Section I: Introduction

Section II: Development of Brownfields Sites for Storage & Renewable Energy Projects

Brownfields Opportunities in Virginia

A Brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of hazardous substance, pollutant, or contaminant. This is a very broad definition includes commercial and industrial property, previously mined lands, former schools, and much more.

The Environmental Protection Agency (EPA) estimates that they are more than 450,000 brownfields in the Unites States including thousands of sites across Virginia. These properties represent an opportunity for reinvestment that leads to increased local tax bases and job growth while utilizing existing infrastructure, preserving undeveloped land, and protecting and enhancing the environment of Virginia in order to promote the health and well-being of the community served. Many of these brownfields represent a great opportunity for deployment of renewable energy projects on land that would otherwise remain underutilized.

The Virginia Brownfields Restoration and Renewal Land Renewal Act (§ 10.1-1231) states that "It 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 is 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 to reinvestment in to underutilized property when possible though grant programs they administer.

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

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

Process in Virginia

In Virginia there is no formal process for registering or declaring sites a "brownfield" in order to qualify for assistance. All communities across Virginia have brownfields sites and the opportunity 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.
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 development of undisturbed open land, facilitates job growth, increases local tax bases and both 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.

DEQ Brownfields Program is fully committed to providing technical assistance to stakeholders and helping them find incentives that will promote the reuse of brownfields sites across the Commonwealth. 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.

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 your 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 and/or liability concerns may warrant enrolling a property in to 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 is able to 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.

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 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 are for up to $500,000 are available on a periodic basis 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 website.

https://www.vedp.org/brownfields

Considerations for Virginia

TBD

Section III: Development of Coal Mined Sites for Storage & Renewable Energy Projects

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 under Governor Chuck Robb, in 2021 legislation was enacted officially changing and rebranding the agency as a greater focus was placed on renewable energy programs and economic development. Worker safety remains the agency's top priority 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, our Mined Land Repurposing team came to Virginia Energy from the Department of Conservation and Economic Development. The Virginia Department of Energy has offices in Big Stone Gap, Charlottesville and Richmond.

The Virginia Department of 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.

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 Virginia 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 Control and Reclamation Act (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 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, Chapter 19, Title 45.1 of the Code and the Virginia Coal Surface Mining Reclamation Regulations (VCSMRR) 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 1970’s 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 prior to December 15, 1981. There must also be no other individual, firm or organization responsible to reclaim the site.

Virginia Energy's Mined Land Repurposing (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 consents for rights of entry, publish public notices in local newspapers to advertise for construction 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 prior to 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.

The Virginia Dept. of 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, is 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

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 a more stringent requirements adopted in the local erosion & sediment Control ordinance*. All localities act as Virginia Erosion and Sediment Control Program (VESCP) Authorities**. 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 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 Areas* 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 operate as approved stormwater management authorities and administer portions of the stormwater program at the local level**.

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.

*When disturbance is proposed at more than 2,500 square feet 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.

**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.

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/

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 **Attachment/Appendix XXX**

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 Interconnection

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 throughout 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-owned utilities, thirteen member-owned utilities, and sixteen municipal electric utilities across the commonwealth (SCC, 2022).

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 expound upon the interconnect application and review processes.

Interconnect Regulations

There are two parts that relate to planning a new electric generation project, the physical connection and 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 you be using the PJM process, the Virginia State Corporation Commission process, or some combination of both processes?

To answer the question of who owns the power line, you will need to check the nearest pole to see if it has identifying markings. Additional confirmation can be obtained by following the line to the nearest substation where the utility's name will be clearly identified on the fence gate. Once you know who owns the line, you can query the utility about the interconnection process and the voltage. The utility can tell you 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 a AEP (Appalachian Power), First Energy (Potomac), VEPCO (Dominion) and it is 69kV or above, chances are good that it will be the PJM process. If the line is owned by a municipality or an

electric Cooperative, regardless of voltage, the chances are good that the interconnection will be studied through the SCC process.

In cases where you are to be studied through the SCC process, your options for 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.

Interconnect 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:

I. **Feasibility Study** - A relatively quick look at a proposed project. Results from which are used to determine which more in-depth studies are required.
II. **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.
III. **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. Figure B provides a sample graphic of the PJM study queue process and the grouping process by class years. For example, the black oval outline shows class year AF1. 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 Virginia 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 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:

I. Sold to the interconnecting utility through a Power Purchase Agreement (PPA)
II. Sold through a PURPA contract to the interconnecting utility
III. Sold into the PJM markets (day ahead or real-time)
IV. Sold to a wholesale buyer via a bilateral contract

For methods II-IV 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.

Summary

This section provided a general overview of the interconnect review processes in Virginia. As described, the steps involved often have a time and cost component, and many with long lead times. Therefore, it is recommended that communication begin early in the process to clarify current review requirements and help to minimize the potential for surprises, increased costs, or delays.

Additional Resources

- SCC, 2022. Regulated Companies & Service Map: Service Territories
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
- PJM, 2017. Queue Point User Guide. PJM System Planning, PJM Interconnection. https://www.pjm.com/-/media/etools/planning-center/queue-point-user-guide.ashx
- PJM, 2022. Connecting to the Grid FAQs. PJM Learning Center https://learn.pjm.com/three-priorities/planning-for-the-future/connecting-grid
- VA LIS, Chapter 314. Regulations Governing Interconnection of Small Electrical Generators and Storage. https://law.lis.virginia.gov/admincode/title20/agency5/chapter314/

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 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 chapter provides a broad overview of how local governments begin to encourage the local redevelopment of brownfields of renewable energy and includes:

-Creating a Community Vision

-Comprehensive Plan

-Identifying and Assessing Local Sites

-Stakeholder Engagement

-Goals and Strategies

-Economic Development Strategies

-Operationalizing the Community Vision

-Zoning and Permitting

-Minimizing Project Costs

-Local Government Owned Sites

-Programs for Local Governments

-RFP and Lease Templates

-Additional Considerations and Resources

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 years.[1] 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 to 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" among other things.[2] 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[3]), sites with released mine permits from Virginia Energy, and previously disturbed sites monitored by 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,

[1] https://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2230/

[2] § 15.2-2224. (Effective October 1, 2021) Surveys and studies to be made in preparation of plan; implementation of plan (virginia.gov)

[3] https://geopub.epa.gov/repoweringApp/

that may be appropriate for renewable energy development. 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. DEQ's Brownfield program can also assist with transforming otherwise unusable land for renewable energy development. [4]

Creating and maintaining a centralized public list or resource of previously disturbed and brownfields 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 development.[5]

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. The Code of Virginia § 15.2-2223 C.8 states local governments in the comprehensive plan may include recommendations for future corridors for electric transmission lines of 150 kilovolts or more.[6] 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.*" [7] This additional assistance can help localities with long term planning for the siting of renewable energy and storage 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 (see Chapter XX for more on public engagement). 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 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.

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[4] Brownfields | Virginia DEQ

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

[6] https://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2223/

[7] LIS > Bill Tracking > HB894 > 2022 session (virginia.gov)

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, 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 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, 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 Park.[8]

Operationalizing the Community Vision

Once your community has defined and adopted policies regarding how it wants to accommodate, encourage, and prioritize redevelopment of brownfields for renewable energy development, the next step is to ensure the appropriate codes, ordinances, and processes are in place to

[8] Wise County Celebrates Groundbreaking on Mineral Gap Solar Project

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.

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 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 state code section 15.2-1232.2[9].
- **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

[9] 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.

extended periods of time to accommodate external permitting the project may require before construction may begin.

- **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 contaminates 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 pilons. 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 state code section 15.2-2241.2[10], and consider alternative zoning methods that can accommodate the unique nature of brownfield redevelopment for renewable energy. 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 redevelopment of previously developed sites or brownfields.

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 tax[11]or adopt a revenue share ordinance[12], and negotiate siting agreements and additional cash payments[13]. However, to minimize project costs for redevelopment projects that provide other co-benefits, a locality could explore options such as expediting permitting processes, minimizing

[10] § 15.2-2241.2. Bonding provisions for decommissioning of solar energy equipment, facilities, or devices (virginia.gov)

[11] https://law.lis.virginia.gov/vacode/title58.1/chapter36/section58.1-3660/

[12] https://law.lis.virginia.gov/vacode/title58.1/chapter26/section58.1-2636/

[13] https://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2316.7/

costs and fees where possible, and consider adopting a local tax exemption for solar energy equipment as permitted by state code 58.1-3661.[14]

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 PPAs (§ 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 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

[14] 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.

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 property.[15]

RFP and Lease Templates

Zoning in place (a plan for how to achieve proper zoning), interconnection is a component to explore before issuing the RFP (determine feasibility), Phase 1 site assessment preferred to be done before issuing RFP...

Be Strategic with Leases: Landfill solar development leases allow for site reuse without transferring responsibility of site maintenance and monitoring. Surface leases enable developers to make use of the area above the cap without interfering with the landfill itself, allow for site access for both the developer and local government, and specify what, if any, taxes or lease fees will be collected. In states without policies and incentives encouraging landfill solar, low-cost or no-cost leases can be offered to reduce the cost of energy on a $/kWh basis for users.

Additional Considerations and Resources for Localities

Redeveloping brownfields for renewable energy is not new; it has been done many times in Virginia and across the US. See below for resources, case studies, examples, and feedback from state agencies and localities with experience in developing renewable energy projects on previously disturbed land.

Local Liability:

[15] Bedford Solar: Bedford, VA — O2 emc

Incentives:

Virginia Brownfields Restoration and Economic Redevelopment Assistance Fund (VBAF)

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

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)

Massachusetts' Guide to Developing Solar PV at Massachusetts Landfills: Guide to Developing Solar PV at Massachusetts Landfills (solarroadmap.com)

Metropolitan Council (Comp Plan Language): Local Planning Handbook Factsheet-Solar Resource Development (metrocouncil.org)

Michigan's "Accelerating Solar Development on Michigan Brownfields: Challenges and pathways forward" report: Dow-Masters-2019-Brownfields.pdf (umich.edu)

Minnesota's Feasibility of Solar Development on State-Managed Closed Landfills: A Report to the Legislature

NYSERDA 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

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)

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)

Appendix to Will County, IL Plan: 087ce094-3343-4674-8f9a-a1d3f4355a4e (illinois.gov)

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)

Feedback from Virginia Localities:

(TBD)

Section VII: Natural and Historic Resources

Environmental Considerations

The environmental permitting process in Virginia for renewable energy projects is complex and was described in detail in Section IV: Permitting. The permitting process done by DEQ is intended to ensure compliance to state regulations, but does not require advanced best practices that can provided added values. This section focuses on natural resources considerations that "add value" to a project, and permitting and added value considerations for historic and cultural resources.

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 and operation costs. These practices, such as low-impact development methods, maintaining existing ground cover where possible, and establishing ground cover quickly, usually reduce costs for site grading and may reduce stormwater management costs (cite). These practices may also reduce the need for costly (and challenging) site remediation from erosion. The economic benefits of these practices can be significant (cite).

The second type of added value are 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 (cite). Site planning that increases riparian and wildlife corridors provides multiple values, from improving water quality and fish

and wildlife habitat, to providing wildlife and habitat. This section will identify many voluntary programs to help add value to projects. Many programs provide cost-share and economic incentives to install 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 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 (cite).

Abandoned mine lands and brownfields may not be thought of as needing historic and cultural resources 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 it may be useful to consider. For example, the Town of Blacksburg preserved a portion of the Merrimac mining community for historic and recreational purposes (https://montgomerycountyva.gov/parks-and-rec/parks-facilities/coal-mining-heritage-park-and-loop-trail). Dickenson County, VA, created the Virginia Coal Heritage Trail (https://dickensonva.org/332/Virginia-Coal-Heritage-Trail) 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 (cite).

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 more, or for applications to State Corporation Commission for electric generating plants and associated facilities." (https://www.dhr.virginia.gov/environmental-review/state-project-review/)

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 impacts (https://www.dhr.virginia.gov/environmental-review/epix-electronic-project-information-exchange/). 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. 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 impacts (https://www.dhr.virginia.gov/environmental-review/epix-electronic-project-information-exchange/). VADHR's website explaining the federal project review process is at https://www.dhr.virginia.gov/environmental-review/federal-project-review/.

Resources - Adding Value

Virginia's abundant natural resources provide a rich environment for people, plants and wildlife...and benefit 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 Virginians[16] (n.d., https://www.deq.virginia.gov/get-involved/about-deq). 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. Therefore, we provide 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 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 cover. 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.

[16] Virginia Department of Environmental Quality. (n.d.) "About Us" https://www.deq.virginia.gov/get-involved/about-deq

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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.

- Resources to support natural resources, historic and cultural best practices
    - Local, state, federal (Erin)
    - University (Erin)
    - Non-profit and private organizations (Lauren)
        - Re-establishing Pollinator Habitat on Mined Lands Using the Forestry Reclamation Approach

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 habitat 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.
Klusáček et al., "From Wasted Land to Megawatts."
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."

Wildlife and Riparian Habitat and Wildlife Corridors

Former minelands and brownfields can provide unique and valuable opportunities to improve wildlife habitat, wildlife corridors and establish and/or protect riparian corridors. Good site planning that can provide significant added value for 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 resources considerations for renewable energy projects can provide significant added value for low cost.

Solar PV facilities are considered to be land-intensive, sometimes creating intense local opposition. However, we find that developers lease or purchase a significantly larger area for a facility (particularly for the exploration phase) than the area directly covered by panel. Approximately x% of the parcel that is secured for siting (cite Aaron's work) is "inside the fence". We recommend that the area outside of the fence be evaluated through the site planning process 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. 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).

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 can assist in identify what types of vegetation will enhance wildlife at that site, compatible with a solar PV facility (add link).

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 provides multiple added values – wildlife habitat, stream protection, 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.

Section VIII: Policy & Policy Recommendations

Under Development

Section IX: HB 1925 Grant Funding Program Guidelines and Criteria

Under Development

Appendices

Under Development