Virginia Solar Energy Development and Energy Storage Authority

2020 Annual Report

Virginia Solar Energy Development and Energy Storage Authority
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2020 Annual Report of the Solar Energy Development and Energy Storage Authority

A. OVERVIEW OF THE AUTHORITY

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

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

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

B. LOCAL REGULATION

The Authority's September 8, 2020 Meeting featured a presentation by Ms. Carrie Hearne, the Solar Program Manager for the Division of Energy for the Virginia Department of Mines, Minerals & Energy (DMME), titled *Creating Balanced Guidance for Localities on Solar Energy Development.*

1. U.S. DOE *SOLSMART* TECHNICAL ASSISTANCE PROGRAM

The U.S. DOE *SolSmart* technical assistance program provides no-cost technical guidance to communities to help them implement utility scale and distributed solar and reduces costs for solar. Ms. Hearne of DMME discussed how the program works, and how communities can request a consultation through the SolSmart program.

2. FUNDING OPTIONS REGARDING UTILITY SCALE SOLAR

Ms. Hearne then discussed the new revenue share structure for utility scale solar, which localities can adopt that would replace the current machinery and tool tax assessment for solar projects. She explained that because of the complexities of comparing whether the Machinery and Tools (M&T) tax or the revenue share model is the better option for localities, that DMME, UVA and other key stakeholders are developing a "SolTax" tool to help localities determine which tax option is best for them. They anticipate beta testing the tool in the fall of 2020.

3. PERMITTING REGARDING UTILITY SCALE SOLAR

The third part of Ms. Hearne's presentation described the statewide solar survey under development with the support of the Weldon Cooper Center at UVA and the UVA Center for Survey Research. The survey will be used to gather a wide range of data on all types of solar under development, as well as related information such as model solar ordinances, information that localities might need such as decommissioning, solar on brownfields, and other conservation related issues.

Ms. Hearne asked whether the Authority would consider working with the DMME/UVA team to provide feedback and direction on how to advance stakeholder engagement on the creation of a model solar ordinance, decommissioning plans, assistance developing revenue share ordinance language, etc., and other issues outside the scope of the Permit by Rule permitting process. After a lengthy discussion, it was decided that members interested in working on such a stakeholder process would contact Ms. Hearne directly in their individual capacities and not as members of the Authority. The Authority would revisit the topic in the future to address whether any formal action need to be made.

C. STATE REGULATION

1. CONSTRUCTION AUTHORIZATION FOR UTILITY SCALE SOLAR (PBR)

During 2020, activity concerning state regulation for utility scale solar has focused on developments regarding the Department of Environmental Quality's Permit by Rule.

The process commenced on January 14, 2019, when the Department of Environmental Quality (DEQ) issued a Notice of Intended Regulatory Action (NOIRA) Agency Background Document to amend the Small Renewable Energy Projects (Solar) Permit by Rule process (PBR). The original regulations for this process as codified in 9VAC15-60 were developed through a Regulatory Advisory Panel (RAP) in 2012. Since that time, the number of utility scale solar projects being permitted in Virginia has increased dramatically, and the range of projects that fall within the PBR process has increased from an initial range of 5 to 20 MWs to a new range of 5 MW to 150 MWs[1].

In order to address the increased permitting workload for DEQ and other agencies, and to account for the larger footprint and the types of land being incorporated into such projects, it was determined that amendments to the regulations were required. DEQ's stated purpose of the regulatory action was to "clarify specific definitions, establish clear timeframes for data submittals and recordkeeping activities, provide clarity for natural and cultural resource studies, clarify the public participation procedures, and address the fee structure to adequately fund the program."

On May 27, 2019 DEQ advised that it was seeking public comment on any issue regarding the PBR regulations. They also advised they would again use a RAP process to develop recommended amendments to the regulations and that they were requesting those interested in serving on the RAP provide submissions of interest.

On July 23, 2019, fifteen individuals were selected to serve on the RAP. Those selected included five individuals representing the interests of firms developing solar projects, five individuals representing environmental organizations, and five others representing Virginia governmental agencies, associations, and the Virginia Solar Energy Development and Energy Storage Authority.

[1] 2017 legislation raised the maximum capacity of a project from 100 MW to 150 MW.

Public meetings were held between August of 2019 and February of 2020, and in May 2020, DEQ published the current draft of proposed regulations. These Proposed regulations are currently being reviewed by the Secretary of Natural Resources. When that review is complete, the proposed regulations will be published in the Virginia Register, and there will be a 60-day public comment period. The major issues addressed within the current draft are listed in table below:

Issue	Proposed change
Administrative issues in definitions and throughout regulations	Many minor changes to address wording and references.
Definitions for "Begin construction", "Disturbance zone", and "land-disturbing activity"	Amend the definitions to make it clear which activities trigger start of construction, and which areas are to be included within the permitted area.
Notice of Intent	Amend to create a trigger for when NOI must be issued to DEQ by developer.
Duration of permit	Amend to invalidate permit if construction is not begun within a specific timeframe or maintained. DEQ may grant extensions.
Virginia Department of Historic Resources (DHR) approval delays	Amend to allow streamlined process and to require that comments from DHR be provided within a certain time limit.
Environmental concerns	Amend to require a desktop survey of Virginia Natural Lands Assessment Ecological Cores. It is not clear what would require mitigation or the method of mitigation.
Environmental concerns	Amend to require a Department of Conservation and Recreation (DCR) Virginia Solar Site Pollinator/Bird Habitat Scorecard for the project.
Modification of fee structure	Amend to provide more required funds to sustain the permitting program.

Feedback that the DEQ has received on the proposed regulations includes the February 13, 2020 letter that the utility scale solar industry in Virginia provided to DEQ Director David Paylor addressing their concerns relating to four specific issues in what has become the Proposed Regulations. The industry feels that the Proposed Regulations “if enacted in 2020, have the

potential to impact Governor Northam's stated goals of producing 30 percent of Virginia's electricity from renewable energy sources by 2030 by potentially affecting every solar project with a construction start date after January 1, 2021." The issues addressed by the industry are as follows:

1) Increase in fees – The proposed fee structure would increase fees for larger project tenfold. The development cycle for most of these projects is 3-5 years and these projects have been moving forward through the interconnection process and local permitting process with the assumption that the fees would be as stated in the current regulation.

2) Ecological core impact analysis – Some industry members explained that they do not support the proposed analysis of "intersections" with ecological core areas under the proposed Rule 40 C. This language would appear to trigger a finding of adverse environmental impacts and an undefined mitigation requirement if a solar development is located in an
"ecological core area." These areas are pervasive throughout the Commonwealth, and it seems that few projects could be developed without impacting a core area. The industry's understanding is that analysis of core area impacts and mitigation is not required under any other Virginia permitting program.

3) Pollinator scorecard analysis – The industry expressed concerns with mandatory minimum pollinator score requirements as conditions precedent to permit coverage due to the potential costs which could be project altering.

4) Predicted suitable habitat analysis – The industry also explained that the "predicted suitable habitat" analysis was not discussed during the PBR RAP discussions, and they do not support its inclusion in the regulation.

2. STORAGE REGULATIONS DOCKET

Virginia Clean Economy Act (VCEA) Energy Storage Parameters

The VCEA contains energy storage targets to be achieved by December 31, 2035 and requires that each utility petition the State Corporation Commission (SCC or Commission) for the necessary approvals to construct or acquire the following minimum energy storage capacity: 400 MW by Appalachian Power (APCo) and 2,700 MW by Dominion Energy. The storage portfolios must meet the following criteria:

- At least 35% of the energy storage facilities must be purchased by the public utility from a party other than a public utility or owned by a party other than a public utility that sells its capacity to the utility.

- No single energy storage project to exceed 500 megawatts in size, except that Dominion may procure a single energy storage project up to 800 megawatts.
- Each utility's annual Renewable Portfolio Standard (RPS) Plan must include its plan to meet these energy storage project targets, including the goal of installing at least 10 percent of such energy storage projects behind the meter.

The VCEA requires the SCC to adopt energy storage regulations by January 1, 2021.These regulations must include the following items:

- Interim targets
- Updates to existing utility planning and procurement rules.
- Programs and mechanisms to deploy energy storage, including competitive solicitations, behind-the-meter incentives (BTM), non-wires alternatives programs (NWA), and peak demand reduction programs.

SCC Proposed Energy Storage Rules

On September 11, 2020, the SCC in Case No. PUR-2020-00120 published its proposed rules for deployment of energy storage. They are summarized below:

Interim Targets for Energy Storage Deployment for APCo

December 31, 2025: 25 MW

December 31, 2030: 150 MW

December 31, 2035: 400 MW

Interim Targets for Energy Storage Deployment for Dominion Energy Virginia (Dominion)

December 31, 2025: 250 MW

December 31, 2030: 1,200 MW

December 31, 2035: 2,700 MW

Key Points

- Broad definition of energy storage resources and no restrictions on what technologies will count towards the capacity goals
- Does not indicate maximum project size, therefore it would default to the legislative limit of 500 MW generally and 800 MW for Dominion
- Utility-affiliated interests do not count towards 35% non-utility goal
- Utilities must issue at least one solicitation for storage resources each year

- Commission has agreed with utility suggestion that non-utility facilities over 100 KW must obtain a permit or a Certificate of Public Convenience and Necessity (CPCN) from the SCC
    - Projects should also meet criteria of the Environmental Justice Act (Code §2.2-234)
- Licensing requirement for aggregators
    - Plus list of customer disclosure requirements

Comments Submitted to the SCC

A large number of comments were submitted to this docket, with four organizations, Delorean Power, the US Energy Storage Association (ESA), APCo and Dominion, also filing proposed regulations.[2] The utilities filed a joint proposal and the Commission's proposed regulations largely align with their suggestions. The interim storage targets set by the Commission match the utility suggested amounts where other parties, including Advanced Energy Economy (AEE), Maryland-DC-Delaware-Virginia Solar Energy Industries Association (MDV SEIA) and ESA, had suggested more aggressive targets, believing they would provide a greater opportunity for utilities to gain experience in the storage field and act as a better incentive for the storage industry to expand into Virginia. The 2019 Virginia Energy Storage Study, prepared for this Authority, identified 1,000MW of storage deployment across the Commonwealth by 2030 to be an optimal target, therefore, the Commission's proposals align with this finding and then apply the additional VCEA-mandated capacity to the period 2030-2035. Most respondents who addressed the issue recommended that acquisitions from utility-affiliated interests not count towards the minimum 35% non-utility owned procurement requirement and the Commission incorporated this recommendation into its draft regulations, while Dominion and APCo noted that the regulations should not contain any limitations on the acquisition of energy storage facilities or purchases of capacity from utility-affiliated interests and noted that such acquisitions or approvals would be subject to Commission approval under the Affiliates Act.

The bulk of the SCC's regulations adopted the regulations for permitting non-utility energy storage projects that were proposed by the utilities (Dominion and APCo), as well as their proposed licensing requirements for energy storage aggregators. Some commenters, including the Virginia Cooperative Association and Able Grid Solutions, considered permitting of non-utility projects to be appropriate and cited DEQ's Permit-By-Rule (PBR) process for projects

[2] Commenters included Dominion and APCo (jointly),Virginia Electric Cooperatives, Virginia Dept. of Mines, Mineral and Energy, Environmental Advocates (Southern Environmental Law Center, Appalachian Voices, the Virginia Conservation Network, the Chesapeake Climate Action Network, the Virginia League of Conservation Voters, the Piedmont Environmental Council, the Rappahannock League for Environmental Protection, and the National Parks Conservation Association), Sierra Club, Solar United Neighbors, Advanced Energy Economy, Virginia Oil and Gas Association, Maryland-DC-Delaware-Virginia Solar Energy Industries Association, US Energy Storage Alliance, LS Power, Delorean Power, ES Volta, Highland Electric Transportation, Grid Alternatives, Able Grid Energy Solutions, Institute for Policy Integrity at New York University School of Law and Cliona Robb.

under 150 MW as a potential model for a streamlined process. Others, including AEE, MDV-SEIA and the Environmental Advocates did not consider new regulations on non-utility permitting to be necessary at this time but did recommend that the Commission identify and address any rules that would prohibit storage resources from being developed. The wide scope of the SCC's proposed regulations on the energy storage permitting process for non-utility projects and the size of project it applies to (any project greater than 100KW) may be the source of considerable debate during the next comment period if storage developers and clean energy advocates perceive these rules to be inhibitive to development.

The draft regulations adhere to a broad definition of energy storage resources per the request of most of the respondents. Pumped-hydro has been cited by some commenters as a resource to be excluded, with Delorean Power additionally suggesting that projects should be limited to 50 MW of capacity compared to the 500 MW limit set forth in the VCEA legislation. The New York University (NYU) Institute for Policy Integrity has highlighted that storage resources are not equal in terms of their emissions impact and has recommended that marginal emissions impacts be reported by the utility, accounting for the emissions from the charging resource and the energy spent in building, maintaining and deploying the stored charge. They state that the Commission should create rules that restrict or prohibit the participation of resources with high marginal emissions. NYU and esVolta have encouraged the Commission to consider the Massachusetts Clean Peak Standard (CPS) as a possible model for how to address this issue. In the draft rules there are provisions for utilities and developers to report on emissions but there is no indication of how that information will be assessed in regard to project approval.

Many entities have recommended that the utility planning and procurement processes be amended to identify where energy storage can provide more efficient alternatives to the further deployment of generation, distribution or transmission resources. The draft regulations require utilities to document the "location and effect on the transmission grid of an energy storage facility" but there is no prescribed standard for deciding where certain storage technologies could be optimally deployed. AEE, MDV-SEIA, ESA and Able Grid Service Solutions have recommended that the utilities should include sub-hourly modeling in their planning process to potentially avail storage technologies that can act as regulation reserves, spinning reserves or provide load-following services. Additionally, these commenters recommend that pricing schemes for storage are updated on an annual basis to reflect the rapid price changes the industry is likely to experience. AEE and ESA have observed that BTM resources are not currently accounted for separately in the planning process rather their contribution is subsumed in the load forecasts. They recommend modeling BTM as a separate capacity resource moving forward. The proposed regulations require the utilities to include their plan for attaining the storage goals in their Integrated Resource Plans (IRP), per the statute, but they do not include any additional instructions or requirements.

To expand opportunities for storage resources to compete across all grid services, AEE and ESA have recommended moving towards all-source procurement and using a net cost of capacity calculation as these approaches would enable storage resources to participate in all utility solicitations and account for their flexibility as a grid resource. In their draft rules, the Commission has indicated that there would be a dedicated storage solicitation each year and there is no indication that they are considering implementing changes to the wider procurement process.

The VCEA created new planning requirements for the mandated clean energy goals, including the storage goals, as § 56-585.5 D 4. One of the requirements was to outline the plan for achieving "the goal of installing at least 10 percent of such energy storage projects behind the meter". AEE, ESA and MDV-SEIA have recommended that the Commission include this threshold as part of the overall and interim targets but this is not included in the proposed regulations, therefore suggesting that the 10% BTM goal is not a mandatory requirement. Additionally, a number of respondents recommended that priority be given to BTM projects that address resilience, such as response to natural disasters or support medically-necessary equipment, however, resilience is not identified as a criteria for assessment in the proposed regulations.

SCC Proposed Regulations and Comments on Proposed Regulations

After considering draft regulations filed by utilities and other interested parties, the SCC published proposed regulations on September 11, 2020. In early November 2020, several parties filed comments and objections to the SCC's draft regulations. Comments were filed by, among others, utilities, energy storage developers, legislators, data centers, and environmental organizations. Those expressing concerns about the proposed regulations sought to have the SCC adopt more aggressive interim goals for the deployment of energy storage, simplify the permitting process, and increase transparency during the bidding process. Several parties, including the DMME, requested that the SCC reconsider the proposed regulatory requirements for non-utility storage facilities. DMME was concerned that the SCC's draft regulations would impose unnecessarily onerous permitting requirements on small facilities that have little environmental impacts and no impact on ratepayers. The utilities generally supported the proposed rules, saying the graduated approach to energy storage deployment more closely mirrors the development of the technology and plans for procurement. The utilities also continued to request that the regulations not impose restrictions on purchases from affiliates that were not included in the legislation. The Commission Staff issued its report on the proposed regulations on November 16, 2020. Overall, Staff generally supported maintaining the regulations as proposed, though it also removed the language that utility affiliates do not count toward 35% non-utility requirement and increased the trigger for requiring a permit to 1 MW (up from 100

kW). Staff stated that accelerating the interim targets as proposed by legislators and others is a policy question for the Commission.

The deadline for the SCC to promulgate final regulations is January 1, 2020.

3. Interconnection of Small Renewable Energy Generators Docket

On July 29, 2020 in Case No. PUR-2018-00107, the SCC adopted revised regulations governing the Interconnection of Small Electric Generators. Significant revisions adopted by the SCC included removing the 20 MW size limit for a small generating facility, adding energy storage as an applicable technology, facilitating improved efficiency of interconnection study processing through prioritizing on-interdependent projects, allowing developers to request a pre-application report on the suitability of a site, having the utility annually report queue status to the SCC Staff, and adopting new forms and revised fees. The SCC declined to adopt revisions requested by electric cooperatives; such revisions would have required interconnecting customers to pay ongoing operation and maintenance costs for the existing distribution plants, separate from upgrades related to the project being interconnected. On October 26, 2020 in SCC Case No. PUR-2020-00154, the SCC issued a Final Order rejecting attempts by Shenandoah Valley Electric Cooperative (SVEC) to impose ongoing operation maintenance costs for SVEC's existing distribution plant as a condition of interconnecting a Dogwood Solar project.

4. Shared Solar Dockets

In an effort to bring the benefits of solar energy to a broader range of customers, the General Assembly in its 2020 session approved legislation for two different types of community solar programs permitting third-party owned and operated 3 MW to 5 MW solar facilities that are located in a utility's service territory to sell their output to individuals or organizations on a subscription basis.

One was the "shared solar" program (§ 56-594.3 - applicable only to Dominion), which reserves at least 30% of the output for low-income customers. The other was the "multi-family" program (§ 56-585.1:11 - applicable to Dominion and to Kentucky Utilities serving Southwest Virginia), which allows residents of apartment buildings and condominiums to share the output of a solar array located on the premises or next door. These programs are in addition to provisions that previously authorized utility community solar programs, which are discussed in "Utility Administrated Community Solar" in Section E 9 of this Report.

Features of the shared solar program, which is being addressed in SCC Case No. PUR-2020-00125, include the following:

- Only applies to Dominion territory
- Dominion will be the program administrator, overseeing items including the billing arrangements and the interconnection process
- At least 30% of subscribers must be low-income customers
- Program initially capped at 150MW of generation but an additional 50MW can be approved by the Commission if the low-income target (which equates to 45MW of generation) is met
- Utility administers a bill credit based on a subscriber's proportional share of the output from the shared solar facility to which they subscribe
- As part of the proceeding, the Commission is to establish a minimum bill that will represent the utility's fixed infrastructure and administration costs
    - Low-income customers are to be exempt from minimum bill
- Program will be fully operational when Dominion completes development of its new Customer Information Platform (CIP) on or before July 1, 2023. Projects can start development sooner than that, but subscribers will not start receiving generation from them until the CIP is in place.

Features of the multi-family solar program, which is being addressed in SCC Case No. PUR-2020-00124, include the following:

- Dominion and Old Dominion Power (ODP) territories
- Utilities will be the program administrators and administer bill credits based on a subscriber's proportional share of the output from the shared solar facility
- No low-income requirement
- No cap on the overall size of the program
- Minimum billing is not required but utilities have requested a mechanism like the minimum bill to account for fixed costs
- The solar facility must be located on or adjacent to the multifamily premises
- Program will start six months after regulations are finalized (so probably July 1, 2021).

This legislation requires the SCC to establish final rules for the programs by January 1, 2021. On July 1 the SCC began rulemaking proceedings for the two programs. Proposed rules for both programs were released on September 21, 2020 with comments on such rules due by November 2, 2020.

The SCC proposed rules largely tracked the draft rules submitted by Dominion on August 14, 2020. While all parties were invited to provide draft rules, most others did not. Comments expressing reservations about the proposed rules were filed on November 2, 2020 by the Sierra Club, Environmental Advocates, MDV-SEIA, on November 4, 2020 by the Virginia Clean Advisory

Board and the DMME, and on November 5, 2020 by Senators McClellan and Surovell and Delegates Sullivan, Jones, Keam and Lopez.

Concerns regarding the proposed rules for the shared solar program include the minimum bill amount being undetermined and subject to change on an annual basis. One option suggested to address this concern includes having an evidentiary hearing to determine upfront what the costs and thus what the minimum bill will be, permitting developers to know at the outset if the minimum bill is so high the program will not work. Another option suggested for addressing the minimum bill issue is for the SCC to adopt the approach followed by other states that set the minimum bill upfront at a level that still saves customers some money, thereby encouraging the development of shared solar projects. Under this second approach, Dominion could, during its triennial rate review cases, seek to adjust rates to recover its costs.

Concerns regarding the proposed rules for the multi-family solar program include adopting Dominion's proposal to define the required administrative costs charge in a manner similar to the minimum bill in the shared solar program. Those representing customers argued that utilities are not authorized to impose a minimum bill amount and instead are only permitted to collect from the program provider "reasonable costs of administering the program". Costs such as standby generation and balancing charges do not constitute program administration costs.

5. GRID MODERNIZATION DOCKET

On March 26, 2020 in Case No. PUR-2019-00154, the SCC issued its Final Order partially approving Dominion's Grid Transformation Plan.

The SCC approved these Dominion projects:

- *Customer Information Platform (CIP*). The SCC approved Dominion implementing a new software platform for customer service or CIP, noting that Dominion's system is nearing obsolescence and a new platform will facilitate better data flows for customers and the Company, which should help to deliver the full benefits of Distributed Energy Resource (DER) integration, deployment of modern meters, better energy efficiency programs, and other customer benefits.
- *Smart Charging Pilot Program*. The SCC approved Dominion implementing this rebate program for EV charging infrastructure projects, which also entails Dominion installing and operating four fast charging stations of its own.
- *Hosting Capacity Analysis*. The SCC approved Dominion conducting a study to ascertain the volume of DERs that can be integrated across the grid.
- *Strengthening Cyber Security Protections*. The SCC approved measures to strengthen the security of the grid.

- *Improving service reliability through certain grid hardening projects.* The SCC approved certain grid hardening projects that will increase service reliability, including:
    - main feeder line hardening (11 projects)
    - targeted corridor improvements/vegetation management
    - voltage island mitigation
- *Locks Campus Microgrid*. The SCC approved a microgrid project to study efficacy and impact on the grid.
- *Stakeholder engagement/customer education*: The SCC approved stakeholder and customer engagement and education related to the approved programs.

The SCC denied approval, without prejudice to resubmit, these elements of the Dominion Plan:

- *Advanced Metering Infrastructure (AMI*). The SCC appeared to base its rejection of the Company's request to recover for AMI meters as grid transformation projects on the lack of compelling evidence that the benefits of the new meters would outweigh their costs, especially without a full rollout of systemwide Time-of-Use (TOU) rates, which the SCC described as the primary benefit of AMI meters. A pilot TOU rate has since been approved.
- *Intelligent Grid Devices.* The SCC rejected the Company's request for approval of intelligent grid devices that would promote a self-healing grid and advanced analytics of grid performance. The Company explained that these proposed devices would help modernize the grid by assisting with the integration of DERs and enabling the use of AMI data for load management. The SCC based its rejection on its view that these capabilities are not justified at this point, given a lack of evidence on DER trends and their rejection of AMI meters as a grid transformation project.
- *Certain Grid Hardening and Related Telecom Projects.* The SCC declined to approve certain proactive component upgrades that were part of the Company's grid hardening plan, as well as any telecommunications upgrades associated with the projects that were not approved.

6. DOMINION IRP

On May 1, 2020, Dominion filed its 2020 Integrated Resource Plan (IRP) in SCC Case No. PUR-2020-00035. Per Virginia law, the SCC must review the plan and determine whether it is "reasonable" and "in the public interest."

Current Energy Mix and Development Plans

Per the IRP, solar accounted for 1% of Dominion's overall capacity and energy mix in 2019 with pumped storage accounting for 9% of capacity and 2% of actual energy use.

Figure 5.1.1.2 - 2019 Actual Capacity Mix

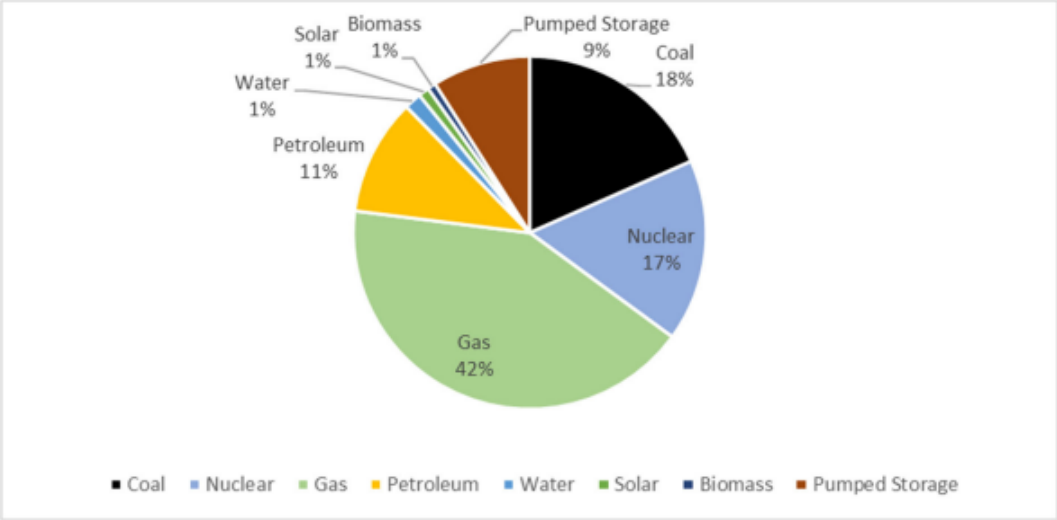
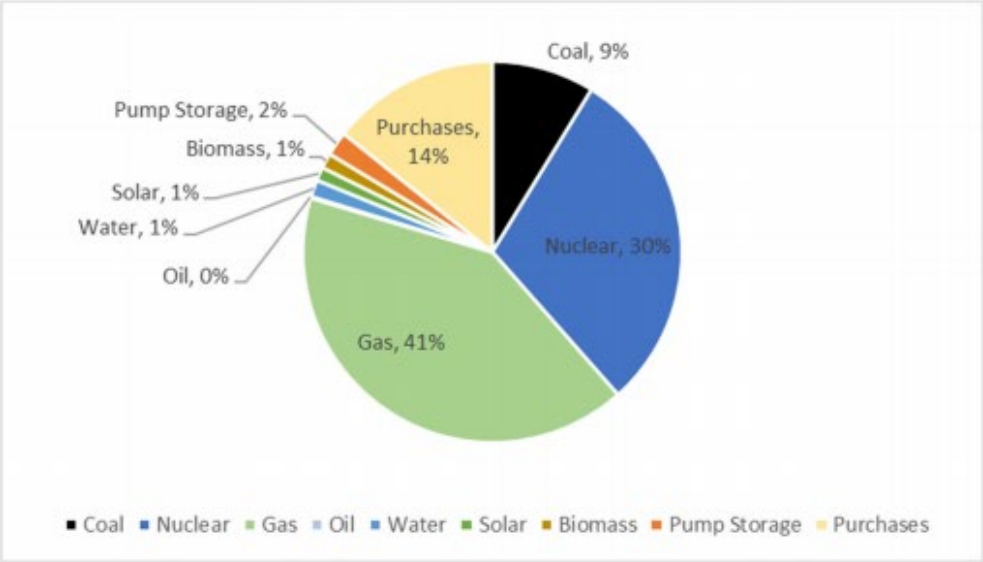


Figure 5.1.1.3 - 2019 Actual Energy Mix



Per Dominion's IRP the Company currently has three solar or storage projects under construction:

- Spring Grove 1 Solar Project
- Sadler Solar Project
- Battery Energy Storage System at Scott Solar Facility

Dominion intends to bring 50 electric school buses to 16 localities by the end of 2020 and one of the program's intentions is to gain experience with vehicle-to-grid (V2G) technology that leverages bus batteries to store and inject energy onto the grid during periods of high demand when the buses are not needed for transport. Additionally, the Company is continuing to conduct feasibility studies for a potential pumped storage facility at a site in Tazewell County. The Company also states that, at present, it considers lithium-ion batteries and pumped storage to be the most commercially viable energy storage technologies for utility-scale projects.

Discussion of Issues related to Solar and Storage

In its assessment of future capacity issues, Dominion indicates that solar contributes significantly to meeting peak demand in the summer but barely contributes to meeting winter peak demand. The Company goes on to say that as it adds more solar, these seasonal differences will result in the system having excess capacity in the summer and not enough capacity in the winter.

Dominion discusses the possibility of an extensive buildout of storage to address the winter capacity deficit. But it notes that significant development of storage resources could result in an "overbuilt system," meaning a system with higher resource nameplate capacity compared to peak load. The Company indicates that it could meet future winter capacity challenges by purchasing capacity from the PJM market to fill the deficit.

Dominion describes how wider use of Distributed Energy Resources (DERs) will require fundamental changes to the electric grid. Specifically, the Company advocates for expanding two-way communication capability between meters and the grid and a more intelligent grid in general (see update on PUR-2019-00154 for more information on the current status of grid modernization programs).

Next Steps

The SCC scheduling order in Case NO. PUR-2020-00035 called for comments on the IRP to be submitted by October 20, 2020 and for a public hearing.

During the public hearing conducted on October 27th to October 30th, parties debated the reasonableness of Dominion's plans to comply with the VCEA. The Attorney General's Division of Consumer Counsel ("Consumer Counsel") and environmental respondents questioned Dominion's proposal to continue operating several coal-fired power plants, including its newest coal plant, the Virginia City Hybrid Energy Center. The Consumer Counsel's witness testified that the continued operation of the Virginia City Hybrid Energy Center would result in a *negative* ratepayer value of -$472 million over the next 10 years.

Several environmental respondents questioned Dominion's analysis of energy efficiency resources and its decision to include a high-cost pumped storage facility in its IRP. The SCC Staff

also questioned the need for all the proposed resources included in each of Dominion's VCEA-compliant plans.

The SCC directed parties to file an "issues matrix" on or before December 18th. This issues matrix will include all the issues the parties want the SCC to decide in its final order. Per the statutory timeline, the Commission must enter a final order on or before February 1, 2021.

7. RPS DOCKETS AND RGGI DOCKET

RPS in the VCEA

The VCEA takes a dual-pronged approach to a transition to non-carbon emitting energy in Virginia for the state's two largest public utilities. First, it contains provisions related to both the retirement of carbon emitting resources, and provisions related to the construction of new, non-carbon emitting resources (namely, solar and wind-based resources). Second, it contains provisions establishing renewable portfolio standards (RPS) for each utility. Compliance with the RPS is evidenced by obtaining and retiring qualifying Renewable Energy Certificates (RECs) consistent with the PJM-EIS Generation Attribute Tracking System. Each year the utilities must submit a plan for procuring the mandated solar and wind generation, and complying with the RPS.

On July 10, 2020, the SCC entered its order establishing the 2020 RPS Proceedings for Dominion (PUR-2020-000134) and APCo (PUR-2020-000135) in order to implement the requirements of section 56-585.5 D 4 and the VCEA that the utilities submit plans and petitions for approval of new solar and onshore wind generation located in the Commonwealth by 2035 ("RPS Filing"). The utilities are required to make RPS Filings annually, commencing in 2020 and concluding in 2035. The RPS Filings may also contain utility requests for (i) approval to construct such renewable energy facilities, and (ii) for approval or update of a rate adjustment clause to recover the costs of such facilities. Additionally, the utilities' RPS Filings must include individual utility plans to meet the energy storage project targets established by the VCEA. The legislation further requires the SCC to determine whether an RPS Filing is reasonable and prudent, taking into consideration, *inter alia,* the RPS and carbon dioxide reduction requirements, fuel savings, and the promotion of new renewable generation and energy storage resources and associated economic development. The order requires each utility to file with the SCC its 2020 RPS Filing, either as a full petition or as a more abbreviated plan document, no later than November 2, 2020.

Dominion filed its RPS plan on October 30, 2020 while APCo filed its plan on November 2, 2020. Each filing includes proposals to add large amounts of new solar generation over the next decade. Dominion's plan requests approval to add almost 500 MW of new solar, including utility-owned facilities and power purchase agreements with third-party-owned facilities.

Dominion proposes larger additions of solar and offshore wind over the next 25 years. APCo plans to add approximately 210 MW of solar generation over the next 3 years. APCo's plan also proposes to add 2,200 MW of onshore wind and 400 MW of storage resources by 2050.

An evidentiary hearing will be conducted on the Dominion RPS plan on February 12, 2021 and on the APCo RPS plan on February 2, 2021. The deadline for public comments is February 12, 2021 for Dominion and February 2, 2021 for APCo. The deadline to intervene in these proceedings was December 18, 2020 for Dominion and was December 14, 2020 for APCo.

Retirement Schedule for Dominion's Carbon-Emitting Facilities

- Dec 31, 2024, All oil and coal-fired plants to be retired (excluding Virginia City Hybrid Energy Center, because it co-fires with biomass, and Clover, because it is co-owned with a cooperative)
- Dec 31, 2028, All biomass retired (excluding VCHEC)
- Dec 31, 2045, All carbon-emitting facilities retired

RPS Compliance Requirements for Dominion

- 2021-2024: In order to comply with the RPS during this time period, Dominion may procure and retire RECs from any renewable energy facility located in Virginia or the PJM Interconnection, LLC region.
- 2025 onwards: During this time period, Dominion's compliance requirements change as follows:

    - Dominion may use RECs from the following types of resources in the following locations:

        a) Certain solar or wind resources (located in Virginia, PJM or offshore wind located in Virginia or Federal waters that are directly interconnected through Virginia)

        b) Falling water resources that are owned or contracted by the utilities and were in operation as of January 1, 2020 (VA, PJM);

        c) Non-utility-owned falling water resources that are less than 65 megawatts and began commercial operation or were expanded by greater than 50% of their original capacity after December 31, 1979 (located in Virginia or PJM);

        d) Waste-to-energy or landfill gas-fired generating resources in operation as of January 1, 2020, provided that such resources do not use waste heat

from fossil fuel combustion or forest or woody biomass as fuel (located in Virginia); or

e) Biomass-fired facilities in operation as of January 1, 2020, that supply no more than 10 percent of generation to the electric grid or no more than 15 percent of their energy to any entity other than the manufacturing facility to which the generating source is interconnected. (located in Virginia)

- For Dominion 75% of all RECs must come from resources located in Virginia.

The RPS Program requirements shall be a percentage of the total electric energy sold in the previous calendar year, according to an established schedule for each year from 2021 to 2050.

The RPS requirements in five-year increments are as follows:

- 2021, APCo: 6% Dominion: 14%
- 2025, APCo: 14% Dominion: 26%
- 2030, APCo: 30% Dominion: 41%
- 2035, APCo: 45% Dominion: 59%
- 2040, APCo: 65% Dominion: 79%
- 2045, APCo: 80% Dominion: 100%
- 2050, APCo: 100%

Additionally, the utilities are required to perform mandatory procurements of solar or onshore wind generation located in Virginia with 35% of each target amount to be fulfilled with power purchase agreements with third-party owned resources:

<u>For APCo:</u>

- By December 31, 2023: 200 MW
- By December 31, 2027: 200 MW (400 MW cumulative)
- By December 31, 2030: 200 MW (600 MW Cumulative)

<u>For Dominion:</u>

- By December 31, 2024: 3,000 MW
- By December 31, 2027: 3,000 MW (6,000 MW Cumulative)
- By December 31, 2030: 4,000 MW (10,000 MW Cumulative)

- By December 31, 2035: 6,100 MW (16,100 MW Cumulative, including up to 5,200 MW for offshore wind that is utility constructed or purchased off Virginia's coast or interconnected to Virginia.)

Additional Provisions

- Dominion must meet one percent of the RPS Program requirements each year with solar, wind, or anaerobic digestion resources of one megawatt or less located in Virginia, with not more than 3,000 kilowatts at any single location or at contiguous locations ("small-scale Solar") and no less than 25 percent of these resources shall be composed of low-income qualifying projects, to the extent that they are available.
- If, in any year, a utility is unable to meet the RPS Program requirements or if the cost of RECs necessary to comply with RPS Program requirements exceeds $45 per megawatt hour, the utility is obligated to make a deficiency payment of $45 per megawatt hour (or $75 per megawatt hour for small-scale Solar resources located in the Commonwealth) for each megawatt-hour shortfall for the year of noncompliance. The amount of any deficiency payment shall increase by one percent annually after 2021. All proceeds from the deficiency payments shall be deposited in an interest-bearing account administered by the Department of Mines, Minerals, and Energy with the revenue allotted as follows: (i) 50 percent of total revenue shall be directed to job training programs in historically economically disadvantaged communities; (ii) 16 percent of total revenue shall be directed to energy efficiency measures for public facilities; (iii) 30 percent of total revenue shall be directed to renewable energy programs located in historically economically disadvantaged communities; and (iv) four percent of total revenue shall be directed to administrative costs.
- Commercial and industrial customers with loads greater than 25 MW in the prior calendar year may purchase their own RECs and offset all or a portion of their electric load for the purposes of RPS compliance.

Regional Greenhouse Gas Initiative (RGGI)

RGGI is a regional market-based trading program for carbon dioxide emissions that currently is being implemented by a number of states on and near the east coast. In the 2020, the General Assembly passed the Clean Energy and Community Flood and Preparedness Act, Senate Bill No. 1027 and House Bill No. 981, which authorized Virginia to become a full participant of RGGI, and authorized DEQ to implement its previously finalized CO_2 Budget Trading rule, which was designed to provide for Virginia's entrance into and participation in RGGI. Following passage of this statute, DEQ revised its rule finalizing it on June 25, 2020, and it became effective on July 10, 2020. To comply with RGGI through Virginia's CO_2 Budget Trading rule, regulated sources

of carbon emissions need to purchase emission allowances through the RGGI auctions. Docket PUR-2020-00169 at the SCC has been established for a proceeding regarding the recovery of costs related to Dominion's compliance with Virginia's CO_2 Budget Trading rule.

RECs Obtained for Compliance with the VCEA's RPS

As discussed above, public utilities must comply with the VCEA's RPS by obtaining and retiring qualifying RECs. While each public utility will formulate its own plan as to how to obtain the necessary, qualifying RECs, among other things, it is likely that RECs will be generated from public utility owned renewable resources and will also be obtained from third-party owned renewable resources through purchase agreements and market purchases. Docket PUR-2020-00170 at the State Corporation Commission has been established for a proceeding regarding the recovery of costs related to Dominion's obtaining qualifying RECs necessary to comply with the VCEA's RPS.

D. FEDERAL REGULATION IMPACTING STORAGE AND DISTRIBUTED SOLAR RESOURCES

1. FERC ORDER 841

In addition to being impacted by state regulations, the deployment of energy storage and deployment of energy storage and distributed solar generation is impacted by federal regulation that governs PJM Interconnection (PJM), the regional transmission organization (RTO) operating the regional and grid and wholesale market that includes Virginia.

Opening the wholesale markets to emerging technologies so that they can compete on an equal basis with all other resources fosters competition in those markets, thereby helping to ensure efficient market outcomes and cost-effective rates for consumers. On this premise, and after evaluating the existing Regional Transmission Organization (RTO) and Independent System Operation (ISO) market rules for energy storage, the Federal Energy Regulatory Commission (FERC) issued Order 841 in February 2018 to require the RTOs/ISOs to remove barriers to the participation of energy storage resources in their capacity, energy and ancillary service markets.

Order 841 required the RTOs/ISOs to create a participation model (i.e. a set of market rules) for all energy storage technologies that recognizes their physical and operational characteristics and facilitates their participation in the RTO/ISO markets. The final rule included five primary requirements related to the participation of storage resources. First, it requires the RTOs/ISOs to ensure that a resource using the participation model for storage resources is eligible to

provide all capacity, energy, and ancillary services. While storage resources will still need to meet the minimum technical requirements of providing these services, this reform makes sure the storage resources have access to the markets and are not unnecessarily prohibited from selling certain services as was the case in multiple markets.

Second, the RTOs/ISOs are required to ensure that a resource using the participation model for storage resources can be dispatched and can set the wholesale market clearing price as both a wholesale seller and wholesale buyer. This reform acknowledges the bidirectional characteristics of energy storage (i.e. its ability to charge from the grid, and discharge back to the grid). Consistent with the economic theory upon which they are built, the RTO/ISO markets generally put resources either on the supply side of the market (generators of electricity), or on the demand side of the market (consumers of electricity), but since energy storage can to do both, Order 841 ensured that it is able to participate as both supply and demand.

Third, Order 841 required the RTOs/ISOs to account for the physical and operational characteristics of electric storage resources in their participation models. The energy limitations and bidirectional capabilities of storage resources make operating them unlike other energy assets. Making sure the resources are able to submit information about their physical constraints or operational limitations either as a dynamic part of their market offers or as a static characteristic of the resource ensures that it is being modeled and dispatched consistent with its capabilities. Order 841 established a list of 13 physical and operational characteristics that the RTOs/ISOs must account for and also provided them flexibility to propose other characteristics they think are necessary to operate storage resources. This list included characteristics like state of charge, maximum charge and discharge rates, minimum charge and discharge rates, maximum state of charge, and minimum state of charge. The list of characteristics was intended to be broad enough to acknowledge the potential constraints of all energy storage technologies, but submission of the information was not mandatory as some of the characteristics may not be relevant for a particular technology.

Fourth, because several RTOs/ISOs had size requirements that were creating a barrier to entry for small storage resources, Order 841 required that the RTOs/ISOs allow energy storage resources at least as small as 100 kilowatts to use their participation models for storage resources. This was also consistent with the requirement that transmission-connected, distribution-connected and behind-the-meter storage resources be able to participate in the RTO/ISO markets, and the fact that many smaller storage resources are being developed today.

Lastly, Order 841 required each RTO/ISO to ensure that storage resources are able to pay the wholesale price for their charging energy. This requirement extends to all resources that fall under the definition of electric storage resources in the Final Rule, and not just those that are

using the participation model for storage resources. Because charging an electric storage resource to sell electricity back into the wholesale markets is not an end use of electricity, this qualifies as a wholesale transaction, and therefore the relevant wholesale rate is applicable. However, while wholesale rates are generally lower than retail rates thus potentially improving the competitiveness of storage resources in the markets, storage resources were not precluded from paying the retail rate for their charging energy, buying it bilaterally, or charging off a co-located generator.

PJM Compliance

As noted above, Virginia is located within the PJM RTO and so PJM's compliance with Order No. 841 will significantly impact how energy storage resources are integrated in the Commonwealth and determine the wholesale revenues that they can generate. PJM already had significant experience with energy storage due to the influx of battery resources into its frequency regulation market when it first implemented its pay-for-performance reforms in response to FERC Order 755 several years ago. However, PJM still had significant work to do to comply with Order 841 and submitted its initial filing in December 2018.

PJM clearly defined energy storage as resources capable of receiving electric energy from the grid and storing it for later injection to the grid that participates in the PJM Energy, Capacity, and/or Ancillary Services markets as a Market Participant. PJM further clarified that energy storage can be connected to transmission, distribution, or behind the meter. PJM also ensured that energy storage would be modeled in its markets as a single resource (as opposed to generation and load), which allows energy storage to now be modeled and dispatched across its entire operation range from charging to discharging and allowing it to more effectively participate and arbitrage prices in the PJM energy market. However, PJM also allows energy storage market participants to operate exclusively in charge or discharge mode and manage their own state of charge in case there are operational constraints of a particular technology or market conditions that make such modes more favorable. Additionally, PJM's 841 compliance gave slightly more flexibility to how energy storage can offer synchronized reserves into the market.

The most controversial issues in PJM's initial compliance filing was the duration requirement for energy storage resources in the PJM capacity market. PJM proposed that energy storage resources must be able to discharge continuously for at least ten hours to be able to receive full capacity credit in the market. This is in stark contrast with other organized markets around the country where the duration requirements for energy storage range between two hours and four hours. This issue was heavily protested by stakeholders. Ultimately FERC determined that PJM needed to revisit its proposal, and the issue was split into a separate proceeding.

Currently, the Markets and Reliability committee at PJM Interconnection has approved an Effective Load-Carrying Capability (ELCC) package in response FERC's requirement to re-evaluate storage duration. The ELCC methodology evaluates the ability of capacity resources to support system load under various operational conditions (i.e. the model looks at current and anticipated resource mixes and determines how much capacity value different types of supply resources can contribute). The approach creates a 'reliability-agnostic' valuation of energy storage, solar and other capacity resources, allowing a more apples-to-apples comparison to fuel-based generation and other resources. Once the filing is approved, duration requirements for energy storage are expected to be around four hours initially, although they may increase in the future.

2. FERC ORDER 845

After numerous disputes regarding the uncertainty on cost and schedule in the interconnection process, particularly as significantly more clean energy resources were trying to connect to the transmission grid, on April 19, 2018, FERC issued Order No. 845, a final rule revising the pro forma Large Generator Interconnection Procedures and pro forma Large Generator Interconnection Agreement. FERC issued ten specific reforms and explained the revisions sought to improve certainty for interconnection customers, promote more informed decisions, and enhance the interconnection process. To improve certainty for interconnection customers, FERC adopted reforms that:

- enable an interconnection customer to exercise its option to build, regardless of whether the transmission provider can meet the customers' proposed construction dates; and
- impose a revised dispute resolution requirement on all transmission providers.

To promote more informed interconnection decisions, FERC adopted reforms that:

- require all transmission providers to publish a method for identifying contingent facilities;
- require transmission providers to offer access the study processes and assumptions for maintaining network models used for interconnection studies;
- alter the definition of "Generating Facility" in the LGIP and LGIA to include electric storage resources; and
- require transmission providers to post interconnection study reporting requirements on a quarterly basis.

To enhance the efficiency of the interconnection process, FERC adopted reforms that:

- enable interconnection customers to request interconnection service at a level lower than their generating facility capacity;

- require transmission providers to allow interconnection agreements for limited operation of a generating facility before completion of the full interconnection process;
- require transmission providers to develop an expedited process for interconnection customers wanting to use or transfer surplus interconnection service; and
- require transmission providers to establish a procedure to assess whether a change to an interconnection customer's proposed technology occurring during the interconnection process would constitute a material modification.

Several of these reforms had specific implications for energy storage resources and even more so for energy storage paired with renewable generation (or hybrid facilities). In addition to explicitly including electric storage resources in the definition of Generating Facility, the reforms for provisional interconnection service, surplus interconnection service, and requesting interconnection service at a level lower than generating facility capacity offered greater pairing of storage with renewables. The idea was that the intermittency of renewable generation created opportunities for storage to effectively fill in the gaps when the renewable resources were not generating, and that if this smoothing/firming of renewable output was the intended use of the energy storage, then such resources should not have to pay for additional interconnection capacity above what is needed for the renewable generation. Additionally, by allowing technology changes during the interconnection process (which can take multiple years) storage and renewable developers are able to utilize the latest and most cost-effective technology when they begin construction of their facility instead of having to commit to a specific technology that may become obsolete by the time they finish the interconnection process.

PJM has complied with the requirements of Order 845 and these reforms are now available for interconnection customers requesting FERC-jurisdictional interconnection service in Virginia.

3. CAPACITY MARKET REFORMS

As states around the country have implemented clean energy legislation and/or provided incentives to the development of clean energy resources, there has been an impassioned debate about how the wholesale capacity markets should accommodate such resources. One side of the debate believe that clean energy policies and any related incentives are simply accounting for externalities that the wholesale markets do not otherwise address and therefore new market equilibriums should result without additional intervention. The opposing perspective is that state clean energy policies can result in suppression of otherwise competitive prices and that it is necessary for the wholesale markets to encourage market entry by ensuring adequate revenues to the marginal resources in those markets, which is viewed by many as combined cycle natural gas generation. An administrative mechanism intended to

prevent such price suppression and which is central to the capacity market reform debate in PJM is the Minimum Offer Price Rule (MOPR), which establishes minimum prices at which "subsidized" resources must offer into the capacity market.

In June 2018, FERC found that PJM's MOPR rules needed to change because they only applied to natural gas resources and failed to consider the impact of state subsidies on PJM's wholesale markets. FERC directed PJM to expand its MOPR to cover out-of-market support for all new and existing resources, regardless of resource type, with few to no exemptions. The proceeding has been long and the 2019 capacity auction continues to be delayed, but PJM submitted its most recent compliance filing on June 1, 2020 and FERC issued its latest order on compliance on October 15, 2020, partially accepting PJM's compliance and ordering further compliance.

The latest order creates exemptions for demand response, energy efficiency, energy storage and non-subsidized renewable portfolio standard resources, as well as creates an opportunity for resource-specific exceptions, but it maintains a broad definition of state-subsidized resources and price floors for various resources types which could make it difficult for them to clear the capacity auction. While these MOPR-related reforms began several years ago, this has now become acutely important for Virginia since it passed the VCEA in 2020 and is now on a path to 100% clean energy with at least 3,100 MW of energy storage. If any of the clean energy resources being developed and deployed in Virginia to comply with the VCEA are characterized as "state subsidized" resources, then there is a risk that their offers into the capacity market are mitigated to a price floor that prevents them from clearing the PJM capacity market, and customers in Virginia are then required to pay for capacity twice (once for the clean energy, and once for the PJM capacity). Despite the risk of being mitigated under the expanded MOPR rules, self-supply entities and states can elect the Fixed Resource Requirement (FRR) Alternative as an option to participating in the PJM capacity auctions. The FRR Alternative allows a self-supply entity to develop a plan to remove its generation resources and respective load from the capacity auctions. Under this alternative, the generators are not paid capacity revenues, nor does the respective load pay capacity charges. However, generation resources are still required to perform in the energy and ancillary service markets. While it is unclear how much of this will play out in the context of VCEA implementation, many states with significant clean energy requirements in PJM, such as Maryland, New Jersey and Illinois are already contemplating the FRR Alternative or exiting the PJM market altogether and managing resource adequacy and capacity requirements for their utility on their own.

4. FERC ORDER 2222

Issued on September 17, 2020, FERC Order 2222 is intended to remove barriers that have been preventing distributed energy resources (DERs) from competing on a level playing field in the organized capacity, energy and ancillary services markets run by regional grid operators such as PJM. According to FERC, DERs are small-scale power generation or storage technologies (typically from 1 kW to 10,000 kW) that can provide an alternative to or an enhancement of the traditional electric power system. DERs can be located on an electric utility's distribution system, a subsystem of the utility's distribution system or behind a customer meter. They may include electric storage, intermittent generation, distributed generation, demand response, energy efficiency, thermal storage or electric vehicles and their charging equipment. In a similar vein as Order 841 governing energy storage, removing barriers to these resources will help to not only promote competition in the wholesale markets, but also help DERs provide all of the services they are capable of providing, creating new business models and helping to enable a transition to a modern and distributed energy system.

Order 2222 enables DERs to participate alongside traditional resources in the wholesale markets through aggregations, and will help provide a variety of benefits including: lower costs for consumers through enhanced competition, more grid flexibility and resilience, and more innovation within the electric power industry. Specifically, PJM will have to minimum size limit for DER aggregations that does not exceed 100 kW as well as address technical considerations such as:

- locational requirements for DER aggregations (i.e. how closely together the DERs in a DER aggregation must be located);
- distribution factors and bidding parameters (i.e. how the DER aggregation is needs to represent its geographic location and other physical characteristics in its offers to the PJM market);
- information and data requirements (i.e. what information is specifically required of the aggregation as a whole and its constituent DERs);
- metering and telemetry requirements (i.e. for the DER and its member resources); and
- coordination of dispatch and operations among the regional grid operator, the DER aggregator, the distribution utility and the relevant retail regulatory authority.

The rule also directs the grid operators to allow DERs that participate in one or more retail programs to participate in its wholesale markets and to provide multiple wholesale services, but to include any appropriate, narrowly designed restrictions necessary to avoid double counting. PJM is required to make its compliance filing within 270 days of Order 2222 being published in the Federal Register. While much stands to be determined in this landmark rulemaking, it will certainly play out over the coming years of VCEA implementation and create

new business models for the growing number of clean distributed resources in the Commonwealth.

E. UPDATE ON SOLAR AND ENERGY STORAGE DEPLOYMENTS IN VIRGINIA

According to the Solar Energy Industries Association (SEIA), total installed solar capacity in Virginia is 1,099.65 MW, ranking the Commonwealth 17th in the nation – up from 19th in 2019 – or enough to power 123,529 homes. Still, this constitutes only 1.22% of the Commonwealth's electric portfolio. SEIA projects a growth of 4,040 MW over the next 5 years (6th in the nation).[3]

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

1. DOMINION BATTERY STORAGE PILOT

On February 14, 2020 in Case No. PUR-2019-00124, the SCC issued its Final Order approving Dominion's three pilot projects proposed as part of its battery storage pilot program.

This first pilot project involves deploying a 2 MW/4MWh AC lithium-ion battery system at a substation to study the prevention of solar back-feeding onto the transmission grid.

The second pilot project involves deploying a 2 MW/4 MWh AC lithium-ion battery system at a substation to study batteries as a non-wires alternative to reduce transformer loading. The third pilot project involves deploying a lithium-ion battery system at the Scott Solar Facility consisting of a 2 MW/8 MWh DC system with a 10 MW/40 MWh AC-coupled system to study solar plus storage capabilities.

2. DOMINION RIDER TRG

On July 2, 2020 in Case No. PUR-2019-00094, the SCC issued its Order Approving Tariff for Dominion's Rider TRG. Rider TRG is a tariff that provides Dominion's customers with an opportunity to purchase 100% renewable energy to meet all or a part of their electric needs. Customers taking service under Rider TRG will be served by a portfolio of Dominion's solar, falling water, and biomass driven resources, but will not be served by the Virginia City Hybrid Energy Center based on its reliance on coal to co fire biomass. Pursuant to statute, the Commission's approval of Rider TRG results in customers who seek to purchase 100%

[3] https://www.seia.org/state-solar-policy/virginia-solar

renewable supply under Section 56-577 A 5 of the Virginia Code no longer being allowed to obtain it from competitive service providers.

3. Dominion Pilot Time Of Use Rate

On May 20, 2020 in Case No. PUR-2019-00214, the Commission issued its Final Order Approving Experimental Rate Schedule, and subsequently issued its Clarifying Order on June 9, 2020, approving Dominion's pilot program for a Time of Use (ToU) rate through its new Schedule 1G. This rate, which was the result of a stakeholder process, contains peak, off-peak and super off-peak rates with different time schedules for summer and winter. It is limited to 10,000 participants. New Schedule 1G also includes a $500 rebate as a solar incentive option for 500 new net metering customers.

4. REC Battery Storage Project

Rappahannock Electric Cooperative (REC) and East Point Energy, a leading energy storage project developer, are commencing the first grid-scale energy storage project by a Virginia electric cooperative with the installation of a 2MW/8MWh battery storage system with a peak capacity of 2 MW and a duration of 8 megawatt hours, or enough to power about 1,000 homes for 8 hours.

Powin Energy Corp. will serve as the project's integrator and equipment provider. Indie Energy, based in Austin, Texas, provided technical and engineering support to the project. Construction is expected to begin in the fall of 2020, with full operation starting in early 2021.

The project will be located in Spotsylvania County and is expected to provide multiple values to the grid, including:

- Providing resiliency to REC member-owners by temporarily providing electricity at times when the transmission system fails and the substation and the members served by it would otherwise be without power;
- Managing wholesale power costs by dispatching stored energy during peak times when electricity is more expensive for the cooperative to purchase; and
- Delaying the need for substation upgrades.

All of these uses help REC provide its member-owners more resilient, sustainable, and affordable energy. Additionally, REC will use this project to learn how additional energy storage projects can be deployed on its system in the future.

5. MARTINSVILLE BATTERY STORAGE PROJECT

Wärtsilä Corporation launched its newest modular energy storage system solution at a 'critical municipal infrastructure' project performing grid services and reducing peak demand for the City of Martinsville.

AEP OnSite Partners, an affiliate of American Electric Power, the parent company of APCo, will be the first to deploy Wärtsilä's new GridSolv Quantum storage product. The 9 MW/15.6 MWh lithium-ion lithium iron phosphate battery storage system will respond to PJM market signals and reduce the city's peak demand by about 9 MW, while saving $1 million per year in transmission and capacity costs. The project is scheduled to be operational in the second half of 2021.

AEP OnSite Partners would pay for the construction of the $8.35 million facility and would own, operate and maintain the facility at its expense.

For the use of the property, Martinsville will receive 10% of the savings until the cost of the capital and investment have been recovered and then the split will be 50/50.

It should be noted that several localities in Virginia have expressed concerns about the safety of battery energy storage systems in their communities. Wärtsilä says the water cooled GridSolv Quantum batteries are compliant with National Fire Protection Association Code 855, including having undergone fire testing under UL 9540A for thermal runaway, and having a 60-minute enclosure fire rating, fire detection and a selection of fire suppression methods.

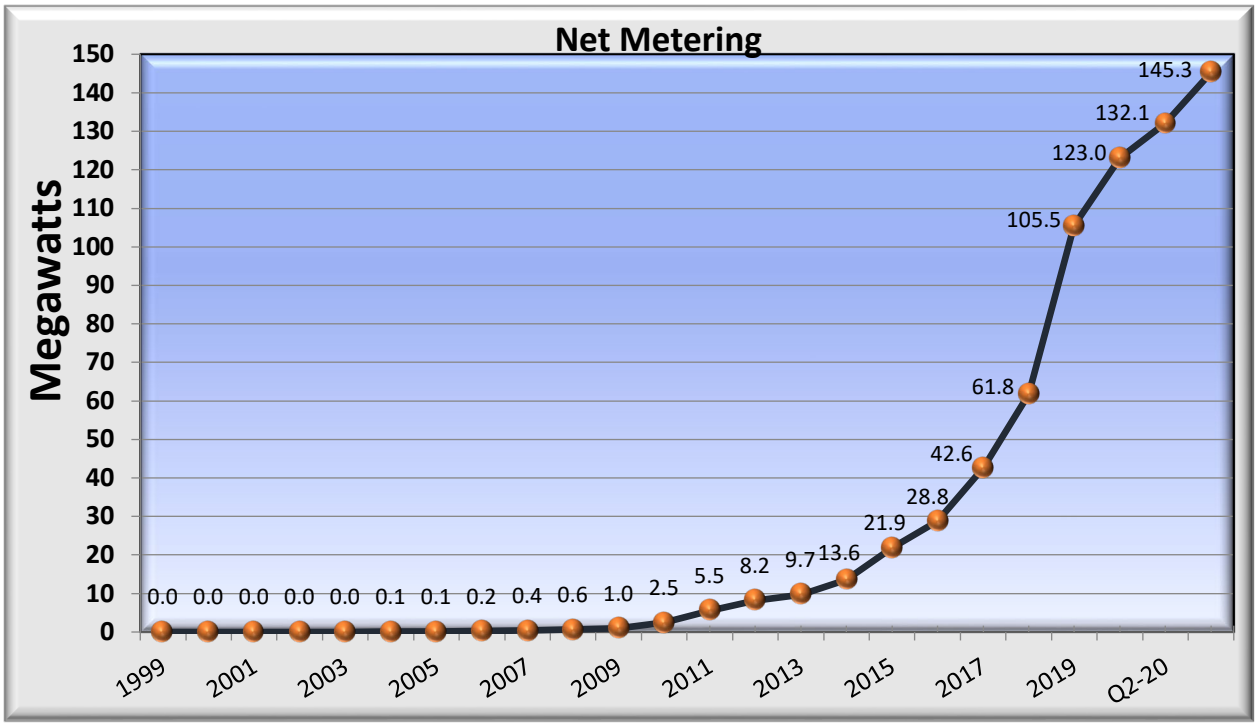
6. MUNICIPAL UTILITY NET METERING

On October 22, 2020 Case No. PUR-2019-0018, the SCC entered final guidelines for Virginia's municipal net metering program. The revised net metering program reflects 2019 legislation (§ 56-585.1:8) that established a pilot program in Dominion's and APCo's service territories. The pilot program allows municipal customers that own or operate renewable energy facilities of two megawatts or less to use the facilities to offset some or all of their electricity consumption. The legislation established a six-year term for the pilot program. The program will be open for enrollment 15 days after the SCC's final order, or on November 6.

7. Net Metering Generally

Net metering, which is implemented pursuant to Va. Code Section 56-594, involves utility purchases of excess power produced by distributed renewable generation facilities located on an eligible customer's premises and sized to meet, but not exceed, 150% of an electric customer's load.

Over the past year, the number of net metered solar installations increased significantly, growing from 9,949 installations totaling 90.5 MW in Q3 of 2019 to 15,129 installations totaling 145.3 MW megawatts in Q3 2020. The chart below illustrates the considerable growth in net metering facilities in recent years in Virginia.



Source: Department of Mines, Minerals and Energy

8. Retail Customer Power Purchase Agreements

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

During its 2020 Session, the Virginia General Assembly revised the existing PPA pilot program by amending and reenacting, some provisions in Article 2 of the VCEA enacted in Chapters 1193 (HB 1526) and 1194 (SB 851) of the 2020 Virginia Acts of Assembly and codifying other provisions in Va. Code § 56-594.02 in Chapter 1187, 1188, 1189, 1193, 1194, and 1239 of the 2020 Virginia Acts of Assembly. The 2020 Amendments now require that the Pilot Program be conducted within the service territory of all three investor-owned electric utility in Virginia, now including Kentucky Utilities Company, doing business as Old Dominion Power Company, in addition to Virginia Electric and Power Company and Appalachian Power Company. The 2020 Amendments also:

a) increase the renewable generation capacities available for this program,
b) increase the size of the renewable generation facilities eligible for inclusion in the program, and
c) increase the overall caps of the program based upon the utilities' peak load forecasts.

The aggregated capacity of all third-party renewable generating facilities participating in the pilot program in Dominion Energy territory was raised from 50 MW to 500 MW for Virginia jurisdictional customers and 500 MW for Virginia nonjurisdictional customers.

The aggregated capacity in Appalachian Power and Old Dominion Power is 40 MW (originally 7W for APCo). However, because chapters 1193 and 1194 of the 2020 Acts of Assembly limits the aggregated capacity for APCo and Old Dominion to 6% of each Pilot Utility's adjusted Virginia peak load forecast for the previous year, not to exceed 40 MW, the PPA pilot capacity for Old Dominion is limited to well below 40 MW. Based on 6% of their estimated 2020 peak load of 212.706 MW, their aggregated pilot program capacity limit is 12.76 MW.

The minimum size PPA project in all utility territories is 50 kilowatts, unless the customer is a low-income utility customer, as defined in § 56-576 of the Code of Virginia, or is an entity with tax-exempt status in accordance with § 501(c) of the Internal Revenue Code.

According to the SCC, the PPA Pilot Program has installed just over 8.99 MW of its aggregate capacity limit in Dominion Energy's service territory. As of this writing, nothing has been installed in either APCo or Old Dominion territories; however, 2.25 MW has been reserved in APCo service territory and three MW in Old Dominion territory.[4]

[4] http://scc.virginia.gov/pur/ppa/dev_capmgmt.pdf

9. UTILITY-ADMINISTERED COMMUNITY SOLAR

Dominion Energy Community Solar

Senate Bill 1393 approved by the General Assembly in the 2017 legislative session requires Dominion Energy and Appalachian Power to conduct what has been characterized as "community solar" pilot programs administered by the utilities in which their retail customers voluntarily subscribe to purchase output from a project owned by a third-party solar developer or acquired by the utility via asset purchase.

The first 2 MW solar project for Dominion's community solar program is under construction and is slated for commercial operations some time in 2021. They are also in discussions with a developer for three more 2 MW sites, and plan to issue another RFP for sites to complete 10MW of capacity.

Since there are no active sites to subscribe into yet, Dominion is only accepting pre-enrollments. They currently have over 4,000 customers that have pre-enrolled in the community solar program. Once they have an operational site, they will go back to pre-enrolled customers to see who is still interested and would like to subscribe.

Cooperative Utilities Solar Subscription Programs

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

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

Shenandoah Valley Electric Cooperative (SVEC) is one of the latest ODEC member to add a community solar project.

SVEC has identified a location in Shenandoah County to host solar project as part of the program. The property is located on 32 acres in Mount Jackson, VA. It is adjacent to an existing SVEC substation.

At a public hearing on October 1, 2020, the Shenandoah County Planning Commission voted to recommend to the county's Board of Supervisors the approval of a special-use permit filed by Randolf Solar Partners LLC (an entity of EDF Renewables).

On October 27, the Board of Supervisors unanimously approves the permit. Construction will take six to nine months. Their hope is that SVEC can enroll interested members in mid-late 2021.

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

Northern Virginia Electric Cooperative announced in February that they signed a PPA with D.E. Shaw Renewable Investments ("DESRI") to purchase 300 MW of solar energy from facilities that DESRI will construct within the Dominion Energy and PJM footprint. The final siting has not occurred yet and sites are being identified across Virginia and possibly adjacent states (e.g. West Virginia and North Carolina). Final siting of projects will likely occur in 2021

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

Municipal Utility Solar Subscription Program

Harrisonburg Electric Commission (HEC) entered into a long-term power purchase agreement with Dominion Energy, who will provide 1.4 MW of solar power generation to the HEC for their planned community solar program.

Dominion Energy will own and operate a facility on land owned by the City of Harrisonburg. It will allow HEC to purchase power that will then be used to supply HEC members with power that is both locally produced and renewable.

The Harrisonburg City Council has already approved the project, and construction should begin early in 2021. HEC will begin designing a Community Solar Program to meet its needs and begin reaching out to customers to gauge interest and weigh feedback on its options.

HEC's primary objective was having the solar energy facility located within their footprint, physically offsetting energy that would have otherwise been purchased through their existing delivery points from Dominion Energy.

10. Solar Generation Dedicated To Large Customers

Dominion Energy's solar development in Virginia includes a mix of projects developed by both its regulated utility and its unregulated or merchant generation development business. Dominion Energy currently has approximately 713 MW of large-scale solar projects in operation as of October of 2019, with approximately 1,486 MW under development, including solar capacity under long-term purchase contracts. A large portion of this solar development is being driven by demand from owners of large data centers or other institutional customers such as the Commonwealth of Virginia who have set specific renewable energy goals. These are often described as "ring-fenced" models in which any additional costs associated with the solar generation is assigned to one or more specific customers that have entered into contracts with Dominion Energy regarding particular solar generation projects.

a. Energy and Renewable Attributes Dedicated to Specific Large Customers

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

b. Renewable Attributes Dedicated to Specific Large Customers

Yet another model utilized by Dominion Energy allows eligible customers to promote the development of new renewable energy facilities by enhancing their cost effectiveness for all customers in exchange for the environmental attributes of up to 100% of the facility. Eligible non-residential customers may participate in this offering by subscribing to a voluntary companion rate schedule called Schedule RF.[5] Facebook has committed to subscribing to Schedule RF to meet its renewable energy goals connected to its proposed data center complex in Henrico County. Pursuant to this approach, Facebook purchases the renewable attributes

[5] https://www.dominionenergy.com/library/domcom/media/home-and-small-business/rates-and-regulation/residential-business-rates-shared/virginia/schedule-rf.pdf?la=en&modified=20180601150242

from the facility while the energy is assigned to Dominion Energy's overall customer load. The SCC has approved construction of three solar facilities totaling 340 MW currently under development, which will provide environmental attributes to Facebook under Schedule RF. The three projects, Colonial Trail West (142 MW), which is operational, and Spring Grove 1 (98 MW) and Sadler (100 MW), which are under development in Surry and Greensville Counties, respectively and will become operational in late 2020. Additional projects dedicated to specific customers can be found in **Appendix C** to this Report.

11. UTILITY SOLAR

a. Rooftop Solar

Dominion Energy has installed approximately 6.4 MWs of distributed solar across 9 projects located on property owned by non-residential customers through its *Solar Partnership Program.*[6] The electricity from these 9 facilities is used to serve regulated electric customers in Dominion Energy's Virginia and North Carolina electric service territories. Under the *Solar Partnership Program*, Dominion Energy is authorized to construct and operate up to 30 MWs of company-owned solar facilities on leased rooftops or on the grounds of commercial businesses and public properties throughout their service area.

b. Large Scale Solar

Dominion Energy

Dominion Energy now has more than 4 gigawatts of solar generation in operation or under development in Virginia including early stage projects in advanced development. In terms of publicly announced utility-scale projects, Dominion Energy currently has 21 solar facilities totaling 713 MWs in service, with another 1,486 MW under construction or development (2,199 MW total). See **Appendix C** to this report for a full listing of Dominion Energy's large-scale solar projects both operational and under development.

Old Dominion Electric Cooperative (ODEC)

As previously mentioned, in 2017 ODEC entered into two long-term power purchase agreements to buy solar power from the 10 MW Clark County and 20 MW Cherrydale solar facilities owned by Dominion Generation.

Not previously reported, in 2018, ODEC entered into a long-term power purchase agreement with Ørsted to purchase the output from the 75 MW Cabin Point Solar Facility in Sussex County,

[6] https://www.dominionenergy.com/large-business/renewable-energy-programs/solar-partnership-program

VA. This project is expected to be in commercial operations date in 2022.

In 2019 ODEC and EDF Renewables North America entered a partnership to develop and build a 30 MW portfolio of distributed solar projects on 10 to 12 sites across ODEC member service territories in Virginia, Maryland, and Delaware. ODEC will purchase power from the projects at a fixed rate through a power purchase agreement, thus providing energy cost surety for its members. In 2020 ODEC *increased* its partnership with EDF Renewables to 15 projects totaling more than 60 MW.

The City of Martinsville

In March 2020, Martinsville City Council approved an approximately 9 MW solar facility at a former Golf Club.

Martinsville will sell the former Lynwood Golf Club site on the DuPont Road to Sol Systems, a solar energy investor and developer with headquarters in Washington, D.C.
Martinsville's peak demand is 42 megawatts, and 2% of that is generated at a hydroelectric dam on the Smith River.

It is anticipated the project will provide significant savings in transmission charges by using electricity generated locally. The savings to the city is not so much in the cost of the electricity, but in transmission fees, and those costs are projected to increase at a greater rate than the cost of the electricity itself. Electricity produced locally eliminates most of the transportation costs.

The City of Danville

In September, TurningPoint Energy, Navisun and the City of Danville completed construction on two 5 MW solar facilities under a power purchase agreement with municipal utility Danville Utilities.

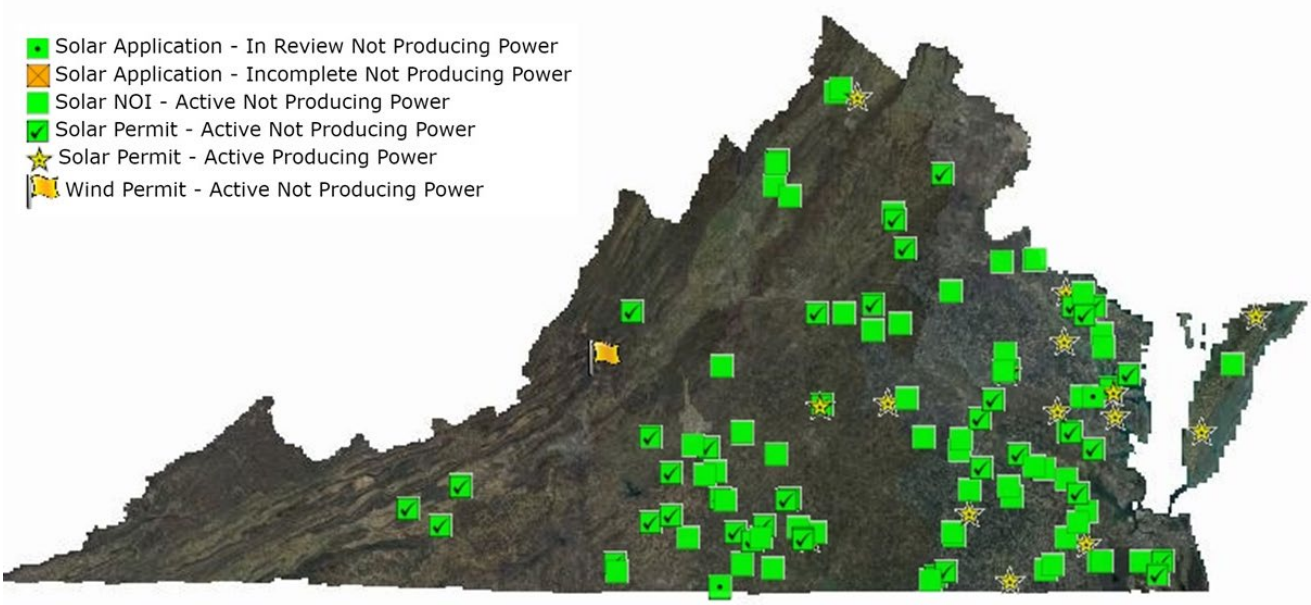
The two solar projects, named Irish Road Solar and Whitmell Solar, span 100 acres along State Road 703/Irish Road and will generate an estimated 23,668,000 kWh annually. These new projects are in addition to Danville's six MW Kentuck Solar project, which was completed. Danville Utilities expects to save money over the life of the project because the solar will reduce transmission congestion charges the city currently pays.

A listing of all known completed solar projects is found in Appendix D.

12. PROJECTS PERMITTED UNDER THE PERMIT BY RULE PROCESS

Typically, electric generation construction projects must be approved by the Virginia State Corporation Commission. In order to streamline the process for smaller scale renewable generation projects, Virginia Code § 56-580 D and Virginia Code § 10.1-1197.6 created the **Permit by Rule** ("PBR") process, which was developed and is overseen by the Virginia Department of Environmental Quality (DEQ). Section C.1 of this Annual Report discusses proposed changes to the PBR regulations.

Since the solar PBR became effective in 2012, 51 projects totaling 2,261 MW have been issued; three permits totaling 243 MW are undergoing review, and Notices of Intent to apply for permits were submitted by developers for 69 additional projects totaling 3,186 MW.



Solar and One Wind Power Permit by Rule Projects

A detailed list of solar projects that have submitted Notices of Intent to apply for a permit and who have been permitted is included in **Appendix E**.

13. ADDITIONAL POTENTIAL PROJECTS IN THE PJM NEW SERVICES 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. Section C.3 of this report describes amendments to the SCC regulations governing solar projects interconnecting at the distribution level.

As of this report, there are 352 active projects in the PJM New Services Queue (PJM Queue) totaling 29,783 MW. Of these, 3,153 MW are in the engineering and procurement stage, 493 MW are under construction, and 718 MW are partially in service. The remainder are actively undergoing the PJM study processes. A list of active solar projects in the PJM Queue is set forth in **Appendix F** of this Report. It would not be an understatement to say that navigating the PJM 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 F** also includes solar energy projects withdrawn from the PJM Queue.

F. ASSESSMENT OF PROGRESS ON ENERGY STORAGE AS COMPARED TO 2019 STORAGE STUDY

As discussed in the Authority's 2019 Annual Report, in August 2019, the Commonwealth of Virginia released a study performed by Strategen Consulting LLC on behalf of the Governor of Virginia. The study was focused on Energy Storage in the Commonwealth of Virginia and produced a set of recommendations to guide policy actions to accelerate adoption. In this section of the Authority's 2020 Annual Report, we assess what progress has been made towards these goals based on the significant developments for energy storage encompassed in the VCEA.

Recommendation 1: *"Establish a statewide storage deployment requirement to complement Virginia's existing renewable energy goals under the Grid Transformation and Security Act (i.e. 5,000 MW of wind and solar). [A] storage deployment target of approximately 1,000 MW by year 2030 would be consistent with an approach that maximizes net benefits for the Commonwealth."*

Progress 1: During its 2020 Session, the Virginia General Assembly enacted the Virginia Clean Economy Act ("VCEA"). Among other things, the VCEA, in Code § 56-585.5 E, requires APCo and Dominion to petition the SCC for approval to construct or acquire 400 MW and 2,700 MW, respectively, of new utility-owned energy storage resources by 2035.

Recommendation 2: *"Convene a statewide 'storage issues forum' on a regular basis to allow key stakeholders (including the significant number of federal entities in Virginia) to identify challenges and opportunities for the industry going forward."*

Progress 2: During its 2020 Session, the Virginia General Assembly passed HB 1183, which requires the SCC to create a task force to evaluate and analyze the regulatory, market, and local barriers to the deployment of distribution and transmission-connected bulk energy storage resources to help integrate renewable energy into the electric grid, reduce costs for the electricity system, allow customers to deploy storage technologies to reduce their energy costs, and allow customers to participate in electricity markets for energy, capacity, and ancillary services. The task force shall include representatives of municipalities, the Virginia Solar Energy Development and Energy Storage Authority, the Department of Mines, Minerals and Energy, the Office of the Attorney General, and at least one representative each from the following sectors: regulated electric service providers, competitive electric service providers, rural utility consumer services cooperatives, commercial or industrial energy customers or an association representing such customers, and energy storage companies or an association representing such companies. The SCC is required to submit a copy of the task force's evaluation and analysis to the General Assembly no later than October 1, 2021.

Recommendations 3 & 4: *"3: Move beyond the pilot stage to implement additional commercial scale deployments of energy storage, in addition to the 40 MW already being considered. These deployments should leverage lessons learned from the broad array of existing pilot programs across the U.S. and can advance Virginia's storage industry through 'learning by doing.'"*

"4: Adopt more advanced methods and best practices for considering storage in utility resource planning processes (e.g. within the SCC's resource planning process) as well as utility procurement processes (e.g. through competitive all-resource solicitations)."

Progress 3&4: On May 1, 2020, Dominion announced a Request for Proposals ("RFP") process to procure at least 250 MW of energy storage in the Commonwealth in the next year and was the largest competitive all-resource solicitation in the Company's history for renewable energy. This represents the first step towards achieving a clean energy future and reflects expectations of projected expansion of offshore wind, solar, and energy storage development amounts to

approximately 24,000 new megawatts of renewable energy and storage capacity over the next 15 years.

G. ASSESSMENT OF PROGRESS REGARDING ENERGY STORAGE AS COMPARED TO OTHER STATES

To help assess the Commonwealth's significant progress regarding storage as compared to other states, this Annual Report provides a summary below of states that are generally considered "forward leaning" on energy storage.

Arizona

In Arizona, solar-plus-storage resources are competing head to head against traditional resources, and winning contracts for providing power to major utilities in the state. For example, the Salt River Project utility (SRP) recently awarded a contract for power delivered from a 250 MW solar + 1 GWh battery, notable in part because it was selected from an all-source request for proposals (RFP) and deemed the most cost effective replacement for retiring coal generation.[7] In its 2020 IRP, Arizona Public Service plans to invest in 2,500 MW of storage by 2030 and up to 10,550 by 2035.[8] In January of this year, APS committed to 100% carbon-free energy by 2050.[9]

California

California set the first state energy storage procurement targets in 2010 with AB 2514, which stipulated the independently-owned utilities had to procure 1325 MW (collectively) by 2020. The utilities are all on track to meet or exceed that goal. California also set up SGIP (Self-Generation Incentive Program), which provided incentives for residential and commercial customers to own energy storage, among other distributed generation resources.[10] The California Independent System Operator (CAISO) was also one of the first wholesale markets in the US to implement specific reforms for energy storage and distributed energy resources, allowing storage projects to provide additional benefit to the

[7] "SRP to Cut Emissions Through Major Solar+Battery Energy Purchase." URL: https://media.srpnet.com/srp-to-cut-emissions-through-major-solar--battery-energy-purchase/
[8] "Arizona utility APS to rely on battery storage, solar to enable 2031 exit from coal generation." URL: https://ieefa.org/arizona-utility-aps-to-rely-on-battery-storage-solar-to-enable-2031-exit-from-coal-generation/
[9] Spector, Julian. "Arizona Utility APS Commits to Carbon-Free Power by 2050." URL: https://www.greentechmedia.com/articles/read/arizona-public-service-carbon-free-power-2050
[10] "California looks to next steps as utilities near energy storage targets." URL: https://www.utilitydive.com/news/california-looks-to-next-steps-as-utilities-near-energy-storage-targets/525441/#:~:text=California%20established%20the%20first%20energy,%2Downed%20utilities%20(IOUs).

grid and generate supplemental revenues in the market, while also enabling utilities to exceed the storage requirements of AB-2514. Today, the CAISOis deliberating how to regulate storage as a transmission asset.[11]

Hawaii

Rapidly moving toward 100% renewable energy on multiple islanded grids, Hawaii has led the way in storage and solar-plus-storage procurements that are designed to help replace baseload as well as flexible grid resources. In 2015 Hawaii became the first state to set a 100% renewable electricity target, with the goal to procure all electricity from clean sources by 2045.[12] In 2017, the Hawaii Public Utilities Commission approved a joint plan from a group of the state island utilities (Hawaiian Electric Companies) that would accelerate that transition to 2040.[13] In May of this year, Hawaiian Electric announced 460 MW of solar procurements and 3 GWh of storage procurements.[14]

Electrically isolated from the rest of the Hawaiian Islands, Kauai has pioneered solar and battery-based energy storage and already has multiple solar-plus-storage projects operating on the island.

Maryland

In April of this year Maryland passed HB 650, which enacts an energy storage pilot program under which Maryland's four investor-owned utilities must establish two energy storage pilot projects by 2022. An interesting aspect of the Maryland program is the storage ownership structures it stipulates. Utilities can select two of four structures (utility-owned, utility and third party-owned, third party-owned, and a virtual power plant model). Utilities must provide annual reports including technical and financial data to the state legislature on the projects beginning in 2023. One of the objectives of the pilots is to answer the question of how utilities in a deregulated electricity market can own energy storage assets, which can

[11] "California ISO's long road ahead to turn storage into a transmission asset." URL: https://www.utilitydive.com/news/california-isos-long-road-ahead-to-turn-storage-into-a-transmission-asset/526552/

[12] "PRESS RELEASE: GOVERNOR IGE SIGNS BILL SETTING 100 PERCENT RENEWABLE ENERGY GOAL IN POWER SECTOR"URL: https://governor.hawaii.gov/newsroom/press-release-governor-ige-signs-bill-setting-100-percent-renewable-energy-goal-in-power-sector/

[13] Greentech Media. URL: https://www.greentechmedia.com/articles/read/hawaiian-electric-100-renewable-energy-plan-green-light#gs.q7emsn

[14] Greentech Media. URL: https://www.greentechmedia.com/articles/read/hawaiian-electric-picks-460mw-of-solar-nearly-3gwh-of-storage-to-replace-power-plants

act as both generation and load, and provide services like a transmission or distribution asset.[15]

Massachusetts

Massachusetts has enacted two programs in the past five years that have jump started the energy storage and solar industries in the state. The first is the Solar Massachusetts Renewable Target or "SMART" program, which requires each of the investor-owned utilities to procure solar energy in established multi-MW blocks. Subsequent blocks decline in guaranteed tariff rate. Solar installations larger than 500 kW are required to have an energy storage component to help shift energy towards peak periods.[16]

In addition, Massachusetts has instituted a resource-neutral Clean Peak Standard that requires all retail electricity providers in the state to purchase a minimum percentage of their annual energy sales from qualifying resources that produce "Clean Peak Energy Certificates" or CPECs. The program incentivizes resources that produce energy during seasonal peak demand periods by adding multipliers to the CPECs they produce.[17]

Nevada

In Nevada, like Arizona, solar-plus-storage resources are competing and winning contracts for supplying power to the state utilities. Nevada has instituted a storage target of 1 GW by 2030.[18] In addition to bulk energy storage, Nevada's utility NV Energy has instituted incentives at the residential and commercial levels for private investment in energy storage.[19]

[15] "Maryland passes energy storage pilot program to determine future regulatory framework." URL: https://www.utilitydive.com/news/maryland-passes-energy-storage-pilot-program-to-determine-future-regulatory/551769/

[16] MA DOER SMART Program. URL: https://www.mass.gov/info-details/solar-massachusetts-renewable-target-smart-program

[17] Kirkland and Ellis. URL: https://www.kirkland.com/publications/blog-post/2020/04/massachusetts-clean-peak-energy-standard

[18] "Nevada becomes sixth US state to adopt energy storage target." 18 March 2020. URL: https://www.energy-storage.news/news/nevada-becomes-us-sixth-state-to-adopt-energy-storage-target

[19] NV Energy. Energy Storage Incentives. URL: https://www.nvenergy.com/cleanenergy/energy-storage

H. UTILITY RFPs

On May 1, 2020 Dominion Energy Virginia issued a Request for Proposals (RFP) for up to 1,000 MW of solar and onshore wind generation and up to 250 MW of energy storage in the Commonwealth.

The RFP solicited bids for new solar or onshore wind power generation facilities or mechanically complete solar facilities under both asset purchase agreements and power purchase agreements.

Dominion's long-term Virginia IRP calls for the development and procurement of approximately 16,000 megawatts in the state over the next fifteen years.

Dominion was tasked through the VCEA to procure 2,700 megawatts of energy storage by the end of 2035 – the most aggressive goal in the country to date. To this end, Dominion is also seeking bids for new energy storage projects that may be paired with new solar or onshore wind facilities or that will be connected to the power grid as a stand-alone facility. For all energy storage projects, Dominion is requiring a minimum of four-hour duration Lithium-ion battery energy storage system. Each Proposal must represent generation at a single site and cannot reflect an aggregate of multiple facilities at separate sites to meet the minimum size threshold.

All new solar and storage facilities must be at least 5 MW, physically located in Virginia, and operational by the end of 2023.

Notices of Intent to Bid and Confidentiality Agreements were due by May 18, 2020. Dominion is currently conducting due diligence activities on project acquisition bids that were submitted for consideration by the September 1, 2020 deadline. PPA bids for the renewable RFP are due to be received on March 1, 2021 and the Company expects to conclude the RFP process in Q2 2021.

The Company issued a further RFP targeted toward small-scale solar projects on October 9, 2020. The RFP is soliciting bids for development assets for new distributed solar generation facilities or mechanically complete solar facilities under asset purchase agreements. The RFP is also seeking power purchase agreement bids where the Company will enter into an agreement for the energy, capacity, ancillary services, and environmental attributes including Renewable Energy Certificates (RECs) from the facility. The new facilities must be no larger than three megawatts (MW)(ac) in capacity, located in the Dominion Energy Virginia service area and commercially operational by the end of 2022 to be considered.

Notices of Intent to Bid and Confidentiality Agreements were due by October 30, 2020 with final Asset Purchase proposals due January 8, 2021 and Power Purchase proposals due March 1, 2021.

Appalachian Power

Appalachian Power issued an RFP on January 22, 2020 to obtain up to 200 megawatts (MW) of solar energy projects in Virginia to reduce customer costs and diversify its electric generation mix.

To qualify for consideration, projects must be located within the Commonwealth and be interconnected to the PJM Interconnection RTO or Appalachian Power Company's distribution system. All projects must have a minimum size of 10 MW and must be operational by December 15, 2022 and qualify for the federal Investment Tax Credit.

Proposals may include the option of an up to 10 MW battery energy storage, and must include the use of local goods and services sourced, in whole or in part, from Virginia businesses.

The deadline for proposals was March 31,2020, and the company is currently in negotiations with a subset of developers.[20]

I. WORKFORCE DEVELOPMENT

SHINE, the Solar Hands-on Instructional Network of Excellence, was established in 2019 as a public-private partnership of over 20 solar-affiliated organizations and academic institutions throughout Virginia (full list available at https://www.shine.energy/sponsors). The goal of the organization is to train Virginians to work on utility-scale solar projects that are expected to exponentially grow in number in the Commonwealth throughout the next decade and beyond. The program additionally emphasizes equity, diversity and inclusion in the solar field.

SHINE began its pilot two-week utility-scale solar installer training program in October 2019 at Southside Virginia Community College (SVCC) in Blackstone, VA. Graduates of SHINE's training program will enter the workforce with industry standard OSHA safety credentials, CPR training, foundational knowledge of solar photovoltaic systems, and hands-on experience performing the specific construction tasks that will be required for success on solar project installations. To date, SHINE has held 5 pilot training sessions of 6 students each for 30 total graduates. To date, all of SHINE's graduates have received solar job opportunities.

In addition to the learning lab at SVCC, SHINE also has plans to deploy 2 mobile solar lab facilities in order to partner with additional community colleges and solar companies looking to train workforce. COVID-19 complications have hampered the program due to the constraints

[20] https://www.appalachianpower.com/global/utilities/lib/docs/b2b/rfp/APCO/2020Solar/APCo_2020_Solar_RFP1-0.pdf

placed upon its hands-on learning component, but new cohorts are currently being scheduled and expansion opportunities looking robust for 2021.

The Virginia Energy Workforce Consortium (VEWC) was formed in 2007 to engage energy companies and utilities in strategic, unified, and results-oriented efforts to ensure a skilled, qualified, and diverse workforce to meet future industry needs throughout the Commonwealth. VEWC members include representatives from electric, natural gas, renewable energy, and utility companies; contractors; organized labor unions; industry associations; secondary and postsecondary educational institutions; the public workforce system; and local, regional, and state government agencies. In 2019, the need for the VEWC's presence in the Commonwealth became more concrete as the Governor of Virginia issued *Executive Order 43: Expanding Access to Clean Energy and Growing the Clean Energy Jobs of the Future*. The Virginia Chamber of Commerce's *Blueprint Virginia 2025, A Business Plan for the Commonwealth* recognized the need for Virginia to build a diverse portfolio of energy resources through the promotion of sustainability and efficiency; energy diversity; infrastructure development and regulation; and energy talent supply.

This year, the VEWC continues to expand its membership and created three new committees—Communications, Education, and Industry Demand—to drive the mission and energy workforce goals for the Commonwealth. On July 1, 2020, the Virginia Department of Education launched the 17th Energy Career Cluster created in partnership with the Center for Energy Workforce Development (CEWD), the VEWC, Virginia Nuclear Energy Consortium, and Virginia Department of Education making Virginia one of four states in the nation to have an Energy Career Cluster and the first to do so via legislation. The VEWC also partnered with Henrico County Career and Technical Education (CTE) to offer their "Life Ready Expo" virtually highlighting the 17th career cluster through a Careers in Energy Expo. The expo, which took place on November 17, 2020, exposed high school juniors and seniors to the Cluster's Pathways in Energy Sustainability and Efficiency; Energy Transmission, Distribution and Storage; Fuels Production; and Power Generation by allowing them to hear directly from professionals in these fields about their career development. The Governor of Virginia recognized and proclaimed October 19 – 23 as Careers in Energy Week in Virginia. The VEWC members participated in wide-ranging virtual activities across the state and the VEWC distributed CEWD's Careers in Energy Week materials for members to engage more with the nation's Energy sector. 2020 has been a pivotal year for the trajectory of the VEWC and growing the foundation that will continue to expand, consolidate, and promote collaboration on workforce development initiatives across the Commonwealth.

APPENDIX A

Enabling Legislation (Amended 2017)

Enabling Legislation (Amended 2017)

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

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

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

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

B. Except as otherwise provided herein, all appointments shall be for terms of four years each. No member shall be eligible to serve more than two successive four-year terms. After expiration of an initial term of three years or less, two additional four-year terms may be served by such member if appointed thereto. Appointments to fill vacancies, other than by expiration of a term, shall be made for the unexpired terms. Any appointment to fill a vacancy shall be

made in the same manner as the original appointment. The remainder of any term to which a member is appointed to fill a vacancy shall not constitute a term in determining the member's eligibility for reappointment.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

7. Invest its funds as permitted by applicable law;

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

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

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

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

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

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

14. Conduct any other activities as may seem appropriate to increase solar energy generation in the Commonwealth and the associated jobs and economic development and competitiveness benefits, including assisting investor-owned utilities in the planned deployment of at least 400 megawatts of solar energy projects in the Commonwealth by 2020 through entering into agreements in its discretion in any manner provided by law for the purpose of planning and

providing for the financing or assisting in the financing of the construction or purchase of such solar energy projects authorized pursuant to § 56-585.1;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX B

Virginia Solar Energy Development and Energy Storage Authority Members

Virginia Solar Energy Development and Energy Storage Authority Members

Member/Organization	Area Represented	Appointed By	Term Expires
Paul Duncan GSD Energy Consultants	Non legislative Citizen	Governor	6/30/21
John Ockerman CEO Ockerman Automation Consulting, Inc.	Non legislative Citizen	Governor	6/30/23
Damian Pitt Associate Professor, VCU	Non legislative Citizen	Governor	6/30/22
Careth *Cody* Apperson Nystrom Managing Director, SJF Ventures	Non legislative Citizen	Governor	6/30/22
Cliona Mary Robb Director, Thompson McMullan, PC	Non legislative Citizen	Governor	6/30/23
Hayes Framme Ørsted	Non legislative Citizen	Governor	6/30/21
Colleen A. Lueken, PhD AES Energy Storage, Director of Market Analytics	Non legislative Citizen	Governor	6/30/24
Will Gathright Tumalow, Inc., Founder	Non legislative Citizen	Governor	6/30/21
Jon F. Hillis CEO, SolUnesco	Non legislative Citizen	Speaker of the House	6/30/21
John H. Rust, Jr. Commissioner CoA-FFX	Non legislative Citizen	Speaker of the House	6/30/22
Brian M. Gordon Vice President of Government Affairs Apartment and Office Building Association of Metropolitan Washington	Non legislative Citizen	Speaker of the House	6/30/21

Member/Organization	Area Represented	Appointed By	Term Expires
Kenneth G. Hutcheson Old Dominion Public Affairs	Non legislative Citizen	Senate Committee on Rules	6/30/22
Katharine Bond VP, Public Policy & State Affairs	Non legislative Citizen	Senate Committee on Rules	6/30/23
Michael Herbert Co-Founder/Managing Partner Delorean Power	Non legislative Citizen	Senate Committee on Rules	6/30/24

APPENDIX C

STATUS OF DOMINION SOLAR PROJECTS AND POWER OFFTAKERS

Dominion Energy's Large-Scale Solar Projects located in Virginia* (as of Nov. 5, 2020)

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		20	Dec. 1, 2017	20
Amazon Solar Farm Virginia - New Kent	New Kent County	Merchant		20		20
Amazon Solar Farm Virginia - Scott	Powhatan County	Merchant		20		20
Amazon Solar Farm Virginia - Sappony	Sussex County	Merchant		20		20
Amazon Solar Farm Virginia - Southampton	Southampton County	Merchant		100	Dec. 15, 2017	100
Clarke	Clarke County (White Post, VA)	Merchant	Old Dominion Electric Cooperative	10	Aug-17	10
Cherrydale	Kendall Grove (Eastern Shore)	Merchant		20	Nov. 22, 2017	20
Remington	Fauquier County	Regulated	Commonwealth of VA (Energy) and Microsoft (RECs)	20	Oct. 1, 2017	20
Oceana	Virginia Beach	Regulated	Commonwealth of VA	18	Dec. 1, 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)	17	Sep-18	17
UVA Puller	Middlesex County	Regulated		15	Oct-18	15
Essex	Essex County (Dunnsville, VA)	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	20	Dec. 14, 2017	20

Dominion Energy's Large-Scale Solar Projects located in Virginia* (as of Nov. 5, 2020)

Facility	Locality	Category	Offtaker	Capacity in Operation (MWac)	Commercial Operations Date (COD)	Cumulative Capacity in Operation & Development* (MWac)
Spring Grove 1	Surry County	Regulated	Serving all Dominion Energy regulated electric customers in VA and NC; supported by Facebook via Dominion Energy Virginia Schedule RF	0	Late 2020	98
Colonial Trail West	Surry County	Regulated		142	Dec-19	142
Sadler Solar	Greensville County	Regulated		0	Dec-20	100
Water Strider	Halifax County	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	0	Q4 2020	80
Montross	Westmoreland County	Regulated	Facebook	20	Dec-18	20
Gloucester	Gloucester County	Regulated	Facebook	20	Apr-19	20
Grasshopper	Mecklenburg County	Regulated	Facebook	20	Sep-20	80
Greensville	Greensville County	Merchant	T-Mobile USA	0	2020	80
Myrtle	City of Suffolk	Merchant	T-Mobile USA	15	2020	15
Belcher Solar	Louisa County	Regulated	Commonwealth of Virginia	0	Dec-20	88
Bedford Solar	City of Chesapeake	Regulated	Commonwealth of Virginia	0	2021	70
Fort Powhatan	Prince George County	Regulated	Amazon Web Services	0	2021	150
Westmoreland Solar	Westmoreland County	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	0	2021	20
Madison	Orange County	Merchant	Northrup Grumman	0	2022	62.5
Amazon Arlington Solar Farm Virginia	Pittsylvania County	Regulated	Amazon HQ2 / Arlington County	0	2022	120
Dulles Solar	Fairfax and Loudoun Counties	Regulated	Serving all Dominion Energy regulated electric customers in VA and NC	0	2023	100

Dominion Energy's Large-Scale Solar Projects located in Virginia* (as of Nov. 5, 2020)

Facility	Locality	Category	Offtaker	Capacity in Operation (MWac)	Commercial Operations Date (COD)	Cumulative Capacity in Operation & Development* (MWac)
Rochambeau	James City County	Regulated	William & Mary	0	2021	20
Watlington	Halifax County	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	0	2022	20
Chesapeake	City of Chesapeake	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	0	2022	118
Pleasant Hill	City of Suffolk	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	0	2022	20
Wythe	Wythe County	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	0	2022	75
Cavalier	Surry and Isle of Wight Counties	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	0	2022	170
Rivanna	Albermarle County	PPA with Dominion Energy Virginia (Regulated)	Serving all Dominion Energy regulated electric customers in VA and NC	0	2021	12.5
Grassfield	City of Chesapeake	Regulated	Serving all Dominion Energy regulated electric customers in VA and NC	0	2021	20

Dominion Energy's Large-Scale Solar Projects located in Virginia* (as of Nov. 5, 2020)

Facility	Locality	Category	Offtaker	Capacity in Operation (MWac)	Commercial Operations Date (COD)	Cumulative Capacity in Operation & Development* (MWac)
Sycamore	Pittsylvania County	Regulated	Serving all Dominion Energy regulated electric customers in VA and NC	0	2022	42
Norge	James City County	Regulated	Serving all Dominion Energy regulated electric customers in VA and NC	0	2022	20
Total*				**653**		**2,199**

*Excludes the following:
- an additional 97 MW of solar generation (project TBD) under development with Commonwealth of Virginia announced on Oct. 18, 2019;
- approximately 6.4 MW of solar distributed generation under Dominion Energy Virginia's Solar Partnership Program; and
- 0.48 MW of solar distributed generation under development as a rooftop canopy at Dominion Energy's Tredegar Campus.

APPENDIX D

SOLAR PROJECTS COMPLETED IN VIRGINIA

SOLAR PROJECTS COMPLETED IN VIRGINIA

Distributed (Net Metered) Solar

System Owner	Location	Capacity (MW)
15,129 Distributed Individual Utility Customers	Distributed Across State	
	Total	**145.3**

Behind-the-Meter - Not Net Metered

System Owner	Location	Capacity (MW)
Norfolk Naval "Monkey Bottom"	Norfolk Naval Base	2
Dept. Military Affairs	Ft. Pickett	0.6
	Total	**2.6**

Dominion Energy - Complete

Facility Name	County/City	Capacity (MW)
Amazon Solar - Accomack	Accomack	80
Amazon Solar - Buckingham	Buckingham	20
Amazon Solar - New Kent	New Kent	20
Amazon Solar - Scott	Powhatan	20
Amazon Solar - Sappony	Sussex	20
Amazon Solar - Southampton	Southampton	100
Clarke	Clarke	10
Cherrydale	Kendall Grove	20
Remington	Fauquier	20
Oceana	Virginia Beach	18
Whitehouse	Louisa	20
Woodland	Isle of Wight	19
Scott	Powhatan	17
UVA Hollyfield	King William	17
UVA Puller	Middlesex	15
Essex	Essex	20
Colonial Trail West Solar	Surry	142

Montross Solar	Westmoreland	20
Gloucester Solar	Gloucester	20
Grasshopper	Mecklenburg	20
Myrtle Solar	City of Suffolk	15
	Total:	**713**

Cooperative Utility Projects

Cooperative	Location	Capacity (MW)
Central Virginia Electric Cooperative	Goochland County	5
Central Virginia Electric Cooperative	Fluvanna County	5
BARC Electric Cooperative	Fauquier County	0.6
	Total	**10.6**

Municipal Utility Projects

Municipality	Capacity (MW)
Town of Bedford	3
Town of Front Royal	3
City of Danville	20
TOTAL:	**24.0**

Dominion Solar Partnership Projects

Project Site	Location	Capacity (MW)
Old Dominion University	Norfolk	0.13
Capital One	Chesterfield County	0.5
Virginia Union University	Richmond	0.05
Prologis Concorde Center	Loudoun County	0.74
Randolph-Macon College	Ashland	0.05
Philip Morris Park 500	Chesterfield County	2.0
Western Branch High School	Chesapeake	1
Merck	Rockingham County	1.5
University of Virginia	Charlottesville	0.4
	Total:	**6.4**

Power Purchase Agreements

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

TOTAL INSTALLED CAPACITY: 834 MW

APPENDIX E

SOLAR ENERGY PROJECTS UNDER DEVELOPMENT

Dominion Energy – Under Development

Facility Name	County/City	Capacity (MW)
Spring Grove 1	*Surry*	*98*
Sadler Solar	*Greensville*	*100*
Water Strider	*Halifax*	*80*
Greensville	*Greensville*	*80*
Belcher Solar	*Louisa*	*88*
Bedford Solar	*City of Chesapeake*	*70*
Fort Powhatan	*Prince George*	*150*
Westmoreland Solar	*Westmoreland*	*20*
Madison	*Orange*	*62.5*
Amazon Arlington Solar Farm	*Pittsylvania*	*120*
Dulles Solar	Fairfax and Loudoun Counties	100
Rochambeau	James City	20
Watlington	Halifax	20
Chesapeake	City of Chesapeake	118
Pleasant Hill	City of Suffolk	20
Wythe	Wythe	75
Cavalier	Surry and Isle of Wight	170
Rivanna	Albemarle	12.5
Grassfield	City of Chesapeake	20
Sycamore	Pittsylvania	42
Norge	James City	20
	TOTAL:	**1,486**

Cooperative Utility Projects Under Development

Cooperative	Location	Capacity (MW)
Old Dominion Electric Cooperative	TBD	60
	Total	**60**

Municipal Utility Projects Under Development

Municipality	Capacity (MW)
City of Martinsville	9
TOTAL:	**9.0**

Permit by Rule – Permits Issued To Date

NOTE: Highlighted are Dominion Energy projects listed on Pages 65 and not reflected in the total on Page 73.

Permit Name	County/City	Capacity (MW)
Wythe County Solar Project, LLC	Wythe County	75
Greenwood Solar I, LLC	Culpeper County	100
Caden Energix Wytheville LLC	Wythe County	20
Maplewood Solar	Pittsylvania County	120
Rochambeau Solar, LLC	James City County	19.9
Whitehorn Solar LLC	Pittsylvania County	50
Bedford Solar Center	Chesapeake City	70
Fort Powhatan Solar, LLC	Prince George County	150
Nokesville Solar, LLC	Prince William County	20
Westmoreland County Solar Project	Westmoreland County	20
Rivanna Solar, LLC	Albemarle County	12.5
Pumpkinseed Solar	Greensville County	60
Crystal Hill Solar, LLC	Halifax County	65
Foxhound Solar, LLC	Halifax County	83
Depot Solar	Campbell County	15
Otter Creek Solar, LLC	Mecklenburg County	60
Greensville County Solar Project	Greensville County	80
Grasshopper Solar, LLC	Mecklenburg County	115
Altavista Solar LLC	Campbell County	80
Turner Solar, LLC	Henrico County	20
Danville Farm, LLC	Pittsylvania County	12
Powells Creek Farm Solar, LLC	Halifax County	70
Water Strider Solar, LLC	Halifax County	80
Sol Madison Solar, LLC	Orange County	62.5
Caden Energix Hickory, LLC	Chesapeake City	32
Rives Road Solar, LLC	Prince George County	19.7
Sol Leatherwood Solar, LLC	Henry County	20
Gardy's Mill Solar, LLC	Westmoreland County	14
Sunnybrook Farm Solar, LLC	Halifax County	51
Pamplin Solar, LLC	Appomattox County	15.7
Mt. Jackson Solar I, LLC	Shenandoah County	16
Buckingham II Solar LLC	Buckingham County	20
Briel Farm Solar LLC	Henrico County	20
Montross Solar	Westmoreland County	20
TWE Myrtle Solar Project, LLC	Suffolk City	15
Hollyfield II Solar, LLC	King William County	13
Gloucester Solar, LLC	Gloucester County	20
Puller Solar	Middlesex County	15
Bluestone Farm Solar, LLC	Mecklenburg County	50
Twittys Creek Solar, LLC	Charlotte County	15
Hollyfield	King William County	17
Mechanicsville Solar, LLC	Henrico County	20
Belcher Solar, LLC	Louisa County	88

Southampton Solar, LLC	Southampton County	100
Sappony Solar, LLC	Sussex County	20
Scott-II Solar, LLC	Powhatan County	20
Essex Solar Center LLC	Essex County	20
Correctional Solar, LLC	New Kent County	20
Hecate Energy Clarke County, LLC	Clarke County	20
Hecate Energy Cherrydale, LLC	Northampton County	20
Buckingham Solar I, LLC	Buckingham County	20
Eastern Shore Solar, LLC	Accomack County	80
	TOTAL:	**2,261**
	TOTAL MINUS DOMINION:	**1,683**

Permit by Rule – Notices of Intent to Apply Submitted

NOTE: Highlighted are Dominion Energy projects listed on Pages 65 and 69 and not reflected in the total on Page 73

Permit Name	County/City	Capacity (MW)
Apple Grove Solar	Louisa County	20.00
Bartonsville Energy Facility, LLC	Frederick County	130.00
BM&D Ltd.	Pulaski County	40.00
Bookers Mill Solar, LLC	Richmond County	127.00
Bumblebee Solar, LLC	Campbell County	15.00
Cabin Point Solar Center LLC	Sussex County	75.00
Caden Energix Axton LLC	Henry County	66.00
Caden Energix Gladys LLC	Campbell County	60.00
Caden Energix Jarratt LLC	Greensville County	82.50
Caden Energix New Kent, LLC	New Kent County	20.00
Caden Energix Piney River LLC	Amherst County	50.00
Caden Energix Spout Spring LLC	Appomattox County	60.00
Chesapeake Solar Project, LLC	Chesapeake City	150.00
Chester Solar Technology Park, LLC	Chesterfield County	150.00
Children of Chesterfield Solar	Chesterfield County	20.00
Culpeper N. Solar, LLC	Culpeper County	20.00
Dogwood Solar	Page County	20.00
Endless Caverns Solar, LLC	Rockingham County	32.00
Fountain Creek Solar	Greensville County	80.00
Foxglove Solar, LLC	Frederick County	75.00
Ho-Fel Solar Project	Isle of Wight County	39.00
Jarratt Energy Facility, LLC	Greensville County	49.00
Lily Pond Solar, LLC	Dinwiddie County	83.00
Loblolly Solar, LLC	Surry County	150.00
Moody Creek Solar, LLC	Charlotte County	149.50

Moraticco Road Solar 1	Lancaster County	20.00
Mount Nebo Solar Partners, LLC	Surry County	20.00
Mt. Jackson Solar II, LLC	Shenandoah County	19.00
Mt. Jackson Solar III, LLC	Shenandoah County	16.20
North Ridge Powhatan Solar LLC	Powhatan County	20.00
Pigeon Run Solar, LLC	Campbell County	60.00
Piney Creek Solar, LLC	Halifax County	80.00
Pleasant Hill Solar	Suffolk City	20.00
Port Conway Solar, LLC	King George County	20.00
SB Solar, LLC	Halifax County	10.00
Seven Bridges Solar, LLC	Mecklenburg County	116.00
Shockoe Solar, LLC	Pittsylvania County	60.00
Sigora Solar	Wythe County	40.00
Smithfield Solar Farm	Isle of Wight County	14.00
Solidago, LLC	Isle of Wight County	20.00
SolUnesco Racehorse	Caroline County	15.00
Spout Springs Solar LLC	Appomattox County	20.00
Spring Grove Solar II, LLC	Surry County	150.00
Stagecoach Solar, LLC	Halifax County	15.00
Stratford Solar Center, LLC	Suffolk City	15.00
SunPower Corporation, James City	James City County	35.00
SunPower Corp., Southampton	Southampton County	91.00
SunTec Solar ESVA One, LLC	Accomack County	20.00
Sweet Sue Solar LLC	King William County	77.00
Sweetspire, LLC	Hanover County	20.00
TPE Pamplin2 Solar	Prince Edward County	16.00
VSF Solar 1, LLC	Westmoreland County	20.00
VSF Solar 2, LLC	Westmoreland County	11.00
Walnut Solar I, LLC	King and Queen County	150.00
Watlington Solar, LLC	Halifax County	20.00
Waverly Solar, LLC	Sussex County	118.00
Windsor PV1, LLC	Isle of Wight County	85.00
Winterpock Solar I, LLC	Chesterfield County	20.00
	TOTAL:	**3,196**
	TOTAL MINUS DOMINION:	**3,006**

Third Party Power Purchase Agreements under Development

Project	Location	MW AC
Cumberland Solar	Prince Edward County	1.5
Rappahannock Solar	Lancaster County	1.5
Southern Current - Twelve Oaks Solar	Nottoway County	1.5
Southern Current - Ten Oaks Solar	Nottoway County	1.5
Southern Current - Cow Solar	Mecklenburg County	1.5
Augusta Co PS_Cassell ES	Augusta County	0.30
Augusta Co PS_Fort Defiance HS	Augusta County	0.47
Augusta Co PS_Riverheads ES	Augusta County	0.29
Augusta Co PS_Riverheads HS	Augusta County	0.11
Augusta Co PS_Wilson ES	Augusta County	0.37
Augusta Co PS_Wilson MS	Augusta County	0.32
Daniels Run Peace Church	Fairfax	0.01
Eastern Mennonite University II	Harrisonburg	0.07
InterChange_Black Ice	Harrisonburg	0.53
InterChange_Blue Stripe	Harrisonburg	0.72
InterChange_C Pad 2	Rockingham County	0.11
InterChange_Port Services	Warren County	0.28
Richmond PS_Broad Rock ES	Richmond	0.18
Richmond PS_GH Reid ES	Richmond	0.15
Richmond PS_Huguenot HS	Richmond	0.63
Richmond PS_JB Fisher ES	Richmond	0.14
Richmond PS_JH Blackwell ES	Richmond	0.18
Richmond PS_L Holton ES	Richmond	0.17
Richmond PS_LM Brown MS	Richmond	0.29
Richmond PS_MJ Jones ES	Richmond	0.15
Richmond PS_ML King Jr. MS	Richmond	0.54
Richmond PS_Oak Grove ES	Richmond	0.18
Shenandoah Uni. - Athletic Bldg	Winchester	0.34
Shenandoah Uni. - Library	Winchester	0.04
Shenandoah Uni. - Theater	Winchester	0.08
S-Power	Spotsylvania	500
	Total:	**514.1**

TOTAL MW UNDER DEVELOPMENT: 5,593 MW

COMPLETE PLUS UNDER DEVELOPMENT: 6,486 MW

APPENDIX F

Active and Withdrawn Solar Energy Projects in the PJM New Services Queue

Solar Energy Projects in the PJM New Services Queue

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

Buggs Island-Chase City 115kV	20	Mecklenburg	Dominion	Complete	Complete	Complete	12/15/2020
Buggs Island-Chase City 115kV	20	Mecklenburg	Dominion	Complete	Complete	Complete	12/15/2020
Buggs Island-Chase City 115kV	20	Mecklenburg	Dominion	Complete	Complete	Complete	12/15/2020
Hopewell-Surry 230kV	142.4	Surry	Dominion	Complete	Complete	Complete	12/1/2019
Louisa-South Anna 230kV	88.2	Louisa	Dominion	Complete	Complete	Complete	12/1/2020
North Shenandoah-Stanley 34.5 kV	20	Page	APS	Complete	Complete	NA	12/31/2020
Franklin 115kV	91	Southampton	Dominion	Complete	Complete	In Progress	12/31/2018
Brink-Trego 115kV	59.6	Greensville	Dominion	Complete	Complete	In Progress	3/31/2018
Beechwood 115kV	20	Mecklenburg	Dominion	Complete	Complete	In Progress	6/12/2018
Clubhouse-Lakeview 230kV	100	Greensville	Dominion	Complete	Complete	In Progress	12/1/2019
Reams 115kV	80	Dinwiddie	Dominion	Complete	Complete	In Progress	6/1/2019
Waverly #2 DP 115kV	50	Sussex	Dominion	Complete	Complete	In Progress	6/1/2019
Emporia-Trego 115kV	80	Greensville	Dominion	Complete	Complete	In Progress	12/15/2018
Hopewell-Surry 230kV	240	Prince George	Dominion	Complete	Complete	In Progress	6/3/2017
Altavista-Mt. Airy 69kV	42	Pittsylvania	Dominion	Complete	Complete	In Progress	10/1/2019
Mountain Run-Mitchell 115 kV	100	Culpeper	Dominion	Complete	Complete	In Progress	10/1/2019
Harmony Village-Shackleford 115kV	50	King & Queen	Dominion	Complete	Complete	In Progress	10/1/2019
Jacksonville-Renaker 138kV II	60	Halifax	Dominion	Complete	Complete	In Progress	6/1/2019
Locust Grove-Paytes 115kV	62.5	Orange	Dominion	Complete	Complete	In Progress	4/30/2018
Perth-Hickory Grove 115kV	20	Halifax	Dominion	Complete	Complete	In Progress	6/1/2019
Smith Mountain-Bearskin 138kV	100	Pittsylvania	AEP	Complete	Complete	In Progress	10/21/2017
Halifax-Mt. Laurel 115kV	51	Halifax	Dominion	Complete	Complete	In Progress	7/31/2018
Mitchell-Mountain Run 115kV	60	Culpeper	Dominion	Complete	Complete	In Progress	6/1/2019
Mitchell-Mountain Run 115kV	20	Culpeper	Dominion	Complete	Complete	In Progress	6/1/2019
Smith Mtn.-Candler's Mt. 138kV	60	Campbell	AEP	Complete	Complete	In Progress	6/1/2019
Smith Mtn.-Candler's Mtn. 138kV	20	Campbell	AEP	Complete	Complete	In Progress	6/1/2019
Brandy-Remington 115kV	60	Culpeper	Dominion	Complete	Complete	In Progress	6/30/2018

Gretna DP 69kV	50	Pittsylvania	Dominion	Complete	Complete	In Progress	12/1/2018
Spotsylvania 500kV	500	Spotsylvania	Dominion	Complete	Complete	In Progress	10/1/2019
Septa 500kV	240	Isle of Wight	Dominion	Complete	Complete	In Progress	10/1/2019
Briery-Clover 230kV	240	Prince Edward	Dominion	Complete	Complete	In Progress	10/1/2019
Chickahominy 230kV	320	Charles City	Dominion	Complete	Complete	In Progress	10/1/2019
Elmont 115kV	80	Hanover	Dominion	Complete	Complete	In Progress	12/31/2020
Hopewell-Surry 230kV	97.9	Surry	Dominion	Complete	Complete	In Progress	9/30/2019
Halifax-Person 230kV	29.2	Halifax	Dominion	Complete	Complete	In Progress	9/30/2018
Crystal Hill-Halifax 115kV	44.7	Halifax	Dominion	Complete	Complete	In Progress	9/30/2018
Grassfield-Great Bridge 115kV	150	Chesapeake	Dominion	Complete	Complete	In Progress	12/31/2019
Disputanta-Waverly 115kV	60	Prince George	Dominion	Complete	Complete	In Progress	12/31/2019
Ivor-Oakridge 115kV	85	Isle of Wight	Dominion	Complete	Complete	In Progress	12/31/2019
Halifax-Person 230kV	50	Halifax	Dominion	Complete	Complete	In Progress	3/7/2019
Mitchell DP 115kV	80	Culpeper	Dominion	Complete	Complete	In Progress	6/30/2019
Perth 115kV	100	Halifax	Dominion	Complete	Complete	In Progress	10/1/2019
Harmony Village-Shackleford 115kV	70	King & Queen	Dominion	Complete	Complete	In Progress	10/1/2019
Stuarts Draft-Waynesboro 115kV	150	Augusta	Dominion	Complete	Complete	In Progress	10/31/2018
Jacksons Ferry 138kV	75	Wythe	AEP	Complete	Complete	In Progress	12/31/2021
Septa 500kV	240	Isle of Wight	Dominion	Complete	Complete	In Progress	10/1/2019
Bremo-Powhatan 230kV	99.9	Powhatan	Dominion	Complete	Complete	In Progress	10/1/2019
Page-Bethel 138 kV	100	Page	APS	Complete	Complete		12/31/2019
Meadow Brook-Strasburg 138 kV	75	Frederick	APS	Complete	Complete		12/31/2020
Arnold's Corner 34.5kV	18	King George	Dominion	Complete	In Progress		9/15/2017
Smith Mountain-Bearskin 138 kV	120	Pittsylvania	AEP	Complete	In Progress		10/1/2019
Hopewell-Surry 230 kV	150	Surry	Dominion	Complete	In Progress		9/30/2019
Fentress-Landstown 230 kV	70	Chesapeake	Dominion	Complete	In Progress		12/31/2020
Harmony Village-Shackleford 115 kV	50	Gloucester	Dominion	Complete	In Progress		12/23/2019

Oak Grove 34.5 kV I	20	Westmoreland	Dominion	Complete	In Progress		12/1/2018
Oak Grove 34.5 kV II	20	Westmoreland	Dominion	Complete	In Progress		12/1/2018
Oak Grove 34.5 kV III	11.2	Westmoreland	Dominion	Complete	In Progress		12/1/2018
Brink 115 kV	80	Greensville	Dominion	Complete	In Progress		12/1/2018
Beechwood-Palmer Springs 115 kV	45	Mecklenburg	Dominion	Complete	In Progress		12/1/2019
Crystal Hill-Halifax 115 kV	64.7	Halifax	Dominion	Complete	In Progress		1/31/2019
Halifax-Person 230 kV	75.1	Halifax	Dominion	Complete	In Progress		9/30/2018
Paytes 115 kV	20	Orange	Dominion	Complete	In Progress		1/31/2019
Bakers Pond-Ivor 11 5kV	68	Sussex	Dominion	Complete	In Progress		12/31/2019
Clover-Sedge Hill 230 kV	71	Halifax	Dominion	Complete	In Progress		9/2/2019
Biery-Clover 230 kV	110.5	Mecklenburg	Dominion	Complete	In Progress		9/2/2019
Kings Dominion DP 115 kV	77	King William	Dominion	Complete	In Progress		12/31/2019
Mountain Run-Mitchell 115 kV	150	Culpeper	Dominion	Complete	In Progress		10/2/2019
Sedge Hill-Person 230 kV	70	Halifax	Dominion	Complete	In Progress		3/7/2020
Hopewell-Surry 230 kV	150	Surry	Dominion	Complete	In Progress		12/31/2020
Clover-Sedge Hill 230 kV	80	Halifax	Dominion	Complete	In Progress		12/31/2020
Pamplin 34.5 kV	15.7	Appomattox	Dominion	Complete	In Progress		12/31/2018
Stonewall-Long Mountain 69 kV	55	Appomattox	AEP	Complete	In Progress		12/31/2020
Hopewell-Surry 230 kV	7.6	Surry	Dominion	Complete	In Progress		11/1/2019
Hopewell-Surry 230 kV	52.1	Surry	Dominion	Complete	In Progress		9/30/2019
Elko 34.5 kV	20	Henrico	Dominion	Complete	In Progress		12/30/2019
Wan 34.5 kV	19.8	Gloucester	Dominion	Complete	In Progress		10/1/2018
Chase City-Gary 115 kV	130	Lunenburg	Dominion	Complete	In Progress		10/31/2020
Harmony Village-Shackleford 115 kV	90	King & Queen	Dominion	Complete	In Progress		10/1/2019
Crystal Hill 115 kV	65.5	Halifax	Dominion	Complete	In Progress		1/31/2019
Northern Neck 34.5 kV	14	Westmoreland	Dominion	Complete	In Progress		12/30/2019
Boydton DP-Kerr Dam 115 kV	80	Mecklenburg	Dominion	Complete	In Progress		6/1/2021

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

Winterpock 34.5kV	20	Chesterfield	Dominion	In Progress			11/16/2020
Powhatan 34.5kV	18	Powhatan	Dominion	In Progress			7/31/2020
Barterbrook-Stuarts Draft 115 kV	125	Augusta	Dominion	In Progress			11/13/2020
Bakers Pond-Bell Ave 115kV	87	Sussex	Dominion	In Progress			6/1/2022
Endless Caverns 34.5kV	15.7	Rockingham	Dominion	In Progress			9/3/2020
Endless Caverns 34.kV	15.7	Rockingham	Dominion	In Progress			9/3/2020
Axton 138kV	66	Henry	AEP	In Progress			12/15/2021
Union Camp 115 kV	50	Isle of Wight	Dominion	In Progress			4/1/2021
Bremo-Scottsville 138 kV	180	Buckingham	AEP	In Progress			8/31/2021
Baker Pont-Ivor 115kV	85	Southampton	Dominion	In Progress			12/1/2022
Oak Grove 34.5 kV	20	Westmoreland	Dominion	In Progress			10/1/2020
Mt. Jackson 34.5 kV	18.9	Shenandoah	Dominion	In Progress			11/20/2020
Meads 138 kV	97	Bedford	AEP	In Progress			11/30/2020
Clubhouse 230 kV	200	Greensville	Dominion	In Progress			6/30/2019
Wallops Island 69 kV	20	Accomack	ODEC	In Progress			12/1/2020
Kerr Dam-Ridge Rd 115 kV	90	Mecklenburg	Dominion	In Progress			12/1/2021
Disputanta-Poe 115kV	100	Prince George	Dominion	In Progress			12/1/2021
Curdsville-Willis Mountain 115kV	100	Buckingham	Dominion	In Progress			12/1/2021
Remington-Gordonsville 230kV	149	Culpeper	Dominion	In Progress			10/23/2020
Louisa-South Anna 230kV	105.2	Louisa	Dominion	In Progress			10/30/2020
Garner-Northern Neck 115kV	149	Richmond	Dominion	In Progress			10/23/2020
Ladysmith CT-St. Johns 230kV	120	Carolina	Dominion	In Progress			12/1/2021
Ladysmith CT-St. Johns 230kV	120	Carolina	Dominion	In Progress			12/1/2021
Fredericksburg-Pinewood 115kV	120	Carolina	Dominion	In Progress			12/1/2021
Smithfield 34.5kV	20	Isle of Wight	Dominion	In Progress			9/30/2020
Old Chapel 115kV	40	Clarke	APS	In Progress			12/30/2021
Wattsville 12kV	11.1	Accomack	DPL	In Progress			6/25/2021
Victoria-Martin 115kV	150	Nottoway	Dominion	In Progress			9/1/2021
Carson-Suffolk 500kV	800	Sussex	Dominion	In Progress			12/31/2021

Light Foot 34.5kV	19.9	James City	Dominion	In Progress			10/23/2020
Culpepper DP 15kV	20	Culpeper	Dominion	In Progress			9/30/2020
Harmony Village-Shackleford 115 kV	20	Gloucester	Dominion	In Progress			12/21/2020
Harmony Village-Shackleford 115 kV	80	Gloucester	Dominion	In Progress			12/21/2020
Belle Haven-Tasley 69kV	70	Accomack	ODEC	In Progress			11/30/2021
Four Rivers 230kV	300	Hanover	Dominion	In Progress			12/31/2022
Colleen-Clifford 138kV	100	Nelson	AEP	In Progress			6/1/2022
Chatham-Climax 69kV	20	Pittsylvania	Dominion	In Progress			7/31/2020
Bell Avenue 115kV	150	Southampton	Dominion	In Progress			9/30/2021
Reams 115kV	70	Dinwiddie	Dominion	In Progress			12/31/2021
Smith Mountain-E. Danville 138kV	150	Pittsylvania	AEP	In Progress			9/30/2021
Harmony Village-Shackleford 115kV	130	King & Queen	Dominion	In Progress			10/1/2019
Total Megawatts:	**14,101**						

Solar Energy Projects Withdrawn from the PJM Generation Interconnection Queue

Name	Capacity (MW)	Location	Transmission Owner	Feasibility Study Status	System Impact Study Status	Facilities Study Status	Queue Entry Date	Withdrawal Date
Hopewell-Surry 230kV	80	Prince George	Dominion	Complete	Complete	Complete	4/30/2015	10/13/2017
Unionville 115kV	20	Orange	Dominion	Complete	Complete	Complete	3/30/2016	8/24/2018
Hickory 34.5kV	20	Chesapeake	Dominion	Complete	Complete	Complete	4/30/2015	9/29/2016
Westmoreland 34.5kV	20	Westmoreland	Dominion	Complete	Complete	Complete	7/22/2015	5/25/2017
Chickahominy 34.5kV	20	Unknown	Dominion	Complete	Complete	Complete	10/30/2015	6/7/2017
Chase City 34.5kV	36	Mecklenburg	Dominion	Complete	Complete	Complete	4/25/2016	8/31/2018
Boykins 34.5kV	8.5	Southampton	Dominion	Complete	Complete	NA	4/30/2014	1/25/2018
Boykins 34.5kV	13	Southampton	Dominion	Complete	Complete	NA	3/31/2015	1/25/2018
King's Fork 34.5kV	15	Suffolk	Dominion	Complete	Complete	NA	8/31/2016	6/22/2018
Fentress 34.5kV	15	Chesapeake	Dominion	Complete	Complete	NA	8/31/2016	10/20/2017
Hickory 34.5kV	20	Chesapeake	Dominion	Complete	Complete	NA	8/31/2016	10/20/2017
Culpeper 35kV	20	Culpeper	Dominion	Complete	Complete	NA	3/17/2017	10/8/2018
Smithfield 34.5kV	20	Isle of Wight	Dominion	Complete	Complete	NA	3/29/2017	9/5/2018
Old Church 34.5kV	20	Hanover	Dominion	Complete	Complete	NA	3/29/2017	9/10/2018
Bayview	20	Northampton	ODEC	Complete	Complete	NA	7/31/2009	9/12/2011
Bayview	20	Northampton	ODEC	Complete	Complete	NA	10/30/2009	11/27/2012
Tasley-Kellam 69kV	20	Accomack	ODEC	Complete	Complete	NA	1/26/2010	12/11/2013
Tasley-Kellam 69kV	20	Accomack	ODEC	Complete	Complete	NA	2/4/2010	8/29/2014
Culpeper 34.5kV	15	Unknown	Dominion	Complete	Complete	NA	10/30/2015	3/27/2017
Tasley 69kV	10	Accomack	ODEC	Complete	Complete		2/22/2016	3/20/2018
Double Toll Gate 138kV	20	Clarke	APS	Complete	Complete		12/30/2009	11/28/2012
Tasley 69kV	20	Accomack	DPL	Complete	Complete		6/15/2016	3/29/2018

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

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

Hickory 34.5 kV	12	Chesapeake	Dominion				9/30/2017	10/6/2017
Morrisville 230 kV	150	Accomack	Dominion				12/15/2017	1/5/2018
Charles City	20	Henrico	Dominion				2/13/2018	3/7/2018
Bremo-Kidds Store 115 kV	75	Fluvanna	Dominion				3/28/2018	4/2/2018
Hickory 34.5 kV	20	Chesapeake	Dominion				3/29/2018	4/6/2018
Hickory 34.5 kV	12	Chesapeake	Dominion				3/29/2018	4/6/2018
Morrisville 230 kV	200	Fauquier	Dominion				3/30/2018	4/6/2018
Spotsylvania 500 kV	556	Spotsylvania	Dominion				3/30/2018	4/6/2018
Carson-Rodgers Road 500 kV	500	Greensville	Dominion				3/30/2018	4/9/2018
South Creek 115 kV	62	Appomattox	Dominion				3/30/2018	4/6/2018
Clubhouse-Freeman DP 115 kV	250	Greensville	Dominion				3/30/2018	4/4/2018
Suffolk-Poe 115 kV	100	Isle of Wight	Dominion				3/30/2018	4/4/2018
Boykins 115 kV	100	Portsmouth	Dominion				3/30/2018	4/5/2018
Axton 138 kV	68	Henry	AEP				3/30/2018	4/3/2018
Morrisville 230kV	200	Fauquier	Dominion				5/25/2018	6/21/2018
Spotsylvania 500kV	800	Spotsylvania	Dominion				7/11/2018	10/12/2018
Louisa-South Anna 230kV	80	Louisa	Dominion				9/25/2018	10/1/2018
Harrowgate-Locks 115kV	120	Chesterfield	Dominion				9/28/2018	10/1/2018
Carson-Clover 500kV	180	Dinwiddie	Dominion				9/28/2018	10/1/2018
Clover	7	Halifax	Dominion				11/2/2010	1/20/2011
Boykin 115kV	20	Unknown	Dominion				4/30/2014	5/9/2014
Emporia-Trego 115kV	80	Greensville	Dominion				9/10/2015	9/28/2015
Wakefield 34.5kV	10	Surry	Dominion				10/30/2015	11/16/2015
Culpeper 34.5kV	15	Culpeper	Dominion				2/4/2016	3/30/2016
Saddler 115kV	100	Southampton	Dominion				3/13/2017	3/29/2017
Double Toll Gate 34.5kV	20	Clarke	APS				3/27/2017	6/20/2017
Harmony Village-Dunnsville 34.5kV	17.5	Middlesex	Dominion				3/29/2017	3/30/2017

Boykins-Murphy 115kV	50	Southampton	Dominion				3/30/2017	6/20/2017
Mount Eagle 34.5 kV	11	Albemarle	Dominion				7/31/2017	8/10/2017
Louisa 34.5kV	20	Louisa	Dominion				4/30/2015	5/21/2015
Wakefield 12.5kV	20	Sussex	Dominion				4/30/2015	5/21/2015
Grassfield 13.2kV	20	Chesapeake	Dominion				4/18/2016	5/5/2016
Catoctin 138kV	20	Frederick	APS				4/29/2016	6/2/2016
Indian River-Nelson 138kV	80	Sussex	DPL				4/29/2016	5/20/2016
Mt. Airy 34.5kV	50	Wythe	AEP				10/31/2016	11/22/2016
Morgan's Cut 34.5kV	60	Pulaski	AEP				10/31/2016	11/22/2016
Battle Town 115kV	100	Clarke	APS				2/28/2017	3/24/2017
Total Megawatts Withdrawn:	**7,043**							

APPENDIX G

Active and Withdrawn Energy Storage Projects in the PJM New Services Queue

Energy Storage Projects in the PJM Generation Interconnection Queue

Name	Capacity (MW)	Location	Transmission Owner	Fuel	Feasibility Study Status	System Impact Study Status	Projected In Service Date
Newport News 23kV	20	Newport News	Dominion	Storage	Complete	In Progress	4/1/2019
Byllesby 69 kV	4	Carroll	AEP	Storage	In Progress		4/25/2018
Locust Grove-Paytes 115kV	95.5	Orange	Dominion	Storage	In Progress		9/30/2021
Clubhouse 230 kV	200	Greensville	Dominion	Solar; Storage	In Progress		6/30/2019
Wallops Island 69 kV	20	Accomack	ODEC	Solar; Storage	In Progress		12/1/2020
Light Foot 34.5kV	5	James City	Dominion	Storage	In Progress		10/23/2020
Chatham-Climax 69kV	20	Pittsylvania	Dominion	Solar; Storage	In Progress		7/31/2020
Bell Avenue 115kV	150	Southampton	Dominion	Solar; Storage	In Progress		9/30/2021
Reams 115kV	70	Dinwiddie	Dominion	Solar; Storage	In Progress		12/31/2021
Smith Mountain-E. Danville 138kV	150	Pittsylvania	AEP	Solar; Storage	In Progress		9/30/2021
TOTAL STORAGE (MW)	**735**						

Energy Storage Projects Withdrawn from the PJM Generation Interconnection Queue

Name	Capacity (MW)	Location	Transmission Owner	Fuel	Feasibility Study Status	System Impact Study Status
Kellam - Bayview 69kV	20	Northampton	ODEC	Storage	Complete	
Glen Lyn	10	Giles	AEP	Storage	Complete	Complete
New Church 138kV	20	Accomack	DPL	Storage	NA	Complete
Columbia 115kV	2	Louisa	Dominion	Storage	Complete	NA
Tasley 25kV	4	Accomack	DPL	Storage	Complete	Complete
Clubhouse 230kV	85	Greensville	Dominion	Solar; Storage	Complete	Complete
Stuarts Draft-Waynesboro 115 kV	150	Augusta	Dominion	Storage	Complete	
Gosport 34.5kV	21.5	Portsmouth	Dominion	Natural Gas; Diesel; Other; Storage		
Total Storage Withdrawn:	**313**					

APPENDIX H

Virginia Solar Energy Development and Energy Storage Authority Bylaws

Virginia Solar Energy Development and Energy Storage Authority

Bylaws

ARTICLE I. APPLICABILITY

Section 1. General.

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

Section 2. Authority and Limitations.

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

ARTICLE II. AUTHORITY OBJECTIVES

Section 1. General.

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

The Authority is charged with, among other tasks (i) facilitating, coordinating, and supporting the development, either by the Authority or by other qualified entities, of the solar energy and energy storage industries and solar energy and energy storage projects by developing programs

that increase the availability of financing for solar energy projects and energy storage projects; (ii) facilitating the increase of solar energy generation systems and energy storage projects on public and private sector facilities in the Commonwealth; (iii) promoting the growth of the Virginia solar and energy storage industries; (iv) providing a hub for collaboration between entities, both public and private, to partner on solar energy projects and energy storage projects; and (v) positioning the Commonwealth as a leader in research, development, commercialization, manufacturing, and deployment of energy storage technology.

ARTICLE III. MEMBERS AND STAFF

Section 1. Appointment of Members and Terms

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

Section 2. Election of Chair and Vice-Chair.

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

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

Section 3. Authority Staff and Requests for Staff Assistance

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

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

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

ARTICLE IV. MEETINGS

Section 1. Regular Meetings.

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

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

Section 2. Annual Meetings.

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

Section 3. Committee Meetings.

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

Section 4. Special Meetings.

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

Section 5. Notice of Meetings.

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

Section 6. Quorum.

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

Section 7. Conduct of Meetings.

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

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

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

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

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

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

Section 8. Agenda.

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

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

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

Section 9. Amendments.

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

Section 10. Rules of Order

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