Alliance for the Shenandoah Valley

Utility Scale Solar Ordinance and Policy Recommendations

Updated July 2023

Background:

Utility-scale solar (USS) is here in the Shenandoah Valley and continuing to evolve. These recommendations, updated from 2019, are intended to help Valley localities, landowners, and developers stay current with policies and ordinances to address important and changing facets of this land use.

Alliance for the Shenandoah Valley teamed with the Central Shenandoah Planning District Commission and the Northern Shenandoah Valley Regional Commission in 2019 to host workshops for local staff and officials to learn about USS. These brought in a variety of expert speakers to provide needed perspective and information. In spring 2022, the Alliance partnered with the Virginia Cooperative Extension to offer two Agriculture and Solar workshops, bringing together farmers, rural electric co-op representatives, community solar advocates, and solar providers. This furthered the discussion on the challenges and opportunities for incorporating solar in a thriving agricultural landscape.

While the Valley has seen fewer applications and relatively smaller projects compared to central and southside regions of Virginia, almost all of the counties have received applications, as have many towns and cities. Most Valley localities have at least some regulations in place for solar energy, and a number of projects have been permitted. Because of the lag time between permitting and construction, only a few have been built.

These recommendations focus on how best to evaluate proposed USS projects and encourage designs that minimize impacts and maximize benefits. It is organized by sections: I. Solar Basics: What to Expect, II: Ordinance and Policy Recommendations, and III: Considerations by Topic. For more depth, resources and links to locality examples are provided at the end.

These recommendations were developed from many sources: locality experiences in the region and across the state; state resources; interviews with issue experts; topic webinars and research; and recent studies. The latter includes newly released reports by legislative task forces, state universities, agencies, and nonprofit organizations.

I. SOLAR BASICS: WHAT TO EXPECT

Utility-scale solar (USS), the subject of these recommendations, refers to installations that generate solar power (typically 1 MW or greater) to be sold to a utility and fed into the grid. The other type of solar energy, distributed generation (DG), produces electricity on a smaller scale (typically rooftop panels or small ground-mounted installations) at or near where it will be used. Projects will be proposed on both high-voltage transmission lines and on distribution lines. Generally, projects less than 20 MW are connected to distribution lines. State permitting by the Virginia Department of Environmental Quality (DEQ) covers “Small Renewable Energy Projects,” those between 5 MW and 150 MW, through a Permit by Rule (PBR) system. The State Corporation Commission permits projects above that size and those owned by utilities. Further, some utility-scale projects are defined as community or shared solar, where the generated power is earmarked for particular electrical subscribers within a specified region or utility.

As solar energy is developed across the state, battery energy storage systems and transmission facility upgrades will also be needed. Sometimes these will be part of USS projects.

Site selection tends to be driven by several factors: reasonably priced land, willing landowners, and sites that can be efficiently connected to the grid. Large projects command economies of scale both for the legwork of local permitting and also the time and expense of applying for a grid connection. Increasingly, mid-range and small USS projects (about 50 to 300 acres) are being proposed. Some reasons for this trend are programmatic: easier connection to the distribution grid (vs. cost and delay on the interstate grid), Dominion must include 1,100 MW of projects equal or less than 3 MW, and community and shared solar programs are being launched. Also, some developers have found a better chance of gaining locality approval for smaller projects.

The major players in a utility-scale solar project are:

- the developer, who finds a suitable site and willing landowners and guides the project through the permitting process (at this point the project can be sold; ownership changes are not uncommon); contractors are hired for construction and long-term operation.
- the utility (in the Shenandoah Valley this would be either Dominion or one of the rural electric co-ops). The developer works with the utility to create the connection agreement.
- the landowners, who lease their land (usually 25-40 years) and are assured a steady stream of income for the term of the permit. Occasionally the developer or utility purchases the land.

The major stages of a solar project are:

- **installation phase**, which may be of a scale not often seen in rural localities, requiring careful site design and regulatory oversight. Site preparation involves extensive land disturbance, sometimes including grading, in order to construct roads and stormwater facilities. Installers then mount panels, place inverter pads, and lay wiring; establish buffer plantings and fencing; and reestablish ground cover. Substation, transmission lines, or battery storage may also be part of the project. Completion is the date a project goes operational, often two years or more from the approval date.
- **energy production/management phase,** which is more straightforward for localities. Regulations should cover vegetation management, buffer and fence maintenance, disposal of damaged panels, stormwater management, and updating of decommissioning plans.
- **end of the lease term**, when new equipment could be installed ("repowering" to updated technology) and leases renewed, or the site could become discontinued and need to be decommissioned. Decommissioning plans specifically address the removal, recycling, and disposal of a large quantity of equipment and ensure a return of the land to productive uses.

<u>What Localities Need to Know</u>

Developers need three components: 1- control of suitable land, 2 - interconnection approval to the power grid, and 3 - local permitting. Developers have much at stake when seeking local permit approval. The locality in turn has full responsibility for understanding and vetting a project and for setting sufficient conditions if it is to be approved. USS projects require extensive site planning and construction planning, which should be addressed in the local permit.

Developers are looking for all sizes of projects and searching for available interconnection capacity at all locations. The voltage of the line indicates the probable size of the project. Current backlogs in connection to the PJM multi-state regional grid are causing significant delays. Once a line is full, no additional connections can be added without major expense to upgrade the line capacity. The grid is somewhat dynamic, however, and capacity might open up through other ways such as a generator going offline or a change in energy flow.

New federal incentives in the Inflation Reduction Act of 2022 will drive an increase in projects. Direct pay and transferable credits, for example, could make projects more feasible for nonprofits and government entities.

Pulling together the many moving pieces – acreage, grid connection, land leasing, and local permitting – means multiple projects can be jostling for space on the grid and for local permit approval. A large number of projects will be proposed and many will be approved. However, many approved projects may never be built because of interconnection uncertainties and other factors.

Main Points

1. **Solar projects are distinctive** in important ways:
    - Choices – aside from the central goal of maximizing panels, there are options in siting and design, and localities have the ability to influence outcomes through permitting
    - Scale – even small USS are considerable construction projects
    - Complexity – the sheer number of elements poses much to understand and evaluate
    - Industrial use – a significant amount of equipment is deployed, often proposed in a rural agrarian setting and sometimes with accessory components (transmission lines, substations, battery storage)
    - Term –plans are needed for what happens after the use, including the potential for the land to be returned to agriculture or open space
    - Ever-evolving – changes in technology and practices will result in new designs

2. **Each proposal is a site-specific land-use decision;** therefore, analysis and evaluation must be site-specific as well.

3. **Each locality has its own goals and process**. There is not a single set of standards to follow. These recommendations provide information and examples to draw from. Landowners and developers need to be familiar with the particular ordinances and comprehensive plan language within each locality.

4. **Localities need to work closely with each developer** to ensure a carefully crafted set of conditions for the construction, operation, and decommissioning that protect and enhance the site's natural and cultural resources and minimize impacts to the land and the surrounding community. Beneficial components can be encouraged for any solar project, such as minimal grading and the inclusion of native vegetation, wildlife habitat, or agricultural compatibility.

5. **Localities need a full set of tools**: (These are described in Section II.)
    - Guidance in the Comprehensive Plan
    - Ordinance for USS
    - Specific supplemental standards or policies to address the distinctive features of USS.
    - Policies for making taxation and fiscal decisions and considering Host Siting Agreements

II. ORDINANCE and POLICY RECOMMENDATIONS

All localities need to have a plan for how renewable energy will be incorporated as a goal and regulated as a land use. It is important to have both policy guidance and regulations to provide for the greatest clarity and control. Many localities use a stakeholder committee to assist the process of developing policies and ordinances (Augusta, Page, Rockingham). Community engagement and open communication is essential to developing effective policies and reaching the best project outcomes.

1. Address Renewable Energy in the Comprehensive Plan and in Specific Policies
With USS an established use and other types of energy generation and storage on the horizon, localities should work through a public process to consider how renewable energy and resiliency fit in the community's vision for the future.

a) **Comprehensive Plan**. The update process provides an opportunity to consider all types and scales of energy conservation and production and to develop pathways and incentives for desired solutions. Renewable energy can be addressed in appropriate sections throughout the Plan. Guidance can also be developed and adopted outside of the update cycle (Augusta County, 2021 update to utility chapter).

b). **Policies and Strategies.** Because of the urgency and the uniqueness of USS, localities need to develop guidance for evaluating projects. These should be stated policies reflecting community expectations and values. This helps developers know what kinds of projects are more likely to meet approval. These strategies take various forms, especially as localities find the need to update their approaches and address additional aspects.

- 2232 Review for Conformity with the Comprehensive Plan – When and how to do this required step should be considered. Fauquier, for example, requires the review to take place before a permit application can be accepted.
- Supplemental Conditions for USS are used by most localities, usually in the zoning ordinance but also sometimes in a policy document.
- Policy Guidance - Recently, more counties have undertaken extensive processes to develop guidance at the policy level (Culpeper, Prince George, Goochland). Policy can express intent (relation to Comprehensive Plan, zoning, and health, safety, and welfare) and address siting, amount, process, and standards. (Goochland, simultaneous update of zoning ordinance and adoption of extensive policy update on solar energy and energy storage facilities).
- Required Permit Conditions. Stating sample conditions to be required in the SUP can provide clarity to the developer. These should be comprehensive to address all aspects of the project and to safeguard the locality in case of dispute or non-performance. (Culpeper Example Conditions).

2. Adopt a Utility-Scale Solar (USS) Ordinance:

a) Require a Special Use Permit (SUP), also known as a conditional use permit (CUP), for USS solar projects. Coordinate with the Host Siting Agreement process.
b) Expand definitions within the locality's code to include industry-specific terms, set different scales of projects, and cover accessory and related uses.
c) Include a range of types and scales of projects. Consider appropriate permitting tracks and standards depending on size and location. Some localities have a simpler review track for smaller projects (Augusta). Consider allowing small distributed generation projects by right.
d) Consider establishing Supplemental Conditions for USS projects**.**
    - Amount - Many localities address the potential amount of acreage allowed for USS. Some set a county target or maximum acreage (Rockingham, Culpeper, Page). These sometimes reflect the locality's percentage of the grid footprint and are periodically re-

considered. Another approach is setting a cap on the size of individual projects (Shenandoah, Page).

- Siting – Criteria can be very detailed to cover different situations and elements based on local priorities: a) zoning district or policy area (Staunton and Southampton allow only in industrial zoning; Augusta avoids growth areas), b) incentives for projects, such as encouraging them on impervious areas (Rockingham), c) environmental standards, such as prohibitions on forest clearing, karst, high slope, or prime soils d) setback and buffers (Augusta, Rockingham).
- Public process – public meeting(s) should be required early such that questions can be asked and answered with time to adjust the application.
- Application requirements – these should be extensive, reflecting the complexity of such projects (Culpeper, Goochland).

e) Adjust fee schedule to cover costs for large-scale projects beyond normal staff capacity, such as inspections, third-party plan review, and site-specific impact analyses. Provide an option for requiring a technical review conducted by consultants selected by the county and paid by the applicant. (Spotsylvania, Augusta, Albemarle)

f) Set a process to identify and evaluate potential positive and negative impacts. Encourage outreach early to the community, such as preliminary community meetings well before the application, with ample notice and time to work through potential options to solve issues or improve project design. (Rockingham, Prince George County)

g) Require analyses (visual, historical and cultural, environmentally sensitive, safety). Although projects that go through the state PBR process will have agency reviews, these are limited in scope and mostly advisory. Protection of resources will be a local responsibility. In any case the balancing of impact and compatibility is up to the locality.

h) Require specific plans for important phases. Consider performance bonds.

- Construction Plan including traffic plan (American Planning Association, Culpeper)
- Landscaping and Buffering Plan (Culpeper, Page, Goochland)
- Erosion and Sediment Control (E&S) and Stormwater Management Plans (PV-SMarRT study by Great Plains Institute)
- Vegetation Plan setting out stages and phases for reestablishing and maintaining cover (Louisa project example)

i) Require a sufficient bond and Decommissioning Plan. Require the plan to include cost estimates and surety; require five-year updates. Exclude salvage value. In most cases, require land to be returned to its original condition, especially agricultural and forest land. Consider requiring land restoration, to include decompaction and soil amendment (UVA Decommissioning study, VT Professor Daniels research).

3. Adjust Related Ordinances and Policies

a) <u>Concept Plan and Site Plan</u>. At the permitting process, a Concept Plan is typically presented for inclusion in the SUP. Later, a more detailed final engineered plan will be required at Site Plan review. Given the scale and complexity of the construction involved in a USS project, more information may be needed in the Concept Plan. The developer should have completed sufficient engineering on soils, geology, and sensitive features such that the Concept Plan reflects the particular soils types, slopes, and natural features of the site. Maps should be large enough to show contours clearly and should indicate areas of planned grading, including any removal of top soil. The location and extent of all of the project components should be shown. Maps for different stages are recommended.

b) <u>E&S and Stormwater Management ordinances</u>:

- Update local erosion and sediment control and stormwater management regulations to specifically address USS. Requirements should match or exceed the standards in VDEQ's 2022 Stormwater and E&S Control Design Guide (pp. 45-49). Any "opt out" locality that

has DEQ handle its stormwater reviews should specify in its solar ordinance that solar panels should be deemed unconnected impervious surface (otherwise DEQ cannot enforce that standard until after 2024 on certain projects).
    - Minimize grading. Consider limiting grading, such as only to cut and fill for stormwater facilities. Avoid grading in panel areas. As necessary, require soil decompaction and remediation after construction to provide good conditions for revegetation.
    - Ask for a soil stabilization plan to lay out stages of construction and the various steps for protecting soil and achieving revegetation (Louisa).
    - Provide for a third-party consultant as needed, paid by the developer, to review E&S and SWM plans, do inspections, and make sure the vegetation plan is carried out (Louisa).
    - Set a maximum acreage that can be disturbed at once (Surry County, 20 acres).
- c) Buffer and setback requirements. These should be solar-specific. Encourage consideration of each neighbor and of public viewsheds.
- d) Host Siting Agreements (HSAs). Legislation approved by the General Assembly in 2020 and 2021 requires an applicant for a solar project or battery energy storage facility to notify the locality of the intent to propose a solar project and offer to negotiate an agreement. HSAs can be used to meet early on and discuss a project so that potential issues can be understood and addressed, and they offer a financial opportunity to localities. Terms are unique to each project and can include mitigation of impacts, financial compensation to the locality for capital needs, or assistance deploying broadband. However, some localities have declined to use HSAs, wary that they might be construed as board-negotiated financial deals that leave the public out of the process. Localities should have policies in place which include effective public involvement.
- e) Conservation components. Develop a list of desired features that could be encouraged (to vary by project site and design). Examples:
    - Native plants in buffers and as ground cover, ideally across the project site
    - Inclusion of pollinator plantings, ideally Pollinator Smart certification
    - Sheep grazing for vegetation management
    - Complementary agriculture on same area as panels such as pollinator plants, apiaries, livestock grazing, and crop production
    - Contribution to the locality's land conservation goals, such as by extinguishing future development rights, making payment to local farmland protection programs or as matching funds for grants in support of conservation-related efforts.

4. Make Informed Fiscal Decisions

- Decide which taxing/revenue structure to use (machinery and tools tax or revenue sharing; host siting agreement). Seek examples and advice from your Commissioner of Revenue and other localities and entities (Virginia Department of Taxation; UVA fiscal tool, Rappahannock River Basin Commission).
- Negotiate sufficient financial terms in the host siting agreement. Use the right to hire experts. Localities have considerable latitude, but little guidance. Options vary widely from single cash payments, annual payments, contributions to Capital Improvement Plan items, and conservation commitments like placing conservation easements or vacating development rights (W&M report, Frederick, Louisa).
- Understand the tax implications and infrastructure needs on the tract of land should other development options occur on the land instead of solar.
- Balance the combination of revenue from all sources as well as the potential costs or unforeseen risks. Consider what stages might merit bonding.

III. CONSIDERATIONS BY TOPIC

Evaluating Projects

- Consider the impacted area (viewshed/watershed/wildlife movement/neighborhood), not just adjoining properties.
- Require details as needed to fully understand the specific locations, activities, and designs.
- Use information from analyses to consider mitigation needs and propose solutions.
- Distinguish which impacts would require avoiding a site entirely and which impacts could possibly be mitigated.

Working with Developers

- Present clear community expectations and values.
- Start with a base of strong site design and construction standards.
- Have additional conditions or policies in place, such as solar specific supplemental standards in the zoning ordinance and siting or other policies determined by the governing body.
- Describe suitable sites, especially brownfields.
- Encourage taking time to work on the project up front, before the application cycle.
- Provide suggested mitigation measures and desired features.

Avoidance and Mitigation

Virginia DEQ is developing a regulation that requires solar developers to avoid, minimize, and/or mitigate damage to prime agricultural soil (more than 10 acres) and contiguous forest (more than 50 acres), as required by House Bill 206, passed in 2022. The final regulations will apply to all projects that apply for initial interconnection request after December 31, 2024.

Protecting Agriculture & Forestry

Use the VaLEN tool (Virginia Land and Energy Navigator) to easily view site characteristics and proximity to transmission lines. VaLEN layers include Prime Farmland, Productive and Versatile Farmland, Conservation Lands, Forest Conservation Value, and transmission lines. Supplement with detailed information on soils classifications and characteristics and provide clear mapping of these and other land features such as wetlands.

1. Consider the positive and negative impact on long-term farming viability of the property and the farming community.
2. Consider positive and negative factors on the proposed parcels and adjoining parcels.
3. Avoid development on prime soils in agricultural planning policy areas, discourage plans to do large-scale deforestation for solar installations, and consider mitigation measures when avoidance is not possible.
4. In general, avoid rezoning agricultural parcels to industrial or causing parcelization.
5. Consider landowner plans and the potential to accommodate continued or future farming.
6. Consider the potential to use land in ways compatible with continued agriculture.
    - Use sheep grazing for vegetation management (must design ahead of time)
    - Plant low-growing native pollinator plants; consider requiring certification under the Virginia Pollinator Smart program.
    - Use size and designs that enable continued farming on unleased acres.
    - Require that project design, construction, and operation provide for smooth transition back to agricultural use at the end of the permit.
    - Minimize grading, disturbance or removal of topsoil, and compaction.
    - Maintain vegetation to minimize invasive species.
    - When choosing areas to put under panel, avoid sensitive areas and the most productive farmland when possible.

7. Require return of land to its previous condition. Consider land restoration clause in the Decommissioning phase (Daniels research, PV-SMaRT study).

Protecting Cultural Resources (Historic/Scenic)

Objectives: Minimize impact to nearby historic resources and to scenic and rural character. Retain aesthetic quality for agritourism, historical tourism, and recreation.

- Require surveys to describe historical and archaeological sites on or near the property. Survey data and agency reviews required in the state Permit by Rule process can be helpful.
- Include potential impacts, positive and negative, to tourism/recreation in the economic analysis. Coordinate as appropriate with local and regional tourism, economic development, parks, and related sectors.
- Avoid siting projects on properties with National Register sites or districts (designated or potentially eligible), potentially significant archaeological resources, or battlefields.
- Consider carefully whether to approve projects on properties adjacent to or affecting said historic resources as well as scenic designations including Virginia Byways, Blue Ridge Parkway, Skyline Drive, Scenic Rivers, entrance corridor overlays, and other scenic trails or tours.
- Consider views from all strategic viewpoints. Require visualizations.
- Require buffer and landscape designs tailored to each site and from public roads.

Protecting Environmental Resources

- Protect Soil and Water:
    - Use measures listed above: stringent E&S and SWM plans and oversight.
    - Minimize grading and compaction; discourage removing top soil and require that it be kept on site and reapplied promptly (Daniels).
    - Limit extent and time of open areas (revegetate promptly).
    - Provide for soil restoration stages both after construction (ex: decompact and amend soil to aid revegetation) and at decommissioning (Daniels and 2023 PV-SMaRT study).
    - Require Vegetative Plan showing how soil stabilization will be assured at all stages.
- Protect sensitive natural areas, wetlands, and natural heritage sites:
    - Avoid siting on wetlands and on natural heritage sites.
    - Design to protect adjacent and downstream resources.
    - Discourage clearing of trees (forest cover is the most optimal land cover for delivering ecosystem services); maintain riparian forested buffers.
- Provide Wildlife Habitat/Recreation:
    - Consider potential impacts and opportunities.
    - Encourage use of native vegetation throughout the site: in the buffers, native plants in multiple rows and species of different height shrubs and trees; under the panels, low-growing native plants; and where possible, pollinator species.
    - Encourage wildlife corridors or, as appropriate, trails or interconnections to adjoining properties (Augusta).

RESOURCES CITED (by topic)

Soil and Water and Vegetation

Chesapeake Bay Conference: "BMPs to Minimize Impacts of Solar Farms on Landscape Hydrology," STAC meeting April 6-7, 2023, at George Mason University on the subject of best practices and impact on soils. https://www.chesapeake.org/stac/events/best-management-practices-to-minimize-impacts-of-solar-farms-on-landscape-hydrology-and-water-quality/.

PV-SMaRT: "Best Practices: Photovoltaic Stormwater Management Research and Testing (PV-SMaRT)," Great Plains Institute Report (research funded by US DOE), January 2023. *(key design impacts of solar development on stormwater quality and quantity; describes best practices).*

"Soil Compaction and Solar Facility Decommissioning," Virginia Tech Professor W. Lee Daniels, presentation to Rappahannock River Basin Commission, summary 6/13/23.

The American Solar Grazing Association, www.solargrazing.org.

"Virginia DEQ Stormwater Management and Erosion & Sediment Control Design Guide" (VDEQ GM22-2012_SWM ESC Design Gu), VA Department of Environmental Quality, effective Feb 1, 2023 (pp. 45-49 devoted to solar)
https://www.deq.virginia.gov/home/showpublisheddocument/15584/638065135228000000.

Virginia Pollinator Smart program, https://www.dcr.virginia.gov/natural-heritage/pollinator-smart and Pollinator-Smart Comprehensive Manual, https://www.dcr.virginia.gov/natural-heritage/document/solar-site-comprehensive-manual.pdf.

Siting

"Balancing Agricultural Productivity with Ground-Based Solar Photovoltaic (PV) Development," by Tommy Cleveland and David Sarkisian, produced by the NC Clean Energy Technology Center, N.C. State University, May 2019.

"Siting Solar in Virginia: Protecting Virginia's Historic Landscapes While Meeting State's Clean Energy Goals," by the American Battlefield Trust, www.battlefields.org/solar.

Siting Tool: "Virginia Land and Energy Navigator (VaLEN)," https://valen.ext.vt.edu/web_portal/about *(Interactive mapping tool has layers of Prime Farmland Classification, Conservation Lands, Cropland, Forest Conservation Value Model, American Farmland Trust's Land Productivity, Versatility, and Resiliency soils, and Electricity Infrastructure).*

"Smart Solar Siting on Farmland: Achieving Climate Goals While Strengthening the Future for Farming in New York," American Farmland Trust, February 2022.

Solar Siting Scorecard, Nancy Sorrells and Bobby Whitescarver, 2021.

Process /Planning

"Decommissioning Utility-Scale Solar Facilities," University of Virginia Energy Transition Initiative, August 2022. (*Detailed guidance for localities on what to consider and include in their USS ordinances regarding Decommissioning)*.

"Developing Solar Energy in Rural Virginia: An Analysis of Legal, Environmental, and Policy Issues," William & Mary Law School, Virginia Coastal Policy Center, 2022.

Fiscal Tool - Virginia SolTax Model, https://solar-tax-webapp.herokuapp.com/, tool developed by the Weldon Cooper Center at UVA and the Virginia Department of Mines, Minerals, and Energy for use by localities to help them decide which taxation model to use for solar generation systems.

Host Siting Agreements, Code of Virginia, https://law.lis.virginia.gov/vacode/title15.2/chapter22/section15.2-2316.6/

"Planning for Utility-Scale Solar Energy Facilities," Darren Coffey, American Planning Association Planning Advisory Service Memo, Sept/Oct 2019.

Solar at Scale: A Local Government Guidebook for Improving Large-Scale Solar Development Outcomes, Second Edition, International City/County Management Association (ICMA) and American Planning Association (APA), December 2022, https://planning-org-uploaded-media.s3.amazonaws.com/publication/download_pdf/Solar-at-Scale-Guidebook-V2.pdf.

"Stakeholder Perspectives on Utility-Scale Solar Facility Development and Key Considerations for Decision Makers," Rappahannock River Basin Commission, June 28, 2023. *(RRBC hosted presentations from different stakeholders: localities/PDC, agricultural community, state agencies (DEQ, DOF, DOE), conservation organizations, soil expert, property rights advocate, developers, tax and revenue experts, Dominion, and electric cooperatives. Final report shares summaries and makes recommendations).*

"Utility-Scale Solar in Virginia: An Analysis of Land Use and Development Trends," Aaron Berryhill, prepared for Virginia Department of Mines, Minerals, and Energy, 2021 *(analyzed all completed USS projects).*

"Virginia Renewable Energy Task Force Report" (HB 774: Life Cycle Analysis of Renewal Energy Facilities), March 2023. Executive summary: https://rga.lis.virginia.gov/Published/2023/RD189; Full report: https://rga.lis.virginia.gov/Published/2023/RD189/PDF.

Locality Examples:

Augusta County (VA), Solar Ordinance https://www.co.augusta.va.us/home/showpublisheddocument/13758/637667787754770000

Augusta County Comprehensive Plan and Ordinances relating to solar facilities https://www.co.augusta.va.us/government/departments-and-offices/community-development/planning/comprehensive-and-small-area-plans/2021-utilities-solar-update

Culpeper County (VA), "2023 Utility-scale Solar Ordinance & Policy" https://web.culpepercounty.gov/planning/page/2023-utility-scale-solar-ordinance-policy 2023 USS Facility Development Policy (14 pp), adopted February 2023; Article 17-7) Standards and Procedures for Renewable Energy Generation/Utility-scale Solar Facilities (18pp), adopted February 2023

Goochland County (VA), "Solar Energy Ordinance and Policy Update" (Zoning Ordinance amendments and Solar Energy Facility and Energy Storage Facility Policy), adopted May 2023, https://www.goochlandva.us/242/Planning-Zoning

Louisa County (VA), "Example of a complete USS application" (20 MW project, 429 pp) https://louweb.louisa.org/LCDocs/_CUP/2022-07/Application.pdf

Louisa County (VA), "Zoning Regulations: Sec 86-45 Conditional Use permits for minor utility-scale solar generation facilities,"
https://library.municode.com/va/louisa_county/codes/code_of_ordinances?nodeId=CO_CH86LADERE_ARTIGEPR_DIV5COUSPE_S86-45COUSPEMIUTALSOGEFA

Page County (VA), Solar Ordinance, https://ecode360.com/39262125

Prince George County (VA), "Solar Energy Facility Siting Policy – 2020"
https://cms1files.revize.com/princegeorgeva/Adopted%20Solar%20Energy%20Siting%20Policy%20-%2008.11.2020.pdf

Rockingham County (VA), Zoning ordinance: Sec. 17-607 – Supplemental standards for certain land uses. "Solar energy facility, large."
https://library.municode.com/va/rockingham_county/codes/code_of_ordinances?nodeId=CH17ZO_ARTVILAUS_S17-607SUSTCELAUS

Shenandoah County (VA) Energy Ordinance, 2023 https://shenandoahcountyva.us/planning-committee/wp-content/uploads/sites/29/2023/05/Shenandoah-County-Energy-Ordinance-4-25-23.pdf

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This recommendations paper was written in 2019 and updated July 2023 by Sara S. Hollberg, AICP, for Alliance for the Shenandoah Valley with input from Alliance staff and expert reviewers.

Alliance for the Shenandoah Valley is a regional nonprofit, created in 2018 from a merger of four long-standing community groups. Based in New Market, the Alliance advocates, educates, and connects people to conserve the natural resources, cultural heritages, and rural character of its six-county service area in the Shenandoah Valley. www.ShenandoahAlliance.org.