



Developing Renewable Energy and Energy Storage Facilities on Brownfields and Previously Coal Mined Lands in Virginia: A Handbook

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Section I: Introduction

In 2021, House Bill 1925 (HB1925)¹ was passed by the General Assembly and signed into law by the Governor. HB1925 establishes the Virginia Brownfield and Coal Mine Renewable Energy and Grant Fund Program. As mandated by the legislation, this handbook has been developed by the Virginia Department of Energy (Virginia Energy), in consultation with the Department of Environmental Quality (DEQ) as well as other key stakeholders, both private and public. Both the fund program and this handbook were established to help foster the deployment of renewable energy and energy storage on these types of properties throughout the Commonwealth. Virginia possesses a rich history of energy production as well as a significant number of coal mine and brownfield sites throughout the state. The purpose of this handbook is to help identify key considerations and issues associated with developing brownfields and coal mine sites for renewable energy or energy storage systems on those sites.

This handbook is a living document and will be updated periodically in order to reflect the evolving the opportunity and landscape in Virginia for these types of projects. Funding for the grant program is required to be entirely allocated via federal funding opportunities. As of the initial publication of this handbook, no federal funding mechanism has been identified to fund the grant program but the details of the program, as identified in HB1925, will be discussed in this document.

Virginia Energy would like to thank all contributors to the Handbook as well as those individuals and organizations that provided input during the public comment period. Please see the Appendix for a list of key contributors.

Section II: Development of Brownfields Sites

Brownfields Opportunities in Virginia

A brownfield is defined by the Commonwealth of Virginia as “*a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant*”². This is a very broad definition which includes commercial and industrial property, previously mined lands, former schools, and much more.

The Environmental Protection Agency (EPA) estimates that there are more than 450,000 brownfields in the United States including thousands of sites across Virginia. These properties represent an opportunity for reinvestment that leads to increased local

¹ <https://lis.virginia.gov/cgi-bin/legp604.exe?211+sum+HB1925>

² <https://law.lis.virginia.gov/vacodefull/title45.2/chapter17/article7/>

tax bases and job growth while utilizing existing infrastructure, preserving undeveloped land, and protecting and enhancing the environment of Virginia to promote the health and well-being of the community served. Many of these brownfields represent a great opportunity for the deployment of renewable energy projects on land that would otherwise remain underutilized.³

The Virginia Brownfields Restoration and Renewal Land Renewal Act (§ 10.1-1231) states that “[i]t shall be the policy of the Commonwealth to encourage remediation and restoration of brownfields by removing barriers and providing incentives and assistance whenever possible.” To meet this directive the Department of Environmental Quality (DEQ), through its Brownfields Program, provides technical assistance and helps remove barriers to brownfields investment in communities across the Commonwealth. DEQ works with the Virginia Economic Development Partnership (VEDP) and other agencies to help provide incentives for reinvestment in underutilized property when possible via grant programs they administer⁴.

Process in Virginia

In Virginia, there is no formal process for registering or declaring a site a “brownfield” in order to qualify for assistance. All communities across Virginia have brownfield sites and are able to reach out to DEQ for assistance. DEQ offers Brownfields Individualized Outreach (BIO), where DEQ brownfields staff will work with stakeholders to tailor assistance to meet the specific needs of each project or community. To begin that process, contact the Virginia DEQ Brownfields Program Coordinator at:

<https://www.deq.virginia.gov/land-waste/land-remediation/brownfields>

State Programs

DEQ Brownfields Program

Brownfields are properties in which redevelopment or reuse is complicated by the presence of hazardous materials, pollution, or contaminants. Cleaning up and reinvesting in these properties utilizes existing infrastructure, reduces the development of undisturbed open land, facilitates job growth, increases local tax bases and improves community aesthetics while protecting the environment.

DEQ works closely with property owners to turn these contaminated properties back to productive use across Virginia. Using innovative approaches to resolving problems, the agency works to safely clean up, transform and sustainably reuse these underutilized properties.

³ <https://www.epa.gov/brownfields/overview-epas-brownfields-program>

⁴ <https://law.lis.virginia.gov/vacode/title10.1/chapter12.1/section10.1-1231/>

The DEQ Brownfields Program is fully committed to providing technical assistance to stakeholders and helping them find incentives that will promote the reuse of brownfield sites across the Commonwealth. DEQ Staff is often able to help stakeholders navigate the regulatory requirements that may be preventing a project from moving forward. To discuss your project or request assistance please visit the Virginia DEQ Brownfields Program website at:

<https://www.deq.virginia.gov/land-waste/land-remediation/brownfields>

DEQ Voluntary Remediation Program (VRP)

In many cases, the environmental risk liabilities associated with the deployment of renewable energy projects on brownfields can be mitigated by completing environmental due diligence including ASTM Phase I Environmental Site Assessment (ESA) and, as appropriate, a Phase II ESA. However, there are cases where the environmental risk or liability concerns may warrant enrolling a property into the DEQ Voluntary Remediation Program (VRP).

The VRP encourages hazardous substance cleanups that might not otherwise take place. The program is a streamlined mechanism for site owners or operators to voluntarily address contamination sites with support from DEQ. The main goals are site redevelopment and enhanced environmental outcomes.

By overseeing the process, DEQ can ensure that the cleanup achieves a satisfactory level of human health and environmental protection. The program is not intended to serve as an alternative to or refuge from applicable laws, regulatory requirements, or enforcement actions.

When remediation is properly completed, DEQ issues a Satisfactory Completion of Remediation certificate. This certification provides assurance that the remediated site will not later become subject to DEQ enforcement action (unless new issues are discovered). The program facilitates the sale and reuse of industrial and commercial properties in the Commonwealth, which benefits all Virginians, especially property buyers and sellers. Participation decreases potential environmental liabilities of reusing or further developing existing commercial properties as well as the expansion of commercial sites onto pristine lands. These goals are shared with DEQ's [Brownfields Program](#) and the two programs often work as one.

To learn more about the program please visit the DEQ Voluntary Remediation website, please visit <https://www.deq.virginia.gov/land-waste/land-remediation/voluntary-remediation>

Federal Programs

EPA Brownfields Grants

EPA's Brownfields Program provides direct funding for brownfields assessment, cleanup, revolving loans, environmental job training, technical assistance, training, and research. To facilitate the leveraging of public resources, EPA's Brownfields Program collaborates with other EPA programs, other federal partners, and state agencies to identify and make available resources that can be used for brownfield activities. To learn more visit the EPA Brownfields grant website:

<https://www.epa.gov/brownfields/types-epa-brownfield-grant-funding>

EPA Region 3 Brownfields Technical Assistance

The EPA Brownfields Program in Region 3 provides grants and technical assistance to communities and states in Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia. Brownfields grants and technical assistance can be used to assess, safely clean up and sustainably reuse contaminated properties. Land Revitalization Programs in Region 3 assist communities, local governments, property owners and developers in restoring land and other natural resources into sustainable community assets. To learn more about how EPA Region 3 can help visit the Region 3 Technical Assistance website:

<https://www.epa.gov/brownfields/brownfields-and-land-revitalization-epa-region-3#TAB>

Virginia Resources

Virginia Brownfields Restoration and Economic Redevelopment Assistance Fund (VBAF)

VBAF provides grants or loans to local governments to promote the restoration and redevelopment of brownfield sites and to address environmental problems or obstacles to reuse so these sites can be effectively marketed to new economic development prospects.

There are two different grant types available. Site Assessment and Planning Grants are available on a rolling basis as funding allows. These grants for up to \$50,000 can be used to support environmental assessments, redevelopment planning, and limited environmental remediation. Site Remediation Grants for up to \$500,000 are available periodically and are intended to fund remediation of known environmental concerns. Both of these grant programs require one-to-one matching funds. To learn more about this visit the VEDP Brownfields grant website⁵.

⁵ <https://www.vedp.org/brownfields>

Section III: Development of Coal Mined Sites

Introduction and Description

The Virginia Department of Energy leads the Commonwealth to a reliable and responsible energy future. Created as the Department of Mines, Minerals and Energy in January 1985, the agency rebranded in 2021 to reflect the greater focus on renewable energy programs and economic development. Worker safety remains a high priority for the agency as it came into existence after a coal mining disaster in 1983 with the purpose of making service to mining, energy and mineral resources industries more efficient. Virginia Energy's Coal Mine Safety, Gas and Oil and Mineral Mining teams came from Virginia's Department of Labor and Industry. The Renewable Energy and Energy Efficiency programs were under the State Office of Emergency Services and the Mined Land Repurposing team came to Virginia Energy from the Department of Conservation and Economic Development. The Virginia Department of Energy currently has offices in Big Stone Gap, Charlottesville and Richmond.

Virginia Energy's Mined Land Repurposing (MLR) section is responsible for ensuring the reclamation of land affected by surface and underground coal mining activity. Major functions include regulating surface effects of coal mining, reclaiming abandoned mine lands, issuing permits, performing inspections, assisting small operators, and responding to citizen concerns. Through permitting, mine inspections, operator assistance, and training activities, the MLR promotes an environmentally sound mining industry throughout Virginia's active coalfield counties of Buchanan, Wise, Dickenson, Tazewell, Russell, Lee, and Scott. In addition, MLR addresses human health and safety hazards associated with abandoned mined land features throughout Virginia, including the inactive Greater Richmond and the New River Valley coal basins. Increasingly, MLR is engaging in economic development efforts centered around previously coal mined lands. The term "previously coal mined lands" is defined as "*lands, associated waters, and surrounding watersheds where coal extraction, beneficiation, or processing has occurred*"⁶.

Mined Land Repurposing Regulatory History

MLR was created in 1966 under the name of the Division of Mined Land Reclamation, with the enactment by the General Assembly of reclamation laws and regulations governing the coal mine industry. Numerous amendments to the state coal surface mine law through 1974, broadened the authority and duties of the Division.

In 1977, Congress enacted the [federal Surface Mining Control and Reclamation Act of 1977 \(Public Law 95-87\)](#). The federal coal surface mining law established extensive new requirements that impacted the industry, coal mining states, and their regulatory agencies nationwide. Using a provision of the Act, which enables coal mining states to

⁶ <https://law.lis.virginia.gov/vacodefull/title45.2/chapter17/article7/>

establish their own regulatory programs, Virginia passed its own law in 1979, which provided for the adoption of regulations comparable with Public Law 95-87.

Following the approval of Virginia's permanent regulatory program by the federal Office of Surface Mining and Reclamation Enforcement (OSMRE) in 1981, the state regained primary authority for the enforcement of coal surface mining and reclamation requirements. In states with approved regulatory programs, the OSMRE's role changes from inspection and enforcement to one of oversight and coordination with state programs to ensure they meet the intent of the Federal Act.

Coal Surface Mining Operation Permit Requirements

The MLR Technical Services and Reclamation Services Units assure coal mine operator compliance with the Virginia Coal Surface Mining Control Reclamation Act of 1979, Chapter 10, Title 45.2 of the Code and the Virginia Coal Surface Mining Reclamation Regulations (VCSMRR)⁷ to protect the environment and public health and safety from potential adverse effects of mining activities. This is accomplished by reviewing all Coal Surface Mining Operation permits and revisions to assure that requirements are met through proper planning based on the field conditions of the mine site; providing regular inspections and complaint investigations on permitted coal surface mining sites; and providing compliance assistance to mine operators, engineers and consultants.

The MLR Technical Services and Reclamation Services Units maintain accurate automated permit data on each coal surface mining site. Reclamation inspectors conduct over 7000 inspections and 400 complaint investigations annually. Approximately 70,000 acres are currently permitted for coal mining and reclamation in the southwest Virginia coalfield.

Abandoned Mined Land (Coal Program)

Virginia's Abandoned Mined Land (AML) Program was established in the late 1970s to correct pre-federal Act (1977) coal mine-related problems adversely impacting public health, safety, general welfare and the environment. Abandoned mine land-related problems include landslides, stream sedimentation, hazardous structures, dangerous highwalls, subsidence, loss of water, acid mine drainage and open mine portals. AML sites eligible for reclamation must have been mined before December 15, 1981. There must also be no other individual, firm or organization responsible to reclaim the site.

Virginia Energy's Mined Land Repurposing program (MLR) annually applies for a grant from the U.S. Office of Surface Mining (OSM) to reclaim high priority AML sites across the state. Grant funds are used to design reclamation plans, obtain consent for rights of entry, publish public notices in local newspapers to advertise for construction

⁷ <https://law.lis.virginia.gov/vacode/title45.2/chapter10/>

contractors and to ensure the site is reclaimed and the problems abated according to the engineering design. Grant funds come from fees paid by the coal industry on each ton of coal mined.

Widely recognized as one of the best AML programs in the nation, OSM has selected several Virginia AML projects for national awards. Virginia is nationally recognized for its innovative accomplishments in reclaiming abandoned coal mine land.

The AML feature inventory contains over 7,000 features that were created by mining before December 15, 1981. These inventory efforts are ongoing and a map showing these features is located at:

<https://energy.virginia.gov/webmaps/abandonedmineland/>

Virginia Energy's Role

Approximately 100,000 acres of land have been disturbed by coal mining activity in the Southwest Virginia coalfield. These impacts have occurred for over a century and under differing mining and reclamation requirements since 1966. Many areas have been affected by mining numerous times as mining technology and coal market changes have occurred.

Virginia Energy has compiled records from past mining activities through permitting actions and the AML program. These records, along with the mapping information on file at Virginia Energy, are the appropriate source for determination of coal mine lands. Many of these resources can be found through Virginia Energy's website and mapping resource center. However, individual sites may require further validation as coal mined land. Also, records on file may provide critical information about site conditions related to the past mining activity.

Section IV: Permitting

Definition of a Small Renewable Energy Project

During the 2009 legislative session, the General Assembly passed legislation which required the Department of Environmental Quality (DEQ), to develop regulations that establish one or more permits by rule necessary for the construction and operation of small renewable energy projects. Virginia law defines a "*Small renewable energy project*" as:

- an electrical generation facility with a rated capacity not exceeding 150 megawatts that generates electricity only from sunlight or wind;
- an electrical generation facility with a rated capacity not exceeding 100 megawatts that generates electricity only from falling water, wave motion, tides, or geothermal power;

- an electrical generation facility with a rated capacity not exceeding 20 megawatts that generates electricity only from biomass, energy from waste, or municipal solid waste;
- an energy storage facility that uses electrochemical cells to convert chemical energy with a rated capacity not exceeding 150 megawatts; or,
- a hybrid project composed of an electrical generation facility that meets the parameters established in clause (i), (ii), or (iii) and an energy storage facility that meets the parameters established in clause (iv).

Renewable Energy Laws and Regulations

The laws and regulations that govern small renewable energy projects are provided on the Legislative Information System's website:

- [2009 Small Renewable Energy Project Statute](#)
- [Small Renewable Energy Project \(Wind\) Permit by Rule \(9VAC15-40\)](#)
- [Small Renewable Energy Project \(Solar\) Permit by Rule \(9VAC15-60\)](#)
- [Water Related Energy Permit by Rule Withdrawn](#)
- [Small Renewable Energy Project \(Combustion\) Permit by Rule \(9VAC15-70\)](#)
- [Small Renewable Energy Project \(Small Energy Storage Facilities\) Permit by Rule \(9VAC15-100\)](#)

Section 130 Projects

Small renewable energy projects of a certain size are considered “*de minimis*” and are subject to the provisions of section 130 in each chapter of the applicable regulations, thus they are referred to as “*section 130 projects*”. Depending on the rated capacity or acreage, these projects are subject to fewer permitting provisions OR may not required to submit any notification of certification to DEQ. See the section 130 regulations for each small renewable energy project for details:

- **Small wind energy projects** of five megawatts or less-see [9VAC15-40-130](#)
- **Small solar energy projects** less than or equal to five megawatts or less than or equal to 10 acres or meeting certain categorical criteria-see [9VAC15-60-130](#)
- **Small combustion energy projects** with rated capacity less than or equal to five megawatts or meeting other specified criteria-see [9VAC15-70-130](#)
- **Small energy storage facilities** with a disturbance zone less than or equal to 10 acres or meeting certain categorical criteria-see [9VAC15-100-130](#)

Small Solar Energy Projects on Brownfields

Solar projects proposed on previously disturbed areas, regardless of megawatt capacity or size of the disturbance area, can be subject to section 130 permitting provisions. A previously disturbed area is defined as the land area within the property boundary of industrial or commercial properties, including brownfields, or previously mined areas. Impacts to undisturbed areas cannot exceed an additional ten acres.

To initiate the determination of section 130 permitting applicability for a brownfield site, the applicant should:

- Ensure the small solar energy project site meets the definition of a brownfield found in the Code of Virginia, [§ 10.1-1230](#); "*Brownfield*" means real property; the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.
- Submit a letter to the [DEQ Land/Brownfields Program](#) documenting why the site meets the criteria as a previously disturbed area; i.e., historically used as a heavy industrial site, RCRA Corrective Action site, etc. Upon receipt, the DEQ Land/Brownfields Program staff will review the documentation and send a letter to the applicant indicating whether or not the site meets the criteria.

If approved, the applicant can submit the documentation and approval letter to the DEQ PBR Program, along with a NOI and a certification by the governing body where the project is to be located verifying that project complies with all applicable land use ordinances.

Permit by Rule for Small Renewable Energy Projects

Developers of renewable energy projects between 5 MW and up to or equal 150 MW may submit an application to the Virginia Department of Environmental Quality (DEQ) for review and approval under DEQ's Permit by Rule (PBR) program. Alternatively, the project can be submitted to the State Corporation Commission (SCC) for approval. (Although DEQ refers to PBR-eligible projects as small solar projects, the industry refers to grid-tied projects over 5 MW as utility-scale projects.)

Projects owned by a public utility or any project greater than 150 MW must follow the Certificate of Public Convenience and Necessity (CPCN) process with the SCC. These projects require a more rigorous review process and must be approved by the SCC.

Rather than considering permit requirements on a case-by-case basis as each application is received, a permit by rule (PBR), sets forth "*up front*" requirements and includes conditions and standards necessary to protect the Commonwealth's natural resources which may be affected by the construction and operation of small renewable

energy projects. Facilities can obtain authorization from DEQ by agreeing to comply with all the construction and operating requirements of the specific renewable energy PBR.

Permit by Rule Requirements

For projects submitted under the PBR, there is more certainty to the process; the advantage of the PBR is that it identifies all the requirements for an application in one place, rather than settling them on a case by case basis. No additional conditions may be added or removed, and DEQ must make a determination of completeness within 90 days of receipt of the application. Upon approval of the PBR application, the applicant receives a PBR authorization letter to construct and operate, and the permit application becomes the permit.

Through the PBR, DEQ coordinates reviews from the Department of Historic Resources, the Department of Wildlife Resources and the Department of Conservation and Recreation to ensure potential significant impacts to cultural or threatened and endangered species are avoided or mitigated. Some of the requirements for the PBR include conducting surveys for cultural and biological resources, developing mitigation plans if necessary, receiving local government approval and conducting interconnection studies and obtaining interconnection agreements. The specific conditions for issuance of the PBR for small renewable energy projects are listed in [§ 10.1-1197.5](#) et seq. of the Code of Virginia:

- A notice of intent (NOI), provided by the applicant, to be published in the Virginia Register, that a person intends to submit the necessary documentation for a permit by rule for a small renewable energy project;
- A certification by the governing body of the locality or localities wherein the small renewable energy project will be located that the project complies with all applicable land use ordinances;
- Copies of all interconnection studies undertaken by the regional transmission organization or transmission owner, or both, on behalf of the small renewable energy project;
- A copy of the final interconnection agreement between the small renewable energy project and the regional transmission organization or transmission owner indicating that the connection of the small renewable energy project will not cause a reliability problem for the system. If the final agreement is not available, the most recent interconnection study shall be sufficient for the purposes of this section. When a final interconnection agreement is complete, it shall be provided to the Department. The Department shall forward a copy of the agreement or study to the State Corporation Commission;
- A certification signed by a professional engineer licensed in Virginia that the maximum generation capacity of the small renewable energy project by (i) an electrical generation facility that generates electricity only from sunlight or wind

as designed does not exceed 150 megawatts; (ii) an electrical generation facility that generates electricity only from falling water, wave motion, tides, or geothermal power as designed does not exceed 100 megawatts; or (iii) an electrical generation facility that generates electricity only from biomass, energy from waste, or municipal solid waste as designed does not exceed 20 megawatts;

- An analysis of potential environmental impacts of the small renewable energy project's operations on attainment of national ambient air quality standards;
- Where relevant, an analysis of the beneficial and adverse impacts of the proposed project on natural resources. For wildlife, that analysis shall be based on information on the presence, activity, and migratory behavior of wildlife to be collected at the site for a period of time dictated by the site conditions and biology of the wildlife being studied, not exceeding 12 months;
- If the Department determines that the information collected pursuant to subdivision B 7 indicates that significant adverse impacts to wildlife or historic resources are likely, the submission of a mitigation plan detailing reasonable actions to be taken by the owner or operator to avoid, minimize, or otherwise mitigate such impacts, and to measure the efficacy of those actions;
- A certification signed by a professional engineer licensed in Virginia that the small renewable energy project is designed in accordance with all of the standards that are established in the regulations applicable to the permit by rule;
- An operating plan describing how any standards established in the regulations applicable to the permit by rule will be achieved;
- A detailed site plan with project location maps that show the location of all components of the small renewable energy project, including any towers. Changes to the site plan that occur after the applicant has submitted an application shall be allowed by the Department without restarting the application process, if the changes were the result of optimizing technical, environmental, and cost considerations, do not materially alter the environmental effects caused by the facility, or do not alter any other environmental permits that the Commonwealth requires the applicant to obtain;
- A certification signed by the applicant that the small renewable energy project has applied for or obtained all necessary environmental permits;
- A requirement that the applicant hold a public meeting. The public meeting shall be held in the locality or, if the project is located in more than one locality in a place proximate to the location of the proposed project. Following the public meeting, the applicant shall prepare a report summarizing the issues raised at the meeting, including any written comments received. The report shall be provided to the Department; and
- A 30-day public review and comment period prior to authorization of the project.

Fees

Each application for a PBR and each application for a modification of a PBR is a separate action and will be assessed a separate fee. The amount of the permit

application fee is based on the costs associated with the permitting program required by the applicable chapter of the administrative code.

Stormwater Management

In the Commonwealth of Virginia, land-disturbing activity is regulated at multiple disturbance thresholds. The construction of ground-mounted solar development is a regulated land-disturbing activity if minimum disturbance thresholds are triggered. Below is a break-down of the three program parts for regulated land-disturbing activity in Virginia:

1. The Erosion and Sediment Control Program is a state-only program that focuses on erosion and sediment control measures during active disturbance. The land-disturbing activity threshold for compliance with the Virginia Erosion and Sediment Control Laws and Regulations applies at 10,000 sqft and greater of disturbance unless the construction is occurring inside the Chesapeake Bay Preservation Area or inside a locality with more stringent requirements adopted in the local erosion & sediment Control ordinance⁸. All localities act as Virginia Erosion and Sediment Control Program (VESCP) Authorities⁹. The Department of Environmental Quality is the VESCP authority for state and federal entities.
2. The Erosion and Sediment Control Laws and Regulations and Stormwater Management Laws and Regulations apply to a land disturbance at 1-acre or greater or less than 1-acre but part of a larger common plan of development that disturbs more than one acre. This portion of Virginia's 3-part program is directly related to the Federal NPDES 402 Clean Water Act Permit. DEQ has been delegated authority from EPA to regulate and issue this permit at the state level and is officially called the General VPDES Permit for Discharges of Stormwater from Construction Activities. The agency and the public generally refer to this delegated permit as the "*construction general permit*". The Stormwater Management Laws and Regulations apply to Chesapeake Bay Preservation Areas¹⁰ land-disturbing activities. The Stormwater Management Laws and Regulations also detail requirements for post-construction stormwater management compliance as detailed below. In Virginia, DEQ is the stormwater management authority for approximately 60 localities, the remaining localities

⁸ When a disturbance is proposed at more than 2,500 sq ft in the Chesapeake Bay Preservation Area, compliance with the Erosion and Sediment Control Laws and Regulations as well as Stormwater Management Laws and Regulations is required.

⁹ Localities that operate as a VESCP authority and/or a Stormwater Management authority are authorized to adopt more stringent technical criteria and land-disturbing thresholds.

¹⁰ When a disturbance is proposed at more than 2,500 sq ft in the Chesapeake Bay Preservation Area, compliance with the Erosion and Sediment Control Laws and Regulations as well as Stormwater Management Laws and Regulations is required.

operate as approved stormwater management authorities and administer portions of the stormwater program at the local level¹¹.

3. Post-construction stormwater management requires both water quality and quantity compliance. This state-only portion of Virginia's 3-part program ties post-construction compliance with the issuance of the construction general permit detailed above. Construction plans must consider erosion and sediment control measures during construction as well as the post-construction stormwater management water quality and quantity technical criteria in order to receive stormwater management plan approval and construction general permit issuance.

DEQ encourages solar developers and designers to coordinate pre-applications with the agency early in the plan design process. While pre-application meetings are not required as a component of submitting stormwater management plans to DEQ for review, many localities will require them as part of the locality planning and zoning processes. In addition, localities may require the issuance of a Special or Conditional Use Permitting, decommissioning plans, special landscaping and/or vegetative buffer plans, financial assurance and/or surety bonds, local land-disturbing activity permits, and other negotiated or locally-required items.

For a listing of whether DEQ or the locality serves as the stormwater management authority, please see Additional Resources.

Please contact planreview@deq.virginia.gov to set up an appointment to discuss stormwater management related to your upcoming solar project.

Section V: Virginia Utilities and Interconnection¹²

Introduction & Utilities in Virginia

The electrical grid in Virginia consists of a vast and complex network of generation stations, transmission and distribution lines, and substations. In fact, Virginia's electrical grid is actually part of a much larger electrical network spanning the Southeast, mid-Atlantic and Midwest regions of the United States. Utilities are involved in the generation, transmission and distribution of electricity in Virginia, and do so in coordination with regional transmission organizations, such as PJM. Throughout Virginia, electrical utilities primarily consist of Investor-owned (e.g., Appalachian Power), member-owned (e.g., Powell Valley Electric Cooperative), or municipal utilities (e.g., BVU Authority). In total, the State Corporation Commission oversees three investor-

¹¹ Localities that operate as a VESCP authority and/or a Stormwater Management authority are authorized to adopt more stringent technical criteria and land-disturbing thresholds.

¹² Content adapted from content developed and produced by: Bill Pezalla, ODEC.

owned utilities, 13 member-owned utilities, and 16 municipal electric utilities across the Commonwealth¹³.

A proposed utility-scale solar project will need to engage with the local utility to evaluate electrical grid interconnection requirements, in some cases, depending on the site location and project scale, discussions with multiple utilities active in the area may be required to coordinate with various infrastructure owners impacted by the proposed project. This chapter of the handbook introduces some of the main processes and policies regarding electrical grid interconnection for utility-scale generation. As the following sections will describe, there are many steps involved with the process and most with some cost and time component. This brief chapter does not serve as a comprehensive step-by-step guide to the interconnect review process. Therefore, for these reasons, it is recommended that project developers begin communication early with the relevant utilities to help minimize surprises. Project developers are also encouraged to review the relevant additional informational resources provided at the end of this section which expounds upon the interconnect application and review processes.

Interconnection Regulations

Two parts relate to planning a new electric generation project; the physical connection and the sale of the energy. In order to determine how that process is going to proceed, and what steps and materials are needed, one needs to be able to answer a few basic questions:

1. Who owns the power line? Is the owner a member of PJM?
2. Is the connection you are going to make to that power line going to be a transmission voltage or distribution voltage? What kind of power line is it that you are going to be connecting to?
3. What process is going to be applied? Will it be PJM process, the State Corporation Commission process, or some combination of both processes?

The power line owner is typically the utility serving the area where the pole is located. However, the actual power pole itself can be examined for identifying markings. Once ownership is ascertained, the utility can be queried about the interconnection process and the voltage. The utility can advise if connecting to that specific power line is to be studied through the PJM or State Corporation Commission process. If the line is owned by AEP (Appalachian Power), First Energy (Potomac), or VEPCO (Dominion) and it is 69kV or above, it will likely go through the PJM process. If the line is owned by a municipality or an electric cooperative, regardless of voltage, the interconnection will likely be studied through the SCC process.

¹³ <https://www.scc.virginia.gov/pages/Regulated-Companies-Service-Map>

In cases where interconnection is to be studied through the SCC process, options for the sale of output energy will be limited unless the project is also being studied by PJM. Any energy that will not be purchased by the local utility and used by local residents connected to the same line will end up going onto the PJM facilities. That will not be allowed unless the project has been studied by PJM and has obtained a Wholesale Market Participant Agreement (WMPA) from PJM.

Interconnection Review Process

As described above, the interconnect review process will either be through PJM, the SCC, or both. However, and typically for whichever process, the first three steps of an interconnect review process are similar, and consist of:

1. Feasibility Study - A relatively quick look at a proposed project. Results from which are used to determine which more in-depth studies are required.
2. Impact Study - An in-depth study to determine all electrical and physical interconnection requirements, the electrical-grid related impacts and mitigation of resultant overloads on existing electrical facilities, from the proposed project.
3. Facilities Study - Develops cost estimates for all of the equipment, labor and required upgrades resulting from the proposed project. This should include requirements for communications. The communications requirements can be very strict and expensive so these should not be overlooked.

PJM Process

The PJM Process is being reviewed with the expectation that a new study process will be approved in 2022. The current backlog of projects has shut down new projects from entering the queue. If approved, the new process will start accepting new projects in mid-2023 but because of the backlog, interconnection agreements, or WMPAs, will not be ready to be signed until mid-2027. After the backlog is eliminated, the process is planned to take 2 years from start to finish.

The current PJM study process consists of four review periods: an open window for new interconnection applications, a feasibility study analysis period, a system impact study analysis, and a facilities study analysis. PJM stopped accepting new projects for study due to the backlog. If the proposed new process is not approved in 2022, PJM will have to announce the next date that new applications will be accepted.

PJM studies proposals as a common cohort and then determines the impacts of every proposal in the queue. From there, PJM determines how to assign costs of the necessary upgrades to accommodate the proposed projects.

SCC Process

The SCC Interconnection process is described in Chapter 314 of the Virginia Administrative Code (Title 20: Public Utilities and Telecommunications, Agency 5: State Corporation Commission). Grid interconnections to non-PJM controlled facilities, such as cooperative facilities, municipal facilities, or the distribution facilities of investor-owned utilities typically follow this SCC process.

Generally, projects are studied based on the MW size of the project. Projects are classified as: Level I for projects less than 500 kW, Level II for projects greater than 500 kW and less than 2 MW, and Level III for projects greater than 2 MW. However, the utility is not required to strictly use these levels in determining the process. The process takes about a year and studies are performed sequentially and not in groups. As a result, this SCC process requires a new project to wait until prior queued projects have finished their studies. For example, if Project B is in the review-approval queue behind Project A, and each the grid interconnect for each project is in the same general location, Project B will have to wait until Project A has moved out of the queue which includes the completion of its studies, signed its interconnection agreement, and paid its money for any upgrades and construction that is necessary to complete the interconnection. After all that is done, the studies for Project B can begin. Therefore, the process can take several years depending on the location of the interconnection and the number of previously queued projects awaiting their studies.

Sale of Energy

This sale of energy from a project is typically done one of four ways:

1. Sold to the interconnecting utility through a Power Purchase Agreement (PPA)
2. Sold through a PURPA contract to the interconnecting utility
3. Sold into the PJM markets (day-ahead or real-time)
4. Sold to a wholesale buyer via a bilateral contract

For methods 2-4 from above, and regardless of voltage or interconnecting utility, a PJM Wholesale Market Participation Agreement (WMPA) is required. In order to receive the WMPA, the project must have gone through the PJM interconnect study process.

Section VI: Local Considerations

Introduction

Local governments and the residents of a community play an important role in enabling and encouraging the redevelopment of brownfields and previously coal mined lands for renewable energy development. Local efforts to promote sustainable development policies should recognize the opportunity of renewable energy in adding value to a

community. Accordingly, there are a variety of actions that local governments can take to evaluate and embrace renewable energy as an opportunity for the productive management of previously disturbed lands.

Whether projects arise because of a locality's strategic efforts to solicit redevelopment of publicly owned brownfield sites, or because of private-sector requests and proposals, this chapter provides an overview of some of the policy considerations and discreet actions local governments can take to prepare, remove barriers, and promote redevelopment of brownfields for renewable energy projects. The following discussion provides a broad overview of how local governments begin to encourage the local redevelopment of brownfields and coal mined lands for renewable energy and energy storage.

Creating a Community Vision

Broadly, local communities can begin the process of encouraging renewable energy development on brownfields and previously coal mined lands by proactively formulating and articulating a clear vision for redevelopment. Specifically, with community support, local governments can establish and embed a vision for the reuse of local disturbed sites in their long-range comprehensive plans, economic development strategies, and strategic planning initiatives. Defining and formalizing local goals and objectives related to the reuse of brownfields for renewable energy serves as the foundation for future action.

Comprehensive Plan

A community's Comprehensive Plan serves as a guide for future land use and physical development based on public opinion and the physical constraints of a community. All Virginia localities are required to maintain and review the Comprehensive Plan every five years¹⁴. Accordingly, Comprehensive Plans can serve as a functional resource to encourage and promote the reuse of disturbed lands for renewable energy development. Local governments may be able to direct development and minimize impacts on more productive lands by encouraging and prioritizing the redevelopment of brownfields for renewable energy.

Identifying and Assessing Local Sites

As part of a long-range planning process, local governments should survey and study a variety of topics that will inform future development in a community. In the Code of Virginia, this includes surveying the *"use of land, characteristics, and conditions of existing development, existing public facilities, and the transmission of electricity"*

¹⁴ <https://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2230/>

among other things¹⁵. In addition to surveying and mapping those elements, local governments may also choose to inventory and map local brownfields and previously coal mined lands. Identifying these types of lands is a first step in promoting their redevelopment and use for renewable energy. An inventory or map of local brownfields may be included in a locality's comprehensive plan or exist as a separate resource.

In addition to using existing resources to inventory federal- and state-listed brownfield sites ([Re-Powering tool](#)), sites with released mine permits from Virginia Energy, and previously disturbed sites monitored by Virginia DEQ, a community may also establish a stakeholder process to identify and assess other disturbed or underutilized sites such as landfills and wastewater treatment plants, that may be appropriate for renewable energy development¹⁶. Local governments can apply for an [EPA Brownfields Community-wide Assessment Grant](#) to inventory and prioritize redevelopment of multiple sites and assist with preliminary environmental site assessments. [Virginia DEQ's Brownfield](#) program can also assist with transforming otherwise unusable land for renewable energy development¹⁷.

Creating and maintaining a centralized public list or resource of previously disturbed and brownfield sites in addition to electric transmission infrastructure helps developers identify and assess sites that may be most viable for redevelopment for renewable energy. Additionally, a community may also choose to more directly identify, assess, screen, and promote specific sites that are most viable for solar or other renewable energy projects. Some local governments in other states have worked with regional planning agencies and regional transmission organizations to complete an assessment of sites suitable for renewable energy development¹⁸.

While some identified sites may be constrained by access and connections to the grid in the short-term, local governments can also prioritize sites for renewable energy farther into the future. § [15.2-2223 C.8](#) of the Code of Virginia states local governments in the comprehensive plan may include recommendations for future corridors for electric transmission lines of 150 kilovolts or more¹⁹. And, in the 2022 General Assembly session HB 894 passed, which states, "*The Virginia Cooperative Extension may work with Phase I and Phase II Utilities to identify relevant distribution and transmission grid information to further assist localities in siting determinations regarding solar energy collection devices or energy storage devices*"²⁰. This additional assistance can help localities with long-term planning for the siting of renewable energy and storage

¹⁵ [§ 15.2-2224. \(Effective October 1, 2021\) Surveys and studies to be made in preparation of plan; implementation of plan \(virginia.gov\)](#)

¹⁶ <https://geopub.epa.gov/repoweringApp/>

¹⁷ [Brownfields | Virginia DEQ](#)

¹⁸ <https://www.cmap.illinois.gov/documents/10180/288907/FY14-0115+Will+County+Brownfield+Prioritization+Report+lowres.pdf/db88781d-65c5-4435-b816-b6cd5d48d90c?t=1401839169000>

¹⁹ <https://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2223/>

²⁰ [LIS > Bill Tracking > HB894 > 2022 session \(virginia.gov\)](#)

facilities. Accordingly, localities can consider future interconnection needs for sites that could be used for renewable energy.

Stakeholder Engagement

As with any public policy process, citizen and stakeholder engagement is critical. Particularly, with respect to the redevelopment of brownfields for renewable energy, it is natural for the public to have questions and concerns. It is essential that the local government provide a process and forum for stakeholders to share their input and earn their buy-in before public policies and specific siting plans are established.

Government agencies and departments should be included in planning from the beginning, to ensure that critical leadership and decision-makers are fully informed and engaged in the development of policies and specific projects, and to promote cross-departmental cooperation. Early engagement helps ensure that any potential barriers or dependencies are identified early and that where necessary, coordination can be planned and achieved.

Because of their nature, brownfields and previously coal mined lands often have few viable alternative uses and are situated such that land use impacts to adjacent properties can be adequately buffered or mitigated. Therefore, redevelopment for renewable energy generation can be supported and viewed favorably by the public. Further, the redevelopment of underutilized lands can provide substantial opportunities for localities to reap the benefits of reinvestment.

Data and maps identifying brownfield sites, locations of existing and proposed electric transmission lines, and existing and future adjacent land use plans can help support public discussions and enable informed discussions about prioritizing brownfield site redevelopment policies.

Goals and Strategies

Many localities in Virginia do not have comprehensive plan chapters or strategic plans dedicated to energy or brownfield redevelopment. Due to the interrelated nature of this type of development it is reasonable to include goals, objectives and strategies related to brownfield redevelopment for renewable energy within any number of sustainability, land use, and economic development chapters or plans.

For communities that want to encourage or prioritize the redevelopment of brownfields for renewable energy, the following comprehensive plan language is offered:

Sample Comprehensive Plan Language

Goal: Promote the redevelopment of previously developed land, brownfields, and abandoned mined lands for renewable energy and storage.

Objective 1: Prepare local regulations and resources to identify and enable the local redevelopment of brownfields to ensure energy equity, increase low-impact development practices, decrease public health risks, and increase local access to renewable energy.

Strategy 1.A: Inventory, identify and map previously developed land, brownfield, and abandoned mine lands in the locality.

Strategy 1.B: Establish clear processes and approval criteria for renewable energy development located on brownfields.

Objective 2: Facilitate the redevelopment of publicly owned previously developed land, locations with environmental alterations such as closed landfills, wastewater treatment facilities, and brownfields to maximize the value of an underutilized public property, promote economic development opportunities, and provide increased opportunities for energy equity and community access to clean energy.

Strategy 2.A: Conduct site assessment studies for publicly owned brownfield properties

Strategy 2.B: Maximize local benefits as an energy offtaker; support community solar projects;

Strategy 2.C: Prepare and issue an RFP for renewable energy development on public owned lands

Objective 3: Encourage redevelopment of privately owned brownfields and previously disturbed sites for renewable energy and energy storage to promote local economic development, generate revenue, and adaptive reuse.

Strategy 3.A: Provide policy incentives for developers who build renewable energy on local brownfield sites. (Note: See Zoning & Permitting Section)

Strategy 3.B: Incorporate renewable energy development into local economic development and recruitment strategies

Economic Development Strategies

Local economic development departments and officials should consider renewable energy development on brownfields as a potential economic development strategy that can boost other local recruitment efforts. Because many businesses seek access to renewable energy as part of internal business principles (ex: renewable portfolio

standards), renewable energy on underutilized lands can be an attractor for new businesses. Localities that can offer renewable energy opportunities may have a competitive advantage over localities that cannot. Additionally, the redevelopment of underutilized lands for renewable energy can help to increase property values and tax revenue.

As localities consider and plan for growth in their industrial and corporate parks and other lands, identifying locations for renewable energy can be beneficial. For example, the Wise County Industrial Development Authority strategically considered renewable energy in their local economic development strategies and as a result, successfully secured the development of the Mineral Gap Data Center which will be powered by a solar facility built on an adjacent previously coal mined land in their Lonesome Pine Regional Business & Technology Park²¹.

Operationalizing the Community Vision

Once a community has defined and adopted policies regarding how it wants to accommodate, encourage, and prioritize the redevelopment of brownfields for renewable energy development, the next step is to ensure the appropriate codes, ordinances, and processes are in place to operationalize that vision and execute the adopted strategies. Updating zoning, permitting practices, and taxation and incentive policies are all ways a locality can prepare to operationalize community goals related to renewable energy development on brownfields.

Zoning and Permitting

Ensuring redevelopment goals can be fully realized is an important step. Due to the unique nature of brownfield redevelopment, zoning and permitting standards that were adopted with greenfield development in mind can hinder or create barriers for projects. Localities should examine their existing policies, ordinances, and regulations to ensure they do not inadvertently preclude appropriate opportunities to redevelop previously developed land for renewable energy or energy storage facilities.

Minimizing Project Costs

Local governments may also need to balance their desire to site projects on underutilized lands with the necessity of financial viability from a developer's perspective. Redevelopment projects will often require additional costs to prepare a site for a renewable energy project as compared to standard greenfield developments. Virginia law allows localities to levy machinery and tools tax²² or adopt a revenue share

²¹ [Wise County Celebrates Groundbreaking on Mineral Gap Solar Project](#)

²² <https://law.lis.virginia.gov/vacode/title58.1/chapter36/section58.1-3660/>

ordinance²³, and negotiate siting agreements and additional cash payments²⁴. However, to minimize project costs for redevelopment projects that provide other co-benefits, a locality could explore options such as expediting permitting processes, minimizing costs and fees where possible, and consider adopting a local tax exemption for solar energy equipment as permitted by [state code 58.1-3661](#)²⁵.

Local Government-Owned Sites

Local officials can establish goals that encourage the viability of renewable energy on underutilized publicly owned lands. Recently, solar projects have become more financially viable and economically beneficial for local governments across the country. Often, the largest and most viable publicly owned sites for solar may be on or near a site that has limited redevelopment potential. Specifically, closed landfills and active wastewater treatment sites have emerged as viable locations for solar projects. Other underutilized public facilities such as underutilized golf courses, reservoirs, airports, and rights of way also present opportunities for future solar development.

Programs for Local Governments

Local governments have a variety of options to pursue the development of publicly owned brownfields for renewable energy. The following details some of the general programs, policies, and actions that local governments can use to develop renewable energy.

Pilot Program for Municipal Net Energy Metering ([§ 56-585.1:8](#))

For local governments in Dominion Energy or Appalachian Power territories, there are separate pilot programs for local governments to be able to own and operate a renewable energy facility. Local governments can use this program to net-meter and offset some or all of their electricity usage on their electric account. This program has a specific carve out for renewable energy on publicly owned disturbed sites. The limit of an individual facility is two megawatts, but the code states that a generating facility located on airports, landfills, parking lots, parks, post-mine land, or a reservoir that is owned, operated, or leased by the municipality are not subject to that size limit. The total cap on this program in Appalachian Power territory is 5/10 megawatts and 25 megawatts in Dominion Energy territory.

Pilot Program for Power Purchase Agreements ([§ 56-594.01](#) & [§ 56-594.02](#))

To assist with the financing to purchase renewable generation facilities, local governments (as tax-exempt entities) are eligible to execute a third-party partial power

²³ <https://law.lis.virginia.gov/vacode/title58.1/chapter26/section58.1-2636/>

²⁴ <https://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2316.7/>

²⁵ <https://law.lis.virginia.gov/vacode/title58.1/chapter36/section58.1-3661/#:~:text=%C2%A7%2058.1%2D3661.-,Certified%20solar%20energy%20equipment%2C%20facilities%2C%20or%20devices%20and%20certified%20recycling,equipment%2C%20facilities%2C%20or%20devices.>

purchase agreement (PPA). In a PPA, local governments would not own the renewable energy generating facility, and instead would purchase the electricity from a private entity that owns the solar installation on public land. Individual facilities can be no larger than three megawatts. In Dominion Energy territory, the total pilot program is capped at 500 megawatts, while in Appalachian Power territory it is capped at 40 megawatts. Individual electric cooperatives have separate limitations on PPAs for local governments.

Net Metering (§ 56-594)

Local governments can also choose to install and own a renewable energy facility that is net-metered based on the net energy metering provisions in the Code of Virginia. Nonresidential customers are able to net-meter facilities up to three megawatts in capacity. The facilities will directly offset the meter that the facility is physically connected to. Few localities have chosen to do net-metering without a PPA since local governments cannot take advantage of the Federal Investment Tax Credit.

Lease or Sell Property to a Developer

Local governments may also choose to lease or sell public property to a developer to construct and operate a renewable energy facility. Under this option, local governments could choose to purchase power from the facility (especially if they operate a municipal utility). The Town of Bedford offers a good example of this process for a solar facility adjacent to a local landfill on publicly owned property²⁶.

Other strategies for localities to consider are contained in the Policy Recommendations section of this handbook.

Section VII: Natural and Historic Resources

Environmental Considerations

This section focuses on natural resources considerations that “*add value*” to a project. These best practices were originally developed for “*greenfield*” projects where site remediation was not necessary. However, the principles that seek to add value to a project can be considered and applied to brownfields redevelopment. For example, if a brownfield does not require site disturbance for remediation purposes for the proposed project, then the principles of low impact development can be applied. Where projects have little wildlife habitat due to prior disturbance, there is ample opportunity for site planning to incorporate practices to benefit wildlife, such as pollinator habitat, planting of shrubs and trees with wildlife benefit where appropriate on the site.

Three broad types of added value are explained here – and adding one type of value usually adds other values, too. First are those practices that reduce site construction

²⁶ [Bedford Solar: Bedford, VA — O2 emc](#)

and operation costs. These practices, such as low-impact development methods, maintaining existing ground cover where possible, and establishing ground cover quickly, can reduce costs for site grading and may reduce stormwater management costs. These practices can also reduce the need for costly, and challenging, site remediation from erosion.

The second type of added value is practices to improve environmental and wildlife performance as well. For example, low impact development that decreases runoff and erosion also decreases stormwater and pollution carried into streams. Site planning that increases riparian and wildlife corridors provide multiple benefits, from improving water quality and fish and wildlife habitat to providing wildlife and habitat. This section will identify voluntary programs to help add value to projects. Many programs provide potential opportunities for cost-share and economic incentives to adopt or maintain these practices.

The third added value, perhaps the most important when siting permits encounter public opposition, is in practices that tend to build support for a project, reduce the time needed to obtain permits, and decrease the risk of permit denials at the local level. The section on public engagement will explore best practices and resources to increase the efficiency of the permitting process, but we are noting that adding value to a project through natural resources, historical, and cultural planning can increase public and particularly local permitting agency support for a project.

Abandoned mine lands and brownfields may not be thought of as needing historic and cultural resource considerations, but there can be artifacts (historic structures, potential archeological resources) that may require regulatory review. There may also be historic or cultural resources, including landscapes, that do not require regulatory review but which have significant local meaning that may be useful to consider. For example, the Town of Blacksburg preserved a portion of the Merrimac mining community for historic and recreational purposes²⁷. Dickenson County, VA, created the Virginia Coal Heritage Trail²⁸ for similar reasons. Considering what a community believes is of historical and cultural value early in the planning process, and how to protect those values, can reduce permitting challenges at the local level.

Two types of considerations for historic and cultural resources are discussed in this section: regulatory review that involves either permitting or advisory considerations, and voluntary consideration of unique local historic and cultural resources that will add value to a siting effort. Both are important for efficient project success.

State Programs

Regulatory review of historical and cultural resources is usually required if a project involves the expenditure of state funds for a major state project costing \$500,000 or

²⁷ <https://montgomerycountyva.gov/parks-and-rec/parks-facilities/coal-mining-heritage-park-and-loop-trail>

²⁸ <https://dickensonva.org/332/Virginia-Coal-Heritage-Trail>

more, or for applications to the State Corporation Commission for electric generating plants and associated facilities.²⁹

If federal grants are used to fund a portion of a project, Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR Part 800) requires the Federal agency disbursing the funds to take certain actions. The Virginia Department of Historic Resources (VA DHR) can assist site planners and stakeholders in understanding the regulatory landscape for projects that may have historic and/or cultural impacts³⁰. VADHR's website explaining the federal project review process is at:

<https://www.dhr.virginia.gov/environmental-review/federal-project-review/>

Federal Programs

If a project involves the expenditure of federal funds, such as federal grants being used to fund a portion of a project, regulatory review is often required to assess if a project requires permits, or to provide an opportunity for federal agencies to provide voluntary advice.

Natural Resources: Adding Value

Virginia's abundant natural resources provide a rich environment for people, plants and wildlife while also benefiting agriculture, industry, commerce and economic development. To protect the continued vitality of these precious and valuable resources, the Virginia Department of Environmental Quality (VA DEQ) carries out its mission to protect and improve the environment for the health, well-being and quality of life of all Virginians³¹. In addition, a wide range of federal, state, local, not-for-profit, and informal citizen organizations work to protect Virginia's environment. Anecdotal research has found that public concern for large-scale solar PV or wind facilities appears to be increasing, and may be delaying and halting proposed projects. Research is underway to better quantify the impact of public concern on local project approval. Therefore, the information in this section concerning natural resources, historic, and cultural considerations in Virginia that developers and others may want to evaluate to help them avoid unnecessary project delays or failure to secure necessary permits. These considerations are intended to add value to projects by protecting and/or even improving these highly valued resources, as well as increasing economic value for developers and local communities.

Wildlife Habitat – Pollinator Habitat

Utilizing pollinator-friendly ground cover for vegetation management at solar arrays developed on abandoned/reclaimed mining sites can result in significantly improved

²⁹ <https://www.dhr.virginia.gov/environmental-review/state-project-review/>

³⁰ <https://www.dhr.virginia.gov/environmental-review/epix-electronic-project-information-exchange/>

³¹ <https://www.deq.virginia.gov/get-involved/about-deq>

ecosystem service values when compared to business as usual agricultural practices, including pasture for dairy herds and hay and/or corn silage crops. Academic researchers point to solar projects completed with either native grassland or pollinator-friendly ground cover as producing a 3-fold increase in pollinator supply along with increases in sediment and water retention of over 95% and 19%, respectively, as compared to turf grass ground cover³². This also includes an estimated 65% increase in carbon storage potential which, when factoring in the future monetization of carbon sequestration, can provide yet another additional revenue stream for farmers.

A more localized, more secure food production system means it's critical to protect the health of all remaining pollinator species to ensure the future health of our food supply. Honey bee pollination alone can add more than \$15 billion in value to agricultural crops in the U.S. The co-location of solar generation projects and pollinator-friendly ground cover as part of Virginia's mining reclamation process provides numerous social, environmental and economic benefits to our state.

Project examples of pollinator-friendly ground covered deployed alongside solar projects on formerly contaminated lands:

- Pollinator-friendly ground cover will be deployed at a 3.3 MW community solar array on an underutilized brownfield site that was home to a former auto salvage yard.
- A 2.8MW project developed on a former corn silage site and generates revenue in the form of lease income for the landowner to allow her to maintain ownership of the property that has been in her family for decades through the duration of the 25-year lease agreement. It also features pollinator plantings that offer a lower maintenance ground cover while also providing critical habitat for the dwindling number of native pollinators which are critical for our future food supply needs of the community.
- A recently completed 2.3 megawatt solar array was developed on municipally-owned brownfield property formerly used as a gravel pit. The project is co-located with pollinator-friendly ground cover that will support vital habitats for bees, butterflies, hummingbirds, moths, and other insects. The benefits to the surrounding community include boosting crop yields, increasing the recharging of groundwater, reducing soil erosion and has the added benefit of providing long-term cost savings in operations and maintenance for the life of the project.

Wildlife and Riparian Habitat and Wildlife Corridors

Former mined lands and brownfields can provide unique and valuable opportunities to improve wildlife habitat and wildlife corridors, and establish and/or protect riparian

³² <https://www.sciencedirect.com/science/article/pii/S2212041620301698?via%3Dihub>

corridors. Good site planning can provide significant added value at a low cost. Challenges to projects, such as streams, wetlands, slopes, erodible soils, threatened or endangered species, or other unique natural resources valued by the local community can be protected or enhanced with good site planning, providing real environmental benefits and increasing local support for projects. These added values may be obtained at a low cost, given the many technical and financial resources available to support these efforts. The Virginia Tech Renewable Energy Facilities project has worked to identify how natural resource considerations for renewable energy projects can provide significant added value at a low cost.

Solar PV facilities are considered to be land-intensive, sometimes creating intense local opposition. However, developers may lease or purchase a significantly larger area for a facility (particularly for the exploration phase) than the area directly covered by panels. We recommend that the area outside of the fence be evaluated through the site planning process and use of a Certified Wildlife Biologist to achieve conservation goals. For example, if a site includes a stream, programs to assist with establishing and maintaining a riparian zone are available. Riparian zones wider than required for permits can provide increase wildlife habitat and corridors, and increased water quality. These benefits are likely to be highly valued by the public. If sloped land is used for agricultural purposes, and is unsuitable for arrays, it can be placed into conservation programs to reduce erosion and sedimentation, while adding environmental value to a project. Landowners may be willing to place lands into conservation easements or other programs as part of the site planning process, providing environmental benefits and increasing support for a project.

Professional technical assistance and a range of cost-share or conservation easement programs are available through federal and state governments and non-profit organizations.

Inside the fence, the pollinator habitat program previously described is an excellent example of adding value "*inside the fence*". In addition, the Virginia Department of Wildlife Resources can assist in identifying what types of vegetation will enhance wildlife at that site, and are compatible with a solar PV facility.

The Virginia Department of Forestry has several programs to assist landowners in managing their forests and conserving them. Conservation easements placed onto forestland on the part of a parcel not being used for solar arrays can provide significant multiple added values including wildlife habitat, stream protection, and public support for a project, among others. To increase the value of efforts to add extra value, we recommend developing a comprehensive site plan that provides for multiple value added natural resources considerations before pre-clearance of forests is conducted. This common practice can lead to adverse natural resources impacts, and increased public concern for projects. The Virginia Department of Forestry has a conservation easement program that provides incentives for establishing and/or maintaining forests³³.

³³ <https://dof.virginia.gov/forest-management-health/forestland-conservation/conservation-easements/>

Section VIII: HB 1925 Grant Funding Program

Description

HB1925 establishes the “*Virginia Brownfield and Coal Mine Renewable Energy Grant Fund and Program (the Fund and Program)*”³⁴. According to the legislation, no funding, other than Federal, shall be allocated to the program. Both the fund and the program are to be administered by the Virginia Department of Energy in order to award grants to applicants for energy storage and renewable energy projects located on “*previously coal mined lands or brownfields*”³⁵. The basis for the grant awards will be \$500 per kW of nameplate capacity for renewable energy projects on previously coal mined lands and \$100 per kW of nameplate capacity for renewable energy projects on brownfields. The maximum grant allotment for a single renewable energy project on previously coal mined lands is \$10M, while the maximum grant allotment for a single project on brownfields is \$5M. The maximum annual allocation of funding for this program shall be \$35M/year, \$20M of which is reserved for projects on previously coal mined lands. Should less than \$20M be allocated to projects on previously coal mined lands, the remaining funds will be “*reallocated to brownfield projects*”³⁶.

Section IX: Policy Recommendations

Brownfields Policy Recommendations

As part of the stakeholder engagement process for development of this handbook, Virginia Energy worked closely with the Department of Environmental Quality and the U.S. Environmental Protection Agency “*RE-Powering*” America’s Land program to evaluate current and potential policy options that would enable Virginia to incentivize the development of renewable energy on Brownfields, including previously mined lands across the Commonwealth. There are two types of incentives that should be considered at this time.

³⁴ <https://lis.virginia.gov/cgi-bin/legp604.exe?211+sum+HB1925>

³⁵ <https://lis.virginia.gov/cgi-bin/legp604.exe?211+sum+HB1925>

³⁶ <https://lis.virginia.gov/cgi-bin/legp604.exe?211+sum+HB1925>

Upfront Financial Incentives

Direct financial incentive programs for landfills and brownfields from New York State and Rhode Island are summarized below. Both programs are similar in structure to Virginia's Brownfield and Coal Mine Renewable Energy Grant Fund and Program in that they are upfront, capacity-based incentives, though New York and Rhode Island rely on state and regional funding instead of the federal funding that will be required for any outlays under the Virginia law.

In New York, the **NY-Sun Program offers the MW Block incentive** to approved solar contractors and developers for projects up to 7.5 MW_{Direct Current (DC)} in capacity. In addition to the base incentives in that program, brownfield and landfill projects in much of the state are eligible for an additional incentive -- the brownfield/landfill adder. That adder is \$0.15/watt_{DC} (equal to \$150/kilowatt [kW]_{DC}).^{37,38}

Rhode Island offers the Brownfields Solar PV Program. It provides grants for solar projects on brownfields that use net metering or virtual net metering arrangements, and remediation costs are not eligible fund uses.³⁹ The incentive levels are higher than the New York program on a per-unit basis at \$1.00/watt_{DC} (equal to \$1,000/kW_{DC}) to a maximum of \$250,000 per project for direct-owned projects, and \$0.80/watt_{DC} (equal to \$800/kW_{DC}) to a maximum of \$175,000 per project if third-party owned.^{40,41}

It is recommended that priority be given to funding of the Virginia Brownfields and Coal Mine renewable Energy Grant Program, as similar programs have been successful in other states and the enabling legislation enjoyed broad support.

³⁷ For more information on the program, click on "Available Incentives" at: <https://www.nyserda.ny.gov/All-Programs/NY-Sun/Contractors/Doing-Solar-Business> [accessed May 2022].

³⁸ This New York incentive level is generally similar to the Virginia law creating the Brownfield and Coal Mine Renewable Energy Grant Fund and Program, for which "grants shall be awarded in an amount of ... \$100 per kilowatt of nameplate capacity from renewable energy sources that are located on brownfields." See Code of Virginia, § 45.2-1725, <https://law.lis.virginia.gov/vacode/title45.2/chapter17/section45.2-1725/> [accessed May 2022].

³⁹ See Rhode Island Commerce Corporation, *Brownfields Solar PV Program: Request for Projects*, p. 2, <https://commerceri.com/wp-content/uploads/2021/05/Brownfield-RFP-FINAL-4.28.20.pdf> [accessed May 2022].

⁴⁰ *Ibid*, p. 3.

⁴¹ In 2021, Rhode Island's "Brownfields Solar PV program approved three solar projects (with combined capacity of) 3,545 kW, (with) awards (totaling) \$733,280." See Rhode Island Commerce Corporation, *RI Renewable Energy Development Fund: Annual Financial and Performance Report For the calendar year ending 12/31/2021, 2022*, p. 10, https://commerceri.com/wp-content/uploads/2022/04/REF_Financial-and-Performance-Report-CY21-FINAL.pdf [accessed May 2022].

Development of A Comprehensive Solar Resource

There is strong interest in the Commonwealth in developing solar projects, however, the industry is still in a relatively early stage. Localities are receiving applications for solar projects but often find it difficult to decide if they wish to allow solar farms and, if they do, what requirements should be put in place. Developers are interested in constructing projects in Virginia but require a great deal of information regarding regulatory requirements, site suitability and other factors before they can engage in a project. There are a number of efforts underway at the moment to address different aspects of these issues. This includes recent legislative initiatives to create this handbook for brownfield development ([HB 1925](#)), assess life cycle impacts of renewable generation ([HB 774](#)), map the Commonwealth's prime farmland ([HB 894](#)), and require mitigation strategies for solar projects on prime farmlands and areas of special environmental or historical value ([HB 206](#)). Virginia Energy has ongoing efforts to aid localities in shaping their approach to solar development and create data sets and maps that monitor and support solar development in the Commonwealth.

- In response to increasing interest in solar development in the state of Kentucky, the Kentucky Energy and Environment Cabinet created a number of resources. The [Kentucky Solar Toolkit](#) gathers resources designed to address frequently asked questions from all potential stakeholders, including developers considering projects in the state and localities deliberating on how and if they should facilitate solar projects. These resources include guidance documents, maps, data sets and sample legal documents, such as enabling ordinances and power purchase agreements. Kentucky has also created a Solar Site Suitability tool that maps former mine lands and ranks them for solar suitability along a number of criteria, including topography, environmental conditions, farmland designations, workforce characteristics and access to electrical infrastructure.

As the Commonwealth seeks to promote and optimize the development of solar projects on brownfields, it is recommended that a single resource be created for all solar development in the Commonwealth that presents key information for localities, landowners, developers and other stakeholders in an organized format with regular updates and additions as appropriate. This would include brownfield and site suitability mapping, as well as gathering all relevant resources, such as this handbook, the final report from the SCC's renewable facility life cycle study and the Virginia Cooperative Extension's farmland mapping initiative. This resource center would be proactively managed and would evolve to identify knowledge gaps and create resources that facilitate economically and environmentally beneficial solar development in the Commonwealth.

Procurement Preferences

Nationally, community solar projects tend to be well-matched for landfill and brownfield sites due to their typical sizes and the proximity of residential and business consumers, who can be program subscribers, to these sites.^{42,43} There is growing interest in Virginia in community solar⁴⁴, which could make New Jersey's program that offers procurement preferences for brownfields, landfills, and other sites that preserve greenspace potentially relevant. As the recent *Virginia Solar Survey* states, "many potential projects on brownfields and landfills would be in this (community-scale solar) size range."⁴⁵

New Jersey's Community Solar Energy Pilot Program allows residential and business electricity customers to subscribe to output from specific solar projects. Its **evaluation criteria include strong preferences for brownfields, landfills, areas of historic fill, rooftops, and parking canopies**. Among Year 1 awards in the New Jersey program, nine projects (with 33 MW_{DC} of combined capacity) were on landfills, and one project with 2 MW_{DC} was on a brownfield. Among Year 2 awards, nine projects (with 36 MW_{DC} of combined capacity) were on landfills, and one project with 5 MW_{DC} was on a brownfield.⁴⁶

As the Commonwealth looks to promote small to mid-sized renewable energy projects on brownfields, including previously mined lands, and expand Community Solar, consideration should be given to adopting procurement preference policies similar to those implemented in New Jersey. It is recommended that at a minimum a current or new stakeholder group be convened to further evaluate potential policy and programs.

⁴² For example, "the Oxon Run community solar installation is the largest clean energy project in the District (of Columbia) focused on serving neighborhood residents. (It is a) 2.65 MW solar installation (that covers approximately 3.6 acres of an underutilized brownfields site." There is also local subcontractor participation in the project, and about 750 low- and moderate-income households in the area get electricity bill savings from the project. See EPA, *RE-Powering America's Land Initiative: Benefits Matrix*, 2022, p. 6, https://www.epa.gov/system/files/documents/2022-04/benefits_matrix_508_040122.pdf [accessed May 2022]. Benefits from several other community solar projects on landfills and brownfields are summarized in that publication.

⁴³ For more details on the linkages between site reuse and community solar, see EPA, *Community Solar: An Opportunity to Enhance Sustainable Development on Landfills and Other Contaminated Sites*, 2016, https://www.epa.gov/sites/default/files/2016-12/documents/epa_repowering_community_solar_discussion_paper_final_120716_508.pdf [accessed May 2022].

⁴⁴ For example, Harrisonburg Electric Commission (HEC) is offering a community solar subscription option starting this year. See HEC, *Friendly City Solar Program*, <https://www.harrisonburgelectric.com/news/detail/friendly-city-solar-program> [accessed May 2022].

⁴⁵ See *Virginia Solar Survey: Results and Initial Findings*, April 2022, p. 10.

⁴⁶ In total 45% of Year 1 capacity awards and 25% of the (larger) Year 2 capacity awards were on landfills or brownfields. See State of New Jersey, Board of Public Utilities, (NJBPUB), *In the Matter of the Community Solar Energy Pilot Program, Agenda Date: December 20, 2019*, <https://www.nj.gov/bpu/pdf/boardorders/2019/20191220/12-20-19-8D.pdf> [accessed May 2022] and NJBPUB, *In the Matter of the Community Solar Energy Pilot Program, Agenda Date: October 28, 2021*, <https://nj.gov/bpu/pdf/boardorders/2021/20211028/8J%20ORDER%20Community%20Solar%20PY2%20Awards.pdf> [accessed May 2022].

Streamlined Permitting

The speed of environmental review and permitting processes is a major factor affecting the desirability of solar development in a state. Virginia already has one DEQ program, Renewable Energy Permits by Rule (PBR) that can help accelerate permitting of projects in general as it “enables the construction and operation of renewable energy projects of 150 megawatts and less. DEQ’s regulations take the form of ... PBR establish(ing) pollution limits for industrial processes or categories. Facilities can obtain authorization from DEQ by agreeing to comply with all the construction and operating requirements of the specific PBR.”⁴⁷ New York State has two programs that specifically streamline permitting of renewable energy projects on sites it classifies as “repurposed” including landfills and brownfields.

Landfill and brownfield solar projects of 25 acres or fewer can qualify as Type II actions, not requiring further evaluation under **New York’s State Environmental Quality Review Act (SEQRA)**. SEQRA is also known as “mini-NEPA” due to its similarities to the National Environmental Policy Act (NEPA).⁴⁸

Landfills, brownfields, and other repurposed commercial or industrial sites receive expedited review from the **New York Office of Renewable Energy Siting** that was established to provide faster, more predictable permit reviews. **Complete permit applications for landfills, brownfields, and other repurposed sites are acted on within six months**, while permit applications for other (not repurposed) sites receive final decisions within 12 months.⁴⁹

New Jersey also has several agency coordination mechanisms to carefully track and advance renewable projects on landfills and brownfields. It has a central permit coordination process inside its New Jersey Department of Environmental Protection (NJDEP) as well as interagency processes to review program applications between NJDEP and NJBPU as well as between NJDEP and the New Jersey Economic Development Authority.⁵⁰

⁴⁷ “Through the PBR, DEQ coordinates reviews from the Department of Historic Resources, the Department of Wildlife Resources and the Department of Conservation and Recreation to ensure potential significant impacts to cultural or threatened and endangered species are avoided or mitigated. Some of the requirements for the PBR include conducting surveys for cultural and biological resources, developing mitigation plans if necessary, receiving local government approval and conducting interconnection studies and obtaining interconnection agreements.” See DEQ, *Renewable Energy*, <https://www.deq.virginia.gov/permits-regulations/permits/renewable-energy> [accessed May 2022].

⁴⁸ For more information, see New York State Energy Research and Development Authority (NYSERDA), *New York State Solar Guidebook*, 2022, p. 122, <https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Siting/Solar-Guidebook> [accessed May 2022].

⁴⁹ All new renewable energy projects above 25 MW in capacity must go through the Office of Renewable Energy Siting permitting process, and new projects between 20 MW and 25 MW and certain existing projects can opt into this office’s permitting process. See NYSERDA, *Office of Renewable Energy Siting*, <https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Siting/Siting-for-Large-Scale-Renewables/Office-of-Renewable-Energy-Siting> [accessed May 2022].

⁵⁰ For examples of this intra-agency and interagency coordination in New Jersey, see NJDEP, *Office of Permitting and Project Navigation*, <https://www.nj.gov/dep/pcer/> [accessed May 2022] and NJDEP,

As the Commonwealth looks to promote renewable energy projects on Brownfields, including previously mined lands, consideration should be given to adopting policies that reduce the regulatory burden on these previously disturbed sites and/or expedite the review process to create more certainty for the economic investment. It is recommended that at a minimum appropriate stakeholder group(s) be convened to further evaluate the current regulations that impact development and propose changes to incentivize development and increase flexibility for development of these previously disturbed lands.

Considerations for Local Governments

- **Examine adopted policies and ordinances that may inadvertently create barriers or prevent redevelopment of brownfield sites for renewable energy.**

For example: An appropriate brownfield redevelopment project may conflict with adopted maximum solar density or minimum distance between facility requirements that apply to energy generation facilities. Determine whether your locality has adopted policies that may prevent the redevelopment of a brownfield site for renewable energy and consider options to eliminate these barriers.

- **Explore allowing solar as a by-right use on a brownfield site.** Additional considerations and regulations may be needed to ensure certain development standards are met. This can be done in a number of ways that could include adopting a floating solar district or developing specific development standards that apply at site review or before land disturbing permits are issued.

- **Consider establishing an “economic revitalization zone”, or for projects within a designated economic revitalization zone to waive or discount permitting fees.** Given the increased costs the developer may incur to design, stabilize, clean up, or prepare a brownfield site for redevelopment, and considering the benefits the locality may enjoy from the investment, it may make sense to create an economic revitalization zone with incentives or regulatory flexibility, including reducing or waiving permit fees, as permitted by § 15.2-1232.2⁵¹ of the Code of Virginia.

- **Consider creating an expedited review and permitting process.**

- **Extended timelines may be warranted due to the increased complexity of permitting on brownfields.** Often, conditions are attached to special use permits that require construction begin within a specified period (e.g., 12 months). Consider providing extended periods of time to accommodate external permitting the project may require before construction may begin.

Hazardous Discharge Site Remediation Fund, <https://www.nj.gov/dep/srp/finance/hdsrf/> [accessed May 2022].

⁵¹<https://law.lis.virginia.gov/vacode/title15.2/chapter12/section15.2-1232.2/#:~:text=Creation%20of%20local%20economic%20revitalization%20zones,parcels%20suitable%20for%20economic%20development.>

- **Installation techniques and operation and maintenance practices may vary based on the needs of the site.** While the design of the project will be done by qualified engineers and professionals, localities should be aware that the unique site attributes of brownfield sites may require installation and maintenance methods that are not typical or accommodated by existing adopted regulations. For example, to avoid disturbing subsurface contaminants or to avoid penetrating landfill caps, it may not be possible to dig trenches, lay conduit underground, and secure racking systems with traditional posts or pylons. Localities should be open to permitting alternative and innovative methods such as ballasted ground-mounted racking and (above ground) wire management systems.
- **Traditional zoning and solar ordinance requirements may create unnecessary barriers to energy generation and storage projects on brownfield sites, and in some cases may make a project infeasible.** For example, the location and characteristics of a project on previously mined land may not necessitate the same buffering or height restriction requirements as projects being installed on undeveloped sites. Or, decommissioning requirements to return project sites to pre-renewable energy facility conditions may not make sense. Consider decommissioning requirements that are appropriate for the site and conform with § [15.2-2241.2](#) of the Code of Virginia, and consider alternative zoning methods that can accommodate the unique nature of brownfield redevelopment for renewable energy⁵². Adopting a floating zone or overlay zone (such as economic development zones) may be one way to incentivize or allow different development standards for renewable energy facilities on the redevelopment of previously developed sites or brownfields.

⁵² [§ 15.2-2241.2. Bonding provisions for decommissioning of solar energy equipment, facilities, or devices \(virginia.gov\)](#)

Contributors

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- American Clean Power (ACP), Public Comments
- Mid Atlantic Renewable Energy Coalition (MAREC), Public Comments
- William (Bill) Walls, Public Comments

Additional Resources

Section IV: Permitting

Forms, guidance documents and additional information pertaining to the small renewable energy PBR programs can be found on DEQ's website.

Links to the Virginia Erosion and Sediment Control and Stormwater Management laws and regulations as well as the Chesapeake Bay Preservation Act and Regulations are below.

Virginia's selection of proprietary and non-proprietary water quality BMPs are located on the [Virginia BMP Clearinghouse](#):

- Chesapeake Bay Preservation Act:
<https://law.lis.virginia.gov/vacodefull/title62.1/chapter3.1/article2.5/>
- Chesapeake Bay Preservation Regulations:
<https://law.lis.virginia.gov/admincode/title9/agency25/chapter830/>
- Erosion and Sediment Control Laws:
<https://law.lis.virginia.gov/vacodefull/title62.1/chapter3.1/article2.4/>
- Erosion and Sediment Control Regulations:
<https://law.lis.virginia.gov/admincodefull/title9/agency25/chapter840/>
- Stormwater Management Laws:
<https://law.lis.virginia.gov/vacodefull/title62.1/chapter3.1/article2.3/>
- Stormwater Management Regulations:
<https://law.lis.virginia.gov/admincode/title9/agency25/chapter870/>

The Stormwater Management Program regulation allows for offsite compliance options, including nutrient credit purchasing. The specific regulation is located here:

<https://law.lis.virginia.gov/admincode/title9/agency25/chapter870/section69/>

Associated with 9VAC25-870-69 above, the Nonpoint Source Nutrient Credit Program that regulates the creation and certification of nutrient banks implemented a new

hierarchy on how to choose an available nutrient credit bank effective January 1, 2021. The hierarchy for offsite nutrient credit selection is located here:

<https://law.lis.virginia.gov/admincode/title9/agency25/chapter900/section91/>

General VPDES Permit for Discharges of Stormwater from Construction Activities (Construction General Permit):

<https://law.lis.virginia.gov/admincode/title9/agency25/chapter880/>

Section V: Virginia Utilities & Interconnection

Additional Resources

- Regulated Companies & Service Map: Service Territories, SCC 2022
<https://www.scc.virginia.gov/pages/Regulated-Companies-Service-Map>
- Pezalla, B. 2021. Interconnecting New Generation to Non-PJM Facilities, Informational Webinar #6. Virginia Cooperative Extension
<https://sites.google.com/vt.edu/vceinservice121919solarfarms/home>
- Queue Point User Guide. PJM System Planning, PJM Interconnection, PJM 2017
<https://www.pjm.com/-/media/etools/planning-center/queue-point-user-guide.ashx>
- Connecting to the Grid FAQs. PJM Learning Center, PJM, 2022.
<https://learn.pjm.com/three-priorities/planning-for-the-future/connecting-grid>
- Regulations Governing Interconnection of Small Electrical Generators and Storage, VA LIS, Chapter 314.
<https://law.lis.virginia.gov/admincode/title20/agency5/chapter314/>

Section VI: Local Considerations

Additional Resources

- APA Solar Briefing #6: “Recycling Land for Solar Energy Development”, from 2012 but still relevant: https://planning-org-uploaded-media.s3.amazonaws.com/publication/download_pdf/Recycling-Land-for-Solar-Development.pdf
- ICMA’s Solar@ Scale Guidebook: [Solar@Scale Guidebook | icma.org](https://www.icma.org/solar-at-scale)
- Massachusetts’ Solar Massachusetts Renewable Target Program (SMART), provides financial incentives for redevelopment of contaminated land for solar photovoltaic: <https://www.mass.gov/lists/developing-solar-photovoltaics-on-contaminated-land>
- Massachusetts’ Department of Environmental Protection Fact Sheet: Developing Renewable Energy Facilities on Closed Landfills: [fact sheet: \(mass.gov\)](https://www.mass.gov/fact-sheet-developing-renewable-energy-facilities-on-closed-landfills)
- Massachusetts’ Guide to Developing Solar PV at Massachusetts Landfills: [Guide to Developing Solar PV at Massachusetts Landfills \(solarroadmap.com\)](https://www.solarroadmap.com/guide-to-developing-solar-pv-at-massachusetts-landfills)
- Metropolitan Council (Comp Plan Language): [Local Planning Handbook Factsheet-Solar Resource Development \(metrocouncil.org\)](https://www.metrocouncil.org/factsheet-solar-resource-development)

- Michigan’s “Accelerating Solar Development on Michigan Brownfields: Challenges and pathways forward” report: [Dow-Masters-2019-Brownfields.pdf \(umich.edu\)](https://www.umich.edu/~brownfields/pubs/Dow-Masters-2019-Brownfields.pdf)
- Minnesota’s [Feasibility of Solar Development on State-Managed Closed Landfills: A Report to the Legislature](https://www.dhs.gov/sites/default/files/publications/2017/05/feasibility-of-solar-development-on-state-managed-closed-landfills-a-report-to-the-legislature.pdf)
- NYSEERDA Solar Guidebook, particularly the chapter Municipal Solar Procurement Guidebook: <https://www.nyserda.ny.gov/solarguidebook>
- RMI’s The Future of Landfills is Bright Report: [The Future of Landfills is Bright - RMI Page 20 directly addresses how local governments can encourage landfill solar](https://www.rmi.org/sites/default/files/2017-05/The_Future_of_Landfills_is_Bright_-_RMI_Page_20_directly_addresses_how_local_governments_can_encourage_landfill_solar.pdf)
- Virginia Energy’s Abandoned Mine Land Economic Revitalization Program: <https://energy.virginia.gov/coal/mined-land-repurposing/AMLER.shtml>
- Best Practices for Siting Solar Photovoltaic (PV) on Municipal Solid Waste Landfills (nrel.gov): [Best Practices for Siting Solar Photovoltaic \(PV\) on Municipal Solid Waste Landfills \(nrel.gov\)](https://www.nrel.gov/docs/fy14osti/64822.pdf)

Case Studies

- City of Annapolis, MD Case Study: <https://planning.maryland.gov/Pages/OurWork/envr-planning/solar-siting/solar-siting-case-annapolis-anne.aspx>
- Prince George’s County, MD Case Study: <https://planning.maryland.gov/Pages/OurWork/envr-planning/solar-siting/solar-siting-case-prin.aspx>
- Will County, IL Brownfield Prioritization Project: [db88781d-65c5-4435-b816-b6cd5d48d90c \(illinois.gov\)](https://www.illinois.gov/press-releases/2017/08/01/will-county-brownfield-prioritization-project)
- Appendix to Will County, IL Plan: [087ce094-3343-4674-8f9a-a1d3f4355a4e \(illinois.gov\)](https://www.illinois.gov/press-releases/2017/08/01/will-county-brownfield-prioritization-project)
- Wise County, VA: <https://www.wisecounty.org/CivicAlerts.aspx?AID=64>
- West Caldwell, NJ Wastewater Treatment Plant Solar Storage System: [PUBLIC SERVICE ELECTRIC AND GAS COMPANY \(PSE&G\), CALDWELL WASTEWATER TREATMENT PLANT SOLAR STORAGE SYSTEM: #ESNA PSEG - Energy Storage North America Conference and Exposition \(esnaexpo.com\)](https://www.esnaexpo.com/ESNA_PSEG_-_Energy_Storage_North_America_Conference_and_Exposition)

Section VII: Natural and Historic Resources

- Department of Energy, National Renewable Energy Laboratory, Innovative Site Preparation and Impact Reductions on the Environment (InSPIRE) project : Low Impact Development
- <https://openei.org/wiki/InSPIRE/Primer>
- The United States Department of Agriculture has a wide range of resources described at:
- https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/?cid=nrcs144p2_015693.
- The U.S. Fish and Wildlife Services programs are described at: <https://fws.gov/project/habitat-restoration>

- The Virginia Department of Conservation and Recreation has resources to assist in restoring native plants at: <https://www.dcr.virginia.gov/natural-heritage/document/riparian-nat-plants.pdf>.
- The Virginia Cooperative Extension Service's "Understanding the Science Behind Riparian Forest Buffers" describes best practices in establishing forested riparian zones and technical and financial resources to support those efforts <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.180.3358&rep=rep1&type=pdf>
- Town of Blacksburg Merrimac Coal Mining Heritage Park: <https://montgomerycountyva.gov/parks-and-rec/parks-facilities/coal-mining-heritage-park-and-loop-trail>.
- Dickenson County, VA, Virginia Coal Heritage Trail <https://dickensonva.org/332/Virginia-Coal-Heritage-Trail>
- [Re-establishing Pollinator Habitat on Mined Lands Using the Forestry Reclamation Approach](#)
- Poggi, Firmino, and Amado, "Planning Renewable Energy in Rural Areas." 31 Carlisle et al., "Utility-Scale Solar and Public Attitudes toward Siting."
- Dupraz et al., "Combining Solar Photovoltaic Panels and Food Crops for Optimising Land Use"
- Dinesh and Pearce, "The Potential of Agrivoltaic Systems."

Public Comment

1. Comment via public portal from William (Bill) Walls

Good afternoon,

I fully endorse the use of renewable energy, but I am concerned about solving one problem and having unintended consequences of creating other problems. Specifically, I am concerned about the use of hazardous material (e.g. cadmium telluride) being used in the production of certain types of solar panels.

Waste from end-of-life solar panels presents opportunities to recover valuable materials and create jobs through recycling. [According to the International Renewable Energy Agency](#)~~EXITEXIT EPA WEBSITE~~, by 2030, the cumulative value of recoverable raw materials from end-of-life panels globally will be about \$450 million, which is equivalent to the cost of raw materials currently needed to produce about 60 million new panels. Diverting solar panels from landfills to recycling saves space in landfills in addition to capturing the value of the raw materials.

Cadmium Telluride.

With a little research, I found from the GRIST site ([A different kind of solar technology is poised to go big | Grist](#)), the pros of this technology but also researched the Material Safety Data Sheet, a standard in the environmental industry, that outlines that it is a known carcinogen (see below).



[A different kind of solar technology is poised to go big | Grist](#)

Falling panel costs have driven the global solar boom. Over the last decade, the world's total installed solar capacity has seen a nearly tenfold increase, from about 74,000 megawatts in 2011 to ...

grist.org

Cadmium telluride is a type of “thin film” solar cell, and, as that name suggests, it’s much thinner than a traditional silicon cell. Today, panels using

cadmium telluride supply about **40 percent** of the U.S. utility-scale market, and about 5 percent of the global solar market.

<https://www.fishersci.com/store/msds?partNumber=AA1436703&productDescription=CADMIUM+TELLURIDE%2C+99.999%25+1G&vendorId=VN00024248&countryCode=US&language=en>

□

1. Identification

SAFETY DATA SHEET Creation Date 29-Jun-2015 Revision Date 14-Feb-2020 Revision Number 3 1. Identification Product Name Cadmium telluride Cat No. : 14367 CAS-No 1306-25-8 Synonyms No information available Recommended Use Laboratory chemicals. Uses advised against Food, drug, pesticide or biocidal product use. Details of the supplier of the safety data sheet www.fishersci.com

Would you please ensure that the Virginia Energy handbook adequately addresses the important issues of recycling in all its renewable energy solutions.

2. Joint Letter from the American Clean Power Association and the Mid-Atlantic Renewable Energy Coalition Action



May 23, 2022

Nick Polier
Manager, Energy Programs
3405 Mountain Empire Road
Big Stone Gap, Virginia 24219

Re: Draft Report re Brownfield Solar Development

Dear Mr. Polier,

ACP and MAREC Action appreciate the efforts of the Commonwealth to rapidly expand solar on brownfields. As the report is in draft form, we share high-level comments and are happy to serve as a resource to the authors during the drafting process.

The American Clean Power Association (ACP) is a national trade association representing a broad range of entities with a common interest in encouraging the expansion and facilitation of renewable energy and transmission resources in the United States. ACP's members include wind and solar generation, battery storage, and transmission facility developers, owners and operators, construction contractors, equipment manufacturers, component suppliers, financiers, researchers, utilities, marketers, customers, and their advocates.

Mid-Atlantic Renewable Energy Coalition (MAREC) Action is a coalition of utility-scale solar, wind, and battery storage developers, wind turbine and solar panel manufacturers, and public interest organizations dedicated to promoting the growth and development of renewable energy in the Mid-Atlantic region.

First, ACP and MAREC Action were encouraged by the authors' inclusion of a discussion on the PJM interconnection process, and current backlog of projects entering the queue. Transmission is central to renewable energy and storage siting. Utility-scale projects are typically sited within two miles of high voltage transmission lines; the cost and other challenges to constructing additional electric grid infrastructure is often prohibitive. Thus, the location of high voltage transmission lines should give clues to which brownfield sites should be considered for further study by the county or town.

Second, ACP and MAREC Action applaud the drafters for not only reviewing the legal and regulatory regime for interconnection, but also the social and technical constraints associated with brownfield development, such as topography, environmental remediation, and community approval. Policies to facilitate brownfield development are encouraged, such as by-right permitting, expedited



permitting, waiving onerous development standards (such as restrictive setbacks or panel density maximums). ACP and MAREC Action also recommend consideration of public due diligence (to alleviate an early upfront cost), creation of a backstop insurance authority to mitigate development risks, and direct incentives to reduce project costs.

Based on member experience, ACP and MAREC Action highlight the following additional barriers to brownfield development:

“Sunk” Costs of an Initial Environmental Site Assessment

Before any work proceeds on a brownfield, a developer must perform an extensive environmental site assessment to understand the history of the site, existing contaminants, and the likelihood these contaminants can spread and pollute the nearby environment. Given this measure requires extensive expertise – often from an outside consultant – a site assessment represents an early upfront cost.

Remediation & Site Preparation

Brownfield projects often require Special preparations to minimize pollutant discharge, such as excavation or soil replacement, or extensive measures such as solidification, soil recycling, or capping.

Low Impact Construction

Disturbing a brownfield site can result in the migration of pollutants to nearby properties and waterways. Solar deployment requires the operation of heavy equipment and machinery to secure the panels and racking system to the ground, as well as digging trenches to run conduit underground. Sensitive procedures are essential during construction, operations, and maintenance of the site to minimize the disturbance of contaminants. A developer may install special fences or walls, wheel wash ramps and rubble shaker or grids, and protective layers consisting of crushed rocks to prevent contaminated soil from leaving the brownfield. Site developers may also ensure the weight of the system is appropriately distributed as not to cause significant sinking, which may further disturb the site. Finally, all construction workers must be trained in how to safely operate on site.

Special Design Features

Most new ground-mounted, solar facilities use a single-axis tracker, which follows the sun over the course of the day to maximize energy generation. However, many brownfield developers are required to use a fixed tilt, ballasted system to avoid penetrating a landfill cap or disturbing the soil. Given the additional steel, concrete and labor required to build the ballasts,



these projects are costlier to build. However, because the array does not track the sun, it results in about 15% less energy generation than an array capable of tracking the sun.

The primary purpose of a solar project is the generation of clean, affordable, energy. Thus, it is important to consider that the elements in Section VII should be considered as additive, but not necessary, to brownfield development. By placing restrictions and special requirements on brownfield solar projects, a locality will likely dissuade site development, or not reap the full financial benefit of the opportunity. ACP and MAREC Action urge the authors to further consider the tradeoffs among environmental considerations in solar project development. For example, native or pollinator-friendly habitat may not take root as quickly as other available vegetation, thus the rush to establish groundcover may be at odds with other ecosystem services goals. Furthermore, planting pollinator-friendly habitat may attract endangered species – such as the monarch butterfly - to the brownfield, placing the species at potential harm and creating potential legal liability the site owner.

It also worth noting that the long-term cost savings in operations and maintenance of pollinator-friendly habitat on utility-scale solar facilities has not been studied extensively, and many developers may contest this claim. Given these savings are not universal, ACP and MAREC Action recommend striking this sentence on page 27. Similarly, the recommendation that “the area outside of the fence be evaluated through the site planning process to achieve conservation goals” and establishment of a riparian zone will inevitably add significant costs to a solar project, creating a tradeoff between the primary goal of generating clean, affordable energy on the beneficial reuse of a brownfield site.

ACP and MAREC Action also recommend revising the paragraph on page 24 to better represent the types of brownfield landscapes commonly found in Virginia. For example, the last sentence implies the pre-existing land use of a brownfield solar project is agriculture, however, it appears many sites described in the report feature reclaimed mining sites or former industrial land uses. Generally speaking, the pre-existing use of agricultural lands is considered a “greenfield” development, not brownfield development. Furthermore, the Walston, et al study cited on page 24 not only explores examines the ecosystem benefits of native vegetation, pollinator friend-friendly habitat, and turf grasses, but compares these categories to row crop agriculture. Thus, the authors should note that even turf grass may carry sediment and water retention benefits compared to a previous land use, even if it was row crop agriculture.



Thank you for your consideration of ACP and MAREC Action's comments. Please do not hesitate to contact us with further questions at any time.

Sincerely,

A handwritten signature in black ink that reads "David Murray".

David Murray
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A handwritten signature in blue ink that reads "Bruce W. Burcat".

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