arrangements all have the ability to play a much larger role in developing the overall solar industry in the Commonwealth. Additionally, some argue that the removal of limits (like the 1% net metering cap) and other disincentives such as demand charges on customer-installed solar installations can increase the deployment of solar technologies, while others argue that these charges and limits prevent cross subsidization by non-solar customers.

**Utility-scale solar** experienced significant growth during this report period, increasing from 80 MWs in 2016 to over 156 MWs in 2017, a 95 percent increase.

- In addition to the 80MW Amazon Solar Farm US East in Accomack, Dominion Energy, Inc. announced a major expansion of its solar alliance with Amazon Web Services (AWS), Inc. by adding an additional 180 MWs of solar generating capacity in five Virginia counties. Construction of the facilities will be enabled through long-term power purchase agreements between Dominion Energy, Inc., and an affiliate of Amazon's cloud computing business, AWS. The solar facilities are expected to enter service in late 2017. The 180 MW of planned expansion includes:

    - Four 20MW projects acquired from Virginia Solar, LLC in the following Virginia counties:
        - Buckingham County
        - Powhatan County
        - New Kent County
        - Sussex County
    - A 100 MW project in Southampton County, Virginia acquired from Community Energy Solar.

- **Dominion Energy** also has a number of other utility-scale projects in various stages of development. To date, Dominion has:

    - Installed 7.7 MWs of distributed solar as part of their *Solar Partnership Program.* Dominion 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.
    - Three projects totaling 56 MWs were built and became operational in December 2016.
    - Completed construction of the 20 MW Remington project in Fauquier County in partnership with Microsoft and the Commonwealth.
    - Received SCC approval to build an 18 MW solar energy facility at Naval Air Station Oceana in Virginia Beach, in partnership with the Commonwealth of Virginia. As part of the Governors Solar Initiative, the Commonwealth, in partnership with Dominion Energy, has committed to meeting eight percent of the electric requirements of state facilities, or 110 MW, from solar. The Naval Air Station Oceana project will help achieve this goal.
    - Announced it will be adding 300 MW of new solar generation to the electric grid to serve a new Facebook data center to be built in eastern Henrico County using a new and innovative renewable rate option. The new Schedule RF (renewable

facility) was designed by Dominion and Facebook and will be made available to other large energy users beyond just Facebook.

- Acquired *Clarke County Solar*, a 10 MW solar facility in White Post, Virginia in Clarke County from the project's developer, Hecate Energy, LLC. of Chicago, Illinois. Dominion also announced plans to purchase a 20MW solar farm under construction in Northampton County on Virginia's Eastern Shore from the same developer before the end of 2017. Old Dominion Electric Cooperative has signed long-term power purchase agreements for both projects and will be the sole off-taker of the electricity from these facilities.

- **Central Virginia Electric Cooperative** plans to build two 5 MW solar electric generating facilities along the Interstate 64 corridor.

- **Three municipal utilities** are moving forward with plans for multi-megawatt solar projects:

  - **The Town of Bedford** has contracted with North Carolina-based O2 emc to construct a 3 MW installation adjacent to a closed land fill to supplement their municipal customer's electricity. O2 emc is working with Sun Raised Farms, a North Carolina-based collection of farmers, to use sheep to graze at the solar farm. The sheep eat down the grass to minimize the use of chemical herbicides and reduce mowing and trimming. A local farmer has been identified to place a herd of sheep to graze the site, where they plan to plant seed mix that is healthy for sheep.

  - **The City of Danville** is working with Washington Gas and Light and their contractors to build a six megawatt solar farm within the Danville Electric service territory. The assets will not be owned by the City but through a PPA for all energy and capacity from the project. Project construction started in mid-October 2017 and is slated to be completed in March 2018.

  - **Front Royal Electric Department** completed a 2.5 MW solar installation to supplement the power to town electric utility customers. The solar power produced on site can power 350 homes with an average 200-amp service typical of today's market. The power is produced by 10,523 solar modules on the 15 acre site.

- **Permit by Rule (PBR)** activity increased dramatically since 2016. To date, the Virginia Department of Environmental Quality (DEQ), who oversees issuance of PBR review process, have received a total of 74 Notices of Intent to apply for a permit. DEQ has issued 13 permits totaling 523 MW. Of these, 110 MW are in operation and an additional 217 MW are under construction and expected to be complete by the end of this year. The total capacity of permitted PBR projects and projects in the review queue is just under three gigawatts.

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 between all stakeholders is essential to ensure that Virginia develops its solar energy resource in a sustainable manner. Concerns have already been raised in some counties regarding land use and the loss of arable farm land, changes to the tax base and loss of tax revenues, and negative impacts to a county's composite index, which affects state educational funds. Educating local government officials on tax, land use, and other issues related to utility scale solar is strongly encouraged. 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 like North Carolina 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.

**Energy Storage in Virginia** is still in its infancy, but that 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.

**Battery storage applications in Virginia may include:**

- Resiliency and disaster preparedness: Recent data has shown that in extreme weather events, solar installations paired with battery backup perform very well and offer reliable options in the case of a centralized grid failure enabling communities to be more resilient and recover more quickly from natural disasters.

- Demand charge reduction for non-residential ratepayers: Most non-residential ratepayers including, businesses, municipalities, schools and industrial customers pay a demand charge based on the peak demand in KW within a 15-30 minute interval. Battery storage can be used to reduce peak energy demand "peak shaving" and provide cost savings on utility bills.

- Demand response to balance daily peaks and system coincident demand peaks: Virginia utilities have two peaks, a winter peak (cold mornings) and summer peak (afternoon/early evening AC loads). Batteries on both the distributed, commercial and utility scales can be used to manage these peaks by providing on site demand response or larger scale grid balancing. This can help utilities reduce wear and tear on grid and obviate more expensive peaker plants. Potential to couple this with a daily TOU of rate to give real price signals.

- Another development in the future involves electric vehicle to grid technology. EV deployment is driving technological and market advances which are mutually reinforcing deployment in the power/utility sector.

- Ancillary services: Energy storage can provide ancillary services to the grid such as frequency response and frequency regulation faster and more effectively (per MW of dedicated resource) compared to traditional thermal generators. Frequency response is

the first line of defense when the grid frequency begins to increase or decrease from its 60 Hz standard, caused by second or sub-second deviations in generation and load. Frequency regulation, also known as secondary response, requires a resource to follow an output signal to help balance frequency on the grid. PJM (the grid independent system operator for the mid-Atlantic region including Virginia) procures frequency regulation from generators and energy storage resources according to two different signals – a fast signal (RegD) for resources such as energy storage and a slow signal (RegA) for slower responding assets. Over 250 MWs of battery-based energy storage projects, none of which are located in Virginia, provides fast regulation service to PJM under the RegD signal.

- Peaking capacity: Energy storage is also an alternative to traditional peaking plants, and can prove more economic when considering the full range of benefits provided by the systems. Battery-based energy storage is always synchronized to the grid, so can provide ancillary services or other services in addition to peaking, unlike traditional peakers that are only utilized a few hours per year.

- Transmission and distribution alternatives: Energy storage can serve as an alternative to traditional substation or line upgrades. Unlike traditional transmission and distribution infrastructure, energy storage can be sited nearly anywhere and can be implemented in months, not years. Storage can be sized to the need that is identified and can expand over time, unlike traditional solutions that would need to be built with a 20+ year outlook from the start.

- Renewable energy integration: Energy storage anywhere on the grid can help integrate renewable energy by balancing short fluctuations in generation, but co-locating renewables and storage can help project economics by combining some expenses (such as interconnection and land) and in the case of pairing solar and storage, providing tax incentives such as the ITC. Storage can help balance short fluctuations in output from a renewable energy resource, limiting ramp rates or providing smoother output to the grid, for example, or even move energy generated from off-peak to peak hours when it is most needed.

The inability to store surplus power (beyond the limited capacity of older 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 technologies. 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.

Other than three storage projects in the PJM generation interconnection queue, little is known at this time by the Authority on the overall level of deployment of non-pumped-hydro energy storage in Virginia, other than the nanogrid being deployed for the Carillion solar project and the AEP 4 MW energy storage system in Carroll County, but it will begin researching and tracking this metric going forward. Given that the U.S. Department of Defense has given priority to developing resilient solutions for its naval infrastructure in Norfolk and the Hampton Roads region, and the increased sense of urgency to protect 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.

Herndon, Virginia's Greensmith Energy, now a division of Wärtsilä, recently announced that they will partner with American Electric Power to install a 4 MW energy storage system integrated with the Buck and Byllesby hydroelectric plants on the New River in Carroll County in southwest Virginia. The integration of energy storage and software with hydroelectric generation is seen to be a world's first hybridized system of its kind to provide ancillary services in the form of frequency regulation to PJM. The system is due to begin operating in early 2018.

A detailed list of known solar projects installed or under development as of this writing 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 can be found in **Appendix E**, 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 many of these projects may also be included in **Appendix C**.

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.

## II. Update on Authority Activities

The Authority's enabling legislation, as well as its continuation as the Solar Energy Development and Energy Storage Authority, passed without an appropriation of funds, limiting the Authority's activities to studying issues and making recommendations to overcome barriers to solar and energy storage in Virginia.

The Authority continues to explore opportunities for creative financing, in-kind incentives, or unique partnerships including, but not limited to, the Virginia Public-Private Educational Facilities Infrastructure Act (PPEA) and partnerships with other state entities. Funding opportunities may exist at the Federal level as well.

Authority Members continued to discuss actual and perceived barriers to increased solar energy deployment in Virginia, such as 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 over the past year, questions were raised, what is the logical role for the Authority and who are its target constituents? Many advocates would like to see distributed solar given more emphasis in light of its advantages in job creation, resilience, and energy autonomy. Members decided to develop a work plan to guide their activities over the course of the next year divided into five broad areas:

- Identifying barriers and catalysts to solar and energy storage in Virginia
    - Developing a matrix of what the actual barriers and drivers for solar and storage are and developing recommendations to overcome barriers and support catalysts.
- Identifying workforce development needs as the market expands
    - Identifying the state of Virginia's current workforce, what skills are necessary, what training programs are available, and workforce needs at various levels of solar and storage penetration.

- Public access and engagement
    - Developing an Authority website to maintain and share information and provide technical support for public officials, economic development entities, and others to support solar energy and energy storage development.
- Financial mechanisms and partnerships
    - Identifying creative financing mechanisms to support solar and energy storage development, and supporting the expanded use of partnerships, such as private-public partnerships between state agencies, utilities, and third-parties.
- Developing resilient energy solutions for critical infrastructure
    - Identifying mission critical infrastructure and facilities in Virginia, including regional emergency shelters, and exploring technical and financial solutions to public-private partnerships to mitigate those vulnerabilities.

In addition to developing a work plan, the Authority met with Stephen Kalland, Executive Director of the North Carolina Clean Energy Technology Center (formerly the North Carolina Solar Center) to hear about their successful solar market, and how they rose to number two in the nation in cumulative solar capacity through 2016, with over three gigawatts installed.

Much of the rapid growth of the North Carolina market was driven by a 35% personal and corporate tax credit, which expired in 2015. A follow-up study of the tax credit showed that for every dollar of tax credit claimed, $1.64 was returned to the state and local governments.

Another driver in North Carolina includes a mandatory Renewable Energy and Energy Efficiency Portfolio Standard (REPS) which requires electric utilities to meet a portion of their electricity sales with renewable energy and energy efficiency. The REPS has proven to be a key driver to expanding North Carolina's energy portfolio, creating a more secure, affordable long term energy future for the state, having saved customers $162 million since going into effect in 2007. It's expected that the REPS will save North Carolina customers an additional $489 million by 2029.

Probably the greatest driver for utility scale solar in North Carolina is a result of the Public Utilities Regulatory Policy Act (PURPA) of 1978, which requires utilities to purchase power from specific generating facilities known as "Qualifying Facilities" (QFs). PURPA gives states the authority to develop implementation rules for PURPA compliance, and using this authority, the North Carolina Utilities Commission (NCUC) established QF rules that set the state apart from most other states, allowing that any QF under 5 MW receives a 15-year fixed price contract set at the utility's avoided cost.

Mr. Kalland presented several ideas for the Authority's consideration moving forward. These are centered on three key areas:

- Creating competition

- Providing market information
- Incentivizing initiatives to "get the ball rolling"

Within these three areas, options to explore may include:

- **Utility-scale market**
  - PURPA markets are under attack nationally. RFPs from utilities are possible replacements under a voluntary RPS
  - Consider stronger incentives for utilities to want solar
    - Binding RPS with solar or distributed generation carve-out
    - Evolve the regulatory/business model to give utilities more flexibility, but do not block third parties
  - Prepare the market for growth through training and education
    - For landowners about solar opportunities
    - For local government officials on planning, zoning, and tax issues
    - For utility-scale developers about how to participate in the Virginia market
    - For first responders, code officials, community college instructors, lawyers, tax planners, etc.

- **For commercial, industrial and residential markets, consider incentive or low interest loan programs**
  - Community solar programs that allows for third party participation
  - More consumer education
  - Expanding third party ownership options beyond utility pilots and allow all sectors to participate (Appalachian Power's 3rd party program currently allows only institutions of higher education as defined in § 23.1-100 of the Code of Virginia)

It should be noted that the Department of Mines, Minerals and Energy (DMME), who serve as staff to the Authority, submitted an appropriation request in 2017 to create a low-interest loan program and a loan loss reserve fund for solar, but due to state budget constraints the funding was not approved. DMME plans to submit another request for the 2018 legislative session.

## III. Future Goals and Activities

The Authority members are not ready to take a policy stance or make specific recommendations on methods to remove perceived barriers. Instead they have developed the

following list of future goals and activities they plan to address over the next year consistent with their 2017-2018 work plan:

- Engage early on with the new administration and help educate them on the economic and environmental value solar energy and energy storage can bring to the Commonwealth, and encourage them to build upon Governor McAuliffe's solar legacy.
- Develop a recommendation by summer 2018 for a funding appropriation in 2019 General Assembly session to help enable the Authority goals and activities.
- Continue to engage with stakeholders to identify avenues for increased solar deployment to meet the recommendations from the Virginia Energy Plan to:
    - 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.
    - Facilitate the installation of an additional 15 MWs of distributed solar energy generation at commercial, industrial, and residential facilities.
- The Commonwealth should continue to identify and 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.
- 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.
- Explore modeling and case studies on local considerations for solar projects, approved or otherwise, and the economic impacts stemming from the conversion of agricultural land to solar.
- Continue to investigate, analyze, and raise awareness about perceived barriers to expanding solar energy and energy storage in Virginia, and explore possible remedies.
- 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.
- Evaluate programs that can expand access to solar energy and energy storage for all customers in Virginia.
- Continue to explore and facilitate the use of creative financing mechanisms that can expedite and expand solar and energy storage deployment.
- Support recapitalizing the VirginiaSAVES program.

- Develop, maintain and update a Virginia Solar Energy and Energy Storage Authority website, and include regularly updates of information on installed solar energy and energy storage capacity, economics, and environmental impacts.
- 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
- Support the expanded use of partnerships, such as public-private partnerships, between state agencies, utilities, and third parties, including helping meet Governor McAuliffe's eight percent renewable energy goal for state government operations, and reach out to incoming administration to ensure this initiative continues and grows.
- Support exploration of public private partnerships to create microgrids to increase resilience for mission critical infrastructure and regional emergency shelters.
- Explore additional community-based solar ownership models.
- Explore ways to offset the closing of the Pennsylvania SREC market to Virginia solar generators.
- Explore opportunities to enhance tracking by utilities and others the amount of solar energy and energy storage in 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 |
|---|---|---|---|
| William D. Carmack<br>CFO, SW VA Higher Education Center | Non legislative Citizen | Governor | 6/30/21 |
| Michael *Barrett* Hardiman<br>Senior Manager of Government Relations<br>Genworth | Non legislative Citizen | Governor | 6/30/19 |
| Sylvain Marsillac, PhD<br>Professor, Dept. of Electrical & Computer Engineering, Old Dominion University | Non legislative Citizen | Governor | 6/30/18 |
| Careth *Cody* Apperson Nystrom<br>Managing Director, SJF Ventures | Non legislative Citizen | Governor | 6/30/18 |
| Cliona Mary Robb<br>Partner, Christian & Barton, LLP | Non legislative Citizen | Governor | 6/30/19 |
| Hayes Framme<br>Ørsted | Non legislative Citizen | Governor | 6/30/21 |
| Colleen A. Lueken, PhD<br>AES Energy Storage, Director of Market Analytics | Non legislative Citizen | Governor | 6/30/20 |
| Will Gathright<br>Tumalow, Inc., Founder | Non legislative Citizen | Governor | 6/30/21 |
| Jon F. Hillis<br>CEO, SolUnesco | Non legislative Citizen | Speaker of the House | 6/30/19 |
| John H. Rust, Jr.<br>Commissioner<br>CoA-FFX | Non legislative Citizen | Speaker of the House | 6/30/18 |
| Ryan L. Dunn<br>Executive Vice President of Corporate and Government Affairs<br>Virginia Chamber of Commerce | Non legislative Citizen | Speaker of the House | 6/30/21 |
| Vacant<br>New member per 2017 Legislation to be appointed | Non legislative Citizen | Speaker of the House | 6/30/21 |
| Kenneth G. Hutcheson<br>Director of Government Affairs<br>Williams Mullen | Non legislative Citizen | Senate Committee on Rules | 6/30/18 |
| Katharine Bond<br>Director of Public Policy<br>Dominion Resources | Non legislative Citizen | Senate Committee on Rules | 6/30/19 |
| Andrew T. Lamar<br>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) |
|---|---|---|
| 3,767 Distributed Individual Utility Customers | Distributed Across State | |
| | **Total** | **38.5** |

## 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 - Complete

| System Owner | Location | Capacity (MW) |
|---|---|---|
| Clarke | Clarke County | 10 |
| Remington | Fauquier County | 20 |
| Scott Solar 1 | Powhatan County | 17 |
| Whitehouse Solar | Louisa County | 20 |
| Woodland Solar Center | Isle of Wight County | 19 |
| Amazon Solar Farm US East | Accomack County | 80 |
| | **Total** | **166.0** |

## Dominion – Under Development

| System Owner | Location | Capacity (MW) |
|---|---|---|
| Buckingham Solar I / Amazon Solar Farm US East 3* | Buckingham | 20 |
| New Kent / Amazon Solar Farm US East 4* | Sussex | 20 |
| Scott II / Amazon Solar Farm US East 5* | Powhatan | 20 |
| Sussex | Sussex | 20 |
| Southampton | Southampton | 100 |
| Cherrydale | Northampton | 20 |
| Oceana (energy & RECs to COV) | Virginia Beach | 18 |
| Hollyfield | King William County | 17 |
| Puller | Middlesex County | 15 |
| Essex | Essex County | 20 |

## Permit by Rule (Not including Dominion above)

| Developer/Project Name | County (Town) | Capacity (MW) |
|---|---|---|
| Urban Grid/Spring Grove Solar I, LLC | Surry | 150 |
| Urban Grid/Spring Grove Solar II, LLC | Surry | 150 |
| GEENEX/Grasshopper Solar LLC | Mecklenburg | 115 |
| Cypress Creek/Bumblebee Solar. LLC | Campbell (near Lynchburg) | 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 |
| Urban Grid/Crystal Hill Solar, LLC | Halifax | 150 |
| Urban Grid/Alton Post Office Solar, LLC | Halifax | 150 |
| Hexagon Energy/Stagecoach Solar LC | Halifax (Nathalie) | 15 |
| Open Road Renewables/Walnut Solar I | King and Queen (Shacklfords) | 70 |
| Open Road Renewables, LLC/Maplewood Solar I | Pittsylvania (Climax) | 120 |
| Open Road Renewables, LLC/Greenwood Solar I | Culpepper (Stevensburg) | 100 |
| Open Road Renewables, LLC/Sycamore Solar I | Pittsylvania (Gretna) | 42 |
| Dominion Energy/Puller Solar | Middlesex (Topping) | 15 |
| VA Solar/Nokesville Solar LLC | Prince William | 20 |
| Buckingham II Solar LLC | Buckingham | 20 |
| Brookfield Renewables/Otter Creek Solar LLC | Mecklenburg (near Chase City) | 60 |
| Brookfield Renewable/Meherrin Solar LLC | Greenville | 60 |

| | | |
|---|---|---|
| Community Energy/Port Conway Solar LLC | King George (Dogue) | 20 |
| Eco Cap/Westmoreland Solar LLC | Westmorland (Oak Grove) | 20 |
| Core Solar SPV XIII, LLC | Chesapeake | 150 |
| Sigora Solar Wythe Solar | Wythe (Fort Chiswell) | 40 |
| Dominion Energy/Hollyfield | King William | 17 |
| Strata/Gloucester Solar, LLC | Gloucester | 20 |
| OneEnergy/Solidago, LLC | Isle of Wight County | 20 |
| OneEnergy/Sweetspire, LLC | Hanover (Old Church) | 20 |
| Carolina Solar Energy/Powell's Farm Solar, LLC | Halifax | 50 |
| VA Solar/Mt. Jackson Solar I, LLC | Shenandoah (Mount Jackson) | 16 |
| Urban Grid/Gardy's Mill Solar, LLC | Westmoreland (Gray's Corner) | 11 |
| First Solar Development, LLC | Montgomery | 20 |
| Urban Grid/Briel Farm Solar, LLC | Henrico | 20 |
| North Ridge Resources/Pamplin Solar LLC | Appomattox | 20 |
| North Ridge Resources/Halifax Solar LLC | Halifax (Clover) | 15 |
| North Ridge Resources/Hickory Solar 2 LLC | Chesapeake | 15 |
| North Ridge Resources/Hickory Solar 1 LLC | Chesapeake | 20 |
| North Ridge Resources/Rives Road Solar LLC | Prince George | 20 |
| North Ridge Resources/Spout Springs Solar LLC | Appomattox | 20 |
| Sydnor Solar Farm, LLC | Mecklenburg | 9 |
| Colonial Trail W Solar, LLC | Surry | **150** |
| BM&D Ltd. | Pulaski | 40 |
| Carolina Solar Energy /Sunnybrook Farm Solar, LLC | Halifax (Scottsburg) | 51 |
| Virginia Solar/Belcher Solar LLC | Louisa | 88 |
| SunPower Corporation | James City County (Norge) | 35 |
| SolUnesco | Caroline (Woodford) | 15 |
| SolUnesco | Orange County (Locust Grove) | 62 |
| SolUnesco | Albemarle Co. (Charlottesville) | 11 |
| SolUnesco | Henry County (Axton) | 20 |
| SunPower Corporation | Southampton (Near Franklin) | 91 |
| Sun Energy 1/Mechanicsville Solar LLC | Hanover (Mechanicsville) | 20 |
| Twittys Creek Solar LLC | Charlotte | 15 |
| Carolina Solar Energy/Bluestone Farm Solar, LLC | Mecklenburg (near Chase City) | 50 |
| TurningPoint Energy | Pittsylvania (Danville) | 6 |
| Tradewind Energy/Chesapeake Solar LLC | Chesapeake | 20 |
| Tradewind Energy/Myrtle Solar LLC | Suffolk | 15 |
| Tradewind Energy/Centerville Pike Solar | Chesapeake | 15 |
| Ecoplexus | Isle of Wight County | 14 |
| SunTech Solar Solutions | Accomack (near Tasley) | 20 |
| | **Total** | **2781** |

## Cooperative Utility Projects

| Cooperative | Location | Capacity (MW) |
|---|---|---|
| Central Virginia Electric Cooperative | Goochland | 5 |
| Central Virginia Electric Cooperative | Fluvanna | 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 Solar Partnership Projects

| Project Site | Location | Capacity (MW) |
|---|---|---|
| Canon | Gloucester | 0.5 |
| Old Dominion University | Norfolk | 0.1 |
| Capital One | Chester | 0.5 |
| Virginia Union University | Richmond | 0.1 |
| Prologis Concorde Center | Sterling | 0.7 |
| Randolph-Macon College | Ashland | 0.1 |
| Philip Morris Park 500 | Chester | 2.0 |
| Western Branch High School | Chesapeake | 0.8 |
| Merck | Elkton | 1.5 |
| University of Virginia | Charlottesville | 0.4 |
| | **Total:** | **7.7** |

## Third-Party Power Purchase Agreements

| Project Site | Location | Capacity (MW) |
|---|---|---|
| Eastern Mennonite University | Harrisonburg | 0.1 |
| Washington and Lee University | Lexington | 0.4 |
| University of Richmond | Richmond | 0.2 |
| Albemarle High School | Charlottesville | 0.1 |
| Baker-Butler Elementary | Charlottesville | 0.2 |
| Brownsville Elementary | Crozet | 0.1 |
| Monticello High School | Charlottesville | 0.2 |
| Sutherland Middle School | Charlottesville | 0.2 |
| Greer Elementary | Charlottesville | 0.1 |
| Lylburn Downing Middle School | Lexington | 0.1 |
| | **Total:** | **1.7** |

## Third-Party PPA Under Development

| Project Site | Location | Capacity (MW) |
|---|---|---|
| Secure Futures - Carilion Medical Center | Christiansburg | 1.0 |
| Secure Futures - Thrifty Solar | Harrisonburg | 0.1 |
| Secure Futures - Ruckersville Solar | Ruckersville | 0.2 |
| | **Total:** | **1.3** |

| | |
|---|---|
| **Megawatts Installed:** | **219.94** |
| **Megawatts Under Development:** | **2,703.69** |
| **TOTAL:** | **2,923.63** |

# APPENDIX D

## Dominion Energy's Large-Scale Solar Projects located in Virginia

**Dominion Energy's Large-Scale Solar Projects located in Virginia* (as of Nov. 20, 2017)**

| Facility | Locality | Category | Offtaker | Capacity in Operation (MWac) | Commercial Operations Date (COD) | Cumulative Capacity in Operation & Development* (MWac) |
|---|---|---|---|---|---|---|
| Amazon Solar Farm Virginia - Accomack | Accomack County | Merchant | Amazon Web Services | 80 | Oct-16 | 80 |
| Amazon Solar Farm Virginia - Buckingham | Buckingham County | Merchant | | 0 | N/A (not yet operational) - COD expected late 2017 | 20 |
| Amazon Solar Farm Virginia - New Kent | New Kent County | Merchant | | 0 | | 20 |
| Amazon Solar Farm Virginia - Scott | Powhatan County | Merchant | | 0 | | 20 |
| Amazon Solar Farm Virginia - Sappony | Sussex County | Merchant | | 0 | | 20 |
| Amazon Solar Farm Virginia - Southampton | Southampton County | Merchant | | 0 | | 100 |
| Clarke | Clarke County (White Post, VA) | Merchant | Old Dominion Electric Cooperative | 10 | Aug-17 | 10 |
| Cherrydale | Kendall Grove (Eastern Shore) | Merchant | | 0 | N/A (not yet operational) - COD expected late 2017 | 20 |
| Remington | Fauquier County | Regulated | Commonwealth of VA (Energy) and Microsoft (RECs) | 20 | Oct-17 | 20 |
| Oceana | Virginia Beach | Regulated | Commonwealth of VA | 0 | N/A (not yet operational) - COD expected late 2017 | 18 |
| Whitehouse | Louisa County | Regulated | Serving all Dominion Energy regulated electric customers in VA and NC | 20 | Dec-16 | 20 |
| Woodland | Isle of Wight County | Regulated | | 19 | | 19 |
| Scott | Powhatan County | Regulated | | 17 | | 17 |
| UVA Hollyfield | King William County | Regulated | UVA (Commonwealth of VA) | 0 | N/A (not yet operational) - COD expected late 2018 | 17 |
| UVA Puller | Middlesex County | Regulated | | 0 | | 15 |
| Essex | Essex County (Dunnsville, VA) | PPA with Dominion Energy Virginia (Regulated) | Serving all Dominion Energy regulated electric customers in VA and NC | 0 | N/A (not yet operational) - COD expected late 2017 | 20 |
| **Total** | | | | **166** | | **436** |

*Excludes 300 MW of solar generation under development with Facebook announced on Oct. 5, 2017 and 7.7 MW of solar distributed generation facilities developed as part of Dominion Energy Virginia's Solar Partnership Program.

# APPENDIX E

## Solar and Energy Storage Projects in the PJM Generation Interconnection Queue

# Solar Energy Projects in the PJM Generation Interconnection Queue

| Project Name | MW | County | Transmission Owner | Status | In Service Date | Feasibility Study | System Impact Study | Facility Study |
|---|---|---|---|---|---|---|---|---|
| Hopewell-Surry | 240.0 | Prince George | Dominion | Under Study | 2017 Q2 | Complete | Complete | In Progress |
| Tasley | 10.0 | Accomack | ODEC | Under Study | 2017 Q2 | Complete | Complete | In Progress |
| Tasley | 9.0 | Accomack | DPL | Under Study | 2017 Q2 | Complete | In Progress | |
| Arnold's Corner | 20.0 | King George | Dominion | Under Study | 2017 Q3 | Complete | In Progress | |
| Boykins-Handsome | 100.0 | Washington | Dominion | Under Construction | 2017 Q4 | Complete | Complete | Complete |
| Old Church | 20.0 | Hanover | Dominion | Under Construction | 2017 Q4 | Complete | Complete | Complete |
| Brink-Trego | 19.8 | Greensville | Dominion | Under Study | 2017 Q4 | Complete | Complete | In Progress |
| Brink-Trego | 19.8 | Greensville | Dominion | Under Study | 2017 Q4 | Complete | Complete | In Progress |
| Boykins | 13.0 | Southampton | Dominion | Under Construction | 2017 Q4 | Complete | Complete | Not Required |
| Buckingham | 19.8 | Buckingham | Dominion | Under Construction | 2017 Q4 | Complete | Not Required | Not Required |
| Correctional | 20.0 | New Kent | Dominion | Under Construction | 2017 Q4 | Complete | Not Required | Not Required |
| Powhatan | 20.0 | Powhatan | Dominion | Under Construction | 2017 Q4 | Complete | Not Required | Not Required |
| Remington | 19.8 | Fauquier | Dominion | Under Construction | 2017 Q4 | Complete | Not Required | Not Required |
| Sapony | 20.0 | Sussex | Dominion | Under Construction | 2017 Q4 | Complete | Not Required | Not Required |
| Smith Mountain-Bearskin 1 | 100.0 | Pittsylvania | Appalachian | Under Study | 2017 Q4 | Complete | In Progress | |
| Twittys Creek | 15.0 | Charlotte | Dominion | Under Study | 2017 Q4 | Complete | In Progress | |
| Brink-Trego | 20.0 | Greensville | Dominion | Under Study | 2018 Q1 | Complete | Complete | In Progress |
| Unionville | 20.0 | Orange | Dominion | Under Study | 2018 Q1 | Complete | Complete | In Progress |
| Pendleton | 17.6 | Virginia Beach | Dominion | Engineering | 2018 Q1 | Complete | Complete | Not Required |
| Elko | 18.8 | Henrico | Dominion | Under Study | 2018 Q1 | In Progress | In Progress | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Beechwood | 20.0 | Mecklenburg | Dominion | Under Study | 2018 Q2 | Complete | Complete | In Progress |
| Chase City-Gary | 80.0 | Mecklenburg | Dominion | Under Study | 2018 Q2 | Complete | Complete | In Progress |
| Hopewell-Surry | 142.4 | Surry | Dominion | Under Study | 2018 Q2 | Complete | Complete | In Progress |
| Brandy-Remington | 60.0 | Culpeper | Dominion | Under Study | 2018 Q2 | Complete | In Progress | |
| Chase City | 36.0 | Mecklenburg | Dominion | Under Study | 2018 Q2 | Complete | In Progress | |
| Locust Grove-Paytes | 62.5 | Orange | Dominion | Under Study | 2018 Q2 | Complete | In Progress | |
| St. Johns | 14.9 | Carolina | Dominion | Under Study | 2018 Q2 | Complete | In Progress | |
| Wurno I | 20.0 | Pulaski | Appalachian | Under Study | 2018 Q2 | In Progress | | |
| Wurno II | 20.0 | Pulaski | Appalachian | Under Study | 2018 Q2 | In Progress | | |
| Black Branch-Chase City #1 | 20.0 | Mecklenburg | Dominion | Under Study | 2018 Q3 | Complete | Complete | In Progress |
| Black Branch-Chase City #2 | 20.0 | Mecklenburg | Dominion | Under Study | 2018 Q3 | Complete | Complete | In Progress |
| Black Branch-Chase City #3 | 20.0 | Mecklenburg | Dominion | Under Study | 2018 Q3 | Complete | Complete | In Progress |
| Brink | 80.0 | Greensville | Dominion | Under Study | 2018 Q3 | Complete | Complete | In Progress |
| Crystal Hill-Halifax | 44.7 | Halifax | Dominion | Under Study | 2018 Q3 | Complete | In Progress | |
| Halifax-Mt. Laurel | 51.0 | Halifax | Dominion | Under Study | 2018 Q3 | Complete | In Progress | |
| Halifax-Person | 29.2 | Halifax | Dominion | Under Study | 2018 Q3 | Complete | In Progress | |
| Halifax-Person | 75.1 | Halifax | Dominion | Under Study | 2018 Q3 | In Progress | | |
| Harmony Village | 15.0 | Middlesex | Dominion | Under Study | 2018 Q3 | In Progress | | |
| Smithfield | 20.0 | Isle of Wight | Dominion | Under Study | 2018 Q3 | In Progress | | |
| Chase City | 49.9 | Mecklenburg | Dominion | Under Study | 2018 Q4 | Complete | Complete | In Progress |
| Emporia-Trego | 80.0 | Greensville | Dominion | Under Study | 2018 Q4 | Complete | Complete | In Progress |
| Franklin | 91.0 | Southampton | Dominion | Under Study | 2018 Q4 | Complete | Complete | In Progress |
| Louisa-South Anna | 88.2 | Louisa | Dominion | Under Study | 2018 Q4 | Complete | Complete | In Progress |
| King's Fork | 15.0 | Suffolk | Dominion | Engineering | 2018 Q4 | Complete | Complete | Not Required |
| Gretna DP | 50.0 | Pittsylvania | Dominion | Under Study | 2018 Q4 | Complete | In Progress | |
| Stuarts Draft | 20.0 | Augusta | Dominion | Under Study | 2018 Q4 | Complete | In Progress | |
| Stuarts Draft-Waynesboro | 150.0 | Augusta | Dominion | Under Study | 2018 Q4 | Complete | | |
| Brink | 80.0 | Greensville | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Buckingham | 20.0 | Buckingham | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Fentress | 16.7 | Chesapeake | Dominion | Under Study | 2018 Q4 | In Progress | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Harmony Village | 20.0 | Middlesex | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Kings Fork | 15.0 | Suffolk | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Mt. Jackson | 15.7 | Shenandoah | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Nokesville | 20.0 | Prince William | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Oak Grove I | 20.0 | Westmoreland | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Oak Grove II | 20.0 | Westmoreland | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Oak Grove III | 15.0 | Westmoreland | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Old Church | 13.0 | King William | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Old Church | 20.0 | Hanover | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Pamplin | 15.7 | Appomattox | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Poe | 19.7 | Prince George | Dominion | Under Study | 2018 Q4 | In Progress | | |
| South Creek | 16.0 | Appomattox | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Welco | 10.0 | Halifax | Dominion | Under Study | 2018 Q4 | In Progress | | |
| Mount Eagle | 12.5 | Albemarle | Dominion | Engineering | 2019 Q1 | Complete | Complete | Not Required |
| Old Church | 17.0 | King William | Dominion | Engineering | 2019 Q1 | Complete | Complete | Not Required |
| Westmoreland | 20.0 | Westmoreland | Dominion | Engineering | 2019 Q1 | Complete | Complete | Not Required |
| Tasley | 20.0 | Accomack | DPL | Under Study | 2019 Q1 | Complete | In Progress | |
| Halifax-Person | 50.0 | Halifax | Dominion | Under Study | 2019 Q1 | Complete | | |
| Crystal Hill-Halifax | 64.7 | Halifax | Dominion | Under Study | 2019 Q1 | In Progress | | |
| Culpeper | 20.0 | Culpeper | Dominion | Under Study | 2019 Q1 | In Progress | | |
| Paytes | 20.0 | Orange | Dominion | Under Study | 2019 Q1 | In Progress | | |
| Standardsville-Pratts | 20.0 | Greene | APS | Under Study | 2019 Q1 | In Progress | | |
| Timberline | 20.0 | Rockingham | Dominion | Under Study | 2019 Q1 | In Progress | | |
| Reams | 80.0 | Dinwiddie | Dominion | Under Study | 2019 Q2 | Complete | Complete | In Progress |
| Waverly #2 DP | 50.0 | Sussex | Dominion | Under Study | 2019 Q2 | Complete | Complete | In Progress |
| Boykins | 8.5 | Southampton | Dominion | Under Construction | 2019 Q2 | Complete | Complete | Not Required |
| Mitchell-Mountain Run | 60.0 | Culpeper | Dominion | Under Study | 2019 Q2 | Complete | In Progress | |
| Mitchell-Mountain Run | 20.0 | Culpeper | Dominion | Under Study | 2019 Q2 | Complete | In Progress | |
| Perth-Hickory Grove | 60.0 | Halifax | Dominion | Under Study | 2019 Q2 | Complete | In Progress | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Perth-Hickory Grove | 20.0 | Halifax | Dominion | Under Study | 2019 Q2 | Complete | In Progress | |
| Smith Mountain-Candler's Mountain | 60.0 | Campbell | Appalachian | Under Study | 2019 Q2 | Complete | In Progress | |
| Smith Mountain-Candler's Mountain | 20.0 | Campbell | Appalachian | Under Study | 2019 Q2 | Complete | In Progress | |
| Mitchell DP | 80.0 | Culpeper | Dominion | Under Study | 2019 Q2 | Complete | | |
| Mt. Airy | 18.2 | Wythe | Appalachian | Under Study | 2019 Q2 | In Progress | | |
| Hopewell-Surry | 97.9 | Surry | Dominion | Under Study | 2019 Q3 | Complete | In Progress | |
| Gordonsville-Remington | 100.0 | Culpeper | Dominion | Under Study | 2019 Q3 | Complete | | |
| Gordonsville-Remington | 150.0 | Culpeper | Dominion | Under Study | 2019 Q3 | Complete | | |
| Chase City | 150.0 | Mecklenburg | Dominion | Under Study | 2019 Q3 | In Progress | | |
| Clover | 76.0 | Halifax | Dominion | Under Study | 2019 Q3 | In Progress | | |
| Hopewell-Surry | 150.0 | Surry | Dominion | Under Study | 2019 Q3 | In Progress | | |
| Clubhouse-Lakeview | 100.0 | Greensville | Dominion | Under Study | 2019 Q4 | Complete | Complete | In Progress |
| Double Tollgate | 10.0 | Clarke | Allegheny | Under Study | 2019 Q4 | Complete | Complete | Not Required |
| Stockton | 20.0 | Henry | Appalachian | Engineering | 2019 Q4 | Complete | Complete | Not Required |
| Altavista-Mt. Airy | 42.0 | Pittsylvania | Dominion | Under Study | 2019 Q4 | Complete | In Progress | |
| Briery--Farmville | 240.0 | Prince Edward | Dominion | Under Study | 2019 Q4 | Complete | In Progress | |
| Chickahominy | 320.0 | Charles City | Dominion | Under Study | 2019 Q4 | Complete | In Progress | |
| Harmony Village-Shackleford | 50.0 | King and Queen | Dominion | Under Study | 2019 Q4 | Complete | In Progress | |
| Mountain Run-Rex DP | 100.0 | Culpeper | Dominion | Under Study | 2019 Q4 | Complete | In Progress | |
| Septa | 240.0 | Isle of Wight | Dominion | Under Study | 2019 Q4 | Complete | In Progress | |
| Spotsylvania | 500.0 | Spotsylvania | Dominion | Under Study | 2019 Q4 | Complete | In Progress | |
| Bremo-Powhatan | 99.9 | Powhatan | Dominion | Under Study | 2019 Q4 | Complete | | |
| Disputanta-Waverly | 60.0 | Prince George | Dominion | Under Study | 2019 Q4 | Complete | | |
| Grassfield-Great Bridge | 150.0 | Chesapeake | Dominion | Under Study | 2019 Q4 | Complete | | |
| Harmony Village-Shackleford | 70.0 | King and Queen | Dominion | Under Study | 2019 Q4 | Complete | | |
| Ivor-Oakridge | 100.0 | Isle of Wight | Dominion | Under Study | 2019 Q4 | Complete | | |
| Louisa-North Anna | 99.9 | Louisa | Dominion | Under Study | 2019 Q4 | Complete | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Perth | 100.0 | Halifax | Dominion | Under Study | 2019 Q4 | Complete | | |
| Remington-Gainesville | 100.0 | Fauquier | Dominion | Under Study | 2019 Q4 | Complete | | |
| Septa | 240.0 | Isle of Wight | Dominion | Under Study | 2019 Q4 | Complete | | |
| Bakers Pond-Ivor | 68.0 | Sussex | Dominion | Under Study | 2019 Q4 | In Progress | | |
| Culpeper | 20.0 | Culpeper | Dominion | Under Study | 2019 Q4 | In Progress | | |
| Harmony Village-Shackleford | 50.0 | Gloucester | Dominion | Under Study | 2019 Q4 | In Progress | | |
| Kings DP | 77.0 | King William | Dominion | Under Study | 2019 Q4 | In Progress | | |
| Lynbrook | 15.0 | Campbell | Appalachian | Under Study | 2019 Q4 | In Progress | | |
| Mountain Run-Rex DP | 150.0 | Culpeper | Dominion | Under Study | 2019 Q4 | In Progress | | |
| North Shenandoah-Stanley | 20.0 | Page | Allegheny | Under Study | 2019 Q4 | In Progress | | |
| Page-Bethel 1 | 100.0 | Page | Allegheny | Under Study | 2019 Q4 | In Progress | | |
| Smith Mountain-Bearskin | 120.0 | Pittsylvania | Appalachian | Under Study | 2019 Q4 | In Progress | | |
| Turner | 20.0 | Henrico | Dominion | Under Study | 2019 Q4 | In Progress | | |
| Halifax-Person | 70.0 | Halifax | Dominion | Under Study | 2020 Q1 | In Progress | | |
| Grassfield | 20.0 | Chesapeake | Dominion | Engineering | 2020 Q4 | Complete | Not Required | Not Required |
| Elmont | 80.0 | Hanover | Dominion | Under Study | 2020 Q4 | Complete | In Progress | |
| Clover-Halifax | 80.0 | Halifax | Dominion | Under Study | 2020 Q4 | In Progress | | |
| Fentress | 70.0 | Chesapeake | Dominion | Under Study | 2020 Q4 | In Progress | | |
| Hopewell-Surry | 150.0 | Surry | Dominion | Under Study | 2020 Q4 | In Progress | | |
| Meadow Brook-Strasburg | 75.0 | Frederick | Allegheny | Under Study | 2020 Q4 | In Progress | | |
| Sapony | 74.9 | Sussex | Dominion | Under Study | 2020 Q4 | In Progress | | |
| Stonewall-Long Mountain | 55.0 | Appomattox | Appalachian | Under Study | 2020 Q4 | In Progress | | |
| Jacksons Ferry 1 | 75.0 | Wythe | Appalachian | Under Study | 2021 Q4 | Complete | In Progress | |
| **TOTAL MEGAWATTS** | **7,950.8** | | | | | | | |

## Solar Energy Projects Withdrawn from the PJM Generation Interconnection Queue

| Project Name | MW | County | In Service Date | Withdrawal Date | Feasibility Study | Impact Study | Facility Study |
|---|---|---|---|---|---|---|---|
| Hopewell-Surry | 80 | Prince George | 2021 Q4 | 10/13/2017 | Complete | Complete | Complete |
| Westmoreland | 20 | Westmoreland | 2020 Q4 | 5/25/2017 | Complete | Complete | Complete |
| Garner-Lancaster | 100 | Lancaster | 2019 Q4 | 6/12/2017 | Complete | | |
| Chickahominy | 20 | Unknown | 2019 Q4 | 6/7/2017 | Complete | Complete | Complete |
| Saddler | 100 | Southampton | 2019 Q4 | 3/29/2017 | | | |
| Culpeper | 15 | Unknown | 2019 Q4 | 3/27/2017 | Complete | Complete | Not Required |
| Battle Town | 100 | Clarke | 2019 Q4 | 3/24/2017 | | | |
| Hickory | 20 | Chesapeake | 2019 Q2 | 10/6/2017 | | | |
| Hickory | 12 | Chesapeake | 2019 Q2 | 10/6/2017 | | | |
| Harmony Village | 17.5 | Middlesex | 2019 Q2 | 3/30/2017 | | | |
| Mt. Airy | 50 | Wythe | 2019 Q2 | 11/22/2016 | | | |
| Morgan's Cut | 60 | Pulaski | 2019 Q2 | 11/22/2016 | | | |
| Fentress | 15 | Chesapeake | 2018 Q4 | 10/20/2017 | Complete | Complete | not required |
| Hickory | 20 | Chesapeake | 2018 Q4 | 10/20/2017 | Complete | Complete | not required |
| Ridgeway-Dan River | 20 | Pittsylvania | 2018 Q4 | 10/4/2017 | Complete | | |
| Handsome | 75 | Southampton | 2018 Q4 | 7/18/2017 | Complete | Complete | |
| Handsome-Southampton | 130 | Southampton | 2018 Q4 | 7/18/2017 | Complete | | |
| Bakers Pond-Ivor | 85 | Southampton | 2018 Q4 | 7/7/2017 | Complete | Complete | |
| Chase City | 49.9 | Mecklenburg | 2018 Q4 | 4/10/2017 | Complete | | |
| Boykins | 60 | Southampton | 2018 Q4 | 12/13/2016 | Complete | Complete | |
| Chase City-Kerr Dam | 49 | Mecklenburg | 2018 Q4 | 10/11/2016 | Complete | | |
| Chatham | 15 | Pittsylvania | 2018 Q3 | 5/8/2017 | Complete | | |
| Smithfield-Surry | 160 | Isle of Wight | 2018 Q3 | 10/11/2016 | Complete | | |
| Buckhorn-Lonesome Pine | 100 | Tazewell | 2018 Q2 | 8/30/2017 | Complete | | |
| Mount Eagle | 11 | Albemarle | 2018 Q2 | 8/10/2017 | | | |
| Chase-City-Twittys Creek | 100 | Mecklenburg | 2018 Q2 | 6/21/2017 | Complete | | |
| Double Toll Gate | 20 | Clarke | 2018 Q2 | 6/20/2017 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Wallops Island | 20 | Accomack | 2018 Q1 | 9/26/2016 | Complete | | |
| Tasley-Oak Hall I | 20 | Accomack | 2018 Q1 | 9/26/2016 | Complete | | |
| Tasley-Oak Hall II | 20 | Accomack | 2018 Q1 | 9/26/2016 | Complete | | |
| Myrtle-Windsor | 50 | Isle of Wight | 2017 Q4 | 7/21/2017 | Complete | Complete | |
| Clubhouse-Freeman | 40 | Greensville | 2017 Q4 | 7/11/2017 | Complete | Complete | |
| Clubhouse-Freeman | 40 | Greensville | 2017 Q4 | 7/11/2017 | Complete | Complete | |
| Crittenden | 10 | Isle of Wight | 2017 Q4 | 4/11/2017 | Complete | | |
| Culpeper | 20 | Culpeper | 2017 Q4 | 3/27/2017 | Complete | In Progress | |
| Culpeper | 20 | Culpeper | 2017 Q4 | 3/27/2017 | Complete | In Progress | |
| Grassfield | 20 | Chesapeake | 2017 Q4 | 5/5/2016 | | | |
| Wakefield | 10 | Surry | 2017 Q4 | 5/3/2016 | Complete | | |
| Harrisonburg-Stauton | 20 | Rockingham | 2017 Q4 | 4/26/2016 | Complete | | |
| Culpeper | 15 | Culpeper | 2017 Q4 | 3/30/2016 | | | |
| Wakefield | 10 | Surry | 2017 Q4 | 11/16/2015 | | | |
| Emporia-Trego | 80 | Greensville | 2017 Q4 | 9/28/2015 | | | |
| Boykins-Murphy | 50 | Southampton | 2017 Q2 | 6/19/2017 | | | |
| Catoctin | 20 | Frederick | 2017 Q2 | 6/2/2016 | | | |
| Indian River-Nelson | 80 | Sussex | 2017 Q2 | 5/20/2016 | | | |
| Emmitsburg Taneytown | 13.8 | Frederick | 2017 Q1 | 11/9/2016 | Complete | Complete | |
| Old Church | 5 | Hanover | 2017 Q1 | 3/31/2016 | Complete | | |
| Hickory | 20 | Chesapeake | 2016 Q4 | 9/29/2016 | Complete | Complete | Complete |
| Unionville | 10 | Orange | 2016 Q3 | 4/4/2016 | Complete | | |
| Boykins | 20 | Southampton | 2016 Q3 | 10/5/2015 | Complete | | |
| Boykins | 20 | Southampton | 2016 Q3 | 8/14/2015 | | | |
| Tasley-Kellam | 20 | Accomack | 2016 Q3 | 8/29/2014 | Complete | Complete | Not Required |
| Watkins Corner | 20 | Southampton | 2015 Q4 | 10/2/2015 | Complete | | |
| Louisa | 20 | Louisa | 2015 Q4 | 5/21/2015 | | | |
| Wakefield | 20 | Sussex | 2015 Q4 | 5/21/2015 | | | |
| **Megawatts Withdrawn** | **2,218.20** | | | | | | |

## Energy Storage Projects in the PJM Generation Interconnection Queue

| Project Name | MW | County | In Service Date | Feasibility Study | Impact Study | Facility Study |
|---|---|---|---|---|---|---|
| New Church | 20 | Accomack | 2016 Q4 | Complete | Complete | In Progress |
| Columbia | 2 | Louisa | 2017 Q1 | Not Required | Not Required | Not Required |
| Stuarts Draft-Waynesboro | 150 | Augusta | 2018 Q4 | In Progress | | |
| **Megawatts Total** | **172** | | | | | |

## Energy Storage Projects Withdrawn from the PJM Generation Interconnection Queue

| Project Name | MW | County | In Service Date | Withdrawal Date | Feasibility Study | Impact Study | Facility Study |
|---|---|---|---|---|---|---|---|
| Glen Lyn | 10 | Giles | 2016 Q4 | 7/24/2015 | Complete | Complete | |
| Tasley | 4 | Accomack | 2016 Q4 | 10/16/2017 | Complete | Complete | In Progress |
| Kellam - Bayview | 20 | Northampton | 2013 Q4 | 7/3/2012 | Complete | | |
| **Megawatts Withdrawn** | **34** | | | | | | |

# 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.